



## **LatticeECP2/M Family Data Sheet**

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DS1006 Version 04.1, September 2013

## Features

### ■ High Logic Density for System Integration

- 6K to 95K LUTs
- 90 to 583 I/Os

### ■ Embedded SERDES (LatticeECP2M Only)

- Data Rates 250 Mbps to 3.125 Gbps
- Up to 16 channels per device  
PCI Express, Ethernet (1GbE, SGMII), OBSAI, CPRI and Serial RapidIO.

### ■ sysDSP™ Block

- 3 to 42 blocks for high performance multiply and accumulate
- Each block supports
  - One 36x36, four 18x18 or eight 9x9 multipliers

### ■ Flexible Memory Resources

- 55Kbits to 5308Kbits sysMEM™ Embedded Block RAM (EBR)
  - 18Kbit block
  - Single, pseudo dual and true dual port
  - Byte Enable Mode support
- 12K to 202Kbits distributed RAM
  - Single port and pseudo dual port

### ■ sysCLOCK Analog PLLs and DLLs

- Two GPLLs and up to six SPLLs per device
  - Clock multiply, divide, phase & delay adjust
  - Dynamic PLL adjustment
- Two general purpose DLLs per device

### ■ Pre-Engineered Source Synchronous I/O

- DDR registers in I/O cells
- Dedicated gearing logic
- Source synchronous standards support
  - SPI4.2, SFI4 (DDR Mode), XGMII
  - High Speed ADC/DAC devices
- Dedicated DDR and DDR2 memory support
  - DDR1: 400 (200MHz) / DDR2: 533 (266MHz)
- Dedicated DQS support

### ■ Programmable sysI/O™ Buffer Supports Wide Range Of Interfaces

- LVTTTL and LVCMOS 33/25/18/15/12
- SSTL 3/2/18 I, II
- HSTL15 I and HSTL18 I, II
- PCI and Differential HSTL, SSTL
- LVDS, RSDS, Bus-LVDS, MLVDS, LVPECL

### ■ Flexible Device Configuration

- 1149.1 Boundary Scan compliant
- Dedicated bank for configuration I/Os
- SPI boot flash interface
- Dual boot images supported
- TransFR™ I/O for simple field updates
- Soft Error Detect macro embedded

### ■ Optional Bitstream Encryption (LatticeECP2/M “S” Versions Only)

### ■ System Level Support

- ispTRACY™ internal logic analyzer capability
- On-chip oscillator for initialization & general use
- 1.2V power supply

**Table 1-1. LatticeECP2 (Including “S-Series”) Family Selection**

| Device                               | ECP2-6 | ECP2-12 | ECP2-20 | ECP2-35 | ECP2-50 | ECP2-70 |
|--------------------------------------|--------|---------|---------|---------|---------|---------|
| LUTs (K)                             | 6      | 12      | 21      | 32      | 48      | 68      |
| Distributed RAM (Kbits)              | 12     | 24      | 42      | 64      | 96      | 136     |
| EBR SRAM (Kbits)                     | 55     | 221     | 276     | 332     | 387     | 1032    |
| EBR SRAM Blocks                      | 3      | 12      | 15      | 18      | 21      | 60      |
| sysDSP Blocks                        | 3      | 6       | 7       | 8       | 18      | 22      |
| 18x18 Multipliers                    | 12     | 24      | 28      | 32      | 72      | 88      |
| GPLL + SPLL + DLL                    | 2+0+2  | 2+0+2   | 2+0+2   | 2+0+2   | 2+2+2   | 2+4+2   |
| Maximum Available I/O                | 190    | 297     | 402     | 450     | 500     | 583     |
| <b>Packages and I/O Combinations</b> |        |         |         |         |         |         |
| 144-pin TQFP (20 x 20 mm)            | 90     | 93      |         |         |         |         |
| 208-pin PQFP (28 x 28 mm)            |        | 131     | 131     |         |         |         |
| 256-ball fpBGA (17 x 17 mm)          | 190    | 193     | 193     |         |         |         |
| 484-ball fpBGA (23 x 23 mm)          |        | 297     | 331     | 331     | 339     |         |
| 672-ball fpBGA (27 x 27 mm)          |        |         | 402     | 450     | 500     | 500     |
| 900-ball fpBGA (31 x 31 mm)          |        |         |         |         |         | 583     |

**Table 1-2. LatticeECP2M (Including “S-Series”) Family Selection**

| Device                                        | ECP2M20 | ECP2M35 | ECP2M50 | ECP2M70  | ECP2M100 |
|-----------------------------------------------|---------|---------|---------|----------|----------|
| LUTs (K)                                      | 19      | 34      | 48      | 67       | 95       |
| sysMEM Blocks (18kb)                          | 66      | 114     | 225     | 246      | 288      |
| Embedded Memory (Kbits)                       | 1217    | 2101    | 4147    | 4534     | 5308     |
| Distributed Memory (Kbits)                    | 41      | 71      | 101     | 145      | 202      |
| sysDSP Blocks                                 | 6       | 8       | 22      | 24       | 42       |
| 18x18 Multipliers                             | 24      | 32      | 88      | 96       | 168      |
| GPLL+SPLL+DLL                                 | 2+6+2   | 2+6+2   | 2+6+2   | 2+6+2    | 2+6+2    |
| Maximum Available I/O                         | 304     | 410     | 410     | 436      | 520      |
| <b>Packages and SERDES / I/O Combinations</b> |         |         |         |          |          |
| 256-ball fpBGA (17 x 17 mm)                   | 4 / 140 | 4 / 140 |         |          |          |
| 484-ball fpBGA (23 x 23 mm)                   | 4 / 304 | 4 / 303 | 4 / 270 |          |          |
| 672-ball fpBGA (27 x 27 mm)                   |         | 4 / 410 | 8 / 372 |          |          |
| 900-ball fpBGA (31 x 31 mm)                   |         |         | 8 / 410 | 16 / 416 | 16 / 416 |
| 1152-ball fpBGA (35 x 35 mm)                  |         |         |         | 16 / 436 | 16 / 520 |

## Introduction

The LatticeECP2/M family of FPGA devices is optimized to deliver high performance features such as advanced DSP blocks, high speed SERDES (LatticeECP2M family only) and high speed source synchronous interfaces in an economical FPGA fabric. This combination was achieved through advances in device architecture and the use of 90nm technology.

The LatticeECP2/M FPGA fabric is optimized with high performance and low cost in mind. The LatticeECP2/M devices include LUT-based logic, distributed and embedded memory, Phase Locked Loops (PLLs), Delay Locked Loops (DLLs), pre-engineered source synchronous I/O support, enhanced sysDSP blocks and advanced configuration support, including encryption (“S” versions only) and dual boot capabilities.

The LatticeECP2M device family features high speed SERDES with PCS. These high jitter tolerance and low transmission jitter SERDES with PCS blocks can be configured to support an array of popular data protocols including PCI Express, Ethernet (1GbE and SGMII), OBSAI and CPRI. Transmit Pre-emphasis and Receive Equalization settings make SERDES suitable for chip to chip and small form factor backplane applications.

Lattice Diamond® design software allows large complex designs to be efficiently implemented using the LatticeECP2/M FPGA family. Synthesis library support for LatticeECP2/M is available for popular logic synthesis tools. The Diamond software uses the synthesis tool output along with the constraints from its floor planning tools to place and route the design in the LatticeECP2/M device. The Diamond design tool extracts the timing from the routing and back-annotates it into the design for timing verification.

Lattice provides many pre-engineered IP (Intellectual Property) modules for the LatticeECP2/M family. By using these IP cores as standardized blocks, designers are free to concentrate on the unique aspects of their design, increasing their productivity.

## Architecture Overview

Each LatticeECP2/M device contains an array of logic blocks surrounded by Programmable I/O Cells (PIC). Interspersed between the rows of logic blocks are rows of sysMEM™ Embedded Block RAM (EBR) and rows of sys-DSP™ Digital Signal Processing blocks, as shown in Figure 2-1. In addition, the LatticeECP2M family contains SERDES Quads in one or more of the corners. Figure 2-2 shows the block diagram of ECP2M20 with one quad.

There are two kinds of logic blocks, the Programmable Functional Unit (PFU) and Programmable Functional Unit without RAM (PFF). The PFU contains the building blocks for logic, arithmetic, RAM and ROM functions. The PFF block contains building blocks for logic, arithmetic and ROM functions. Both PFU and PFF blocks are optimized for flexibility, allowing complex designs to be implemented quickly and efficiently. Logic Blocks are arranged in a two-dimensional array. Only one type of block is used per row.

The LatticeECP2/M devices contain one or more rows of sysMEM EBR blocks. sysMEM EBRs are large dedicated 18K fast memory blocks. Each sysMEM block can be configured in a variety of depths and widths of RAM or ROM. In addition, LatticeECP2/M devices contain up to two rows of DSP Blocks. Each DSP block has multipliers and adder/accumulators, which are the building blocks for complex signal processing capabilities.

The LatticeECP2M devices feature up to 16 embedded 3.125Gbps SERDES (Serializer / Deserializer) channels. Each SERDES channel contains independent 8b/10b encoding / decoding, polarity adjust and elastic buffer logic. Each group of four SERDES channels along with its Physical Coding Sub-layer (PCS) block, creates a quad. The functionality of the SERDES/PCS Quads can be controlled by memory cells set during device configuration or by registers that are addressable during device operation. The registers in every quad can be programmed by a soft IP interface, referred to as the SERDES Client Interface (SCI). These quads (up to four) are located at the corners of the devices.

Each PIC block encompasses two PIOs (PIO pairs) with their respective sysI/O buffers. The sysI/O buffers of the LatticeECP2/M devices are arranged in eight banks, allowing the implementation of a wide variety of I/O standards. In addition, a separate I/O bank is provided for the programming interfaces. PIO pairs on the left and right edges of the device can be configured as LVDS transmit/receive pairs. The PIC logic also includes pre-engineered support to aid in the implementation of high speed source synchronous standards such as SPI4.2, along with memory interfaces including DDR2.

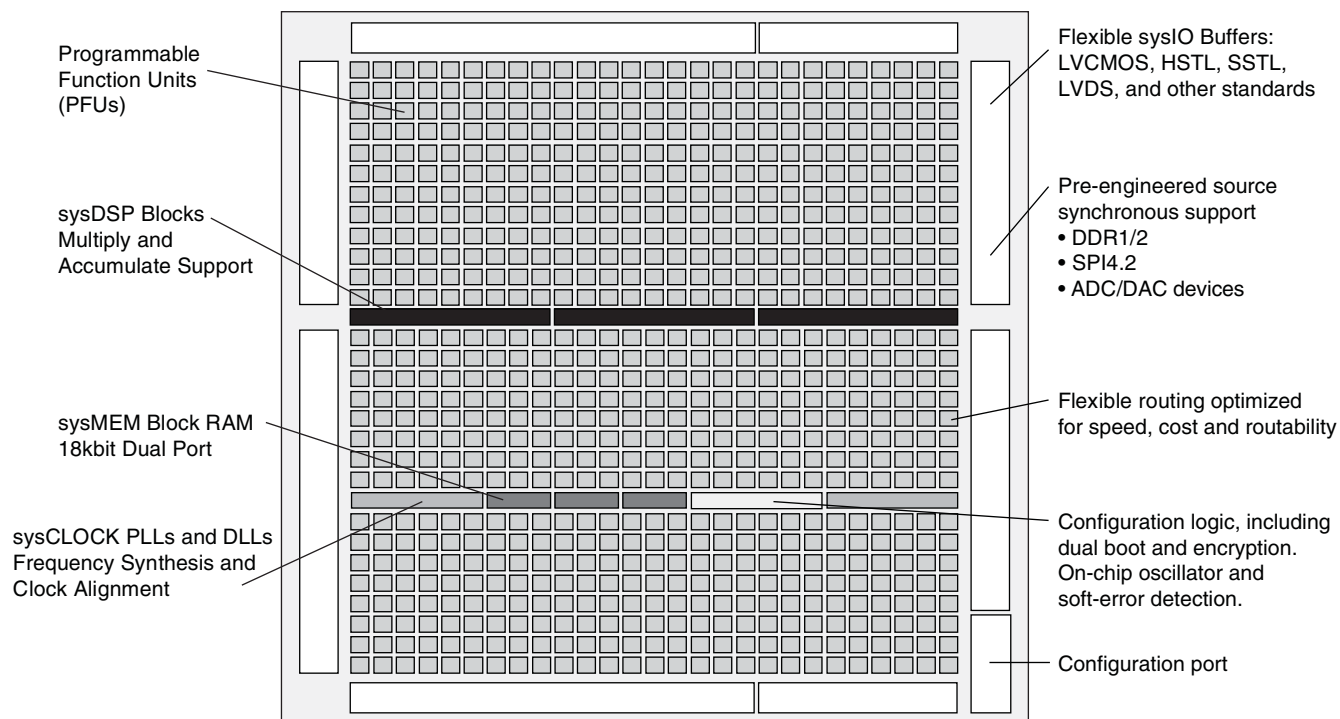
The LatticeECP2/M registers in PFU and sysI/O can be configured to be SET or RESET. After power up and the device is configured, it enters into user mode with these registers SET/RESET according to the configuration setting, allowing the device entering to a known state for predictable system function.

Other blocks provided include PLLs, DLLs and configuration functions. The LatticeECP2/M architecture provides two General PLLs (GPLL) and up to six Standard PLLs (SPLL) per device. In addition, each LatticeECP2/M family member provides two DLLs per device. The GPLLs and DLLs blocks are located in pairs at the end of the bottom-most EBR row; the DLL block is located towards the edge of the device. The SPLL blocks are located at the end of the other EBR/DSP rows.

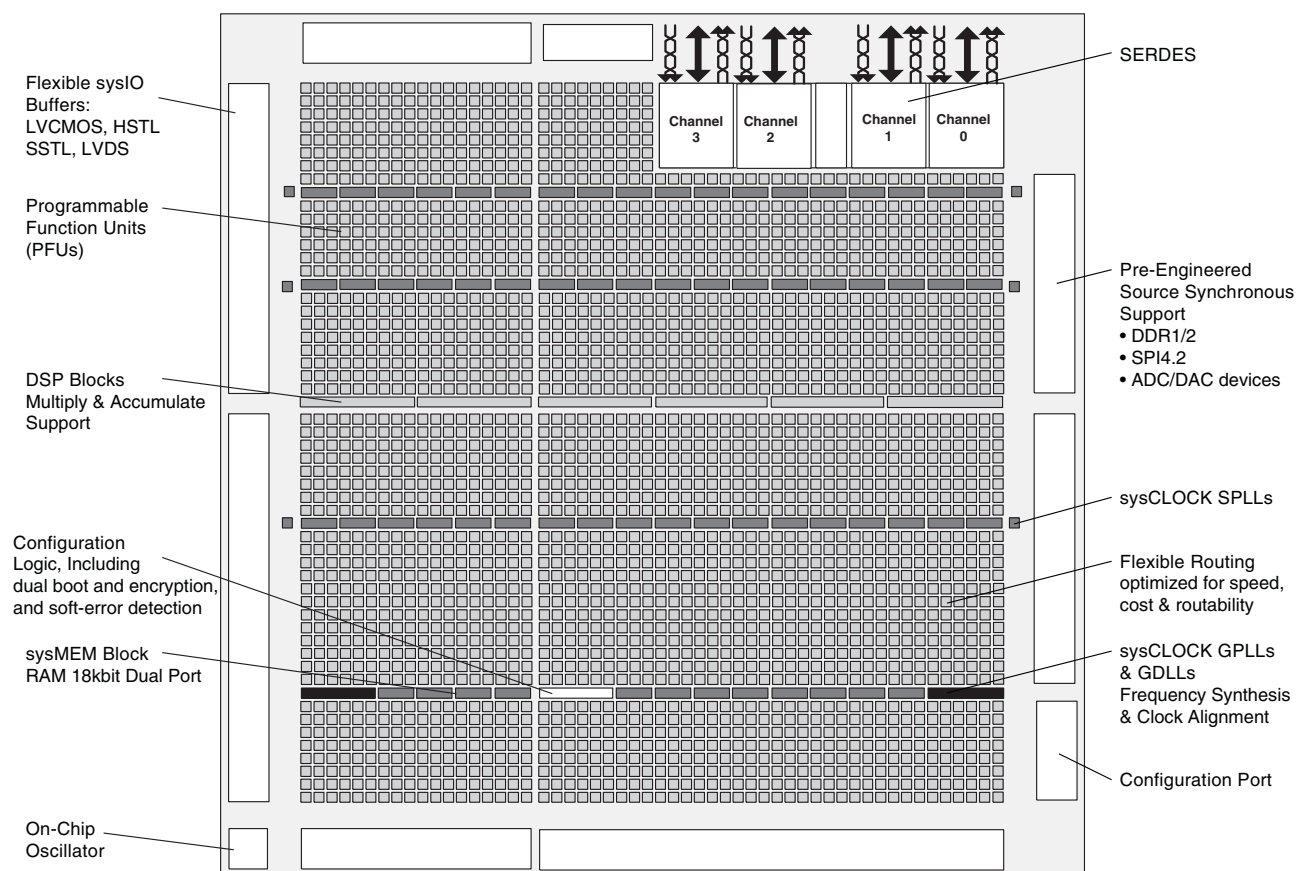
The configuration block that supports features such as configuration bit-stream decryption, transparent updates and dual boot support is located toward the center of this EBR row. The Ball Grid Array (BGA) package devices in the LatticeECP2/M family supports a sysCONFIG™ port located in the corner between banks four and five, which allows for serial or parallel device configuration.

In addition, every device in the family has a JTAG port. This family also provides an on-chip oscillator. The LatticeECP2/M devices use 1.2V as their core voltage.

**Figure 2-1. Simplified Block Diagram, ECP2-6 Device (Top Level)**



**Figure 2-2. Simplified Block Diagram, ECP2M20 Device (Top Level)**

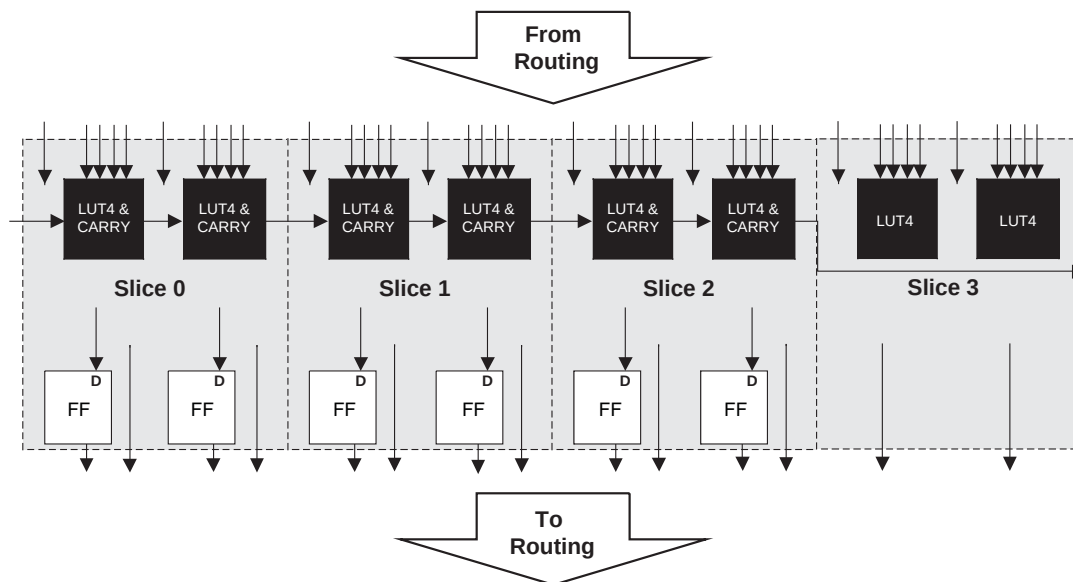


## PFU Blocks

The core of the LatticeECP2/M device consists of PFU blocks, which are provided in two forms, the PFU and PFF. The PFUs can be programmed to perform Logic, Arithmetic, Distributed RAM and Distributed ROM functions. PFF blocks can be programmed to perform Logic, Arithmetic and ROM functions. Except where necessary, the remainder of this data sheet will use the term PFU to refer to both PFU and PFF blocks.

Each PFU block consists of four interconnected slices, numbered 0-3 as shown in Figure 2-3. All the interconnections to and from PFU blocks are from routing. There are 50 inputs and 23 outputs associated with each PFU block.

**Figure 2-3. PFU Diagram**



## Slice

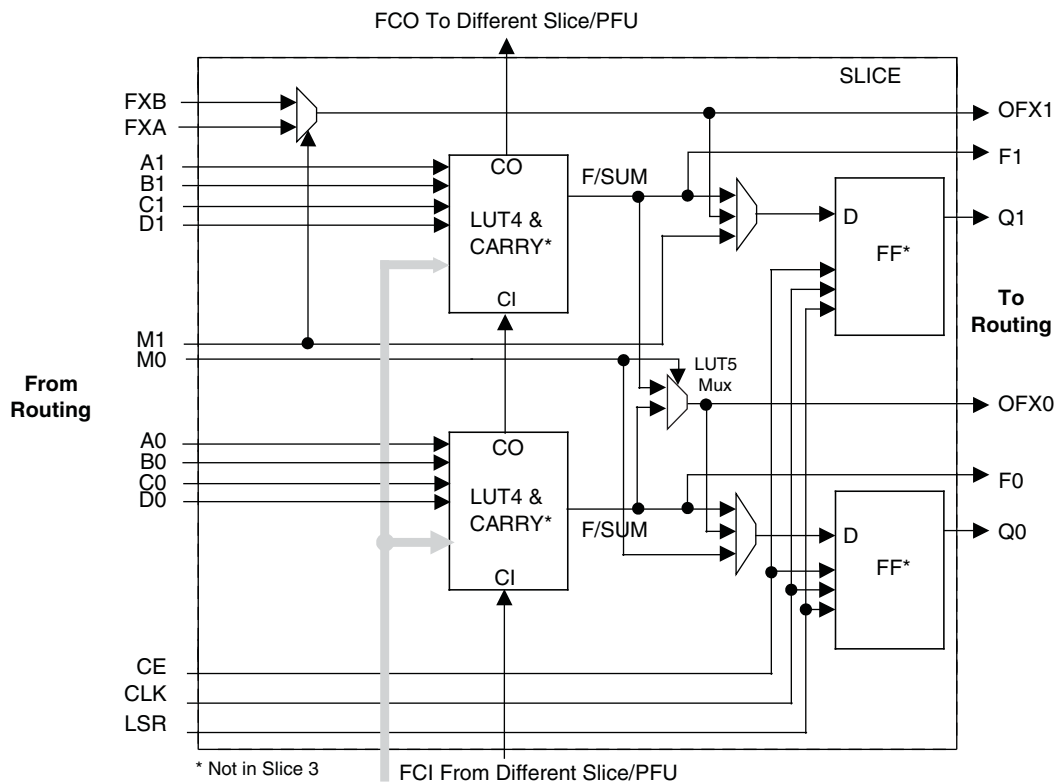
Slice 0 through Slice 2 contain two LUT4s feeding two registers, whereas Slice 3 contains two LUT4s only. For PFUs, Slice 0 and Slice 2 can also be configured as distributed memory, a capability not available in the PFF. Table 2-1 shows the capability of the slices in both PFF and PFU blocks along with the operation modes they enable. In addition, each PFU contains some logic that allows the LUTs to be combined to perform functions such as LUT5, LUT6, LUT7 and LUT8. There is control logic to perform set/reset functions (programmable as synchronous/asynchronous), clock select, chip-select and wider RAM/ROM functions. Figure 2-4 shows an overview of the internal logic of the slice. The registers in the slice can be configured for positive/negative and edge triggered or level sensitive clocks.

**Table 2-1. Resources and Modes Available per Slice**

| Slice   | PFU BLock               |                         | PFF Block               |                    |
|---------|-------------------------|-------------------------|-------------------------|--------------------|
|         | Resources               | Modes                   | Resources               | Modes              |
| Slice 0 | 2 LUT4s and 2 Registers | Logic, Ripple, RAM, ROM | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 1 | 2 LUT4s and 2 Registers | Logic, Ripple, ROM      | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 2 | 2 LUT4s and 2 Registers | Logic, Ripple, RAM, ROM | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 3 | 2 LUT4s                 | Logic, ROM              | 2 LUT4s                 | Logic, ROM         |

Slices 0, 1 and 2 have 14 input signals: 13 signals from routing and one from the carry-chain (from the adjacent slice or PFU). There are seven outputs: six to routing and one to carry-chain (to the adjacent PFU). Slice 3 has 13 input signals from routing and four signals to routing. Table 2-2 lists the signals associated with Slice 0 to Slice 2.

**Figure 2-4. Slice Diagram**



For Slices 0 and 2, memory control signals are generated from Slice 1 as follows:

WCK is CLK  
WRE is from LSR  
DI[3:2] for Slice 2 and DI[1:0] for Slice 0 data  
WAD [A:D] is a 4bit address from slice 1 LUT input

**Table 2-2. Slice Signal Descriptions**

| Function | Type               | Signal Names   | Description                                                          |
|----------|--------------------|----------------|----------------------------------------------------------------------|
| Input    | Data signal        | A0, B0, C0, D0 | Inputs to LUT4                                                       |
| Input    | Data signal        | A1, B1, C1, D1 | Inputs to LUT4                                                       |
| Input    | Multi-purpose      | M0             | Multipurpose Input                                                   |
| Input    | Multi-purpose      | M1             | Multipurpose Input                                                   |
| Input    | Control signal     | CE             | Clock Enable                                                         |
| Input    | Control signal     | LSR            | Local Set/Reset                                                      |
| Input    | Control signal     | CLK            | System Clock                                                         |
| Input    | Inter-PFU signal   | FC             | Fast Carry-in <sup>1</sup>                                           |
| Input    | Inter-slice signal | FXA            | Intermediate signal to generate LUT6 and LUT7                        |
| Input    | Inter-slice signal | FXB            | Intermediate signal to generate LUT6 and LUT7                        |
| Output   | Data signals       | F0, F1         | LUT4 output register bypass signals                                  |
| Output   | Data signals       | Q0, Q1         | Register outputs                                                     |
| Output   | Data signals       | OFX0           | Output of a LUT5 MUX                                                 |
| Output   | Data signals       | OFX1           | Output of a LUT6, LUT7, LUT8 <sup>2</sup> MUX depending on the slice |
| Output   | Inter-PFU signal   | FCO            | Slice 2 of each PFU is the fast carry chain output <sup>1</sup>      |

1. See Figure 2-4 for connection details.

2. Requires two PFUs.

## Modes of Operation

Each slice has up to four potential modes of operation: Logic, Ripple, RAM and ROM.

### Logic Mode

In this mode, the LUTs in each slice are configured as 4-input combinatorial lookup tables. A LUT4 can have 16 possible input combinations. Any four input logic functions can be generated by programming this lookup table. Since there are two LUT4s per slice, a LUT5 can be constructed within one slice. Larger look-up tables such as LUT6, LUT7 and LUT8 can be constructed by concatenating other slices. Note LUT8 requires more than four slices.

### Ripple Mode

Ripple mode supports the efficient implementation of small arithmetic functions. In ripple mode, the following functions can be implemented by each slice:

- Addition 2-bit
- Subtraction 2-bit
- Add/Subtract 2-bit using dynamic control
- Up counter 2-bit
- Down counter 2-bit
- Up/Down counter with Async clear
- Up/Down counter with preload (sync)
- Ripple mode multiplier building block
- Multiplier support
- Comparator functions of A and B inputs
  - A greater-than-or-equal-to B
  - A not-equal-to B
  - A less-than-or-equal-to B

Ripple Mode includes an optional configuration that performs arithmetic using fast carry chain methods. In this configuration (also referred to as CCU2 mode) two additional signals, Carry Generate and Carry Propagate, are generated on a per slice basis to allow fast arithmetic functions to be constructed by concatenating Slices.

### RAM Mode

In this mode, a 16x4-bit distributed single port RAM (SPR) can be constructed using each LUT block in Slice 0 and Slice 2 as a 16x1-bit memory. Slice 1 is used to provide memory address and control signals. A 16x2-bit pseudo dual port RAM (PDPR) memory is created by using one Slice as the read-write port and the other companion slice as the read-only port.

The Lattice design tools support the creation of a variety of different size memories. Where appropriate, the software will construct these using distributed memory primitives that represent the capabilities of the PFU. Table 2-3 shows the number of slices required to implement different distributed RAM primitives. For more information about using RAM in LatticeECP2/M devices, please see the list of additional technical documentation at the end of this data sheet.

**Table 2-3. Number of Slices Required to Implement Distributed RAM**

|                  | SPR 16X4 | PDPR 16X4 |
|------------------|----------|-----------|
| Number of slices | 3        | 3         |

Note: SPR = Single Port RAM, PDPR = Pseudo Dual Port RAM



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**ROM Mode**

ROM mode uses the LUT logic; hence, Slices 0 through 3 can be used in ROM mode. Preloading is accomplished through the programming interface during PFU configuration.

**Routing**

There are many resources provided in the LatticeECP2/M devices to route signals individually or as buses with related control signals. The routing resources consist of switching circuitry, buffers and metal interconnect (routing) segments.

The inter-PFU connections are made with x1 (spans two PFU), x2 (spans three PFU) and x6 (spans seven PFU). The x1 and x2 connections provide fast and efficient connections in horizontal and vertical directions. The x2 and x6 resources are buffered, allowing the routing of both short and long connections between PFUs.

The LatticeECP2/M family has an enhanced routing architecture that produces a compact design. The Diamond design software takes the output of the synthesis tool and places and routes the design. Generally, the place and route tool is completely automatic, although an interactive routing editor is available to optimize the design.

**sysCLOCK Phase Locked Loops (GPLL/SPLL)**

The sysCLOCK PLLs provide the ability to synthesize clock frequencies. All the devices in the LatticeECP2/M family support two General Purpose PLLs (GPLLs) which are full-featured PLLs. In addition, some of the larger devices have two to six Standard PLLs (SPLLs) that have a subset of GPLL functionality.

**General Purpose PLL (GPLL)**

The architecture of the GPLL is shown in Figure 2-5. A description of the GPLL functionality follows.

CLKI is the reference frequency (generated either from the pin or from routing) for the PLL. CLKI feeds into the Input Clock Divider block. The CLKFB is the feedback signal (generated from CLKOP or from a user clock PIN/logic). This signal feeds into the Feedback Divider. The Feedback Divider is used to multiply the reference frequency.

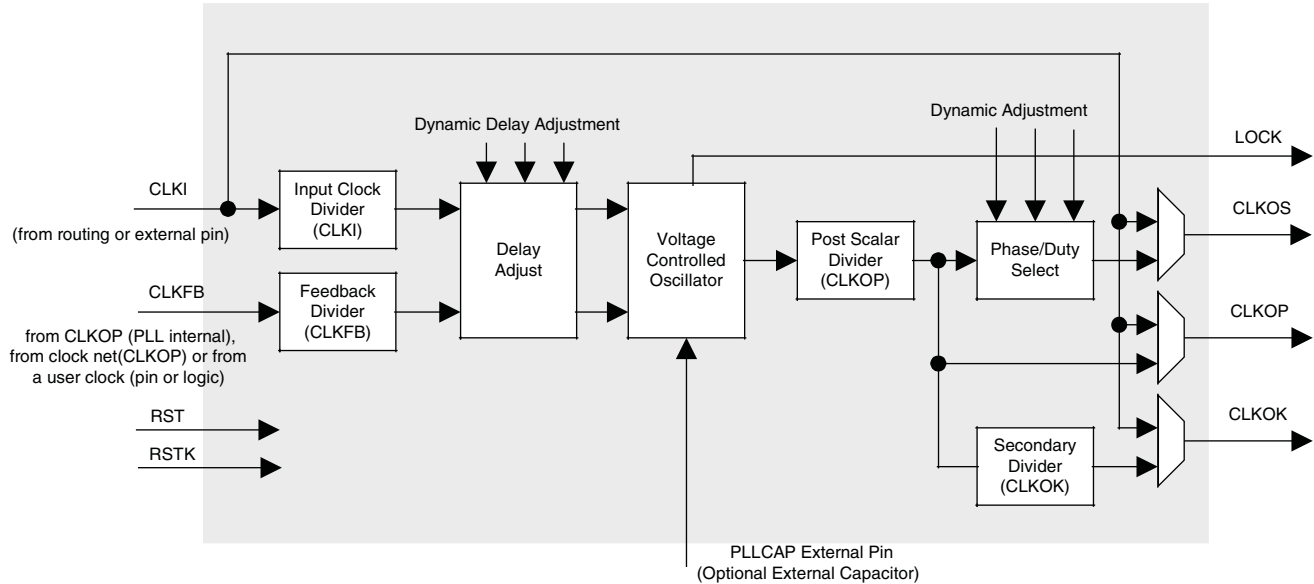
The Delay Adjust Block adjusts either the delays of the reference or feedback signals. The Delay Adjust Block can either be programmed during configuration or can be adjusted dynamically. The setup, hold or clock-to-out times of the device can be improved by programming a delay in the feedback or input path of the PLL, which will advance or delay the output clock with reference to the input clock.

Following the Delay Adjust Block, both the input path and feedback signals enter the Voltage Controlled Oscillator (VCO) block. In this block the difference between the input path and feedback signals is used to control the frequency and phase of the oscillator. A LOCK signal is generated by the VCO to indicate that the VCO has locked onto the input clock signal. In dynamic mode, the PLL may lose lock after a dynamic delay adjustment and not relock until the  $t_{\text{LOCK}}$  parameter has been satisfied. LatticeECP2/M devices have two dedicated pins on the left and right edges of the device for connecting optional external capacitors to the VCO. This allows the PLLs to operate at a lower frequency. This is a shared resource that can only be used by one PLL (GPLL or SPLL) per side.

The output of the VCO then enters the post-scalar divider. The post-scalar divider allows the VCO to operate at higher frequencies than the clock output (CLKOP), thereby increasing the frequency range. A secondary divider takes the CLKOP signal and uses it to derive lower frequency outputs (CLKOK). The Phase/Duty Select block adjusts the phase and duty cycle of the CLKOP signal and generates the CLKOS signal. The phase/duty cycle setting can be pre-programmed or dynamically adjusted.

The primary output from the post scalar divider CLKOP along with the outputs from the secondary divider (CLKOK) and Phase/Duty select (CLKOS) are fed to the clock distribution network.

**Figure 2-5. General Purpose PLL (GPLL) Diagram**



## Standard PLL (SPLL)

Some of the larger devices have two to six Standard PLLs (SPLLs). SPLLs have the same features as GPLLs but without delay adjustment capability. SPLLs also provide different parametric specifications. For more information, please see the list of additional technical documentation at the end of this data sheet.

Table 2-4 provides a description of the signals in the GPLL and SPLL blocks.

**Table 2-4. GPLL and SPLL Blocks Signal Descriptions**

| Signal                    | I/O | Description                                                                                              |
|---------------------------|-----|----------------------------------------------------------------------------------------------------------|
| CLKI                      | I   | Clock input from external pin or routing                                                                 |
| CLKFB                     | I   | PLL feedback input from CLKOP (PLL internal), from clock net (CLKOP) or from a user clock (PIN or logic) |
| RST                       | I   | "1" to reset PLL counters, VCO, charge pumps and M-dividers                                              |
| RSTK                      | I   | "1" to reset K-divider                                                                                   |
| CLKOS                     | O   | PLL output clock to clock tree (phase shifted/duty cycle changed)                                        |
| CLKOP                     | O   | PLL output clock to clock tree (no phase shift)                                                          |
| CLKOK                     | O   | PLL output to clock tree through secondary clock divider                                                 |
| LOCK                      | O   | "1" indicates PLL LOCK to CLKI                                                                           |
| DDAMODE <sup>1</sup>      | I   | Dynamic Delay Enable. "1": Pin control (dynamic), "0": Fuse Control (static)                             |
| DDAIZR <sup>1</sup>       | I   | Dynamic Delay Zero. "1": delay = 0, "0": delay = on                                                      |
| DDAILAG <sup>1</sup>      | I   | Dynamic Delay Lag/Lead. "1": Lead, "0": Lag                                                              |
| DDAIDEL[2:0] <sup>1</sup> | I   | Dynamic Delay Input                                                                                      |
| DPA MODES                 | I   | DPA (Dynamic Phase Adjust/Duty Cycle Select) mode                                                        |
| DPHASE [3:0]              | I   | DPA Phase Adjust inputs                                                                                  |
| DDDUTY [3:0]              | —   | DPA Duty Cycle Select inputs                                                                             |

1. These signals are not available in SPLL.

## Delay Locked Loops (DLL)

In addition to PLLs, the LatticeECP2/M family of devices has two DLLs per device.

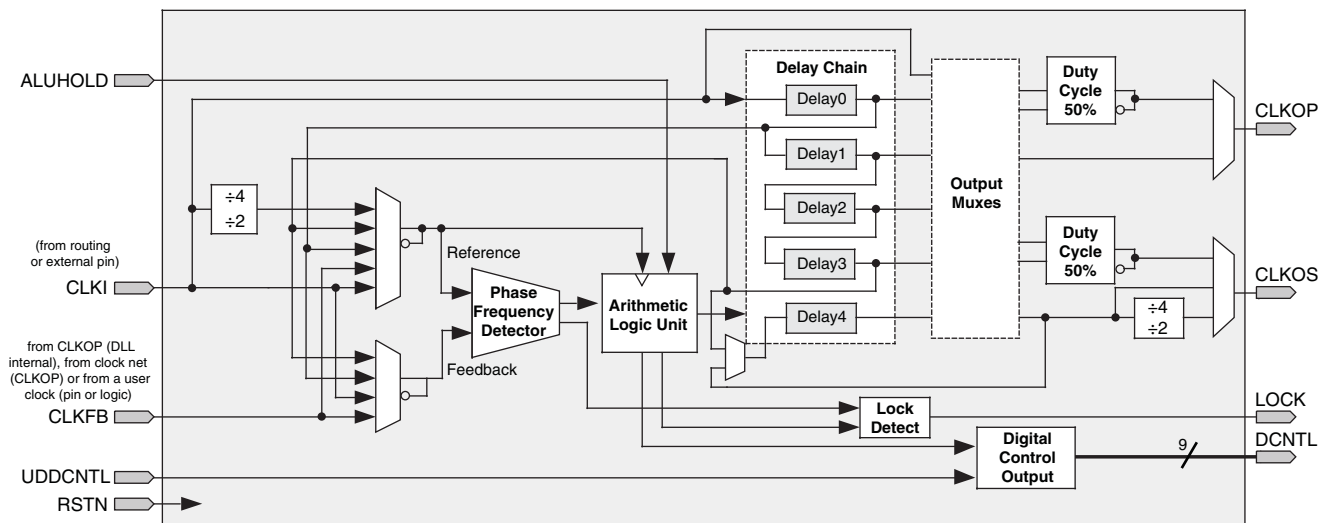
CLKI is the input frequency (generated either from the pin or routing) for the DLL. CLKI feeds into the output muxes block to bypass the DLL, directly to the DELAY CHAIN block and (directly or through divider circuit) to the reference input of the Phase Frequency Detector (PFD) input mux. The reference signal for the PFD can also be generated from the Delay Chain and CLKFB signals. The feedback input to the PFD is generated from the CLKFB pin, CLKI or from tapped signal from the Delay chain.

The PFD produces a binary number proportional to the phase and frequency difference between the reference and feedback signals. This binary output of the PFD is fed into a Arithmetic Logic Unit (ALU). Based on these inputs, the ALU determines the correct digital control codes to send to the delay chain in order to better match the reference and feedback signals. This digital code from the ALU is also transmitted via the Digital Control bus (DCNTL) bus to its associated DLLDELA delay block. The ALUHOLD input allows the user to suspend the ALU output at its current value. The UDDCNTL signal allows the user to latch the current value on the DCNTL bus.

The DLL has two independent clock outputs, CLKOP and CLKOS. These outputs can individually select one of the outputs from the tapped delay line. The CLKOS has optional fine phase shift and divider blocks to allow this output to be further modified, if required. The fine phase shift block allows the CLKOS output to phase shifted a further 45, 22.5 or 11.25 degrees relative to its normal position. Both the CLKOS and CLKOP outputs are available with optional duty cycle correction. Divide by two and divide by four frequencies are available at CLKOS. The LOCK output signal is asserted when the DLL is locked. Figure 2-6 shows the DLL block diagram and Table 2-5 provides a description of the DLL inputs and outputs.

The user can configure the DLL for many common functions such as time reference delay mode and clock injection removal mode. Lattice provides primitives in its design tools for these functions. For more information about the DLL, please see the list of additional technical documentation at the end of this data sheet.

**Figure 2-6. Delay Locked Loop Diagram (DLL)**



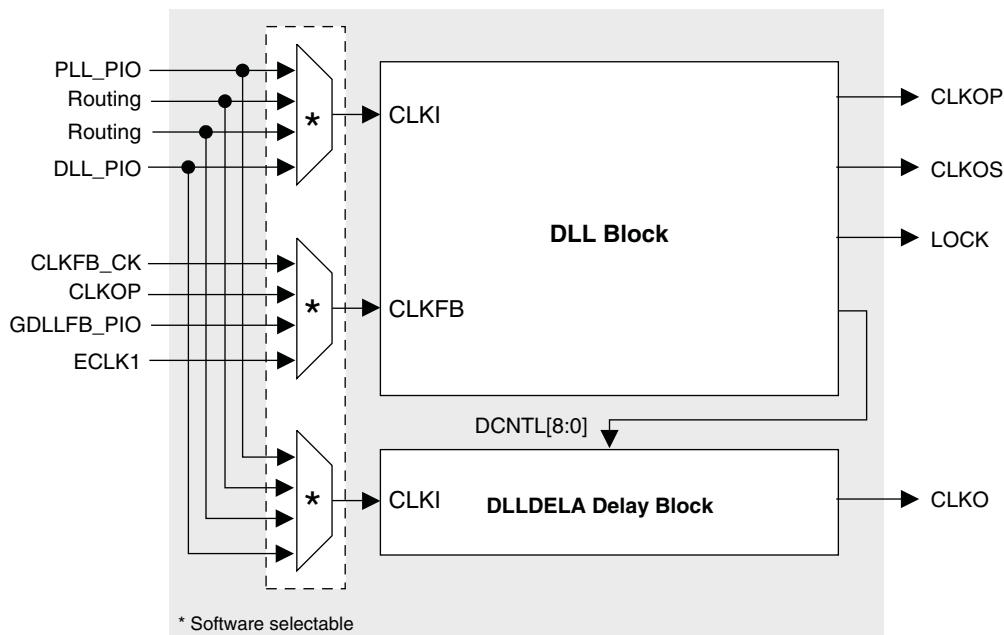
**Table 2-5. DLL Signals**

| Signal     | I/O | Description                                                                   |
|------------|-----|-------------------------------------------------------------------------------|
| CLKI       | I   | Clock input from external pin or routing                                      |
| CLKFB      | I   | DLL feed input from DLL output, clock net, routing or external pin            |
| RSTN       | I   | Active low synchronous reset                                                  |
| ALUHOLD    | I   | Active high freezes the ALU                                                   |
| UDDCNTL    | I   | Synchronous enable signal (hold high for two cycles) from routing             |
| DCNTL[8:0] | O   | Encoded digital control signals for PIC INDEL and slave delay calibration     |
| CLKOP      | O   | The primary clock output                                                      |
| CLKOS      | O   | The secondary clock output with fine phase shift and/or division by 2 or by 4 |
| LOCK       | O   | Active high phase lock indicator                                              |

## DLLDELA Delay Block

Closely associated with each DLL is a DLLDELA block. This is a delay block consisting of a delay line with taps and a selection scheme that selects one of the taps. The DCNTL[8:0] bus controls the delay of the CLKO signal. Typically this is the delay setting that the DLL uses to achieve phase alignment. This results in the delay providing a calibrated 90° phase shift that is useful in centering a clock in the middle of a data cycle for source synchronous data. The CLKO signal feeds the edge clock network. Figure 2-7 shows the connections between the DLL block and the DLLDELA delay block. For more information, please see the list of additional technical documentation at the end of this data sheet.

**Figure 2-7. DLLDELA Delay Block**



## PLL/DLL Cascading

LatticeECP2/M devices have been designed to allow certain combinations of PLL (GPLL and SPLL) and DLL cascading. The allowable combinations are:

- PLL to PLL supported
- PLL to DLL supported

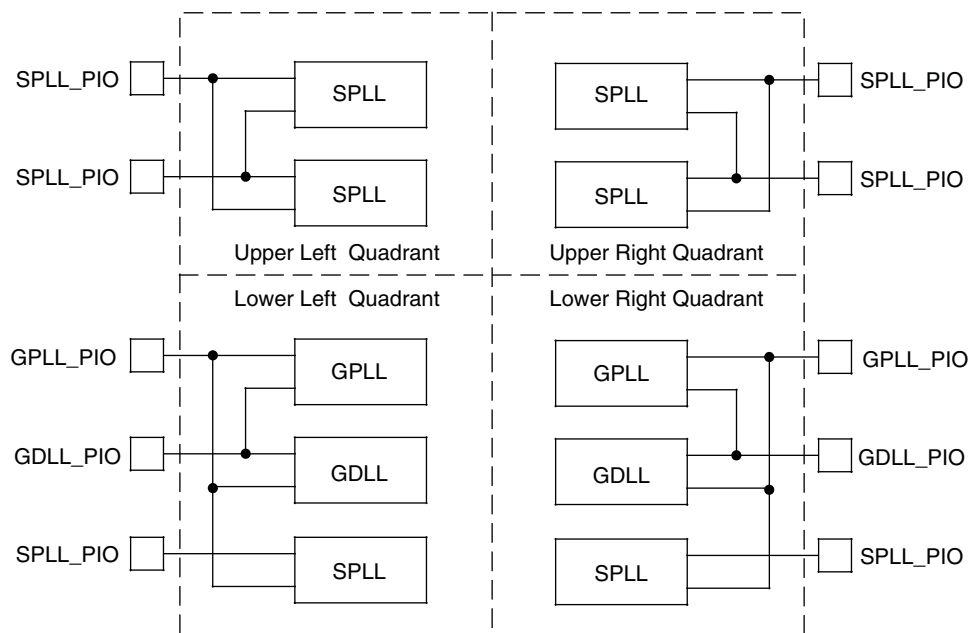
The DLLs in the LatticeECP2/M are used to shift the clock in relation to the data for source synchronous inputs. PLLs are used for frequency synthesis and clock generation for source synchronous interfaces. Cascading PLL and DLL blocks allows applications to utilize the unique benefits of both DLLs and PLLs.

For further information about the DLL, please see the list of additional technical documentation at the end of this data sheet.

## GPLL/SPLL/GDLL PIO Input Pin Connections (LatticeECP2M Family Only)

All LatticeECP2M devices contain two GDLLs, two GPLLs and six SPLLs, arranged in quadrants as shown in Figure 2-8. In the LatticeECP2M devices GPLLs, SPLLs and GDLLs share their input pins. Figure 2-8 shows the sharing of SPLLs input pin connections in the upper two quadrants and the sharing of GDLL, GPLL and SPLL input pin connections in the lower two quadrants.

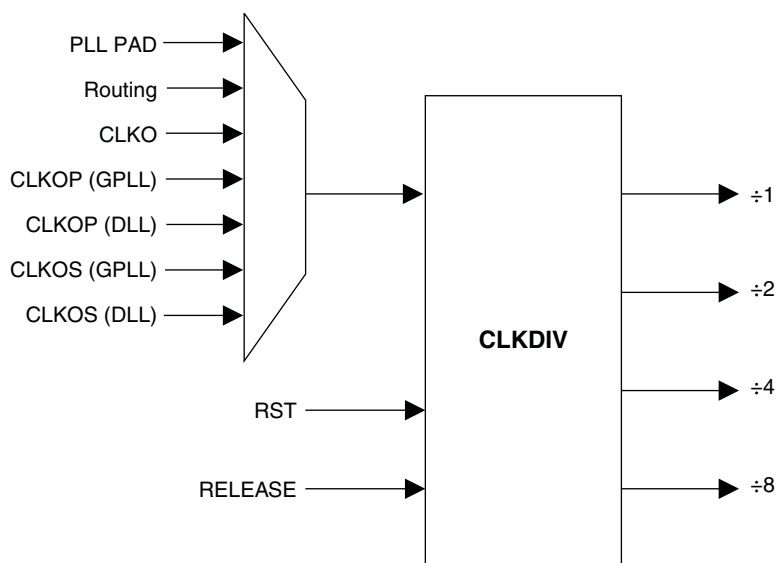
**Figure 2-8. Sharing of PIO Pins by GPLL, SPLL and GDLL in LatticeECP2M Devices**



## Clock Dividers

LatticeECP2/M devices have two clock dividers, one on the left side and one on the right side of the device. These are intended to generate a slower-speed system clock from a high-speed edge clock. The block operates in a  $\div 2$ ,  $\div 4$  or  $\div 8$  mode and maintains a known phase relationship between the divided down clock and the high-speed clock based on the release of its reset signal. The clock dividers can be fed from selected PLL/DLL outputs, DLL-DELA delay blocks, routing or from an external clock input. The clock divider outputs serve as primary clock sources and feed into the clock distribution network. The Reset (RST) control signal resets input and synchronously forces all outputs to low. The RELEASE signal releases outputs synchronously to the input clock. For further information about clock dividers, please see the list of additional technical documentation at the end of this data sheet. Figure 2-9 shows the clock divider connections.

**Figure 2-9. Clock Divider Connections**



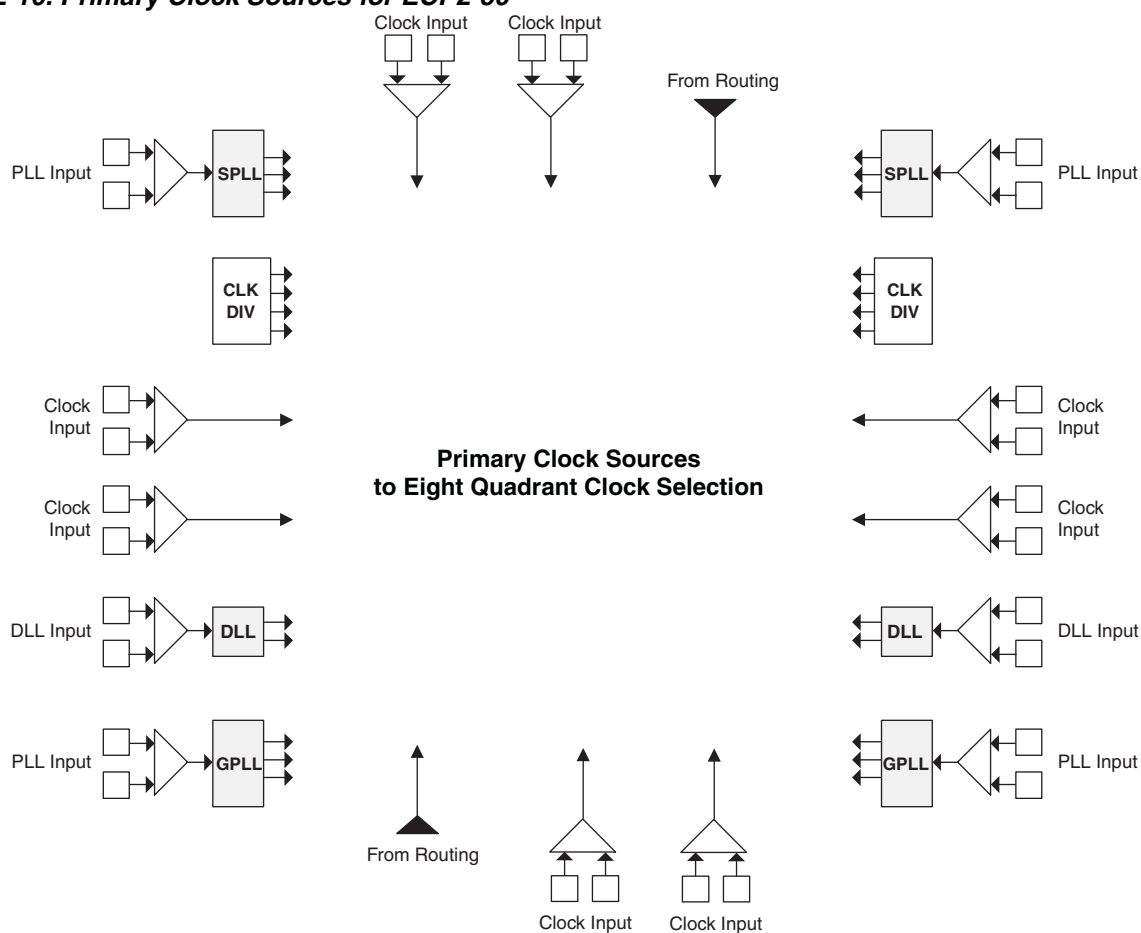
## Clock Distribution Network

LatticeECP2/M devices have eight quadrant-based primary clocks and eight flexible region-based secondary clocks/control signals. Two high performance edge clocks are available on each edge of the device to support high speed interfaces. These clock inputs are selected from external I/Os, the sysCLOCK PLLs, DLLs or routing. These clock inputs are fed throughout the chip via a clock distribution system.

## Primary Clock Sources

LatticeECP2/M devices derive clocks from five primary sources: PLL (GPLL and SPLL) outputs, DLL outputs, CLK-DIV outputs, dedicated clock inputs and routing. LatticeECP2/M devices have two to eight sysCLOCK PLLs and two DLLs, located on the left and right sides of the device. There are eight dedicated clock inputs, two on each side of the device, with the exception of the LatticeECP2M 256-fpBGA package devices which have six dedicated clock inputs on the device. Figure 2-10 shows the primary clock sources.

**Figure 2-10. Primary Clock Sources for ECP2-50**

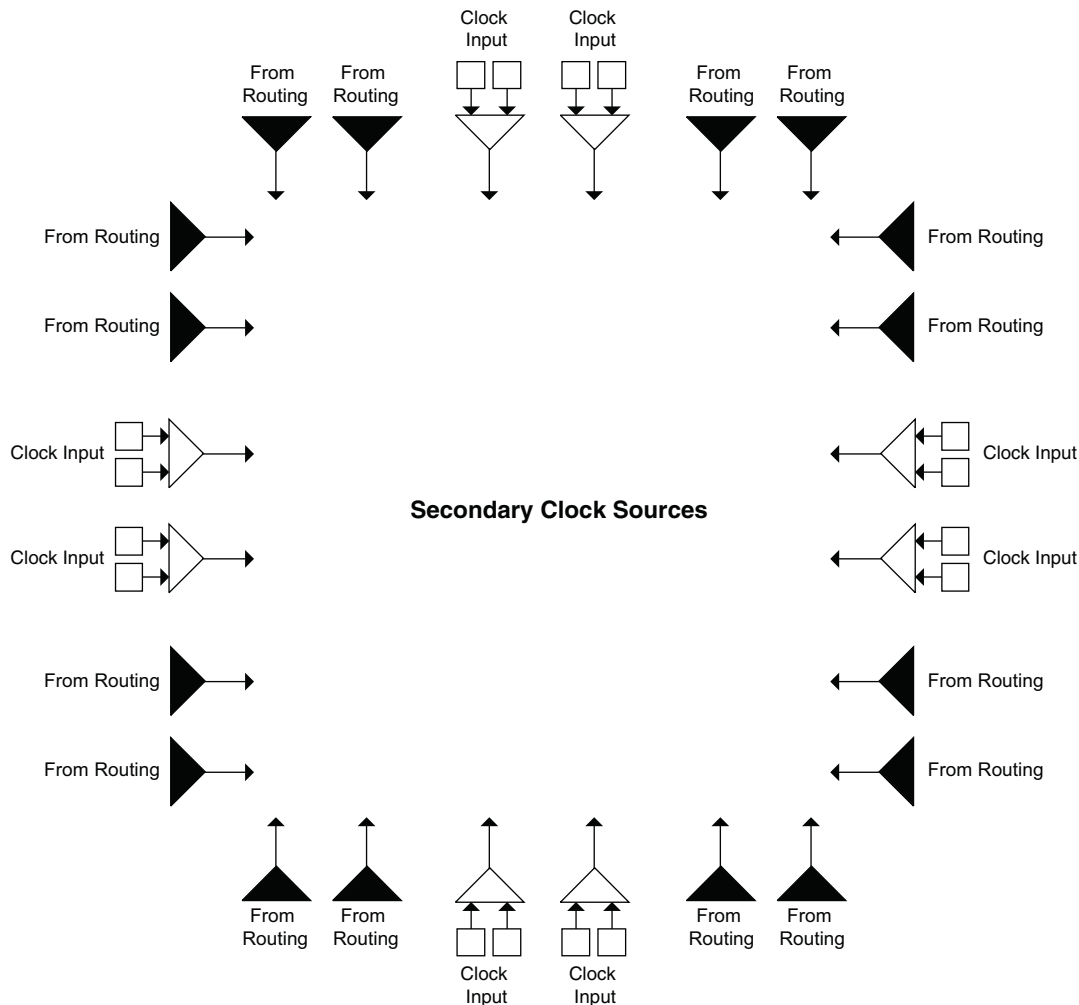


Note: This diagram shows sources for the ECP2-50 device. Smaller LatticeECP2 devices have fewer SPLLs. All LatticeECP2M devices have six SPLLs.

## Secondary Clock/Control Sources

LatticeECP2/M devices derive secondary clocks (SC0 through SC7) from eight dedicated clock input pads and the rest from routing. Figure 2-11 shows the secondary clock sources.

**Figure 2-11. Secondary Clock Sources**

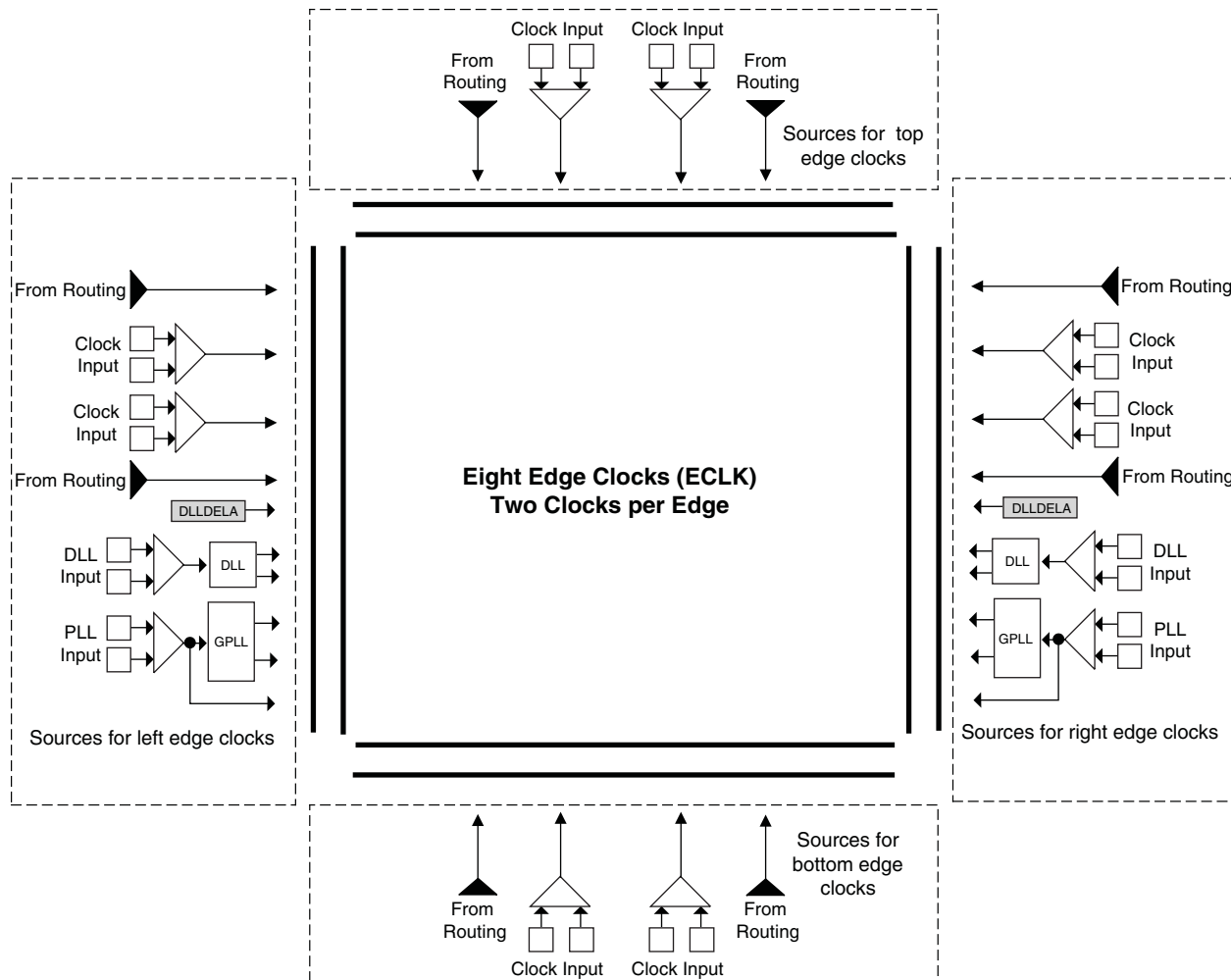




## Edge Clock Sources

Edge clock resources can be driven from a variety of sources at the same edge. Edge clock resources can be driven from adjacent edge clock PIOs, primary clock PIOs, PLLs/DLLs and clock dividers as shown in Figure 2-12.

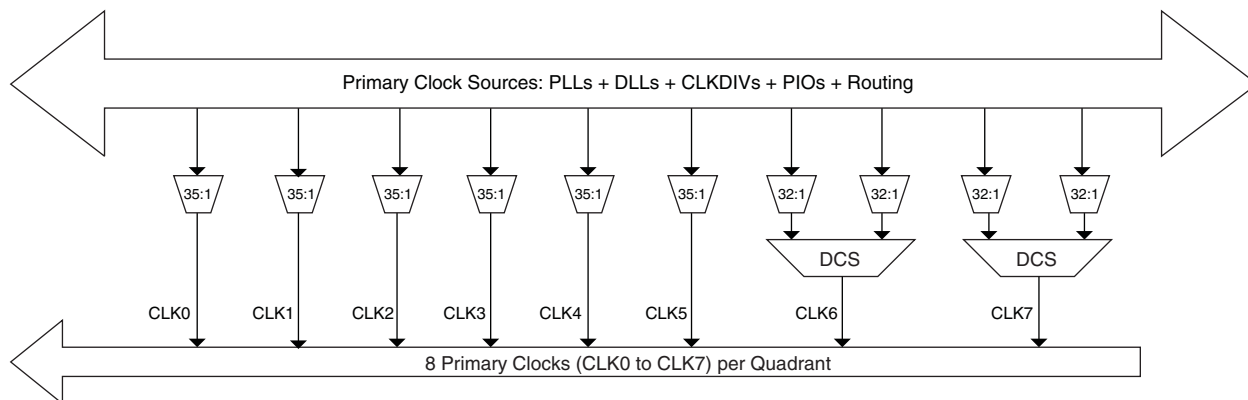
**Figure 2-12. Edge Clock Sources**



## Primary Clock Routing

The clock routing structure in LatticeECP2/M devices consists of a network of eight primary clock lines (CLK0 through CLK7) per quadrant. The primary clocks of each quadrant are generated from muxes located in the center of the device. All the clock sources are connected to these muxes. Figure 2-13 shows the clock routing for one quadrant. Each quadrant mux is identical. If desired, any clock can be routed globally

**Figure 2-13. Per Quadrant Primary Clock Selection**

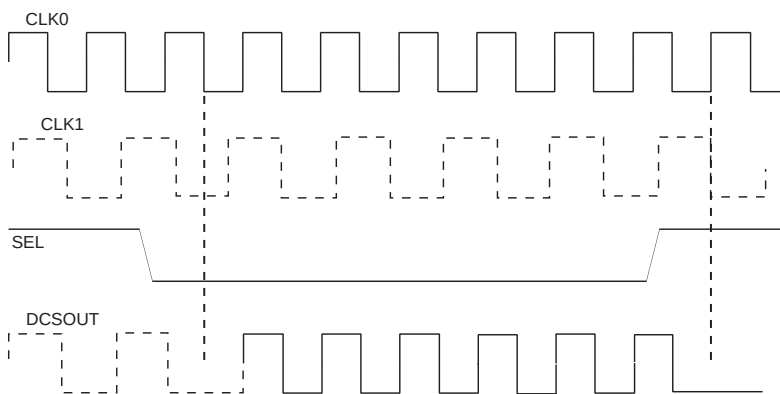


## Dynamic Clock Select (DCS)

The DCS is a smart multiplexer function available in the primary clock routing. It switches between two independent input clock sources without any glitches or runt pulses. This is achieved regardless of when the select signal is toggled. There are two DCS blocks per quadrant; in total, there are eight DCS blocks per device. The inputs to the DCS block come from the center muxes. The output of the DCS is connected to primary clocks CLK6 and CLK7 (see Figure 2-13).

Figure 2-14 shows the timing waveforms of the default DCS operating mode. The DCS block can be programmed to other modes. For more information about the DCS, please see the list of additional technical documentation at the end of this data sheet.

**Figure 2-14. DCS Waveforms**



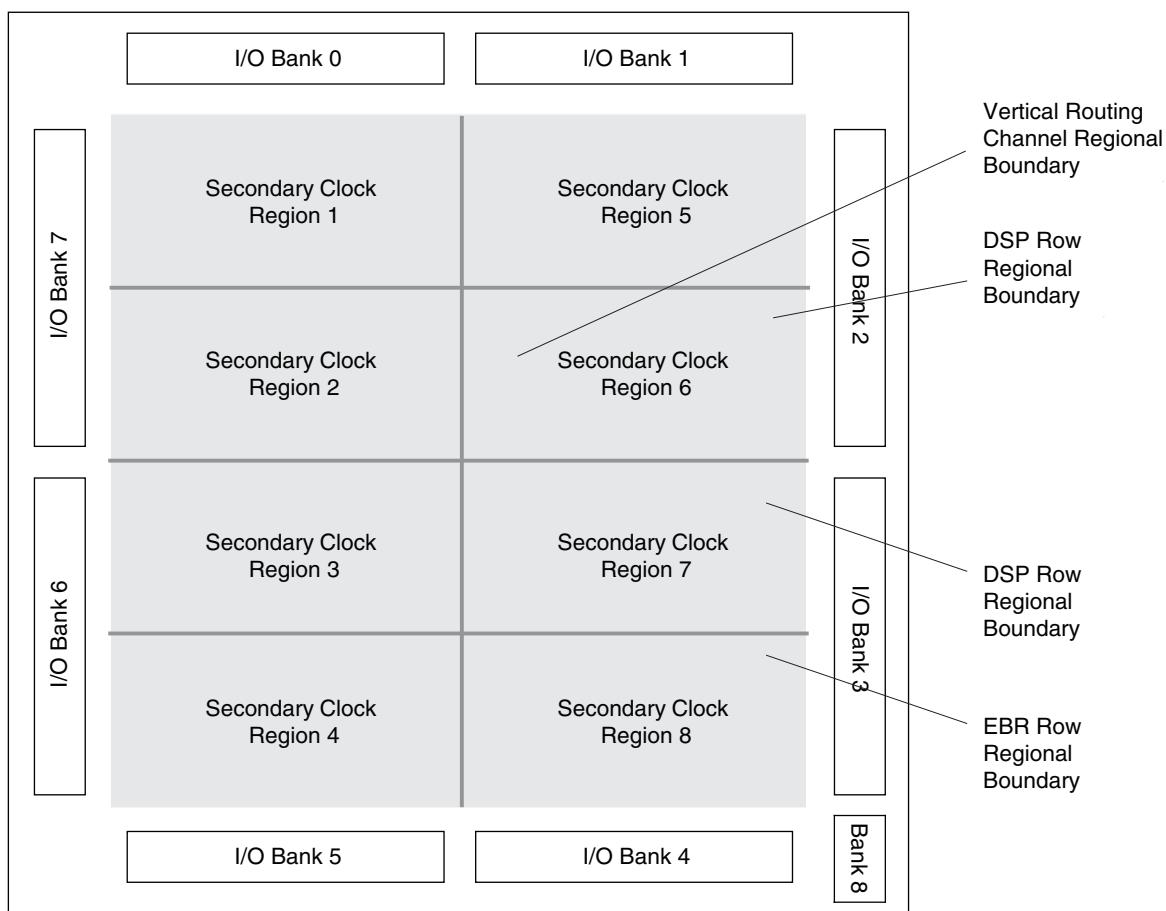
## Secondary Clock/Control Routing

Secondary clocks in the LatticeECP2 devices are region-based resources. The benefit of region-based resources is the relatively low injection delay and skew within the region, as compared to primary clocks. EBR/DSP rows and a special vertical routing channel bound the secondary clock regions. This special vertical routing channel aligns with either the left edge of the center DSP block in the DSP row or the center of the DSP row. Figure 2-15 shows

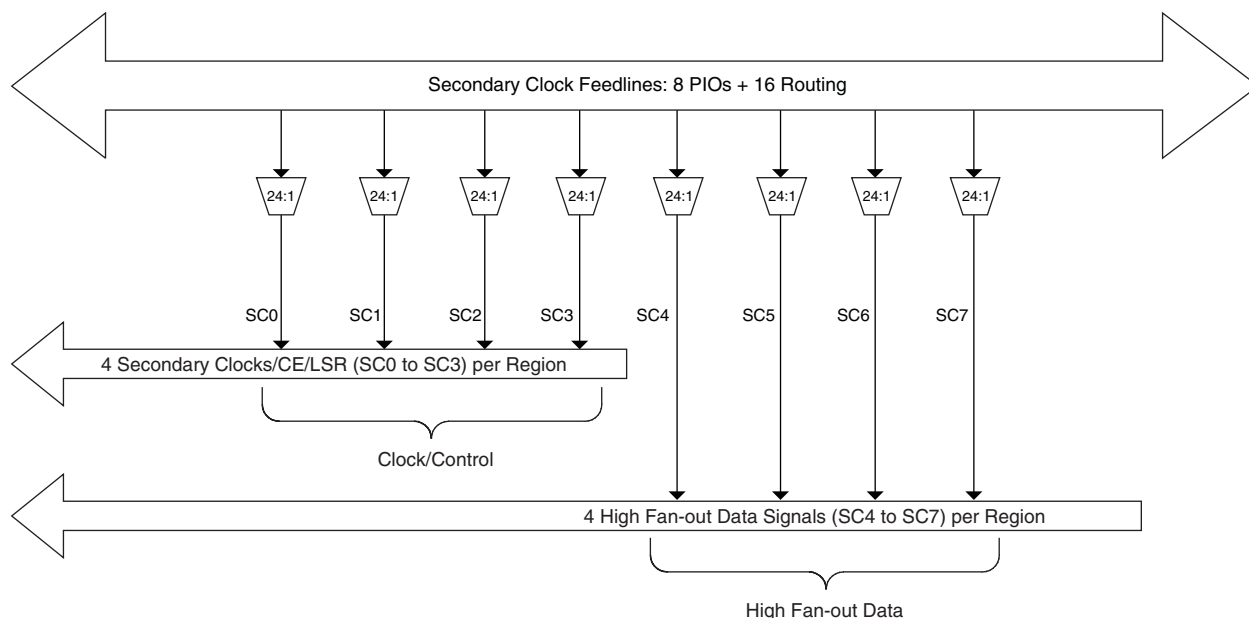
this special vertical routing channel and the eight secondary clock regions for the ECP2-50. LatticeECP2 devices have four secondary clocks (SC0 to SC3) which are distributed to every region.

The secondary clock muxes are located in the center of the device. Figure 2-16 shows the mux structure of the secondary clock routing. Secondary clocks SC0 to SC3 are used for clock and control and SC4 to SC7 are used for high fan-out signals.

**Figure 2-15. Secondary Clock Regions ECP2-50**



**Figure 2-16. Secondary Clock Selection**

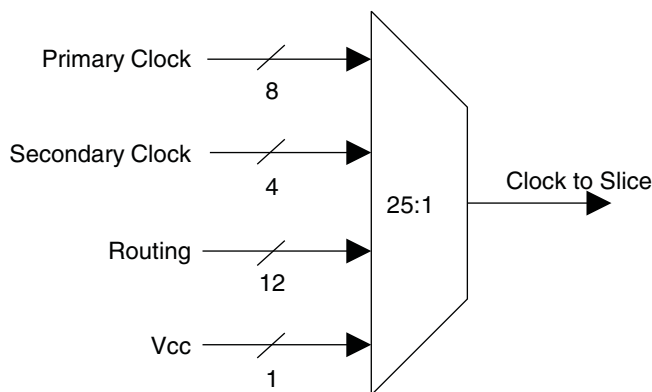


## Slice Clock Selection

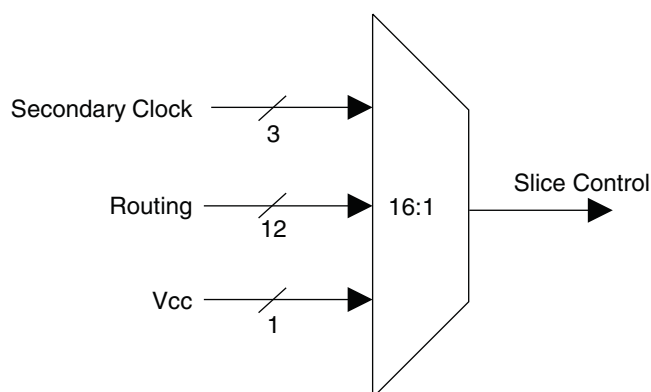
Figure 2-17 shows the clock selections and Figure 2-18 shows the control selections for Slice0 through Slice2. All the primary clocks and the four secondary clocks are routed to this clock selection mux. Other signals can be used as a clock input to the slices via routing. Slice controls are generated from the secondary clocks or other signals connected via routing.

If none of the signals are selected for both clock and control then the default value of the mux output is 1. Slice 3 does not have any registers; therefore it does not have the clock or control muxes.

**Figure 2-17. Slice0 through Slice2 Clock Selection**



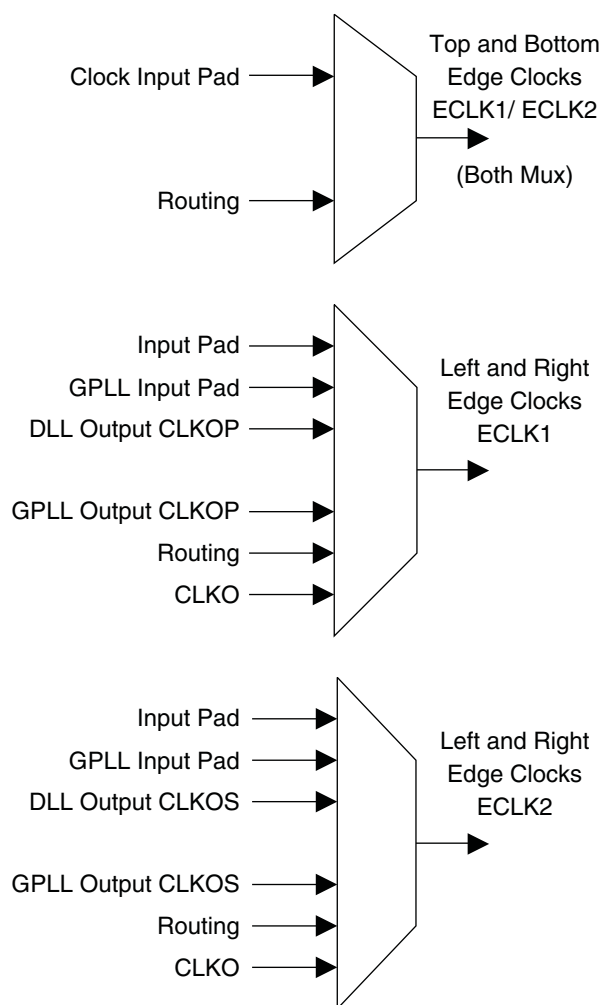
**Figure 2-18. Slice0 through Slice2 Control Selection**



## Edge Clock Routing

LatticeECP2/M devices have a number of high-speed edge clocks that are intended for use with the PIOs in the implementation of high-speed interfaces. There are eight edge clocks per device: two edge clocks per edge. Different PLL and DLL outputs are routed to the two muxes on the left and right sides of the device. In addition, the CLKO signal (generated from the DLLDELA block) is routed to all the edge clock muxes on the left and right sides of the device. Figure 2-19 shows the selection muxes for these clocks.

**Figure 2-19. Edge Clock Mux Connections**



## sysMEM Memory

LatticeECP2/M devices contains a number of sysMEM Embedded Block RAM (EBR). The EBR consists of an 18-Kbit RAM with dedicated input and output registers.

### sysMEM Memory Block

The sysMEM block can implement single port, dual port or pseudo dual port memories. Each block can be used in a variety of depths and widths as shown in Table 2-6. FIFOs can be implemented in sysMEM EBR blocks by implementing support logic with PFUs. The EBR block facilitates parity checking by supporting an optional parity bit for each data byte. EBR blocks provide byte-enable support for configurations with 18-bit and 36-bit data widths.

**Table 2-6. sysMEM Block Configurations**

| Memory Mode      | Configurations                                                              |
|------------------|-----------------------------------------------------------------------------|
| Single Port      | 16,384 x 1<br>8,192 x 2<br>4,096 x 4<br>2,048 x 9<br>1,024 x 18<br>512 x 36 |
| True Dual Port   | 16,384 x 1<br>8,192 x 2<br>4,096 x 4<br>2,048 x 9<br>1,024 x 18             |
| Pseudo Dual Port | 16,384 x 1<br>8,192 x 2<br>4,096 x 4<br>2,048 x 9<br>1,024 x 18<br>512 x 36 |

### Bus Size Matching

All of the multi-port memory modes support different widths on each of the ports. The RAM bits are mapped LSB word 0 to MSB word 0, LSB word 1 to MSB word 1, and so on. Although the word size and number of words for each port varies, this mapping scheme applies to each port.

### RAM Initialization and ROM Operation

If desired, the contents of the RAM can be pre-loaded during device configuration. By preloading the RAM block during the chip configuration cycle and disabling the write controls, the sysMEM block can also be utilized as a ROM.

### Memory Cascading

Larger and deeper blocks of RAM can be created using EBR sysMEM Blocks. Typically, the Lattice design tools cascade memory transparently, based on specific design inputs.

### Single, Dual and Pseudo-Dual Port Modes

In all the sysMEM RAM modes the input data and address for the ports are registered at the input of the memory array. The output data of the memory is optionally registered at the output.

EBR memory supports two forms of write behavior for single port or dual port operation:

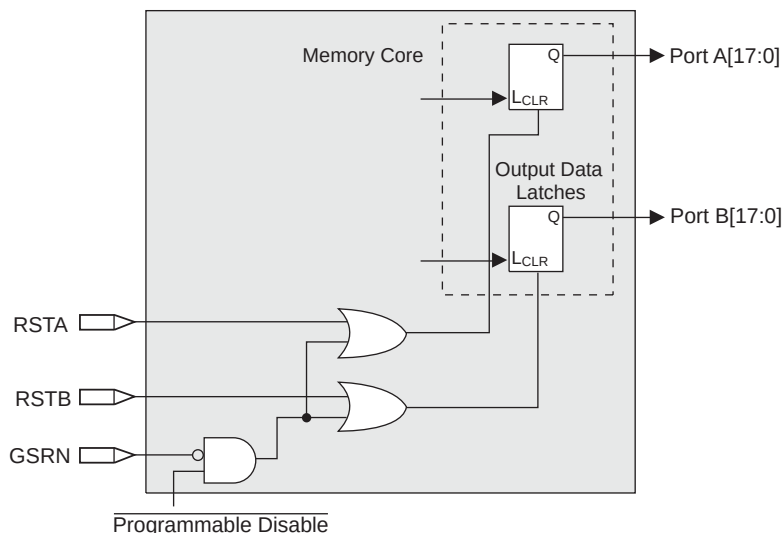
1. Normal – Data on the output appears only during a read cycle. During a write cycle, the data (at the current address) does not appear on the output. This mode is supported for all data widths.

2. Write Through – A copy of the input data appears at the output of the same port during a write cycle. This mode is supported for all data widths.

## Memory Core Reset

The memory array in the EBR utilizes latches at the A and B output ports. These latches can be reset asynchronously or synchronously. RSTA and RSTB are local signals, which reset the output latches associated with Port A and Port B, respectively. The Global Reset (GSRN) signal resets both ports. The output data latches and associated resets for both ports are as shown in Figure 2-20.

**Figure 2-20. Memory Core Reset**

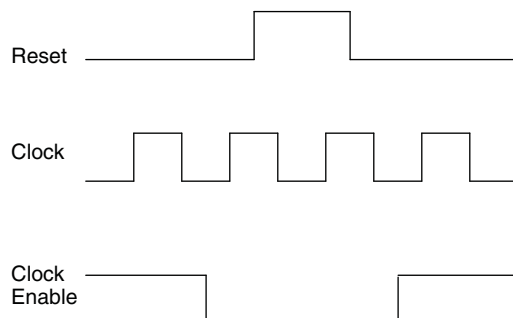


For further information about the sysMEM EBR block, please see the the list of additional technical documentation at the end of this data sheet.

## EBR Asynchronous Reset

EBR asynchronous reset or GSR (if used) can only be applied if all clock enables are low for a clock cycle before the reset is applied and released a clock cycle after the reset is released, as shown in Figure 2-21. The GSR input to the EBR is always asynchronous.

**Figure 2-21. EBR Asynchronous Reset (Including GSR) Timing Diagram**



If all clock enables remain enabled, the EBR asynchronous reset or GSR may only be applied and released after the EBR read and write clock inputs are in a steady state condition for a minimum of  $1/f_{MAX}$  (EBR clock). The reset release must adhere to the EBR synchronous reset setup time before the next active read or write clock edge.

If an EBR is pre-loaded during configuration, the GSR input must be disabled or the release of the GSR during device Wake Up must occur before the release of the device I/Os becomes active.

These instructions apply to all EBR RAM and ROM implementations.

Note that there are no reset restrictions if the EBR synchronous reset is used and the EBR GSR input is disabled.

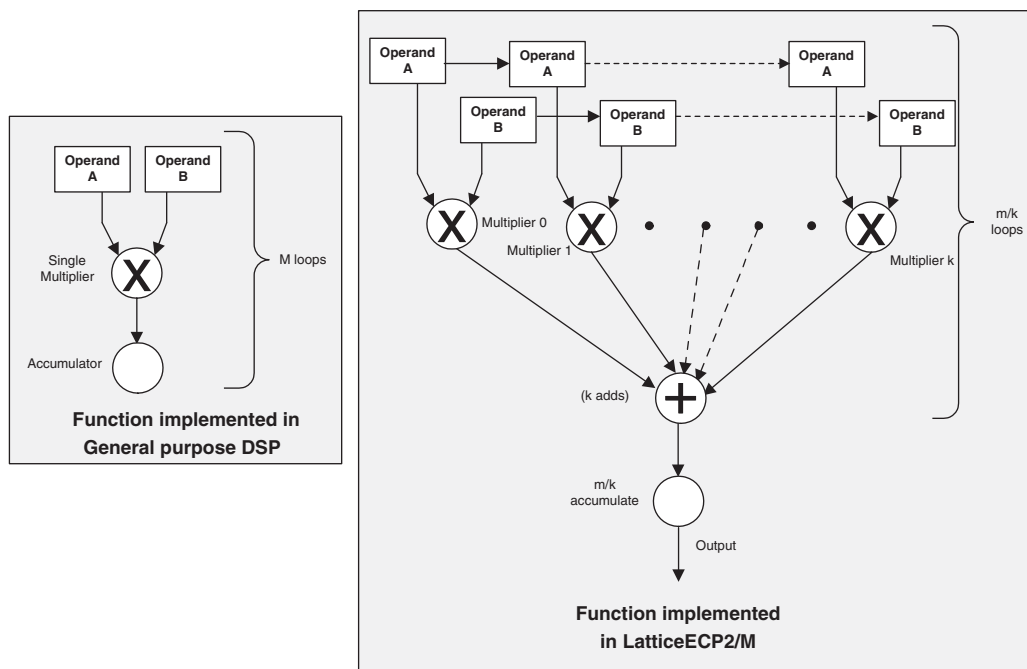
## sysDSP™ Block

The LatticeECP2/M family provides a sysDSP block, making it ideally suited for low cost, high performance Digital Signal Processing (DSP) applications. Typical functions used in these applications are Finite Impulse Response (FIR) filters, Fast Fourier Transforms (FFT) functions, Correlators, Reed-Solomon/Turbo/Convolution encoders and decoders. These complex signal processing functions use similar building blocks such as multiply-adders and multiply-accumulators.

### sysDSP Block Approach Compared to General DSP

Conventional general-purpose DSP chips typically contain one to four (Multiply and Accumulate) MAC units with fixed data-width multipliers; this leads to limited parallelism and limited throughput. Their throughput is increased by higher clock speeds. The LatticeECP2/M, on the other hand, has many DSP blocks that support different data-widths. This allows the designer to use highly parallel implementations of DSP functions. The designer can optimize the DSP performance vs. area by choosing an appropriate level of parallelism. Figure 2-22 compares the fully serial and the mixed parallel and serial implementations.

**Figure 2-22. Comparison of General DSP and LatticeECP2/M Approaches**



### sysDSP Block Capabilities

The sysDSP block in the LatticeECP2/M family supports four functional elements in three 9, 18 and 36 data path widths. The user selects a function element for a DSP block and then selects the width and type (signed/unsigned) of its operands. The operands in the LatticeECP2/M family sysDSP Blocks can be either signed or unsigned but not mixed within a function element. Similarly, the operand widths cannot be mixed within a block. In the LatticeECP2/M family the DSP elements can be concatenated.

The resources in each sysDSP block can be configured to support the following elements:



- MULT (Multiply)
- MAC (Multiply, Accumulate)
- MULTADDSUB (Multiply, Addition/Subtraction)
- MULTADDSUBSUM (Multiply, Addition/Subtraction, Accumulate)

The number of elements available on each block depends in the width selected from the three available options x9, x18, and x36. A number of these elements are concatenated for highly parallel implementations of DSP functions. Table 2-7 shows the capabilities of the block.

**Table 2-7. Maximum Number of Elements in a Block**

| Width of Multiply | x9 | x18 | x36 |
|-------------------|----|-----|-----|
| MULT              | 8  | 4   | 1   |
| MAC               | 2  | 2   | —   |
| MULTADDSUB        | 4  | 2   | —   |
| MULTADDSUBSUM     | 2  | 1   | —   |

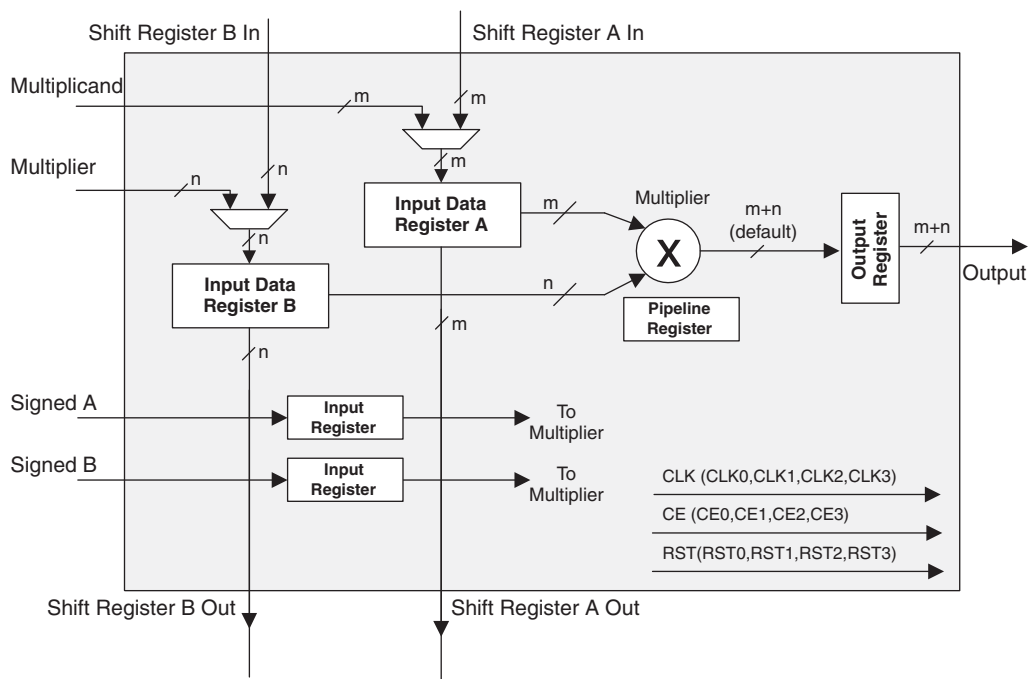
Some options are available in four elements. The input register in all the elements can be directly loaded or can be loaded as a shift register from previous operand registers. By selecting “dynamic operation” the following operations are possible:

- In the ‘Signed/Unsigned’ options the operands can be switched between signed and unsigned on every cycle.
- In the ‘Add/Sub’ option the Accumulator can be switched between addition and subtraction on every cycle.
- The loading of operands can switch between parallel and serial operations.

## MULT sysDSP Element

This multiplier element implements a multiply with no addition or accumulator nodes. The two operands, A and B, are multiplied and the result is available at the output. The user can enable the input/output and pipeline registers. Figure 2-23 shows the MULT sysDSP element.

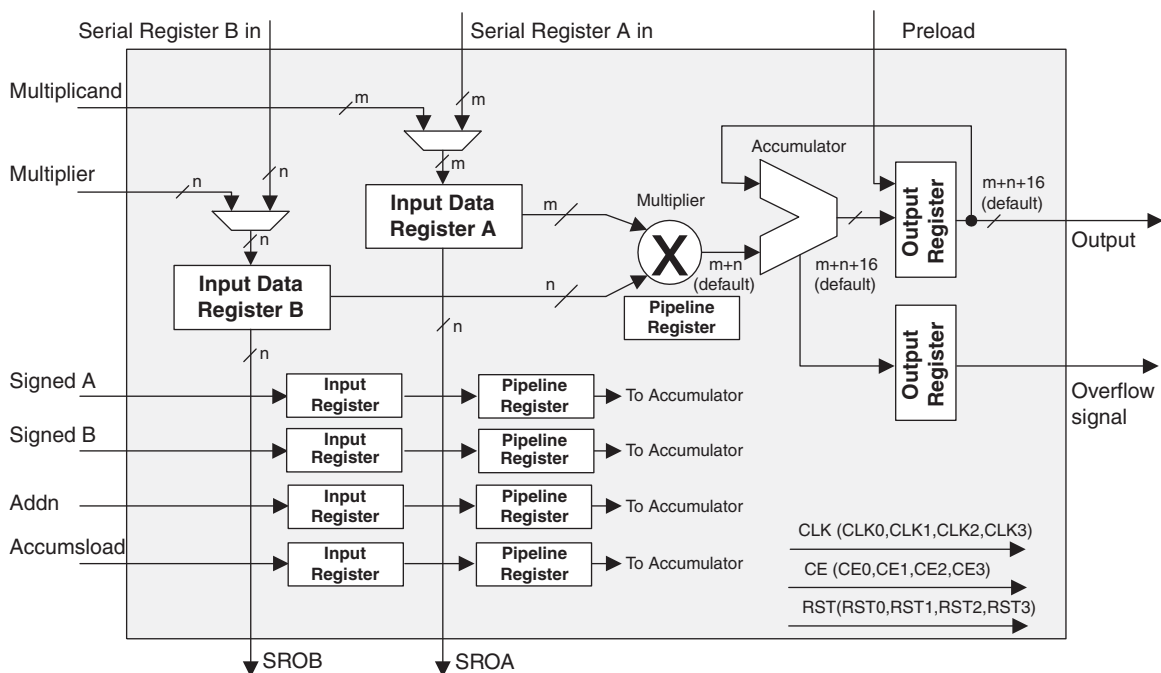
**Figure 2-23. MULT sysDSP Element**



## MAC sysDSP Element

In this case, the two operands, A and B, are multiplied and the result is added with the previous accumulated value. This accumulated value is available at the output. The user can enable the input and pipeline registers, but the output register is always enabled. The output register is used to store the accumulated value. The Accumulators in the DSP blocks in the LatticeECP2/M family can be initialized dynamically. A registered overflow signal is also available. The overflow conditions are provided later in this document. Figure 2-24 shows the MAC sysDSP element.

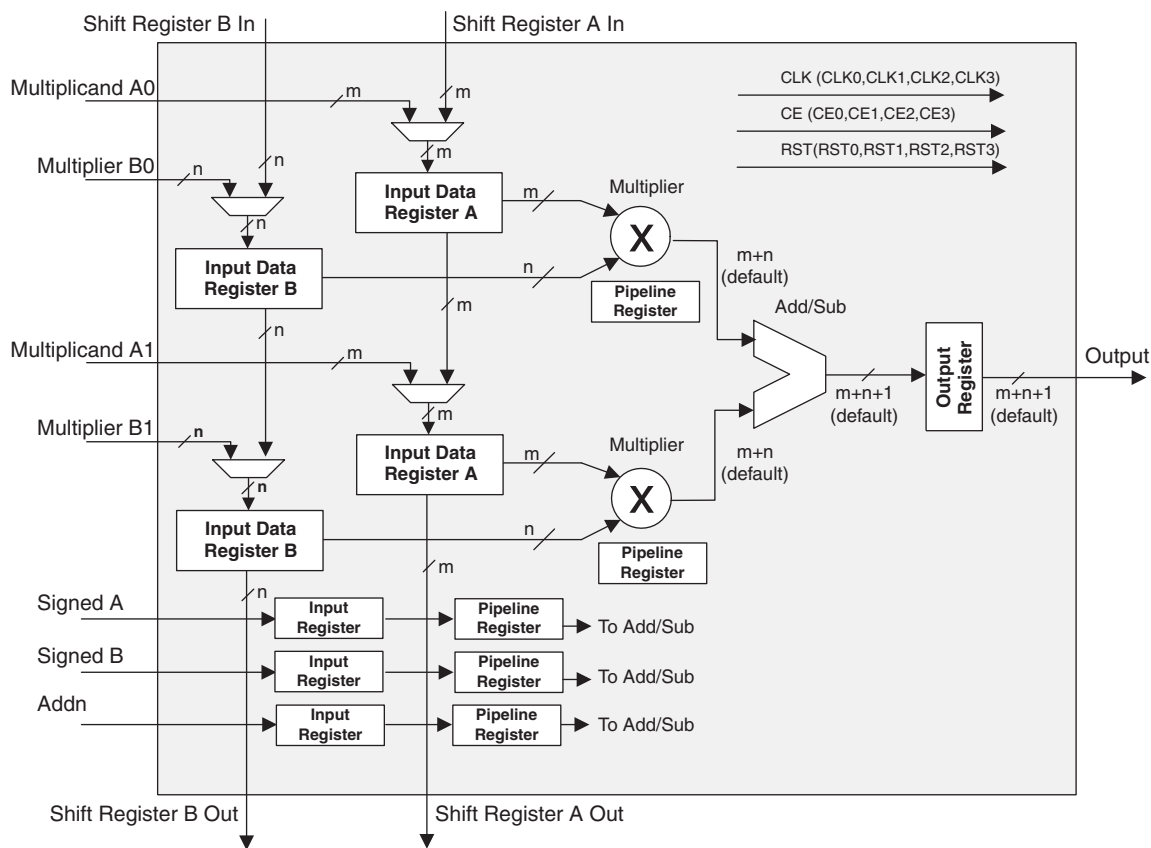
**Figure 2-24. MAC sysDSP**



## MULTADDSUB sysDSP Element

In this case, the operands A0 and B0 are multiplied and the result is added/subtracted with the result of the multiplier operation of operands A1 and A2. The user can enable the input, output and pipeline registers. Figure 2-25 shows the MULTADDSUB sysDSP element.

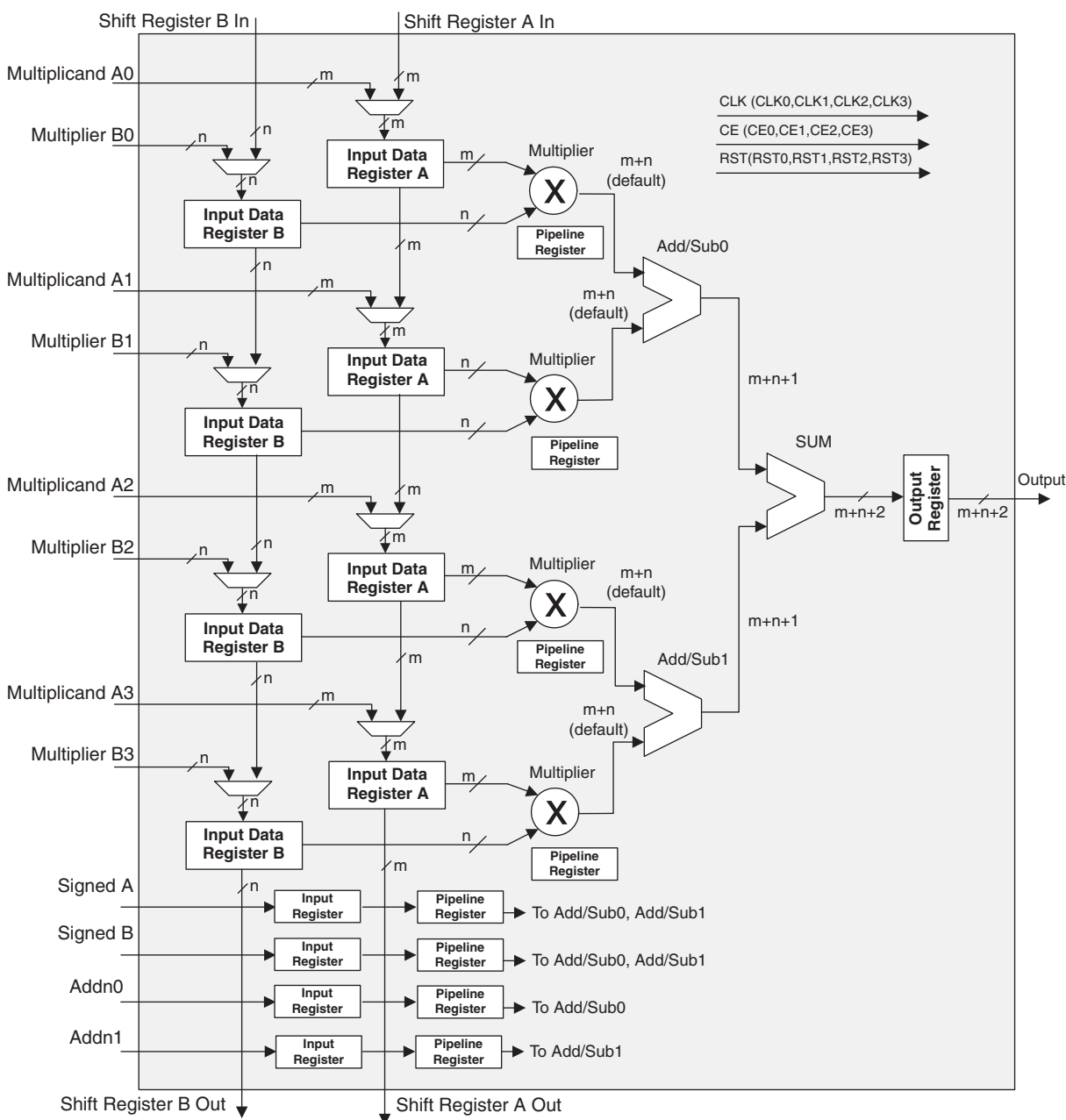
**Figure 2-25. MULTADDSUB**



## MULTADDSUBSUM sysDSP Element

In this case, the operands A0 and B0 are multiplied and the result is added/subtracted with the result of the multiplier operation of operands A1 and B1. Additionally the operands A2 and B2 are multiplied and the result is added/subtracted with the result of the multiplier operation of operands A3 and B3. The result of both addition/subtraction are added in a summation block. The user can enable the input, output and pipeline registers. Figure 2-26 shows the MULTADDSUBSUM sysDSP element.

**Figure 2-26. MULTADDSUBSUM**



## Clock, Clock Enable and Reset Resources

Global Clock, Clock Enable and Reset signals from routing are available to every DSP block. Four Clock, Reset and Clock Enable signals are selected for the sysDSP block. From four clock sources (CLK0, CLK1, CLK2, CLK3)

one clock is selected for each input register, pipeline register and output register. Similarly Clock enable (CE) and Reset (RST) are selected from their four respective sources (CE0, CE1, CE2, CE3 and RST0, RST1, RST2, RST3) at each input register, pipeline register and output register.

### Signed and Unsigned with Different Widths

The DSP block supports different widths of signed and unsigned multipliers besides x9, x18 and x36 widths. For unsigned operands, unused upper data bits should be filled to create a valid x9, x18 or x36 operand. For signed two's complement operands, sign extension of the most significant bit should be performed until x9, x18 or x36 width is reached. Table 2-8 provides an example of this.

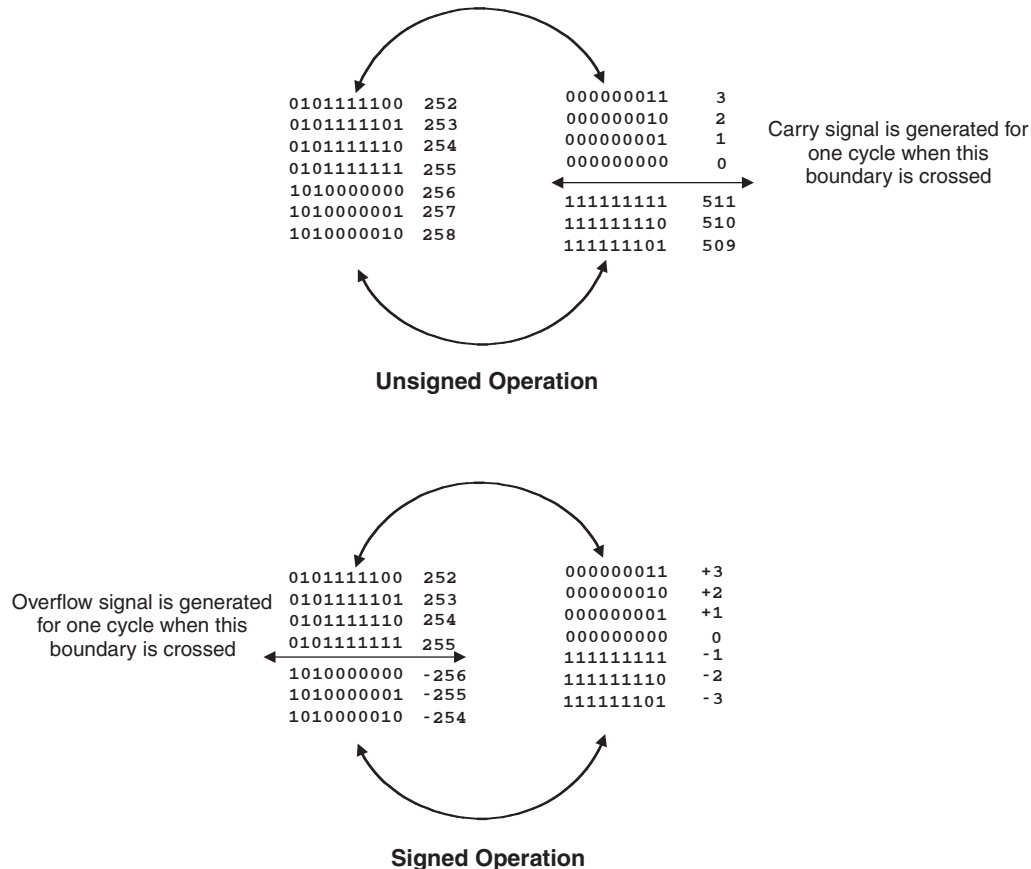
**Table 2-8. Sign Extension Example**

| Number | Unsigned | Unsigned 9-bit | Unsigned 18-bit     | Signed | Two's Complement Signed 9 Bits | Two's Complement Signed 18 Bits |
|--------|----------|----------------|---------------------|--------|--------------------------------|---------------------------------|
| +5     | 0101     | 000000101      | 0000000000000000101 | 0101   | 000000101                      | 0000000000000000101             |
| -6     | N/A      | N/A            | N/A                 | 1010   | 11111010                       | 111111111111111010              |

### OVERFLOW Flag from MAC

The sysDSP block provides an overflow output to indicate that the accumulator has overflowed. When two unsigned numbers are added and the result is a smaller number than the accumulator, “roll-over” is said to have occurred and an overflow signal is indicated. When two positive numbers are added with a negative sum and when two negative numbers are added with a positive sum, then the accumulator “roll-over” is said to have occurred and an overflow signal is indicated. Note that when overflow occurs the overflow flag is present for only one cycle. By counting these overflow pulses in FPGA logic, larger accumulators can be constructed. The conditions overflow signals for signed and unsigned operands are listed in Figure 2-27.

**Figure 2-27. Accumulator Overflow/Underflow**



## IPexpress™

The user can access the sysDSP block via the IPexpress tool, which provides the option to configure each DSP module (or group of modules) or by direct HDL instantiation. In addition, Lattice has partnered with The Math-Works® to support instantiation in the Simulink® tool, a graphical simulation environment. Simulink works with Diamond to dramatically shorten the DSP design cycle in Lattice FPGAs.

## Optimized DSP Functions

Lattice provides a library of optimized DSP IP functions. Some of the IP cores planned for the LatticeECP2/M DSP include the Bit Correlator, Fast Fourier Transform, Finite Impulse Response (FIR) Filter, Reed-Solomon Encoder/Decoder, Turbo Encoder/Decoder and Convolutional Encoder/Decoder. Please contact Lattice to obtain the latest list of available DSP IP cores.

## Resources Available in the LatticeECP2/M Family

Table 2-9 shows the maximum number of multipliers for each member of the LatticeECP2/M family. Table 2-10 shows the maximum available EBR RAM Blocks in each LatticeECP2/M device. EBR blocks, together with Distributed RAM can be used to store variables locally for fast DSP operations.

**Table 2-9. Maximum Number of DSP Blocks in the LatticeECP2/M Family**

| Device   | DSP Block | 9x9 Multiplier | 18x18 Multiplier | 36x36 Multiplier |
|----------|-----------|----------------|------------------|------------------|
| ECP2-6   | 3         | 24             | 12               | 3                |
| ECP2-12  | 6         | 48             | 24               | 6                |
| ECP2-20  | 7         | 56             | 28               | 7                |
| ECP2-35  | 8         | 64             | 32               | 8                |
| ECP2-50  | 18        | 144            | 72               | 18               |
| ECP2-70  | 22        | 176            | 88               | 22               |
| ECP2M20  | 6         | 48             | 24               | 6                |
| ECP2M35  | 8         | 64             | 32               | 8                |
| ECP2M50  | 22        | 176            | 88               | 22               |
| ECP2M70  | 24        | 192            | 96               | 24               |
| ECP2M100 | 42        | 336            | 168              | 42               |

**Table 2-10. Embedded SRAM in the LatticeECP2/M Family**

| Device   | EBR SRAM Block | Total EBR SRAM (Kbits) |
|----------|----------------|------------------------|
| ECP2-6   | 3              | 55                     |
| ECP2-12  | 12             | 221                    |
| ECP2-20  | 15             | 277                    |
| ECP2-35  | 18             | 332                    |
| ECP2-50  | 21             | 387                    |
| ECP2-70  | 60             | 1106                   |
| ECP2M20  | 66             | 1217                   |
| ECP2M35  | 114            | 2101                   |
| ECP2M50  | 225            | 4147                   |
| ECP2M70  | 246            | 4534                   |
| ECP2M100 | 288            | 5308                   |

## LatticeECP2/M DSP Performance

Table 2-11 lists the maximum performance in millions of MAC operations per second (MMAC) for each member of the LatticeECP2/M family.

**Table 2-11. DSP Performance**

| Device   | DSP Block | DSP Performance<br>GMAC |
|----------|-----------|-------------------------|
| ECP2-6   | 3         | 3.9                     |
| ECP2-12  | 6         | 7.8                     |
| ECP2-20  | 7         | 9.1                     |
| ECP2-35  | 8         | 10.4                    |
| ECP2-50  | 18        | 23.4                    |
| ECP2-70  | 22        | 28.6                    |
| ECP2M20  | 6         | 7.8                     |
| ECP2M35  | 8         | 10.4                    |
| ECP2M50  | 22        | 28.6                    |
| ECP2M70  | 24        | 31.2                    |
| ECP2M100 | 42        | 54.6                    |

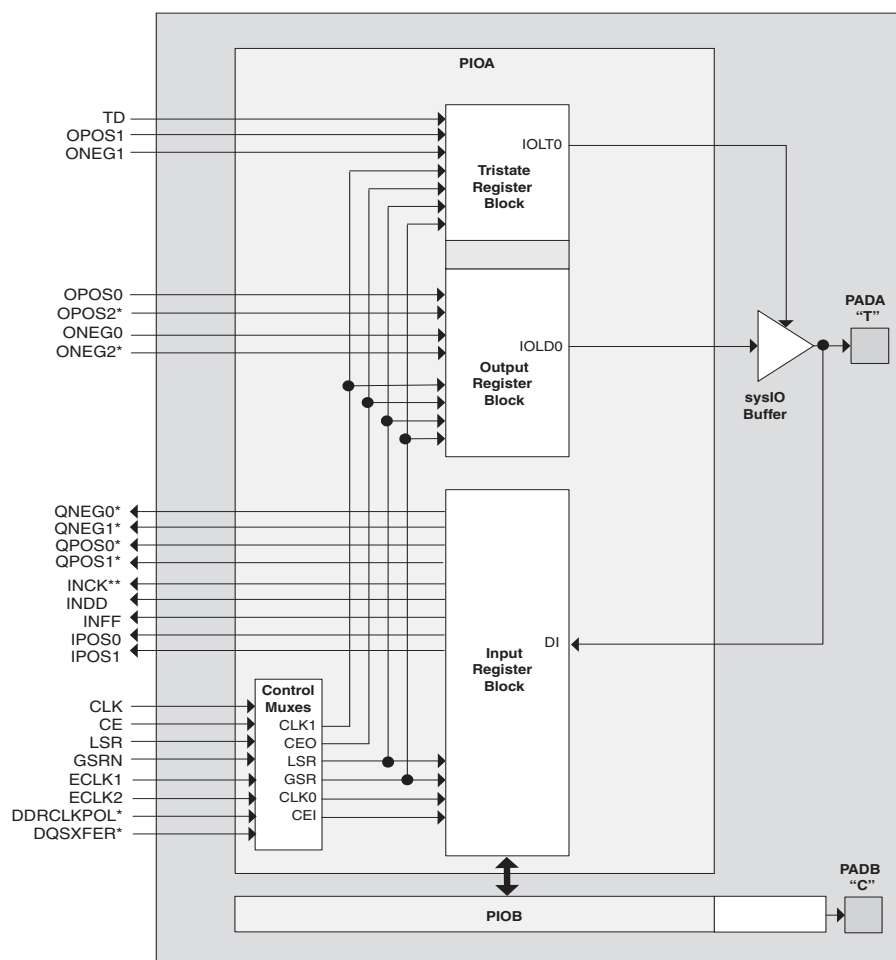
For further information about the sysDSP block, please see the list of additional technical information at the end of this data sheet.

## Programmable I/O Cells (PIC)

Each PIC contains two PIOs connected to their respective sysI/O buffers as shown in Figure 2-28. The PIO Block supplies the output data (DO) and the tri-state control signal (TO) to the sysI/O buffer and receives input from the buffer. Table 2-12 provides the PIO signal list.



Figure 2-28. PIC Diagram



\*Signals are available on left/right/bottom edges only.  
\*\* Selected blocks.

Two adjacent PIOs can be joined to provide a differential I/O pair (labeled as “T” and “C”) as shown in Figure 2-28. The PAD Labels “T” and “C” distinguish the two PIOs. Approximately 50% of the PIO pairs on the left and right edges of the device can be configured as true LVDS outputs. All I/O pairs can operate as inputs.

**Table 2-12. PIO Signals List**

| Name                                    | Type                            | Description                                                             |
|-----------------------------------------|---------------------------------|-------------------------------------------------------------------------|
| CE0, CE1                                | Control from the core           | Clock enables for input and output block flip-flops                     |
| CLK0, CLK1                              | Control from the core           | System clocks for input and output blocks                               |
| ECLK1, ECLK2                            | Control from the core           | Fast edge clocks                                                        |
| LSR                                     | Control from the core           | Local Set/Reset                                                         |
| GSRN                                    | Control from routing            | Global Set/Reset (active low)                                           |
| INCK <sup>2</sup>                       | Input to the core               | Input to Primary Clock Network or PLL reference inputs                  |
| DQS                                     | Input to PIO                    | DQS signal from logic (routing) to PIO                                  |
| INDD                                    | Input to the core               | Unregistered data input to core                                         |
| INFF                                    | Input to the core               | Registered input on positive edge of the clock (CLK0)                   |
| IPOS0, IPOS1                            | Input to the core               | Double data rate registered inputs to the core                          |
| QPOS0 <sup>1</sup> , QPOS1 <sup>1</sup> | Input to the core               | Gearbox pipelined inputs to the core                                    |
| QNEG0 <sup>1</sup> , QNEG1 <sup>1</sup> | Input to the core               | Gearbox pipelined inputs to the core                                    |
| OPOS0, ONEG0, OPOS2, ONEG2              | Output data from the core       | Output signals from the core for SDR and DDR operation                  |
| OPOS1 ONEG1                             | Tristate control from the core  | Signals to Tristate Register block for DDR operation                    |
| DEL[3:0]                                | Control from the core           | Dynamic input delay control bits                                        |
| TD                                      | Tristate control from the core  | Tristate signal from the core used in SDR operation                     |
| DDRCLKPOL                               | Control from clock polarity bus | Controls the polarity of the clock (CLK0) that feed the DDR input block |
| DQSXFER                                 | Control from core               | Controls signal to the Output block                                     |

1. Signals available on left/right/bottom only.

2. Selected I/O.

## PIO

The PIO contains four blocks: an input register block, output register block, tristate register block and a control logic block. These blocks contain registers for operating in a variety of modes along with the necessary clock and selection logic.

### Input Register Block

The input register blocks for PIOs in left, right and bottom edges contain delay elements and registers that can be used to condition high-speed interface signals, such as DDR memory interfaces and source synchronous interfaces, before they are passed to the device core. Figure 2-29 shows the diagram of the input register block for left, right and bottom edges. The input register block for the top edge contains one memory element to register the input signal as shown in Figure 2-30. The following description applies to the input register block for PIOs in the left, right and bottom edges of the device.

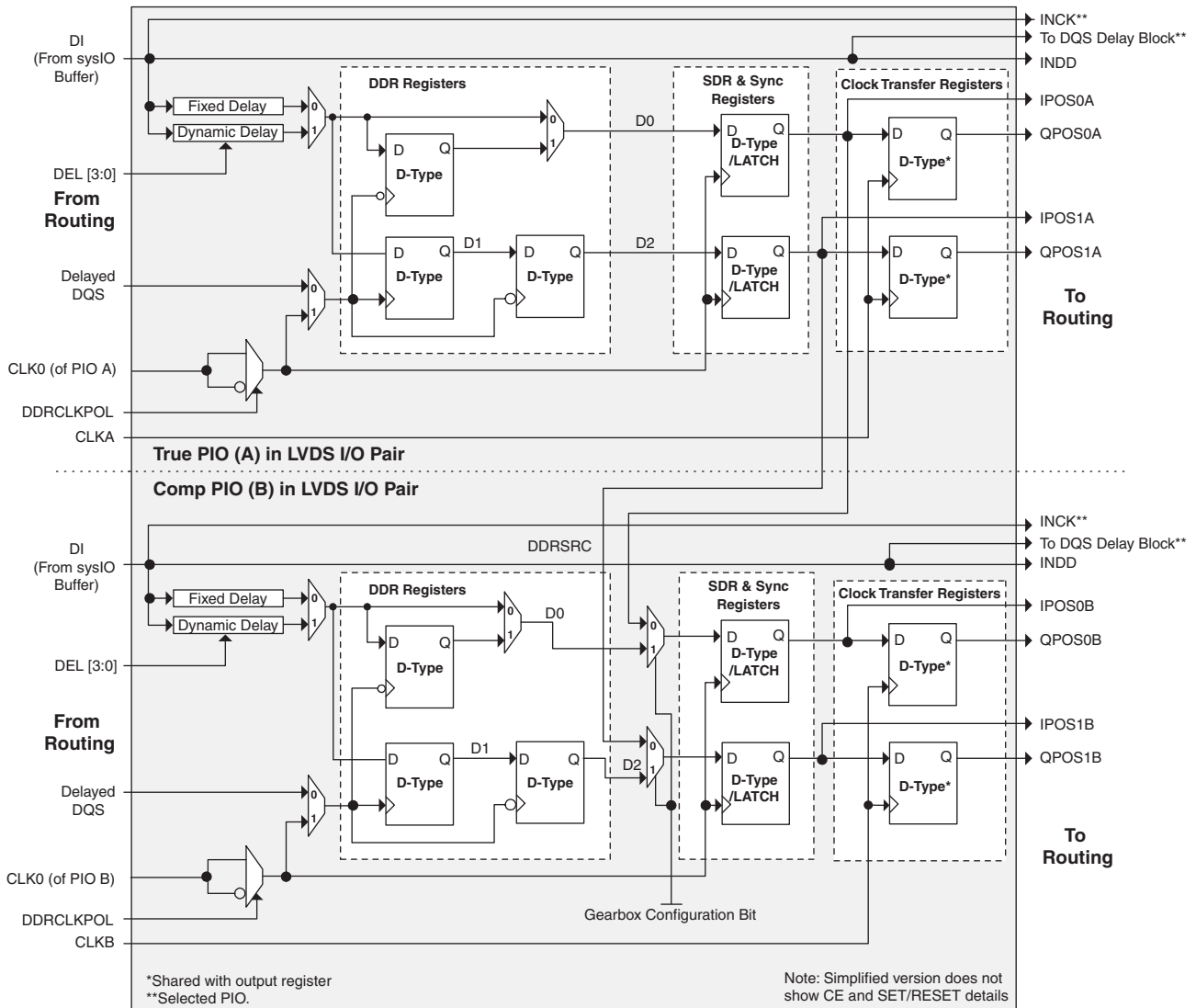
Input signals are fed from the sysI/O buffer to the input register block (as signal DI). If desired, the input signal can bypass the register and delay elements and be used directly as a combinatorial signal (INDD), a clock (INCK) and, in selected blocks, the input to the DQS delay block. If an input delay is desired, designers can select either a fixed delay or a dynamic delay DEL[3:0]. The delay, if selected, reduces input register hold time requirements when using a global clock.

The input block allows three modes of operation. In the single data rate (SDR) the data is registered, by one of the registers in the single data rate sync register block, with the system clock. In DDR Mode, two registers are used to sample the data on the positive and negative edges of the DQS signal, creating two data streams, D0 and D1. These two data streams are synchronized with the system clock before entering the core. Further discussion on this topic is in the DDR Memory section of this data sheet.

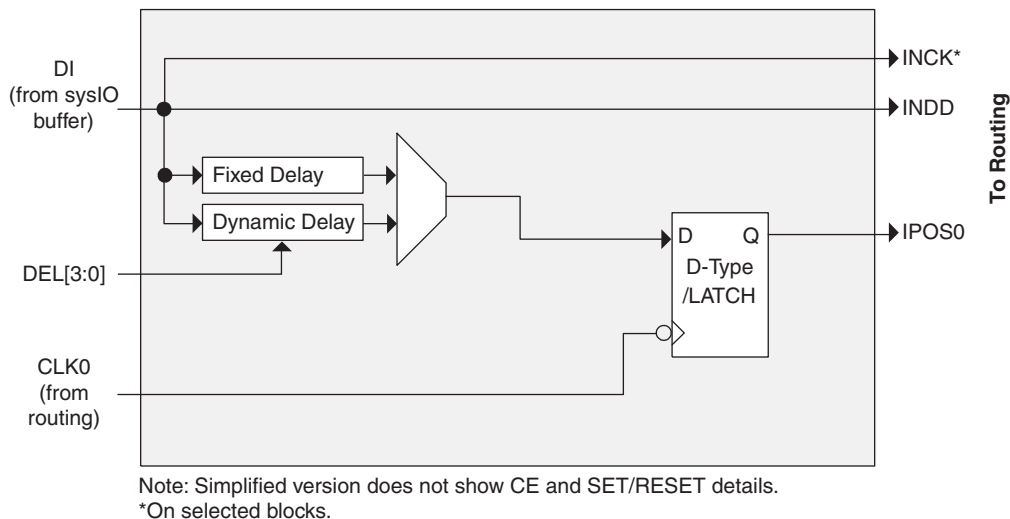
By combining input blocks of the complementary PIOs and sharing some registers from output blocks, a gearbox function can be implemented, which takes a double data rate signal applied to PIOA and converts it as four data streams, IPOS0A, IPOS1A, IPOS0B and IPOS1B. Figure 2-29 shows the diagram using this gearbox function. For more information about this topic, please see information regarding additional documentation at the end of this data sheet.

The signal DDRCLKPOL controls the polarity of the clock used in the synchronization registers. It ensures adequate timing when data is transferred from the DQS to the system clock domain. For further information about this topic, see the DDR Memory section of this data sheet.

**Figure 2-29. Input Register Block for Left, Right and Bottom Edges**



**Figure 2-30. Input Register Block Top Edge**



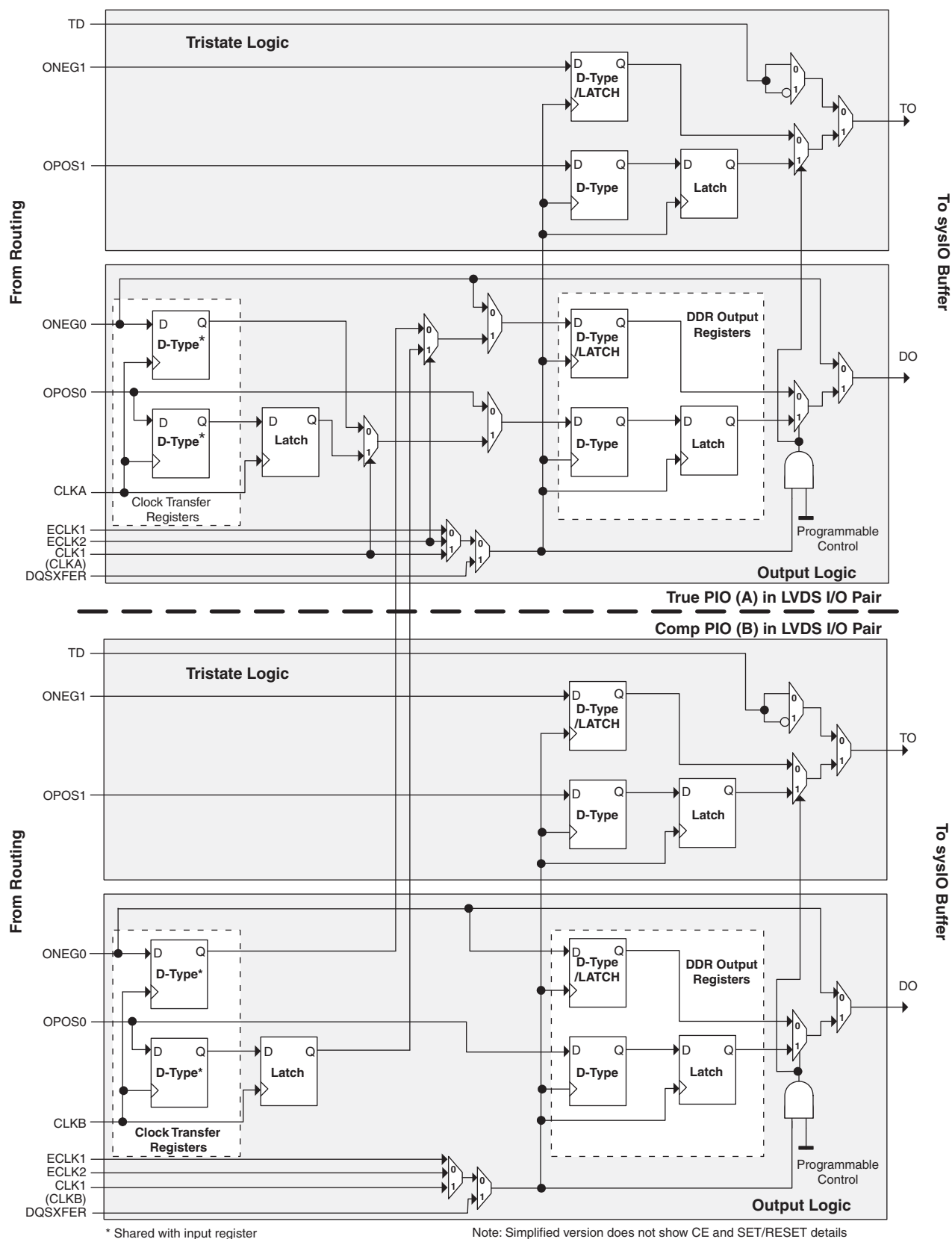
## Output Register Block

The output register block provides the ability to register signals from the core of the device before they are passed to the sysI/O buffers. The blocks on the PIOs on the left, right and bottom contain a register for SDR operation that is combined with an additional latch for DDR operation. Figure 2-31 shows the diagram of the Output Register Block for PIOs on the left, right and the bottom edges. Figure 2-32 shows the diagram of the Output Register Block for PIOs on the top edge of the device.

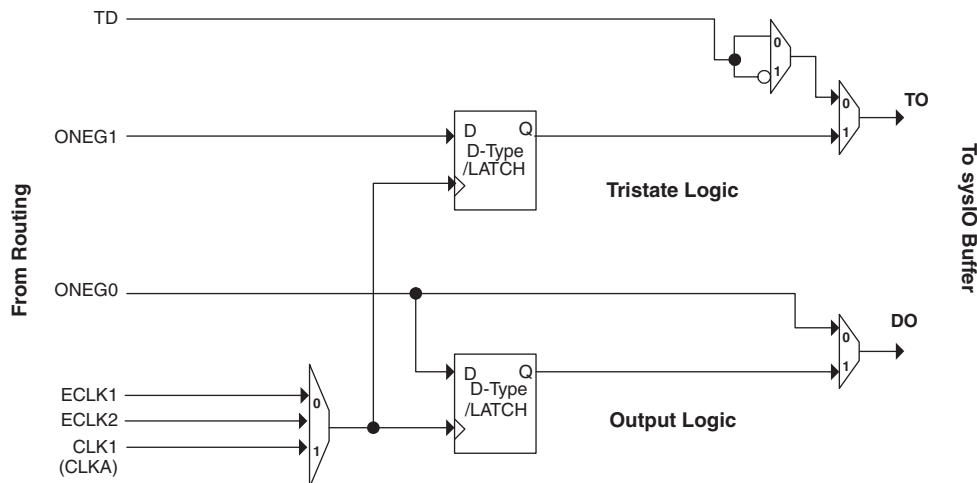
In SDR mode, ONEG0 feeds one of the flip-flops that then feeds the output. The flip-flop can be configured as a D-type or latch. In DDR mode, ONEG0 and OPOS0 are fed into registers on the positive edge of the clock. Then at the next clock cycle this registered OPOS0 is latched. A multiplexer running off the same clock selects the correct register for feeding to the output (D0).

By combining the output blocks of the complementary PIOs and sharing some registers from input blocks, a gearbox function can be implemented, that takes four data streams: ONEG0A, ONEG1A, ONEG1B and ONEG1B. Figure 2-32 shows the diagram using this gearbox function. For more information about this topic, please see information regarding additional documentation at the end of this data sheet.

**Figure 2-31. Output and Tristate Block for Left, Right and Bottom Edges**



**Figure 2-32. Output and Tristate Block, Top Edge**



Note: Simplified version does not show CE and SET/RESET details.

## Tristate Register Block

The tristate register block provides the ability to register tri-state control signals from the core of the device before they are passed to the sys/O buffers. The block contains a register for SDR operation and an additional latch for DDR operation. Figure 2-31 shows the diagram of the Tristate Register Block with the Output Block for the left, right and bottom edges and Figure 2-32 shows the diagram of the Tristate Register Block with the Output Block for the top edge.

In SDR mode, ONEG1 feeds one of the flip-flops that then feeds the output. The flip-flop can be configured a D-type or latch. In DDR mode, ONEG1 and OPOS1 are fed into registers on the positive edge of the clock. Then in the next clock the registered OPOS1 is latched. A multiplexer running off the same clock cycle selects the correct register for feeding to the output (DO).

## Control Logic Block

The control logic block allows the selection and modification of control signals for use in the PIO block. A clock is selected from one of the clock signals provided from the general purpose routing, one of the edge clocks (ECLK1/ ECLK2) and a DQS signal provided from the programmable DQS pin and provided to the input register block. The clock can optionally be inverted.

## DDR Memory Support

Certain PICs have additional circuitry to allow the implementation of high speed source synchronous and DDR memory interfaces. The support varies by the edge of the device as detailed below.

### Left and Right Edges

PICs on these edges have registered elements that support DDR memory interfaces. One of every 16 PIOs contains a delay element to facilitate the generation of DQS signals. The DQS signal feeds the DQS bus that spans the set of 16 PIOs. Figure 2-33 shows the assignment of DQS pins in each set of 16 PIOs.

### Bottom Edge

PICs on the bottom edge have registered elements that support DDR memory interfaces. One of every 18 PIOs contains a delay element to facilitate the generation of DQS signals. The DQS signal feeds the DQS bus that spans the set of 18 PIOs. Figure 2-34 shows the assignment of DQS pins in each set of 18 PIOs.

## Top Edge

The PICs on the top edge are different from PIOs on the left, right and bottom edges. PIOs on this edge do not have DDR registers or DQS signals.

The exact DQS pins are shown in a dual function in the Logic Signal Connections table in this data sheet. Additional detail is provided in the Signal Descriptions table. The DQS signal from the bus is used to strobe the DDR data from the memory into input register blocks. Interfaces on the left and right edges are designed for DDR memories that support 16 bits of data, whereas interfaces on the bottom are designed for memories that support 18 bits of data.

**Figure 2-33. DQS Input Routing for the Left and Right Edges of the Device**

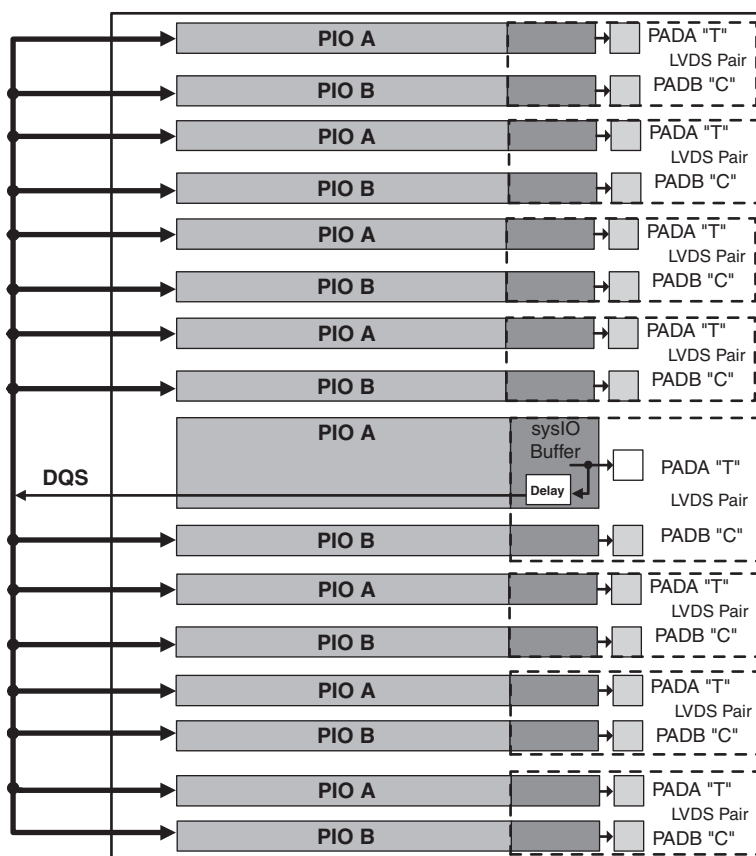
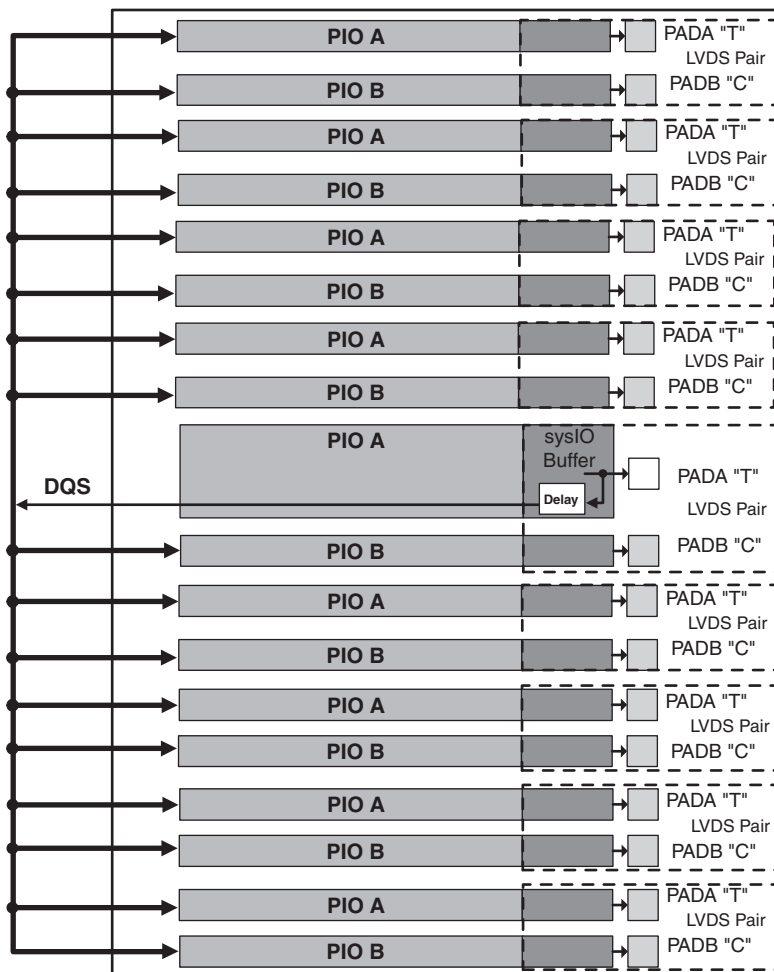


Figure 2-34. DQS Input Routing for the Bottom Edge of the Device



## DLL Calibrated DQS Delay Block

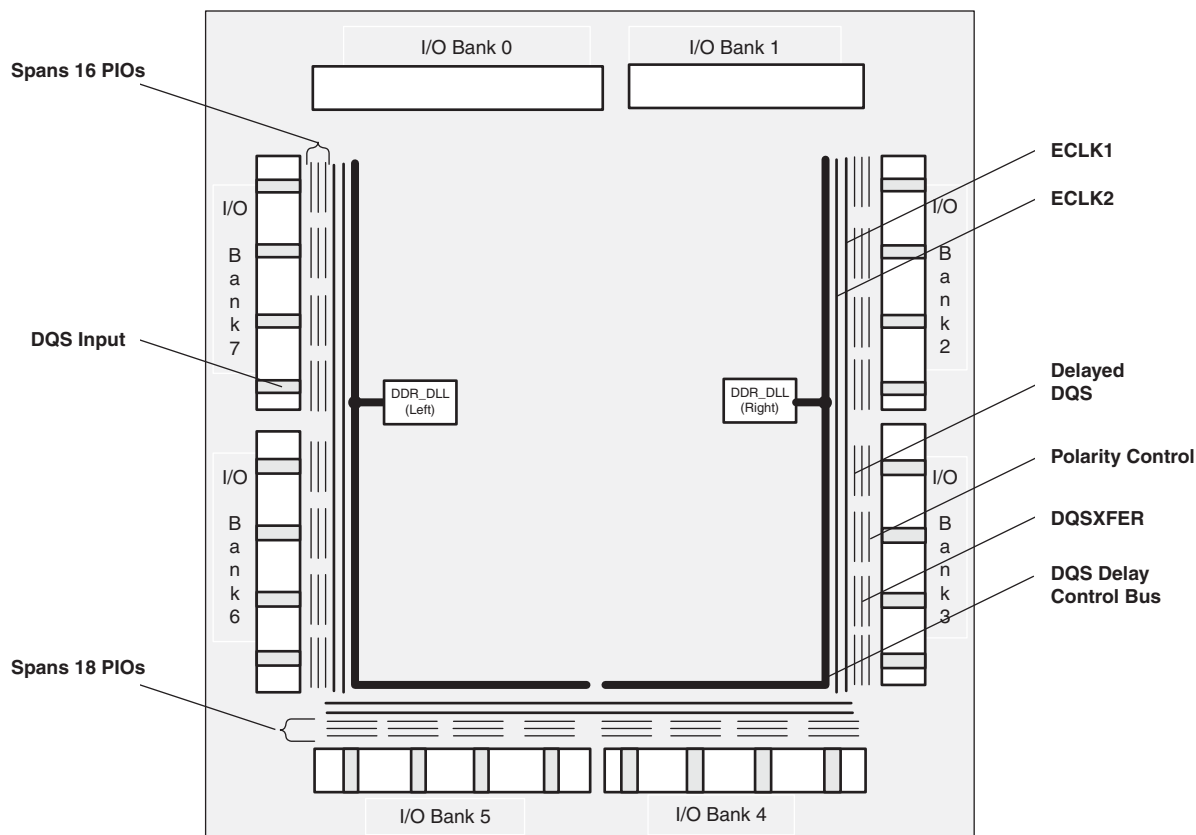
Source synchronous interfaces generally require the input clock to be adjusted in order to correctly capture data at the input register. For most interfaces a PLL is used for this adjustment. However, in DDR memories the clock (referred to as DQS) is not free-running so this approach cannot be used. The DQS Delay block provides the required clock alignment for DDR memory interfaces.

The DQS signal (selected PIOs only, as shown in Figure 2-35) feeds from the PAD through a DQS delay element to a dedicated DQS routing resource. The DQS signal also feeds polarity control logic, which controls the polarity of the clock to the sync registers in the input register blocks. Figure 2-35 and Figure 2-36 show how the DQS transition signals are routed to the PIOs.

The temperature, voltage and process variations of the DQS delay block are compensated by a set of calibration (6-bit bus) signals from two dedicated DLLs (DDR\_DLL) on opposite sides of the device. Each DLL compensates DQS delays in its half of the device as shown in Figure 2-35. The DLL loop is compensated for temperature, voltage and process variations by the system clock and feedback loop.



**Figure 2-35. Edge Clock, DLL Calibration and DQS Local Bus Distribution**



Note: Bank 8 is not shown.

## Polarity Control Logic

The LatticeECP2/M family contains dedicated circuits to transfer data between these domains. To prevent set-up and hold violations, at the domain transfer between DQS (delayed) and the system clock, a clock polarity selector is used. This changes the edge on which the data is registered in the synchronizing registers in the input register block. This requires evaluation at the start of each READ cycle for the correct clock polarity.

Prior to the READ operation in DDR memories, DQS is in tristate (pulled by termination). The DDR memory device drives DQS low at the start of the preamble state. A dedicated circuit detects the first DQS rising edge after the preamble state. This signal is used to control the polarity of the clock to the synchronizing registers.

---

## DQSXFER

LatticeECP2/M devices provide a DQSXFER signal to the output buffer to assist it in data transfer to DDR memories that require DQS strobe be shifted 90°. This shifted DQS strobe is generated by the DQSDEL block. The DQSXFER signal runs the span of the data bus.

## sysI/O Buffer

Each I/O is associated with a flexible buffer referred to as a sysI/O buffer. These buffers are arranged around the periphery of the device in groups referred to as banks. The sysI/O buffers allow users to implement the wide variety of standards that are found in today's systems including LVCMOS, SSTL, HSTL, LVDS and LVPECL.

## sysI/O Buffer Banks

LatticeECP2/M devices have nine sysI/O buffer banks: eight banks for user I/Os arranged two per side. The ninth sysI/O buffer bank (Bank 8) is located adjacent to Bank 3 and has dedicated/shared I/Os for configuration. When a shared pin is not used for configuration it is available as a user I/O. Each bank is capable of supporting multiple I/O standards. Each sysI/O bank has its own I/O supply voltage ( $V_{CCIO}$ ). In addition, each bank, except Bank 8, has voltage references,  $V_{REF1}$  and  $V_{REF2}$ , which allow it to be completely independent from the others. Bank 8 shares two voltage references,  $V_{REF1}$  and  $V_{REF2}$ , with Bank 3. Figure 2-37 shows the nine banks and their associated supplies.

In LatticeECP2/M devices, single-ended output buffers and ratioed input buffers (LVTTL, LVCMOS and PCI) are powered using  $V_{CCIO}$ . LVTTL, LVCMOS33, LVCMOS25 and LVCMOS12 can also be set as fixed threshold inputs independent of  $V_{CCIO}$ .

Each bank can support up to two separate  $V_{REF}$  voltages,  $V_{REF1}$  and  $V_{REF2}$ , that set the threshold for the referenced input buffers. Some dedicated I/O pins in a bank can be configured to be a reference voltage supply pin. Each I/O is individually configurable based on the bank's supply and reference voltages.

Figure 2-37. LatticeECP2 Banks

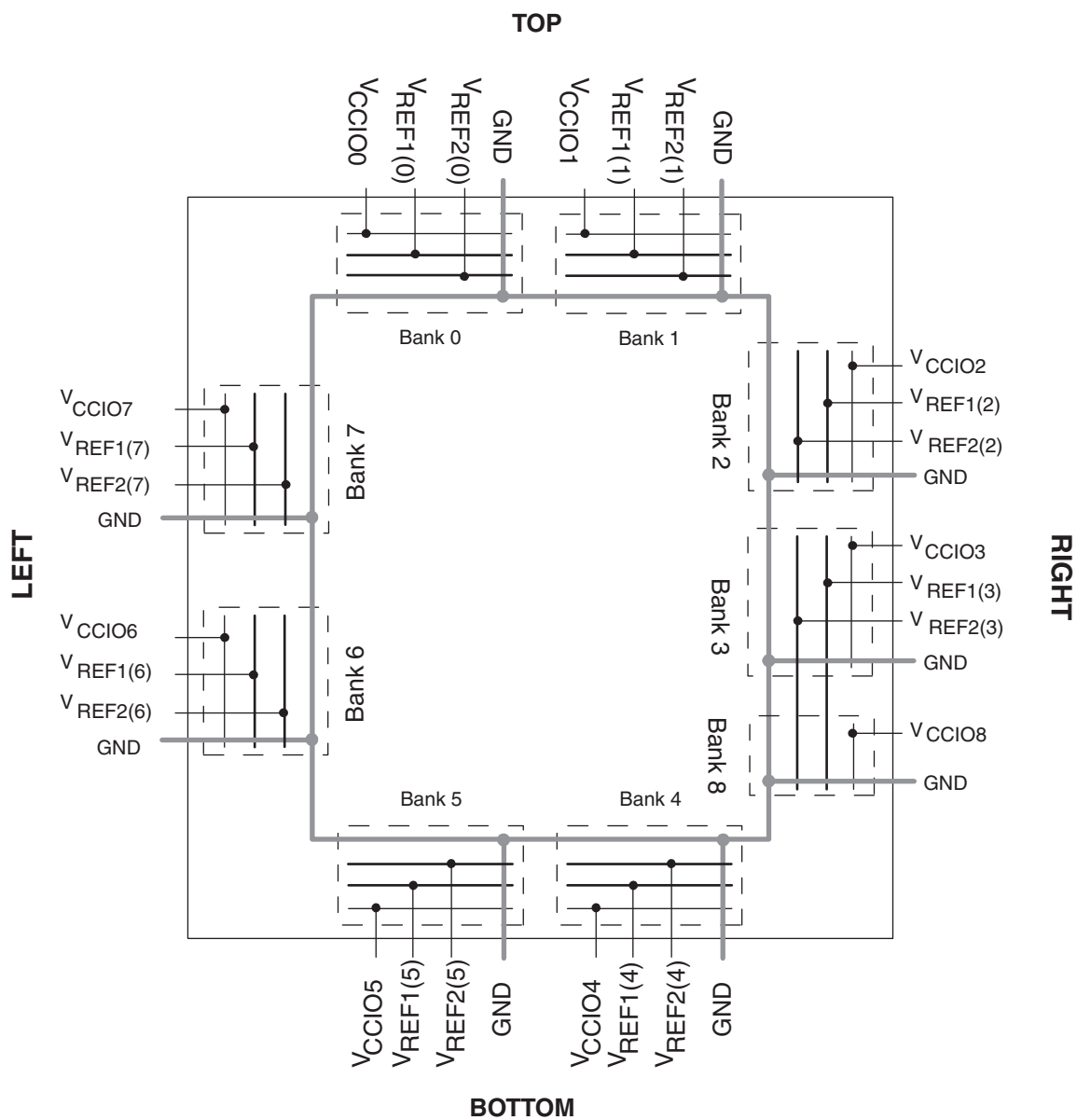
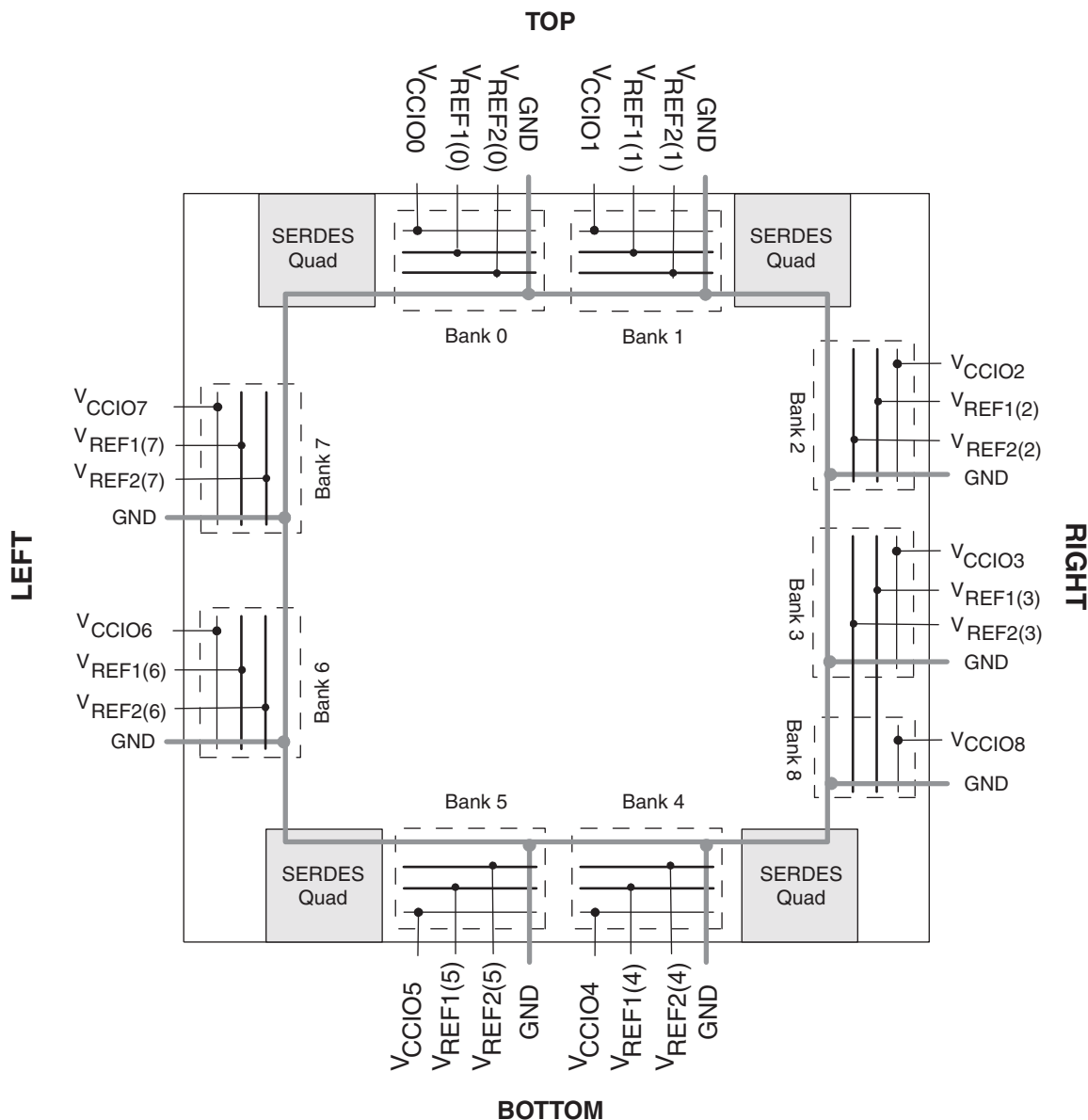


Figure 2-38. LatticeECP2M Banks



LatticeECP2/M devices contain two types of sysI/O buffer pairs.

1. **Top (Bank 0 and Bank 1) sysI/O Buffer Pairs (Single-Ended Outputs Only)**

The sysI/O buffer pairs in the top banks of the device consist of two single-ended output drivers and two sets of single-ended input buffers (both ratioed and referenced). One of the referenced input buffers can also be configured as a differential input.

The two pads in the pair are described as “true” and “comp”, where the true pad is associated with the positive side of the differential input buffer and the comp (complementary) pad is associated with the negative side of the differential input buffer.

2. **Bottom (Bank 4 and Bank 5) sysI/O Buffer Pairs (Single-Ended Outputs Only)**

The sysI/O buffer pairs in the bottom banks of the device consist of two single-ended output drivers and two

sets of single-ended input buffers (both ratioed and referenced). One of the referenced input buffers can also be configured as a differential input.

The two pads in the pair are described as “true” and “comp”, where the true pad is associated with the positive side of the differential input buffer and the comp (complementary) pad is associated with the negative side of the differential input buffer.

**3. Left and Right (Banks 2, 3, 6 and 7) sys/I/O Buffer Pairs (50% Differential and 100% Single-Ended Outputs)**

The sys/I/O buffer pairs in the left and right banks of the device consist of two single-ended output drivers, two sets of single-ended input buffers (both ratioed and referenced) and one differential output driver. One of the referenced input buffers can also be configured as a differential input. In these banks the two pads in the pair are described as “true” and “comp”, where the true pad is associated with the positive side of the differential I/O, and the comp (complementary) pad is associated with the negative side of the differential I/O.

LVDS differential output drivers are available on 50% of the buffer pairs on the left and right banks.

**4. Bank 8 sys/I/O Buffer Pairs (Single-Ended Outputs, Only on Shared Pins When Not Used by Configuration)**

The sys/I/O buffers in Bank 8 consist of single-ended output drivers and single-ended input buffers (both ratioed and referenced). The referenced input buffer can also be configured as a differential input.

The two pads in the pair are described as “true” and “comp”, where the true pad is associated with the positive side of the differential input buffer and the comp (complementary) pad is associated with the negative side of the differential input buffer.

In LatticeECP2 devices, only the I/Os on the bottom banks have programmable PCI clamps. In LatticeECP2M devices, the I/Os on the left and bottom banks have programmable PCI clamps.

### Typical sys/I/O I/O Behavior During Power-up

The internal power-on-reset (POR) signal is deactivated when  $V_{CC}$ ,  $V_{CCIO8}$  and  $V_{CCAUX}$  have reached satisfactory levels. After the POR signal is deactivated, the FPGA core logic becomes active. It is the user's responsibility to ensure that all other  $V_{CCIO}$  banks are active with valid input logic levels to properly control the output logic states of all the I/O banks that are critical to the application. For more information about controlling the output logic state with valid input logic levels during power-up in LatticeECP2/M devices, see the list of additional technical documentation at the end of this data sheet.

The  $V_{CC}$  and  $V_{CCAUX}$  supply the power to the FPGA core fabric, whereas the  $V_{CCIO}$  supplies power to the I/O buffers. In order to simplify system design while providing consistent and predictable I/O behavior, it is recommended that the I/O buffers be powered-up prior to the FPGA core fabric.  $V_{CCIO}$  supplies should be powered-up before or together with the  $V_{CC}$  and  $V_{CCAUX}$  supplies.

Prior to and throughout programming of the FPGA, the I/O of the device have a weak-pullup resistor to  $V_{CCIO}$  on the input buffer and the output buffer is tri-stated. A pullup to  $V_{CCIO}$  is present on the input until the user programs the input differently in the FPGA design. See the [DC Electrical Characteristics](#) table of this data sheet. The pullup value will be between 20-30K ohms based on the  $V_{CCIO}$  voltage supplied on the board. This pullup will also remain active if the design does not use a particular I/O.

### Supported sys/I/O Standards

The LatticeECP2/M sys/I/O buffer supports both single-ended and differential standards. Single-ended standards can be further subdivided into LVCMOS, LVTTTL and other standards. The buffers support the LVTTTL, LVCMOS 1.2V, 1.5V, 1.8V, 2.5V and 3.3V standards. In the LVCMOS and LVTTTL modes, the buffer has individual configuration options for drive strength, bus maintenance (weak pull-up, weak pull-down, or a bus-keeper latch) and open drain. Other single-ended standards supported include SSTL and HSTL. Differential standards supported include LVDS, MLVDS, BLVDS, LVPECL, RSQS, differential SSTL and differential HSTL. Tables 2-13 and 2-14 show the I/

O standards (together with their supply and reference voltages) supported by LatticeECP2/M devices. For further information about utilizing the sysI/O buffer to support a variety of standards please see the the list of additional technical information at the end of this data sheet.

**Table 2-13. Supported Input Standards**

| Input Standard                   | V <sub>REF</sub> (Nom.) | V <sub>CCIO</sub> <sup>1</sup> (Nom.) |
|----------------------------------|-------------------------|---------------------------------------|
| <b>Single Ended Interfaces</b>   |                         |                                       |
| LVTTL                            | —                       | —                                     |
| LVC MOS33                        | —                       | —                                     |
| LVC MOS25                        | —                       | —                                     |
| LVC MOS18                        | —                       | 1.8                                   |
| LVC MOS15                        | —                       | 1.5                                   |
| LVC MOS12                        | —                       | —                                     |
| PCI 33                           | —                       | 3.3                                   |
| HSTL18 Class I, II               | 0.9                     | —                                     |
| HSTL15 Class I                   | 0.75                    | —                                     |
| SSTL3 Class I, II                | 1.5                     | —                                     |
| SSTL2 Class I, II                | 1.25                    | —                                     |
| SSTL18 Class I, II               | 0.9                     | —                                     |
| <b>Differential Interfaces</b>   |                         |                                       |
| Differential SSTL18 Class I, II  | —                       | —                                     |
| Differential SSTL2 Class I, II   | —                       | —                                     |
| Differential SSTL3 Class I, II   | —                       | —                                     |
| Differential HSTL15 Class I      | —                       | —                                     |
| Differential HSTL18 Class I, II  | —                       | —                                     |
| LVDS, MLVDS, LVPECL, BLVDS, RSDS | —                       | —                                     |

<sup>1</sup> When not specified, V<sub>CCIO</sub> can be set anywhere in the valid operating range (page 3-1).

**Table 2-14. Supported Output Standards**

| Output Standard                  | Drive                      | V <sub>CCIO</sub> (Nom.) |
|----------------------------------|----------------------------|--------------------------|
| <b>Single-ended Interfaces</b>   |                            |                          |
| LVTTL                            | 4mA, 8mA, 12mA, 16mA, 20mA | 3.3                      |
| LVC MOS33                        | 4mA, 8mA, 12mA 16mA, 20mA  | 3.3                      |
| LVC MOS25                        | 4mA, 8mA, 12mA, 16mA, 20mA | 2.5                      |
| LVC MOS18                        | 4mA, 8mA, 12mA, 16mA       | 1.8                      |
| LVC MOS15                        | 4mA, 8mA                   | 1.5                      |
| LVC MOS12                        | 2mA, 6mA                   | 1.2                      |
| LVC MOS33, Open Drain            | 4mA, 8mA, 12mA 16mA, 20mA  | —                        |
| LVC MOS25, Open Drain            | 4mA, 8mA, 12mA 16mA, 20mA  | —                        |
| LVC MOS18, Open Drain            | 4mA, 8mA, 12mA 16mA        | —                        |
| LVC MOS15, Open Drain            | 4mA, 8mA                   | —                        |
| LVC MOS12, Open Drain            | 2mA, 6mA                   | —                        |
| PCI33                            | N/A                        | 3.3                      |
| HSTL18 Class I, II               | N/A                        | 1.8                      |
| HSTL15 Class I                   | N/A                        | 1.5                      |
| SSTL3 Class I, II                | N/A                        | 3.3                      |
| SSTL2 Class I, II                | N/A                        | 2.5                      |
| SSTL18 Class I, II               | N/A                        | 1.8                      |
| <b>Differential Interfaces</b>   |                            |                          |
| Differential SSTL3, Class I, II  | N/A                        | 3.3                      |
| Differential SSTL2, Class I, II  | N/A                        | 2.5                      |
| Differential SSTL18, Class I, II | N/A                        | 1.8                      |
| Differential HSTL18, Class I, II | N/A                        | 1.8                      |
| Differential HSTL15, Class I     | N/A                        | 1.5                      |
| LVDS                             | N/A                        | 2.5                      |
| MLVDS <sup>1</sup>               | N/A                        | 2.5                      |
| BLVDS <sup>1</sup>               | N/A                        | 2.5                      |
| LVPECL <sup>1</sup>              | N/A                        | 3.3                      |
| RSDS <sup>1</sup>                | N/A                        | 2.5                      |
| LVC MOS33D <sup>1</sup>          | 4mA, 8mA, 12mA, 16mA, 20mA | 3.3                      |

1. Emulated with external resistors. For more detail, please see information regarding additional technical documentation at the end of this data sheet.

## Hot Socketing

LatticeECP2/M devices have been carefully designed to ensure predictable behavior during power-up and power-down. During power-up and power-down sequences, the I/Os remain in tri-state until the power supply voltage is high enough to ensure reliable operation. In addition, leakage into I/O pins is controlled within specified limits. This allows for easy integration with the rest of the system. These capabilities make the LatticeECP2/M ideal for many multiple power supply and hot-swap applications.

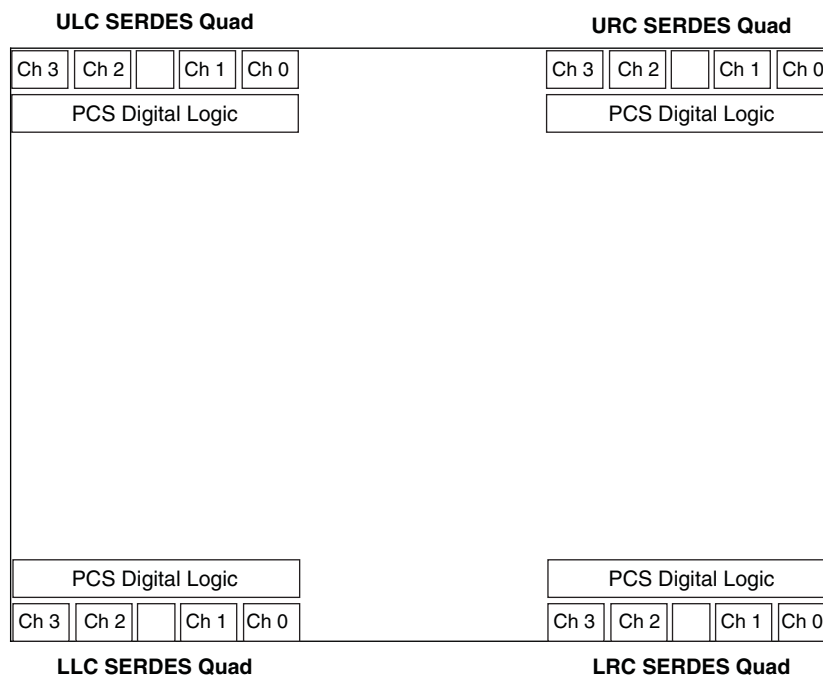


## SERDES and PCS (Physical Coding Sublayer)

LatticeECP2M devices feature up to 16 channels of embedded SERDES arranged in quads at the corners of the devices. Figure 2-39 shows the position of the quad blocks in relation to the PFU array for LatticeECP2M70 and LatticeECP2M100 devices. Table 2-15 shows the location of Quads for all the devices.

Each quad contains four dedicated SERDES (Ch0 to Ch3) for high-speed, full-duplex serial data transfer. Each quad also has a PCS block that interfaces to the SERDES channels and contains digital logic to support an array of popular data protocols. PCS also contains logic to the interface to FPGA core.

**Figure 2-39. SERDES Quads (LatticeECP2M70/LatticeECP2M100)**



**Table 2-15. Available SERDES Quads per LatticeECP2M Devices**

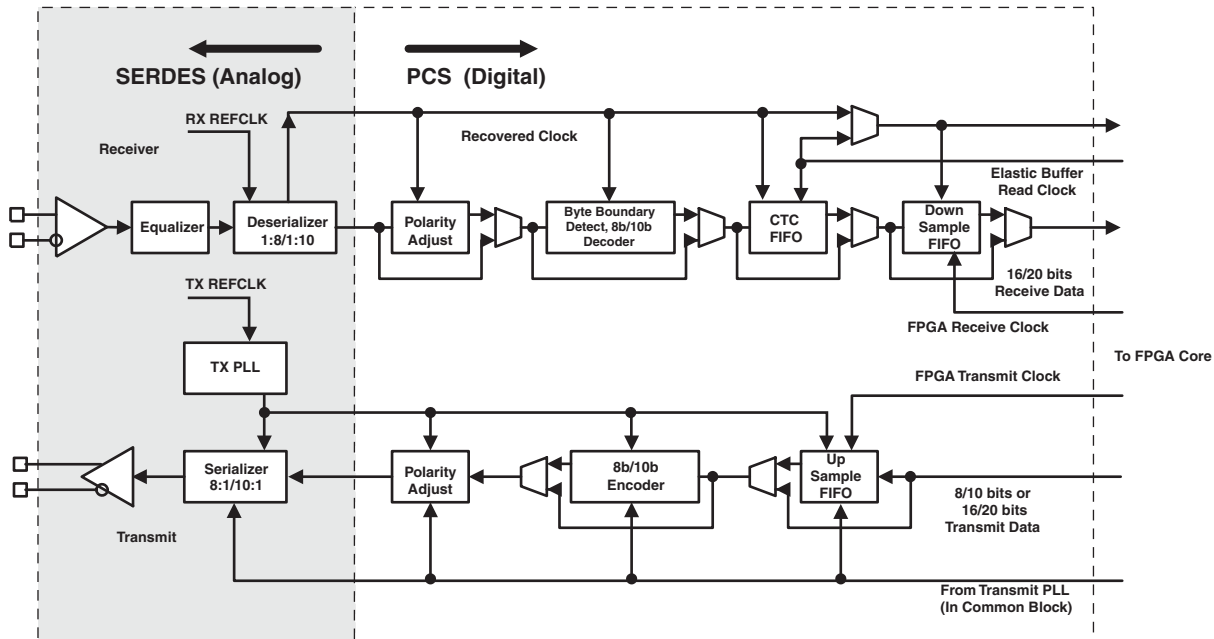
| Device   | URC Quad  | ULC Quad  | LRC Quad  | LLC Quad  |
|----------|-----------|-----------|-----------|-----------|
| ECP2M20  | Available | —         | —         | —         |
| ECP2M35  | Available | —         | —         | —         |
| ECP2M50  | Available | —         | Available | —         |
| ECP2M70  | Available | Available | Available | Available |
| ECP2M100 | Available | Available | Available | Available |

## SERDES Block

A differential receiver receives the serial encoded data stream, equalizes the signal, extracts the buried clock and de-serializes the data-stream before passing the 8- or 10-bit data to the PCS logic. The transmit channel receives the parallel (8- or 10-bit) encoded data, serializes the data and transmits the serial bit stream through the differential buffers. There is a single transmit clock per quad. Figure 2-40 shows a single channel SERDES and its interface to the PCS logic. Each SERDES receiver channel provides a recovered clock to the PCS block and to the FPGA core logic.

Each Transmit and Receive channel has its independent power supplies. The Output and Input buffers of each channel also have their own independent power supplies. In addition, there are separate power supplies for PLL, terminating resistor per quad.

**Figure 2-40. Simplified Channel Block Diagram for SERDES and PCS**



## PCS

As shown in Figure 2-40, the PCS receives the parallel digital data from the deserializer receivers and adjusts the polarity, detects, byte boundary, decodes (8b/10b) and provides Clock Tolerance Compensation (CTC) FIFO for changing the clock domain from receiver clock to the FPGA Clock.

For the transmit channel, the PCS block receives the parallel data from the FPGA core, encodes it with 8b/10b, adjusts the polarity and passes the 8/10 bit data to the transmit SERDES channel.

The PCS also provides bypass modes that allow a direct 8-bit or 10-bit interface from the SERDES to the FPGA logic. The PCS interface to FPGA can also be programmed to run at 1/2 speed for a 16-bit or 20-bit interface to the FPGA logic.

## SCI (SERDES Client Interface) Bus

The SERDES Client Interface (SCI) is a soft IP interface that allow the SERDES/PCS Quad block to be controlled by registers as opposed to the configuration memory cells. It is a simple register configuration interface.

The Diamond design tools support all modes of the PCS. Most modes are dedicated to applications associated with a specific industry standard data protocol. Other more general purpose modes allow users to define their own operation. With Diamond, the user can define the mode for each quad in a design.

Popular standards such as 10Gb Ethernet and x4 PCI-Express and 4x Serial RapidIO can be implemented using IP (provided by Lattice), a single quad (Four SERDES channels and PCS) and some additional logic from the core.

For further information about SERDES, please see the list of additional technical documentation at the end of this data sheet.

---

## IEEE 1149.1-Compliant Boundary Scan Testability

All LatticeECP2/M devices have boundary scan cells that are accessed through an IEEE 1149.1 compliant Test Access Port (TAP). This allows functional testing of the circuit board, on which the device is mounted, through a serial scan path that can access all critical logic nodes. Internal registers are linked internally, allowing test data to be shifted in and loaded directly onto test nodes, or test data to be captured and shifted out for verification. The test access port consists of dedicated I/Os: TDI, TDO, TCK and TMS. The test access port has its own supply voltage  $V_{CCJ}$  and can operate with LVCMOS3.3, 2.5, 1.8, 1.5 and 1.2 standards.

For more details on boundary scan test, please see information regarding additional technical documentation at the end of this data sheet.

## Device Configuration

All LatticeECP2/M devices contain two ports that can be used for device configuration. The Test Access Port (TAP), which supports bit-wide configuration, and the sysCONFIG port, support both byte-wide and serial configuration, including the standard SPI Flash interface. The TAP supports both the IEEE Standard 1149.1 Boundary Scan specification and the IEEE Standard 1532 In-System Configuration specification. The sysCONFIG port is a 20-pin interface with six I/Os used as dedicated pins with the remainder used as dual-use pins. See TN1108, [LatticeECP2/M sysCONFIG Usage Guide](#) for more information about using the dual-use pins as general purpose I/Os.

On power-up, the FPGA SRAM is ready to be configured using the selected sysCONFIG port. Once a configuration port is selected, it will remain active throughout that configuration cycle. The IEEE 1149.1 port can be activated any time after power-up by sending the appropriate command through the TAP port.

## Enhanced Configuration Option

LatticeECP2/M devices have enhanced configuration features such as: decryption support, TransFR™ I/O and dual boot image support.

### 1. Decryption Support

LatticeECP2/M devices provide on-chip, One Time Programmable (OTP) non-volatile key storage to support decryption of a 128-bit AES encrypted bitstream, securing designs and deterring design piracy.

### 2. TransFR (Transparent Field Reconfiguration)

TransFR I/O (TFR) is a unique Lattice technology that allows users to update their logic in the field without interrupting system operation using a single ispVM® command. TransFR I/O allows I/O states to be frozen during device configuration. This allows the device to be field updated with a minimum of system disruption and downtime. See TN1087, [Minimizing System Interruption During Configuration Using TransFR Technology](#), for details.

### 3. Dual Boot Image Support

Dual boot images are supported for applications requiring reliable remote updates of configuration data for the system FPGA. After the system is running with a basic configuration, a new boot image can be downloaded remotely and stored in a separate location in the configuration storage device. Any time after the update the LatticeECP2/M can be re-booted from this new configuration file. If there is a problem, such as corrupt data during download or incorrect version number with this new boot image, the LatticeECP2/M device can revert back to the original backup configuration and try again. This all can be done without power cycling the system.

For more information about device configuration, please see the list of additional technical documentation at the end of this data sheet.

## Soft Error Detect (SED) Support

LatticeECP2/M devices have dedicated logic to perform CRC checks. During configuration, the configuration data bitstream can be checked with the CRC logic block. In addition, the LatticeECP2 device can also be programmed

for checking soft errors (SED) in SRAM. SED can be run on a programmed device when the user logic is not active. If a soft error occurs, during user mode (normal operation) the device can be programmed to either reload from a known good boot image or generate an error signal.

For further information about Soft Error Detect (SED) support, please see the list of additional technical documentation at the end of this data sheet.

### External Resistor

LatticeECP2/M devices require a single external, 10K ohm  $\pm 1\%$  value between the XRES pin and ground. Device configuration will not be completed if this resistor is missing. There is no boundary scan register on the external resistor pad.

### On-Chip Oscillator

Every LatticeECP2/M device has an internal CMOS oscillator which is used to derive a Master Clock for configuration. The oscillator and the Master Clock run continuously and are available to user logic after configuration is completed. The software default value of the Master Clock is 2.5MHz. Table 2-16 lists all the available Master Configuration Clock frequencies for normal non-encrypted mode and encrypted mode. When a different Master Clock is selected during the design process, the following sequence takes place:

1. Device powers up with a Master Clock frequency of 3.1MHz.
2. During configuration, users select a different master clock frequency.
3. The Master Clock frequency changes to the selected frequency once the clock configuration bits are received.
4. If the user does not select a master clock frequency, then the configuration bitstream defaults to the Master Clock frequency of 2.5MHz.

This internal CMOS oscillator is available to the user by routing it as an input clock to the clock tree. For further information about the use of this oscillator for configuration or user mode, please see the list of additional technical documentation at the end of this data sheet.

**Table 2-16. Selectable Master Clock (CCLK) Frequencies During Configuration**

| Non-Encrypted Mode CCLK (MHz) |      |       | Encrypted Mode CCLK (MHz) |
|-------------------------------|------|-------|---------------------------|
| 2.5 <sup>1</sup>              | 13.0 | 45.0  | 2.5 <sup>1</sup>          |
| 4.3                           | 15.0 | 55.0  | 5.4                       |
| 5.4                           | 20.0 | 60.0  | 10.0                      |
| 6.9                           | 26.0 | —     | —                         |
| 8.1                           | 30.0 | —     | —                         |
| 9.2                           | 34.0 | —     | —                         |
| 10.0                          | 41.0 | 130.0 | —                         |

1. Software default frequency.

### Density Shifting

The LatticeECP2/M family is designed to ensure that different density devices in the same family and in the same package have the same pinout. Furthermore, the architecture ensures a high success rate when performing design migration from lower density devices to higher density devices. In many cases, it is also possible to shift a lower utilization design targeted for a high-density device to a lower density device. However, the exact details of the final resource utilization will impact the likelihood of success in each case. Design migration between LatticeECP2 and LatticeECP2M families is not possible. For specific requirements relating to sysCONFIG pins of the ECP2M50, M70 and M100, see the Logic Signal Connections tables.



# LatticeECP2/M Family Data Sheet

## DC and Switching Characteristics

September 2013

Data Sheet DS1006

### Absolute Maximum Ratings<sup>1, 2, 3</sup>

Supply Voltage  $V_{CC}$  . . . . . -0.5 to 1.32V

Supply Voltage  $V_{CCAUX}$  . . . . . -0.5 to 3.75V

Supply Voltage  $V_{CCJ}$  . . . . . -0.5 to 3.75V

Output Supply Voltage  $V_{CCIO}$  . . . . . -0.5 to 3.75V

Input or I/O Tristate Voltage Applied<sup>4</sup> . . . . . -0.5 to 3.75V

Storage Temperature (Ambient) . . . . . -65 to 150°C

Junction Temperature ( $T_j$ ) . . . . . +125°C

1. Stress above those listed under the "Absolute Maximum Ratings" may cause permanent damage to the device. Functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.
2. Compliance with the Lattice [Thermal Management](#) document is required.
3. All voltages referenced to GND.
4. Overshoot and undershoot of -2V to ( $V_{IHMAX} + 2$ ) volts is permitted for a duration of <20ns.

### Recommended Operating Conditions<sup>7</sup>

| Symbol                                                             | Parameter                                       | Min.  | Max.  | Units |
|--------------------------------------------------------------------|-------------------------------------------------|-------|-------|-------|
| $V_{CC}^{1, 4, 5}$                                                 | Core Supply Voltage                             | 1.14  | 1.26  | V     |
| $V_{CCAUX}^{1, 3, 4, 5}$                                           | Auxiliary Supply Voltage                        | 3.135 | 3.465 | V     |
| $V_{CCPLL}$                                                        | PLL Supply Voltage                              | 1.14  | 1.26  | V     |
| $V_{CCIO}^{1, 2, 4}$                                               | I/O Driver Supply Voltage                       | 1.14  | 3.465 | V     |
| $V_{CCJ}^1$                                                        | Supply Voltage for IEEE 1149.1 Test Access Port | 1.14  | 3.465 | V     |
| $t_{JCOM}$                                                         | Junction Temperature, Commercial Operation      | 0     | 85    | °C    |
| $t_{JIND}$                                                         | Junction Temperature, Industrial Operation      | -40   | 100   | °C    |
| <b>SERDES External Power Supply (For LatticeECP2M Family Only)</b> |                                                 |       |       |       |
| $V_{CCIB}$                                                         | Input Buffer Power Supply (1.2V)                | 1.14  | 1.26  | V     |
|                                                                    | Input Buffer Power Supply (1.5V)                | 1.425 | 1.575 | V     |
| $V_{CCOB}$                                                         | Output Buffer Power Supply (1.2V)               | 1.14  | 1.26  | V     |
|                                                                    | Output Buffer Power Supply (1.5V)               | 1.425 | 1.575 | V     |
| $V_{CCAUX33}$                                                      | Termination Resistor Switching Power Supply     | 3.135 | 3.465 | V     |
| $V_{CCR\bar{X}}^6$                                                 | Receive Power Supply                            | 1.14  | 1.26  | V     |
| $V_{CCT\bar{X}}^6$                                                 | Transmit Power Supply                           | 1.14  | 1.26  | V     |

| Symbol      | Parameter                            | Min. | Max. | Units |
|-------------|--------------------------------------|------|------|-------|
| $V_{CCP}^6$ | PLL and Reference Clock Buffer Power | 1.14 | 1.26 | V     |

1. If  $V_{CCIO}$  or  $V_{CCJ}$  is set to 1.2V, they must be connected to the same power supply as  $V_{CC}$ . If  $V_{CCIO}$  or  $V_{CCJ}$  is set to 3.3V, they must be connected to the same power supply as  $V_{CCAUX}$ .  $V_{CCPLL}$  must be connected to the same power supply as  $V_{CC}$  through careful filtering and decoupling.
2. See recommended voltages by I/O standard in subsequent table.
3.  $V_{CCAUX}$  ramp rate must not exceed 30mV/ $\mu$ s during power-up when transitioning between 0V and 3.3V.
4. For proper power-up configuration, users must ensure that the configuration control signals such as the CFGx, INITN, PROGRAMN and DONE pins are driven to the proper logic levels when the device powers up. The device power-up is triggered by the last of  $V_{CC}$ ,  $V_{CCAUX}$  or  $V_{CCIO8}$  supplies that reaches its minimum valid levels. Alternatively, if the configuration control signals are pulled up by  $V_{CCIO8}$ , the  $V_{CCIO8}$  (configuration I/O bank) voltage must be powered up prior to or at the same time as the last of  $V_{CC}$  or  $V_{CCAUX}$  reaches its minimum levels.
5. For power-up,  $V_{CC}$  must reach its valid minimum value before powering up  $V_{CCAUX}$  (LatticeECP2/M "S" version devices only).
6.  $V_{CCRX}$ ,  $V_{CCTX}$  and  $V_{CCP}$  must be tied together in each quad and all quads need to be powered up.
7. For more power supply design recommendations, refer to TN1114 [Electrical Recommendations for Lattice SERDES](#).

## Hot Socketing Specifications<sup>1, 2, 3, 4</sup>

| Symbol       | Parameter                                                                      | Condition                          | Min. | Typ. | Max.    | Units   |
|--------------|--------------------------------------------------------------------------------|------------------------------------|------|------|---------|---------|
| $I_{DK}$     | Input or I/O leakage current                                                   | $0 \leq V_{IN} \leq V_{IH}$ (MAX.) | —    | —    | +/-1000 | $\mu$ A |
| $I_{HDIN}^5$ | SERDES average input current when device is powered down and inputs are driven |                                    | —    | —    | 4       | mA      |

1.  $V_{CC}$ ,  $V_{CCAUX}$  and  $V_{CCIO}$  should rise/fall monotonically.  $V_{CC}$  and  $V_{CCPLL}$  must be connected to the same power supply (applies to ECP2-6, ECP2-12 and ECP2-20 only).
2.  $0 \leq V_{CC} \leq V_{CC} \text{ (MAX)}$ ,  $0 \leq V_{CCIO} \leq V_{CCIO} \text{ (MAX)}$  or  $0 \leq V_{CCAUX} \leq V_{CCAUX} \text{ (MAX)}$ .
3.  $I_{DK}$  is additive to  $I_{PU}$ ,  $I_{PW}$  or  $I_{BH}$ .
4. LVCMOS and LVTTL only.
5. Assumes that the device is powered down with all supplies grounded, both P and N inputs driven by a CML driver with maximum allowed  $V_{CCIB}$  of 1.575V, 8b10b data and internal AC coupling.

## ESD Performance

Please refer to [LatticeECP2/M Product Family Qualification Summary](#) for complete qualification data, including ESD performance.

## DC Electrical Characteristics

### Over Recommended Operating Conditions

| Symbol                 | Parameter                        | Condition                                                                                          | Min.           | Typ. | Max.           | Units   |
|------------------------|----------------------------------|----------------------------------------------------------------------------------------------------|----------------|------|----------------|---------|
| $I_{IL}, I_{IH}^{1,2}$ | Input or I/O Low Leakage         | $0 \leq V_{IN} \leq (V_{CCIO} - 0.2V)$                                                             | —              | —    | 10             | $\mu A$ |
| $I_{IH}^{1,3}$         | Input or I/O High Leakage        | $(V_{CCIO} - 0.2V) < V_{IN} \leq 3.6V$                                                             | —              | —    | 150            | $\mu A$ |
| $I_{PU}$               | I/O Active Pull-up Current       | $0 \leq V_{IN} \leq 0.7 V_{CCIO}$                                                                  | -30            | —    | -210           | $\mu A$ |
| $I_{PD}$               | I/O Active Pull-down Current     | $V_{IL} (MAX) \leq V_{IN} \leq V_{IH} (MAX)$                                                       | 30             | —    | 210            | $\mu A$ |
| $I_{BHLS}$             | Bus Hold Low Sustaining Current  | $V_{IN} = V_{IL} (MAX)$                                                                            | 30             | —    | —              | $\mu A$ |
| $I_{BHHS}$             | Bus Hold High Sustaining Current | $V_{IN} = 0.7 V_{CCIO}$                                                                            | -30            | —    | —              | $\mu A$ |
| $I_{BHLO}$             | Bus Hold Low Overdrive Current   | $0 \leq V_{IN} \leq V_{CCIO}$                                                                      | —              | —    | 210            | $\mu A$ |
| $I_{BHHO}$             | Bus Hold High Overdrive Current  | $0 \leq V_{IN} \leq V_{CCIO}$                                                                      | —              | —    | -210           | $\mu A$ |
| $V_{BHT}$              | Bus Hold Trip Points             | $0 \leq V_{IN} \leq V_{IH} (MAX)$                                                                  | $V_{IL} (MAX)$ | —    | $V_{IH} (MIN)$ | V       |
| $C1^4$                 | I/O Capacitance                  | $V_{CCIO} = 3.3V, 2.5V, 1.8V, 1.5V, 1.2V,$<br>$V_{CC} = 1.2V, V_{IO} = 0 \text{ to } V_{IH} (MAX)$ | —              | 5    | 8              | pf      |
| $C2^4$                 | Dedicated Input Capacitance      | $V_{CCIO} = 3.3V, 2.5V, 1.8V, 1.5V, 1.2V,$<br>$V_{CC} = 1.2V, V_{IO} = 0 \text{ to } V_{IH} (MAX)$ | —              | 5    | 6              | pf      |

1. Input or I/O leakage current is measured with the pin configured as an input or as an I/O with the output driver tri-stated. It is not measured with the output driver active. Bus maintenance circuits are disabled.
2. When used as  $V_{REF}$  maximum leakage = 25 $\mu A$
3. Applicable to general purpose I/Os in top and bottom banks.
4.  $T_A$  25°C,  $f = 1.0MHz$ .

**LatticeECP2 Supply Current (Standby)<sup>1, 2, 3, 4</sup>**
**Over Recommended Operating Conditions**

| Symbol       | Parameter                            | Device                 | Typ. <sup>5</sup> | Units |
|--------------|--------------------------------------|------------------------|-------------------|-------|
| $I_{CC}$     | Core Power Supply Current            | ECP2-6                 | 10                | mA    |
|              |                                      | ECP2-12                | 20                | mA    |
|              |                                      | ECP2-20                | 30                | mA    |
|              |                                      | ECP2-35                | 50                | mA    |
|              |                                      | ECP2-50                | 70                | mA    |
|              |                                      | ECP2-70                | 100               | mA    |
| $I_{CCAUX}$  | Auxiliary Power Supply Current       | ECP2-6                 | 24                | mA    |
|              |                                      | ECP2-12                | 24                | mA    |
|              |                                      | ECP2-20                | 24                | mA    |
|              |                                      | ECP2-35                | 24                | mA    |
|              |                                      | ECP2-50                | 24                | mA    |
|              |                                      | ECP2-70                | 24                | mA    |
| $I_{CCGPLL}$ | GPLL Power Supply Current (per GPLL) | ECP2-35, -50, -70 Only | 0.5               | mA    |
| $I_{CCSPLL}$ | GPLL Power Supply Current (per SPLL) | ECP2-35, -50, -70 Only | 0.5               | mA    |
| $I_{CCIO}$   | Bank Power Supply Current (Per Bank) | ECP2-6                 | 2                 | mA    |
|              |                                      | ECP2-12                | 2                 | mA    |
|              |                                      | ECP2-20                | 2                 | mA    |
|              |                                      | ECP2-35                | 2                 | mA    |
|              |                                      | ECP2-50                | 2                 | mA    |
|              |                                      | ECP2-70                | 2                 | mA    |
| $I_{CCJ}$    | VCCJ Power Supply Current            | All Devices            | 3                 | mA    |

1. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.
2. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the  $V_{CCIO}$  or GND.
3. Frequency 0MHz.
4. Pattern represents a "blank" configuration data file.
5.  $T_J = 25^{\circ}\text{C}$ , power supplies at normal voltage.



**LatticeECP2M Supply Current (Standby)<sup>1, 2, 3, 4</sup>**
**Over Recommended Operating Conditions**

| Symbol       | Parameter                            | Device      | Typ. <sup>5</sup> | Units |
|--------------|--------------------------------------|-------------|-------------------|-------|
| $I_{CC}$     | Core Power Supply Current            | ECP2M20     | 25                | mA    |
|              |                                      | ECP2M35     | 50                | mA    |
|              |                                      | ECP2M50     | 85                | mA    |
|              |                                      | ECP2M70     | 100               | mA    |
|              |                                      | ECP2M100    | 100               | mA    |
| $I_{CCAUX}$  | Auxiliary Power Supply Current       | ECP2M20     | 24                | mA    |
|              |                                      | ECP2M35     | 24                | mA    |
|              |                                      | ECP2M50     | 24                | mA    |
|              |                                      | ECP2M70     | 24                | mA    |
|              |                                      | ECP2M100    | 24                | mA    |
| $I_{CCGPLL}$ | GPLL Power Supply Current (per GPLL) | All Devices | 0.5               | mA    |
| $I_{CCSPLL}$ | GPLL Power Supply Current (per SPLL) | All Devices | 0.5               | mA    |
| $I_{CCIO}$   | Bank Power Supply Current (Per Bank) | ECP2M20     | 2                 | mA    |
|              |                                      | ECP2M35     | 2                 | mA    |
|              |                                      | ECP2M50     | 2                 | mA    |
|              |                                      | ECP2M70     | 2                 | mA    |
|              |                                      | ECP2M100    | 2                 | mA    |
| $I_{CCJ}$    | $V_{CCJ}$ Power Supply Current       | All Devices | 3                 | mA    |

1. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.

2. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the  $V_{CCIO}$  or GND.

3. Frequency 0MHz.

4. Pattern represents a "blank" configuration data file.

5.  $T_J = 25^{\circ}\text{C}$ , power supplies at normal voltage.

**LatticeECP2 Initialization Supply Current<sup>1, 2, 3, 4</sup>**
**Over Recommended Operating Conditions**

| Symbol       | Parameter                            | Device                 | Typ. <sup>5, 6, 7</sup> | Units |
|--------------|--------------------------------------|------------------------|-------------------------|-------|
| $I_{CC}$     | Core Power Supply Current            | ECP2-6                 | 34                      | mA    |
|              |                                      | ECP2-12                | 54                      | mA    |
|              |                                      | ECP2-20                | 82                      | mA    |
|              |                                      | ECP2-35                | 135                     | mA    |
|              |                                      | ECP2-50                | 187                     | mA    |
|              |                                      | ECP2-70                | 267                     | mA    |
| $I_{CCAUx}$  | Auxiliary Power Supply Current       | ECP2-6                 | 30                      | mA    |
|              |                                      | ECP2-12                | 30                      | mA    |
|              |                                      | ECP2-20                | 30                      | mA    |
|              |                                      | ECP2-35                | 30                      | mA    |
|              |                                      | ECP2-50                | 30                      | mA    |
|              |                                      | ECP2-70                | 30                      | mA    |
| $I_{CCGPLL}$ | GPLL Power Supply Current (per GPLL) | ECP2-35, -50, -70 Only | 0.5                     | mA    |
| $I_{CCSPLL}$ | SPLL Power Supply Current (per SPLL) | ECP2-35, -50, -70 Only | 0.5                     | mA    |
| $I_{CCIO}$   | Bank Power Supply Current (per Bank) | All Devices            | 3                       | mA    |
| $I_{CCJ}$    | VCCJ Power Supply Current            | All Devices            | 4                       | mA    |

1. Until DONE signal is active.

2. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.

3. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the  $V_{CCIO}$  or GND.

4. Frequency 0MHz.

5.  $T_J = 25^{\circ}\text{C}$ , power supplies at nominal voltage.

6. A specific configuration pattern is used that scales with the size of the device; consists of 75% PFU utilization, 50% EBR, and 25% I/O configuration.

7. Values shown in this column are the typical average DC current during configuration. Use the Power Calculator tool to find the peak startup current.

**LatticeECP2M Initialization Supply Current<sup>1, 2, 3, 4</sup>**
**Over Recommended Operating Conditions**

| Symbol       | Parameter                            | Device      | Typ. <sup>5, 6, 7</sup> | Units |
|--------------|--------------------------------------|-------------|-------------------------|-------|
| $I_{CC}$     | Core Power Supply Current            | ECP2M20     | 41                      | mA    |
|              |                                      | ECP2M35     | 107                     | mA    |
|              |                                      | ECP2M50     | 169                     | mA    |
|              |                                      | ECP2M70     | 254                     | mA    |
|              |                                      | ECP2M100    | 378                     | mA    |
| $I_{CCAUX}$  | Auxiliary Power Supply Current       | ECP2M20     | 30                      | mA    |
|              |                                      | ECP2M35     | 30                      | mA    |
|              |                                      | ECP2M50     | 30                      | mA    |
|              |                                      | ECP2M70     | 30                      | mA    |
|              |                                      | ECP2M100    | 30                      | mA    |
| $I_{CCGPLL}$ | GPLL Power Supply Current (per GPLL) | All Devices | 0.5                     | mA    |
| $I_{CCSPLL}$ | SPLL Power Supply Current (per SPLL) | All Devices | 0.5                     | mA    |
| $I_{CCIO}$   | Bank Power Supply Current (per Bank) | All Devices | 3                       | mA    |
| $I_{CCJ}$    | VCCJ Power Supply Current            | All Devices | 4                       | mA    |

1. Until DONE signal is active.

2. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.

3. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the  $V_{CCIO}$  or GND.

4. Frequency 0MHz.

5.  $T_J = 25^{\circ}\text{C}$ , power supplies at nominal voltage.

6. A specific configuration pattern is used that scales with the size of the device; consists of 75% PFU utilization, 50% EBR, and 25% I/O configuration.

7. Values shown in this column are the typical average DC current during configuration. Use the Power Calculator tool to find the peak startup current.

## SERDES Power Supply Requirements (LatticeECP2M Family Only)<sup>1</sup>

Over Recommended Operating Conditions

| Symbol                                    | Description                                        | Typ. <sup>2</sup> | Units |
|-------------------------------------------|----------------------------------------------------|-------------------|-------|
| <b>Standby (Power Down)</b>               |                                                    |                   |       |
| I <sub>CCTX-SB</sub>                      | V <sub>CCTX</sub> current (per channel)            | 10                | μA    |
| I <sub>CCR<sub>X</sub>-SB</sub>           | V <sub>CCR<sub>X</sub></sub> current (per channel) | 75                | μA    |
| I <sub>CCIB-SB</sub>                      | Input buffer current (per channel)                 | 0                 | μA    |
| I <sub>CCOB-SB</sub>                      | Output buffer current (per channel)                | 0                 | μA    |
| I <sub>CCP-SB</sub>                       | SERDES PLL current (per quad)                      | 30                | μA    |
| I <sub>CCAX33-SB</sub>                    | SERDES termination current (per quad)              | 10                | μA    |
| <b>Operating (Data Rate = 3.125 Gbps)</b> |                                                    |                   |       |
| I <sub>CCTX-OP</sub>                      | V <sub>CCTX</sub> current (per channel)            | 19                | mA    |
| I <sub>CCR<sub>X</sub>-OP</sub>           | V <sub>CCR<sub>X</sub></sub> current (per channel) | 34                | mA    |
| I <sub>CCIB-OP</sub>                      | Input buffer current (per channel)                 | 4                 | mA    |
| I <sub>CCOB-OP</sub>                      | Output buffer current (per channel)                | 13                | mA    |
| I <sub>CCP-OP</sub>                       | SERDES PLL current (per quad)                      | 26                | mA    |
| I <sub>CCAX33-OP</sub>                    | SERDES termination current (per quad)              | 0.01              | mA    |

1. Equalization enabled, pre-emphasis disabled.

2. T<sub>J</sub> = 25°C, power supplies at nominal voltage.

## SERDES Power (LatticeECP2M Family Only)

Table 3-1 presents the SERDES power for one channel.

**Table 3-1. SERDES Power<sup>1</sup>**

| Symbol                | Description                             | Typ. <sup>2</sup> | Units |
|-----------------------|-----------------------------------------|-------------------|-------|
| P <sub>S-1CH-31</sub> | SERDES power (one channel @ 3.125 Gbps) | 90                | mW    |
| P <sub>S-1CH-25</sub> | SERDES power (one channel @ 2.5 Gbps)   | 87                | mW    |
| P <sub>S-1CH-12</sub> | SERDES power (one channel @ 1.25 Gbps)  | 86                | mW    |
| P <sub>S-1CH-02</sub> | SERDES power (one channel @ 250 Mbps)   | 76                | mW    |

1. One quarter of the total quad power (includes contribution from common circuits, all channels in the quad operating, pre-emphasis disabled, equalization enabled).

2. Typical values measured at 25°C and 1.2V.

## sysI/O Recommended Operating Conditions

| Standard                                 | V <sub>CCIO</sub> |      |       | V <sub>REF</sub> (V) |      |       |
|------------------------------------------|-------------------|------|-------|----------------------|------|-------|
|                                          | Min.              | Typ. | Max.  | Min.                 | Typ. | Max.  |
| LVC MOS 3.3 <sup>2</sup>                 | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| LVC MOS 2.5 <sup>2</sup>                 | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| LVC MOS 1.8                              | 1.71              | 1.8  | 1.89  | —                    | —    | —     |
| LVC MOS 1.5                              | 1.425             | 1.5  | 1.575 | —                    | —    | —     |
| LVC MOS 1.2 <sup>2</sup>                 | 1.14              | 1.2  | 1.26  | —                    | —    | —     |
| LVTTL <sup>2</sup>                       | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| PCI                                      | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| SSTL18 <sup>2</sup> Class I, II          | 1.71              | 1.8  | 1.89  | 0.833                | 0.9  | 0.969 |
| SSTL2 <sup>2</sup> Class I, II           | 2.375             | 2.5  | 2.625 | 1.15                 | 1.25 | 1.35  |
| SSTL3 <sup>2</sup> Class I, II           | 3.135             | 3.3  | 3.465 | 1.3                  | 1.5  | 1.7   |
| HSTL <sup>2</sup> 15 Class I             | 1.425             | 1.5  | 1.575 | 0.68                 | 0.75 | 0.9   |
| HSTL <sup>2</sup> 18 Class I, II         | 1.71              | 1.8  | 1.89  | 0.816                | 0.9  | 1.08  |
| LVDS <sup>2</sup>                        | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| MLVDS25 <sup>1</sup>                     | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| LVPECL33 <sup>1,2</sup>                  | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| BLVDS25 <sup>1,2</sup>                   | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| RSDS <sup>1,2</sup>                      | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| SSTL18D_I <sup>2</sup> , II <sup>2</sup> | 1.71              | 1.8  | 1.89  | —                    | —    | —     |
| SSTL25D_I <sup>2</sup> , II <sup>2</sup> | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| SSTL33D_I <sup>2</sup> , II <sup>2</sup> | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| HSTL15D_I <sup>2</sup>                   | 1.425             | 1.5  | 1.575 | —                    | —    | —     |
| HSTL18D_I <sup>2</sup> , II <sup>2</sup> | 1.71              | 1.8  | 1.89  | —                    | —    | —     |

1. Inputs on chip. Outputs are implemented with the addition of external resistors.

2. Input on this standard does not depend on the value of V<sub>CCIO</sub>.

## sys/I/O Single-Ended DC Electrical Characteristics

| Input/Output Standard | $V_{IL}$ |                   | $V_{IH}$          |          | $V_{OL}$<br>Max. (V) | $V_{OH}$<br>Min. (V) | $I_{OL}^1$ (mA)  | $I_{OH}^1$ (mA)       |
|-----------------------|----------|-------------------|-------------------|----------|----------------------|----------------------|------------------|-----------------------|
|                       | Min. (V) | Max. (V)          | Min. (V)          | Max. (V) |                      |                      |                  |                       |
| LVCMOS 3.3            | -0.3     | 0.8               | 2.0               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVTTTL                | -0.3     | 0.8               | 2.0               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 2.5            | -0.3     | 0.7               | 1.7               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.8            | -0.3     | $0.35 V_{CCIO}$   | $0.65 V_{CCIO}$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 16, 12, 8, 4     | -16, -12, -8, -4      |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.5            | -0.3     | $0.35 V_{CCIO}$   | $0.65 V_{CCIO}$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 8, 4             | -8, -4                |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.2            | -0.3     | $0.35 V_{CC}$     | $0.65 V_{CC}$     | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 6, 2             | -6, -2                |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| PCI                   | -0.3     | $0.3 V_{CCIO}$    | $0.5 V_{CCIO}$    | 3.6      | $0.1 V_{CCIO}$       | $0.9 V_{CCIO}$       | 1.5              | -0.5                  |
| SSTL3 Class I         | -0.3     | $V_{REF} - 0.2$   | $V_{REF} + 0.2$   | 3.6      | 0.7                  | $V_{CCIO} - 1.1$     | 8                | -8                    |
| SSTL3 Class II        | -0.3     | $V_{REF} - 0.2$   | $V_{REF} + 0.2$   | 3.6      | 0.5                  | $V_{CCIO} - 0.9$     | 16               | -16                   |
| SSTL2 Class I         | -0.3     | $V_{REF} - 0.18$  | $V_{REF} + 0.18$  | 3.6      | 0.54                 | $V_{CCIO} - 0.62$    | 7.6              | -7.6                  |
|                       |          |                   |                   |          |                      |                      | 12               | -12                   |
| SSTL2 Class II        | -0.3     | $V_{REF} - 0.18$  | $V_{REF} + 0.18$  | 3.6      | 0.35                 | $V_{CCIO} - 0.43$    | 15.2             | -15.2                 |
|                       |          |                   |                   |          |                      |                      | 20               | -20                   |
| SSTL18 Class I        | -0.3     | $V_{REF} - 0.125$ | $V_{REF} + 0.125$ | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 6.7              | -6.7                  |
| SSTL18 Class II       | -0.3     | $V_{REF} - 0.125$ | $V_{REF} + 0.125$ | 3.6      | 0.28                 | $V_{CCIO} - 0.28$    | 8                | -8                    |
|                       |          |                   |                   |          |                      |                      | 11               | -11                   |
| HSTL Class I          | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 4                | -4                    |
|                       |          |                   |                   |          |                      |                      | 8                | -8                    |
| HSTL18 Class I        | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 8                | -8                    |
|                       |          |                   |                   |          |                      |                      | 12               | -12                   |
| HSTL18 Class II       | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 16               | -16                   |

1. The average DC current drawn by I/Os between GND connections, or between the last GND in an I/O bank and the end of an I/O bank, as shown in the logic signal connections table shall not exceed  $n * 8\text{mA}$ , where n is the number of I/Os between bank GND connections or between the last GND in a bank and the end of a bank.

## sysI/O Differential Electrical Characteristics

### LVDS

#### Over Recommended Operating Conditions

| Parameter         | Description                                  | Test Conditions                                    | Min.   | Typ. | Max.  | Units   |
|-------------------|----------------------------------------------|----------------------------------------------------|--------|------|-------|---------|
| $V_{INP} V_{INM}$ | Input Voltage                                |                                                    | 0      | —    | 2.4   | V       |
| $V_{CM}$          | Input Common Mode Voltage                    | Half the Sum of the Two Inputs                     | 0.05   | —    | 2.35  | V       |
| $V_{THD}$         | Differential Input Threshold                 | Difference Between the Two Inputs                  | +/-100 | —    | —     | mV      |
| $I_{IN}$          | Input Current                                | Power On or Power Off                              | —      | —    | +/-10 | $\mu$ A |
| $V_{OH}$          | Output High Voltage for $V_{OP}$ or $V_{OM}$ | $R_T = 100$ Ohm                                    | —      | 1.38 | 1.60  | V       |
| $V_{OL}$          | Output Low Voltage for $V_{OP}$ or $V_{OM}$  | $R_T = 100$ Ohm                                    | 0.9V   | 1.03 | —     | V       |
| $V_{OD}$          | Output Voltage Differential                  | $(V_{OP} - V_{OM})$ , $R_T = 100$ Ohm              | 250    | 350  | 450   | mV      |
| $\gamma V_{OD}$   | Change in $V_{OD}$ Between High and Low      |                                                    | —      | —    | 50    | mV      |
| $V_{OS}$          | Output Voltage Offset                        | $(V_{OP} + V_{OM})/2$ , $R_T = 100$ Ohm            | 1.125  | 1.20 | 1.375 | V       |
| $\gamma V_{OS}$   | Change in $V_{OS}$ Between H and L           |                                                    | —      | —    | 50    | mV      |
| $I_{SA}$          | Output Short Circuit Current                 | $V_{OD} = 0V$ Driver Outputs Shorted to Ground     | —      | —    | 24    | mA      |
| $I_{SAB}$         | Output Short Circuit Current                 | $V_{OD} = 0V$ Driver Outputs Shorted to Each Other | —      | —    | 12    | mA      |

### Differential HSTL and SSTL

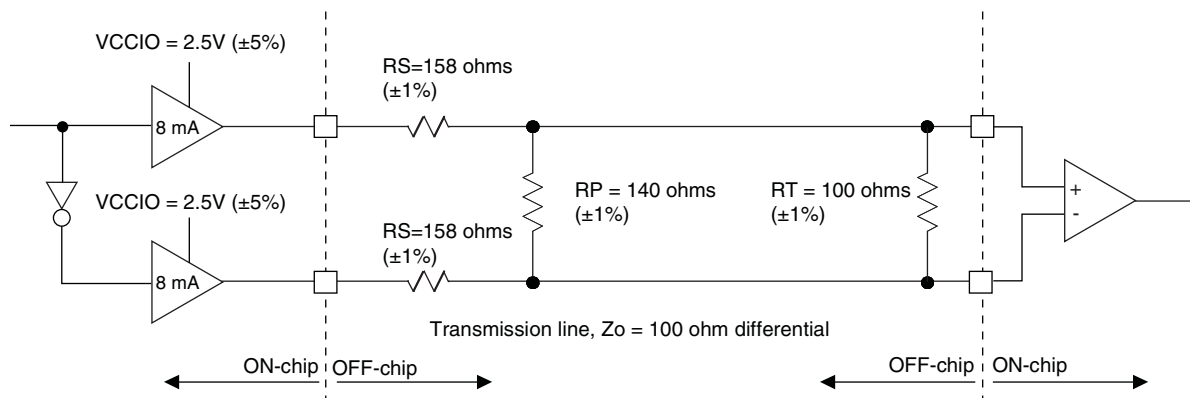
Differential HSTL and SSTL outputs are implemented as a pair of complementary single-ended outputs. All allowable single-ended output classes (class I and class II) are supported in this mode.

For further information about LVPECL, RSDS, MLVDS, BLVDS and other differential interfaces please see the list of additional technical information at the end of this data sheet.

### LVDS25E

The top and bottom sides of LatticeECP2/M devices support LVDS outputs via emulated complementary LVCMOS outputs in conjunction with a parallel resistor across the driver outputs. The scheme shown in Figure 3-1 is one possible solution for point-to-point signals.

**Figure 3-1. LVDS25E Output Termination Example**



**Table 3-2. LVDS25E DC Conditions**

| Parameter  | Description                      | Typical | Units    |
|------------|----------------------------------|---------|----------|
| $V_{CCIO}$ | Output Driver Supply (+/-5%)     | 2.50    | V        |
| $Z_{OUT}$  | Driver Impedance                 | 20      | $\Omega$ |
| $R_S$      | Driver Series Resistor (+/-1%)   | 158     | $\Omega$ |
| $R_P$      | Driver Parallel Resistor (+/-1%) | 140     | $\Omega$ |
| $R_T$      | Receiver Termination (+/-1%)     | 100     | $\Omega$ |
| $V_{OH}$   | Output High Voltage              | 1.43    | V        |
| $V_{OL}$   | Output Low Voltage               | 1.07    | V        |
| $V_{OD}$   | Output Differential Voltage      | 0.35    | V        |
| $V_{CM}$   | Output Common Mode Voltage       | 1.25    | V        |
| $Z_{BACK}$ | Back Impedance                   | 100.5   | $\Omega$ |
| $I_{DC}$   | DC Output Current                | 6.03    | mA       |

### LVCMOS33D

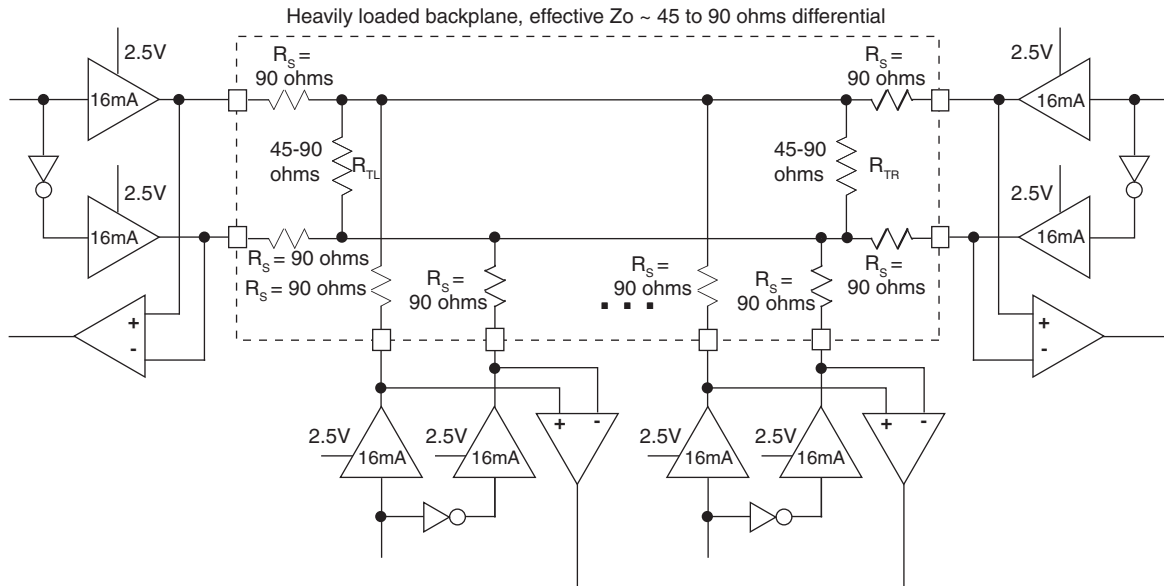
All I/O banks support emulated differential I/O using the LVCMOS33D I/O type. This option, along with the external resistor network, provides the system designer the flexibility to place differential outputs on an I/O bank with 3.3V VCCIO. The default drive current for LVCMOS33D output is 12mA with the option to change the device strength to 4mA, 8mA, 16mA or 20mA. Follow the LVCMOS33 specifications for the DC characteristics of the LVCMOS33D.



### BLVDS

The LatticeECP2/M devices support the BLVDS standard. This standard is emulated using complementary LVC-MOS outputs in conjunction with a parallel external resistor across the driver outputs. BLVDS is intended for use when multi-drop and bi-directional multi-point differential signaling is required. The scheme shown in Figure 3-2 is one possible solution for bi-directional multi-point differential signals.

**Figure 3-2. BLVDS Multi-point Output Example**



**Table 3-3. BLVDS DC Conditions<sup>1</sup>**

#### Over Recommended Operating Conditions

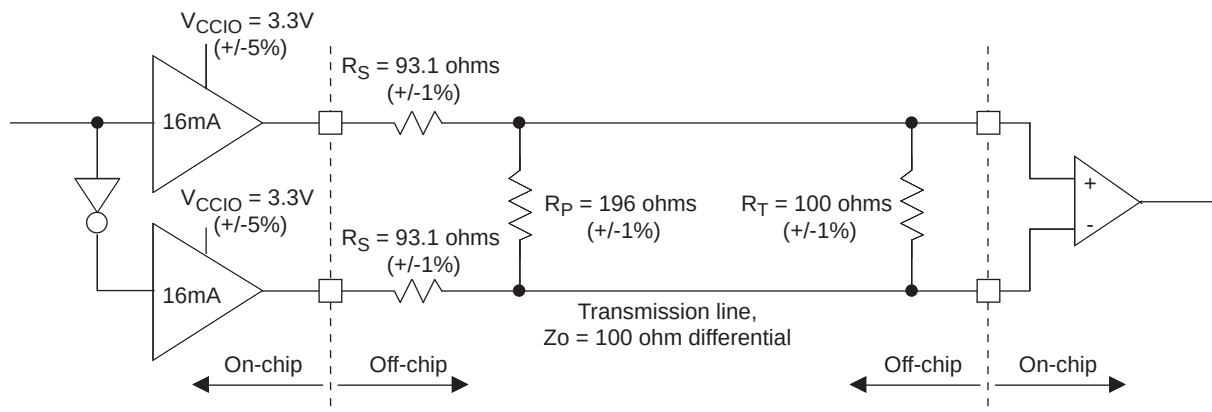
| Parameter         | Description                       | Typical  |          | Units |
|-------------------|-----------------------------------|----------|----------|-------|
|                   |                                   | Zo = 45Ω | Zo = 90Ω |       |
| V <sub>CCIO</sub> | Output Driver Supply (+/- 5%)     | 2.50     | 2.50     | V     |
| Z <sub>OUT</sub>  | Driver Impedance                  | 10.00    | 10.00    | Ω     |
| R <sub>S</sub>    | Driver Series Resistor (+/- 1%)   | 90.00    | 90.00    | Ω     |
| R <sub>TL</sub>   | Driver Parallel Resistor (+/- 1%) | 45.00    | 90.00    | Ω     |
| R <sub>TR</sub>   | Receiver Termination (+/- 1%)     | 45.00    | 90.00    | Ω     |
| V <sub>OH</sub>   | Output High Voltage               | 1.38     | 1.48     | V     |
| V <sub>OL</sub>   | Output Low Voltage                | 1.12     | 1.02     | V     |
| V <sub>OD</sub>   | Output Differential Voltage       | 0.25     | 0.46     | V     |
| V <sub>CM</sub>   | Output Common Mode Voltage        | 1.25     | 1.25     | V     |
| I <sub>DC</sub>   | DC Output Current                 | 11.24    | 10.20    | mA    |

1. For input buffer, see LVDS table.

### LVPECL

The LatticeECP2/M devices support the differential LVPECL standard. This standard is emulated using complementary LVCMOS outputs in conjunction with a parallel resistor across the driver outputs. The LVPECL input standard is supported by the LVDS differential input buffer. The scheme shown in Figure 3-3 is one possible solution for point-to-point signals.

**Figure 3-3. Differential LVPECL**



**Table 3-4. LVPECL DC Conditions<sup>1</sup>**

#### Over Recommended Operating Conditions

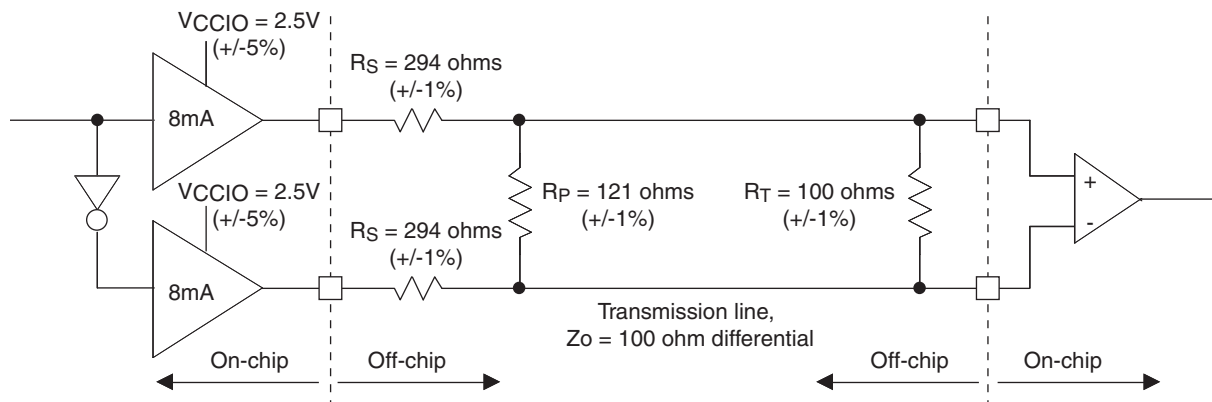
| Parameter  | Description                            | Typical | Units    |
|------------|----------------------------------------|---------|----------|
| $V_{CCIO}$ | Output Driver Supply ( $\pm 5\%$ )     | 3.30    | V        |
| $Z_{OUT}$  | Driver Impedance                       | 10      | $\Omega$ |
| $R_S$      | Driver Series Resistor ( $\pm 1\%$ )   | 93      | $\Omega$ |
| $R_P$      | Driver Parallel Resistor ( $\pm 1\%$ ) | 196     | $\Omega$ |
| $R_T$      | Receiver Termination ( $\pm 1\%$ )     | 100     | $\Omega$ |
| $V_{OH}$   | Output High Voltage                    | 2.05    | V        |
| $V_{OL}$   | Output Low Voltage                     | 1.25    | V        |
| $V_{OD}$   | Output Differential Voltage            | 0.80    | V        |
| $V_{CM}$   | Output Common Mode Voltage             | 1.65    | V        |
| $Z_{BACK}$ | Back Impedance                         | 100.5   | $\Omega$ |
| $I_{DC}$   | DC Output Current                      | 12.11   | mA       |

1. For input buffer, see LVDS table.

### RSDS

The LatticeECP2/M devices support differential RSDS standard. This standard is emulated using complementary LVCMOS outputs in conjunction with a parallel resistor across the driver outputs. The RSDS input standard is supported by the LVDS differential input buffer. The scheme shown in Figure 3-4 is one possible solution for RSDS standard implementation. Resistor values in Figure 3-4 are industry standard values for 1% resistors.

**Figure 3-4. RSDS (Reduced Swing Differential Signaling)**



**Table 3-5. RSDS DC Conditions<sup>1</sup>**

#### Over Recommended Operating Conditions

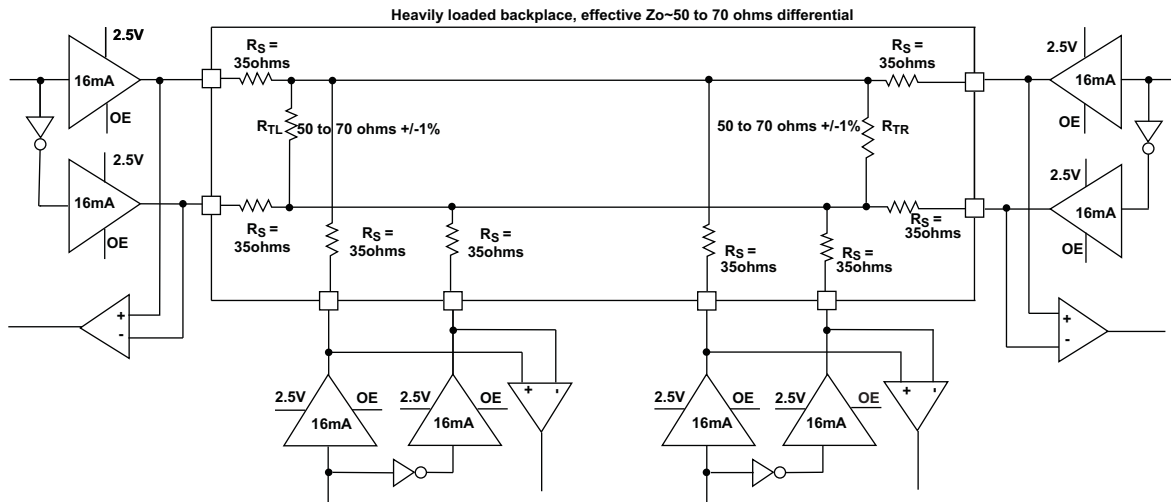
| Parameter         | Description                      | Typical | Units |
|-------------------|----------------------------------|---------|-------|
| V <sub>CCIO</sub> | Output Driver Supply (+/-5%)     | 2.50    | V     |
| Z <sub>OUT</sub>  | Driver Impedance                 | 20      | Ω     |
| R <sub>S</sub>    | Driver Series Resistor (+/-1%)   | 294     | Ω     |
| R <sub>P</sub>    | Driver Parallel Resistor (+/-1%) | 121     | Ω     |
| R <sub>T</sub>    | Receiver Termination (+/-1%)     | 100     | Ω     |
| V <sub>OH</sub>   | Output High Voltage              | 1.35    | V     |
| V <sub>OL</sub>   | Output Low Voltage               | 1.15    | V     |
| V <sub>OD</sub>   | Output Differential Voltage      | 0.20    | V     |
| V <sub>CM</sub>   | Output Common Mode Voltage       | 1.25    | V     |
| Z <sub>BACK</sub> | Back Impedance                   | 101.5   | Ω     |
| I <sub>DC</sub>   | DC Output Current                | 3.66    | mA    |

1. For input buffer, see LVDS table.

### MLVDS

The LatticeECP2/M devices support the differential MLVDS standard. This standard is emulated using complementary LVCMOS outputs in conjunction with a parallel resistor across the driver outputs. The MLVDS input standard is supported by the LVDS differential input buffer. The scheme shown in Figure 3-5 is one possible solution for MLVDS standard implementation. Resistor values in Figure 3-5 are industry standard values for 1% resistors.

**Figure 3-5. MLVDS (Multipoint Low Voltage Differential Signaling)**



**Table 3-6. MLVDS DC Conditions<sup>1</sup>**

| Parameter         | Description                      | Typical             |                     | Units |
|-------------------|----------------------------------|---------------------|---------------------|-------|
|                   |                                  | Z <sub>o</sub> =50Ω | Z <sub>o</sub> =70Ω |       |
| V <sub>CCIO</sub> | Output Driver Supply (+/-5%)     | 2.50                | 2.50                | V     |
| Z <sub>OUT</sub>  | Driver Impedance                 | 10.00               | 10.00               | Ω     |
| R <sub>S</sub>    | Driver Series Resistor (+/-1%)   | 35.00               | 35.00               | Ω     |
| R <sub>TL</sub>   | Driver Parallel Resistor (+/-1%) | 50.00               | 70.00               | Ω     |
| R <sub>TR</sub>   | Receiver Termination (+/-1%)     | 50.00               | 70.00               | Ω     |
| V <sub>OH</sub>   | Output High Voltage              | 1.52                | 1.60                | V     |
| V <sub>OL</sub>   | Output Low Voltage               | 0.98                | 0.90                | V     |
| V <sub>OD</sub>   | Output Differential Voltage      | 0.54                | 0.70                | V     |
| V <sub>CM</sub>   | Output Common Mode Voltage       | 1.25                | 1.25                | V     |
| I <sub>DC</sub>   | DC Output Current                | 21.74               | 20.00               | mA    |

1. For input buffer, see LVDS table.

For further information about LVPECL, RSDS, MLVDS, BLVDS and other differential interfaces please see the list of additional technical information at the end of this data sheet.

## Typical Building Block Function Performance<sup>1</sup>

### Pin-to-Pin Performance (LVCMOS25 12mA Drive)

| Function               | -7 Timing | Units |
|------------------------|-----------|-------|
| <b>Basic Functions</b> |           |       |
| 16-bit Decoder         | 3.8       | ns    |
| 32-bit Decoder         | 4.5       | ns    |
| 64-bit Decoder         | 5.0       | ns    |
| 4:1 MUX                | 3.2       | ns    |
| 8:1 MUX                | 3.4       | ns    |
| 16:1 MUX               | 3.5       | ns    |
| 32:1 MUX               | 4.0       | ns    |

1. These timing numbers were generated using the ispLEVER 8.0 design tool. Exact performance may vary with device and tool version. The tool uses internal parameters that have been characterized but are not tested on every device.

### Register-to-Register Performance

| Function                                                                   | -7 Timing | Units |
|----------------------------------------------------------------------------|-----------|-------|
| <b>Basic Functions</b>                                                     |           |       |
| 16-bit Decoder                                                             | 599       | MHz   |
| 32-bit Decoder                                                             | 542       | MHz   |
| 64-bit Decoder                                                             | 417       | MHz   |
| 4:1 MUX                                                                    | 847       | MHz   |
| 8:1 MUX                                                                    | 803       | MHz   |
| 16:1 MUX                                                                   | 660       | MHz   |
| 32:1 MUX                                                                   | 577       | MHz   |
| 8-bit Adder                                                                | 591       | MHz   |
| 16-bit Adder                                                               | 500       | MHz   |
| 64-bit Adder                                                               | 306       | MHz   |
| 16-bit Counter                                                             | 488       | MHz   |
| 32-bit Counter                                                             | 378       | MHz   |
| 64-bit Counter                                                             | 260       | MHz   |
| 64-bit Accumulator                                                         | 253       | MHz   |
| <b>Embedded Memory Functions</b>                                           |           |       |
| 512x36 Single Port RAM, EBR Output Registers                               | 370       | MHz   |
| 1024x18 True-Dual Port RAM (Write Through or Normal, EBR Output Registers) | 370       | MHz   |
| 1024x18 True-Dual Port RAM (Write Through or Normal, PLC Output Registers) | 280       | MHz   |
| <b>Distributed Memory Functions</b>                                        |           |       |
| 16x4 Pseudo-Dual Port RAM (One PFU)                                        | 819       | MHz   |
| 32x4 Pseudo-Dual Port RAM                                                  | 521       | MHz   |
| 64x8 Pseudo-Dual Port RAM                                                  | 435       | MHz   |
| <b>DSP Functions</b>                                                       |           |       |
| 18x18 Multiplier (All Registers)                                           | 420       | MHz   |
| 9x9 Multiplier (All Registers)                                             | 420       | MHz   |

**Register-to-Register Performance (Continued)**

| Function                                                    | -7 Timing | Units |
|-------------------------------------------------------------|-----------|-------|
| 36x36 Multiplier<br>(All Registers)                         | 372       | MHz   |
| 18x18 Multiplier/Accumulate (Input and<br>Output Registers) | 295       | MHz   |
| 18x18 Multiplier-Add/Sub-Sum (All Reg-<br>isters)           | 420       | MHz   |
| <b>DSP IP Functions</b>                                     |           |       |
| 16-Tap Fully-Parallel FIR Filter                            | 304       | MHz   |
| 1024-pt, Radix 4, Decimation in<br>Frequency FFT            | 227       | MHz   |
| 8x8 Matrix Multiplier                                       | 223       | MHz   |

**Derating Timing Tables**

Logic timing provided in the following sections of this data sheet and the Diamond design tool are worst case numbers in the operating range. Actual delays at nominal temperature and voltage for best case process, can be much better than the values given in the tables. The Diamond design tool can provide logic timing numbers at a particular temperature and voltage.

## LatticeECP2/M External Switching Characteristics<sup>9</sup>

Over Recommended Operating Conditions

| Parameter                                                                 | Description                              | Device   | -7   |      | -6   |      | -5   |      | Units |
|---------------------------------------------------------------------------|------------------------------------------|----------|------|------|------|------|------|------|-------|
|                                                                           |                                          |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| General I/O Pin Parameters (using Primary Clock without PLL) <sup>1</sup> |                                          |          |      |      |      |      |      |      |       |
| t <sub>CO</sub>                                                           | Clock to Output - PIO Output Register    | LFE2-6   | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-12  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-20  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-35  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-50  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-70  | —    | 3.70 | —    | 4.10 | —    | 4.40 | ns    |
|                                                                           |                                          | LFE2M20  | —    | 3.90 | —    | 4.30 | —    | 4.70 | ns    |
|                                                                           |                                          | LFE2M35  | —    | 3.90 | —    | 4.30 | —    | 4.70 | ns    |
|                                                                           |                                          | LFE2M50  | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
|                                                                           |                                          | LFE2M70  | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
|                                                                           |                                          | LFE2M100 | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
| t <sub>SU</sub>                                                           | Clock to Data Setup - PIO Input Register | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
| t <sub>H</sub>                                                            | Clock to Data Hold - PIO Input Register  | LFE2-6   | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-12  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-50  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-70  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M50  | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                                                                           |                                          | LFE2M70  | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                                                                           |                                          | LFE2M100 | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |

**LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)**

Over Recommended Operating Conditions

| Parameter                                                                    | Description                                                    | Device   | -7   |      | -6   |      | -5   |      | Units |
|------------------------------------------------------------------------------|----------------------------------------------------------------|----------|------|------|------|------|------|------|-------|
|                                                                              |                                                                |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>SU_DEL</sub>                                                          | Clock to Data Setup - PIO Input Register with Data Input Delay | LFE2-6   | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2-12  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2-20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2-35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2-50  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2-70  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2M20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2M35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2M50  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2M70  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                              |                                                                | LFE2M100 | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
| t <sub>H_DEL</sub>                                                           | Clock to Data Hold - PIO Input Register with Input Data Delay  | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                                | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
| f <sub>MAX_IO</sub>                                                          | Clock Frequency of I/O Register and PFU Register               | ECP2/M   | —    | 420  | —    | 357  | —    | 311  | MHz   |
| <b>General I/O Pin Parameters (using Edge Clock without PLL)<sup>1</sup></b> |                                                                |          |      |      |      |      |      |      |       |
| t <sub>COE</sub>                                                             | Clock to Output - PIO Output Register                          | LFE2-6   | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2-12  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2-20  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2-35  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2-50  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2-70  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2M20  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2M35  | —    | 2.60 | —    | 2.90 | —    | 3.20 | ns    |
|                                                                              |                                                                | LFE2M50  | —    | 3.10 | —    | 3.40 | —    | 3.70 | ns    |
|                                                                              |                                                                | LFE2M70  | —    | 3.10 | —    | 3.40 | —    | 3.70 | ns    |
|                                                                              |                                                                | LFE2M100 | —    | 3.10 | —    | 3.40 | —    | 3.70 | ns    |



**LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)**

Over Recommended Operating Conditions

| Parameter            | Description                                                    | Device   | -7   |      | -6   |      | -5   |      | Units |
|----------------------|----------------------------------------------------------------|----------|------|------|------|------|------|------|-------|
|                      |                                                                |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>SUE</sub>     | Clock to Data Setup - PIO Input Register                       | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                      |                                                                | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
| t <sub>HE</sub>      | Clock to Data Hold - PIO Input Register                        | LFE2-6   | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2-12  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2-20  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2-35  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2-50  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2-70  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2M20  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2M35  | 0.90 | —    | 1.10 | —    | 1.30 | —    | ns    |
|                      |                                                                | LFE2M50  | 1.20 | —    | 1.40 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2M70  | 1.20 | —    | 1.40 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2M100 | 1.20 | —    | 1.40 | —    | 1.60 | —    | ns    |
| t <sub>SU_DELE</sub> | Clock to Data Setup - PIO Input Register with Data Input Delay | LFE2-6   | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2-12  | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2-20  | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2-35  | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2-50  | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2-70  | 1.00 | —    | 1.30 | —    | 1.60 | —    | ns    |
|                      |                                                                | LFE2M20  | 1.20 | —    | 1.60 | —    | 1.90 | —    | ns    |
|                      |                                                                | LFE2M35  | 1.20 | —    | 1.60 | —    | 1.90 | —    | ns    |
|                      |                                                                | LFE2M50  | 1.20 | —    | 1.60 | —    | 1.90 | —    | ns    |
|                      |                                                                | LFE2M70  | 1.20 | —    | 1.60 | —    | 1.90 | —    | ns    |
|                      |                                                                | LFE2M100 | 1.20 | —    | 1.60 | —    | 1.90 | —    | ns    |

## LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)

Over Recommended Operating Conditions

| Parameter                                                                    | Description                                                   | Device   | -7   |      | -6   |      | -5   |      | Units |
|------------------------------------------------------------------------------|---------------------------------------------------------------|----------|------|------|------|------|------|------|-------|
|                                                                              |                                                               |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>H_DELE</sub>                                                          | Clock to Data Hold - PIO Input Register with Input Data Delay | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                              |                                                               | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
| f <sub>MAX_IOE</sub>                                                         | Clock Frequency of I/O and PFU Register                       | ECP2/M   | —    | 420  | —    | 357  | —    | 311  | MHz   |
| <b>General I/O Pin Parameters (using Primary Clock with PLL)<sup>1</sup></b> |                                                               |          |      |      |      |      |      |      |       |
| t <sub>COPLL</sub> <sup>10</sup>                                             | Clock to Output - PIO Output Register                         | LFE2-6   | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2-12  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2-20  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2-35  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2-50  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2-70  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2M20  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2M35  | —    | 2.30 | —    | 2.60 | —    | 2.80 | ns    |
|                                                                              |                                                               | LFE2M50  | —    | 2.60 | —    | 2.90 | —    | 3.10 | ns    |
|                                                                              |                                                               | LFE2M70  | —    | 2.60 | —    | 2.90 | —    | 3.10 | ns    |
|                                                                              |                                                               | LFE2M100 | —    | 2.70 | —    | 3.00 | —    | 3.20 | ns    |
| t <sub>SUPLL</sub>                                                           | Clock to Data Setup - PIO Input Register                      | LFE2-6   | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2-12  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2-20  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2-35  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2-50  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2-70  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2M20  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2M35  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2M50  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2M70  | 0.70 | —    | 0.80 | —    | 0.90 | —    | ns    |
|                                                                              |                                                               | LFE2M100 | 0.80 | —    | 0.90 | —    | 1.00 | —    | ns    |

## LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)

Over Recommended Operating Conditions

| Parameter              | Description                                                    | Device   | -7   |      | -6   |      | -5   |      | Units |
|------------------------|----------------------------------------------------------------|----------|------|------|------|------|------|------|-------|
|                        |                                                                |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>HPLL</sub>      | Clock to Data Hold - PIO Input Register                        | LFE2-6   | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-12  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-20  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-35  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-50  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-70  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M20  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M35  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M50  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M70  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M100 | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
| t <sub>SU_DELPLL</sub> | Clock to Data Setup - PIO Input Register with Data Input Delay | LFE2-6   | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-12  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-20  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-35  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-50  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-70  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M20  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M35  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M50  | 1.90 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                        |                                                                | LFE2M70  | 1.90 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                        |                                                                | LFE2M100 | 2.00 | —    | 2.20 | —    | 2.40 | —    | ns    |
| t <sub>H_DELPLL</sub>  | Clock to Data Hold - PIO Input Register with Input Data Delay  | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |

### DDR I/O Pin Parameters<sup>2</sup>

|                      |                                   |        |       |       |       |       |       |       |     |
|----------------------|-----------------------------------|--------|-------|-------|-------|-------|-------|-------|-----|
| t <sub>DVADQ</sub>   | Data Valid After DQS (DDR Read)   | ECP2/M | —     | 0.225 | —     | 0.225 | —     | 0.225 | UI  |
| t <sub>DVEDQ</sub>   | Data Hold After DQS (DDR Read)    | ECP2/M | 0.640 | —     | 0.640 | —     | 0.640 | —     | UI  |
| t <sub>DQVBS</sub>   | Data Valid Before DQS (DDR Write) | ECP2/M | 0.250 | —     | 0.250 | —     | 0.250 | —     | UI  |
| t <sub>DQVAS</sub>   | Data Valid After DQS (DDR Write)  | ECP2/M | 0.250 | —     | 0.250 | —     | 0.250 | —     | UI  |
| f <sub>MAX_DDR</sub> | DDR Clock Frequency <sup>6</sup>  | ECP2/M | 95    | 200   | 95    | 166   | 95    | 133   | MHz |

### DDR2 I/O Pin Parameters<sup>3</sup>

|                    |                                 |        |       |       |       |       |       |       |    |
|--------------------|---------------------------------|--------|-------|-------|-------|-------|-------|-------|----|
| t <sub>DVADQ</sub> | Data Valid After DQS (DDR Read) | ECP2/M | —     | 0.225 | —     | 0.225 | —     | 0.225 | UI |
| t <sub>DVEDQ</sub> | Data Hold After DQS (DDR Read)  | ECP2/M | 0.640 | —     | 0.640 | —     | 0.640 | —     | UI |

## LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)

Over Recommended Operating Conditions

| Parameter                                                            | Description                         | Device   | -7    |      | -6    |      | -5    |      | Units |
|----------------------------------------------------------------------|-------------------------------------|----------|-------|------|-------|------|-------|------|-------|
|                                                                      |                                     |          | Min.  | Max. | Min.  | Max. | Min.  | Max. |       |
| $t_{DQVBS}$                                                          | Data Valid Before DQS (DDR Write)   | ECP2/M   | 0.250 | —    | 0.250 | —    | 0.250 | —    | UI    |
| $t_{DQVAS}$                                                          | Data Valid After DQS (DDR Write)    | ECP2/M   | 0.250 | —    | 0.250 | —    | 0.250 | —    | UI    |
| $f_{MAX\_DDR2}$                                                      | DDR Clock Frequency                 | ECP2/M   | 133   | 266  | 133   | 200  | 133   | 166  | MHz   |
| <b>SPI4.2 I/O Pin Parameters Static Alignment<sup>4, 8, 11</sup></b> |                                     |          |       |      |       |      |       |      |       |
|                                                                      | Maximum Data Rate                   | ECP2-20  | —     | 750  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2-35  | —     | 750  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2-50  | —     | 750  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2-70  | —     | 750  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2M20  | —     | 622  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2M35  | —     | 622  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2M50  | —     | 622  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2M70  | —     | 622  | —     | 622  | —     | 622  | Mbps  |
|                                                                      |                                     | ECP2M100 | —     | 622  | —     | 622  | —     | 622  | Mbps  |
| $t_{DVACLKSPI}$                                                      | Data Valid After CLK (Receive)      | ECP2-20  | —     | 0.25 | —     | 0.25 | —     | 0.25 | UI    |
|                                                                      |                                     | ECP2-35  | —     | 0.25 | —     | 0.25 | —     | 0.25 | UI    |
|                                                                      |                                     | ECP2-50  | —     | 0.25 | —     | 0.25 | —     | 0.25 | UI    |
|                                                                      |                                     | ECP2-70  | —     | 0.25 | —     | 0.25 | —     | 0.25 | UI    |
|                                                                      |                                     | ECP2M20  | —     | 0.21 | —     | 0.21 | —     | 0.21 | UI    |
|                                                                      |                                     | ECP2M35  | —     | 0.21 | —     | 0.21 | —     | 0.21 | UI    |
|                                                                      |                                     | ECP2M50  | —     | 0.21 | —     | 0.21 | —     | 0.21 | UI    |
|                                                                      |                                     | ECP2M70  | —     | 0.21 | —     | 0.21 | —     | 0.21 | UI    |
|                                                                      |                                     | ECP2M100 | —     | 0.21 | —     | 0.21 | —     | 0.21 | UI    |
| $t_{DVECLKSPI}$                                                      | Data Hold After CLK (Receive)       | ECP2-20  | 0.75  | —    | 0.75  | —    | 0.75  | —    | UI    |
|                                                                      |                                     | ECP2-35  | 0.75  | —    | 0.75  | —    | 0.75  | —    | UI    |
|                                                                      |                                     | ECP2-50  | 0.75  | —    | 0.75  | —    | 0.75  | —    | UI    |
|                                                                      |                                     | ECP2-70  | 0.75  | —    | 0.75  | —    | 0.75  | —    | UI    |
|                                                                      |                                     | ECP2M20  | 0.79  | —    | 0.79  | —    | 0.79  | —    | UI    |
|                                                                      |                                     | ECP2M35  | 0.79  | —    | 0.79  | —    | 0.79  | —    | UI    |
|                                                                      |                                     | ECP2M50  | 0.79  | —    | 0.79  | —    | 0.79  | —    | UI    |
|                                                                      |                                     | ECP2M70  | 0.79  | —    | 0.79  | —    | 0.79  | —    | UI    |
|                                                                      |                                     | ECP2M100 | 0.79  | —    | 0.79  | —    | 0.79  | —    | UI    |
| $t_{DIASPI}$                                                         | Data Invalid After Clock (Transmit) | ECP2-20  | —     | 280  | —     | 280  | —     | 280  | ps    |
|                                                                      |                                     | ECP2-35  | —     | 280  | —     | 280  | —     | 280  | ps    |
|                                                                      |                                     | ECP2-50  | —     | 280  | —     | 280  | —     | 280  | ps    |
|                                                                      |                                     | ECP2-70  | —     | 280  | —     | 280  | —     | 280  | ps    |
|                                                                      |                                     | ECP2M20  | —     | 230  | —     | 230  | —     | 230  | ps    |
|                                                                      |                                     | ECP2M35  | —     | 230  | —     | 230  | —     | 230  | ps    |
|                                                                      |                                     | ECP2M50  | —     | 230  | —     | 230  | —     | 230  | ps    |
|                                                                      |                                     | ECP2M70  | —     | 230  | —     | 230  | —     | 230  | ps    |
|                                                                      |                                     | ECP2M100 | —     | 230  | —     | 230  | —     | 230  | ps    |

## LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)

Over Recommended Operating Conditions

| Parameter                                        | Description                                  | Device   | -7   |      | -6   |      | -5   |      | Units |
|--------------------------------------------------|----------------------------------------------|----------|------|------|------|------|------|------|-------|
|                                                  |                                              |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>DIBSPI</sub>                              | Data Invalid Before Clock (Transmit)         | ECP2-20  | —    | 280  | —    | 280  | —    | 280  | ps    |
|                                                  |                                              | ECP2-35  | —    | 280  | —    | 280  | —    | 280  | ps    |
|                                                  |                                              | ECP2-50  | —    | 280  | —    | 280  | —    | 280  | ps    |
|                                                  |                                              | ECP2-70  | —    | 280  | —    | 280  | —    | 280  | ps    |
|                                                  |                                              | ECP2M20  | —    | 230  | —    | 230  | —    | 230  | ps    |
|                                                  |                                              | ECP2M35  | —    | 230  | —    | 230  | —    | 230  | ps    |
|                                                  |                                              | ECP2M50  | —    | 230  | —    | 230  | —    | 230  | ps    |
|                                                  |                                              | ECP2M70  | —    | 230  | —    | 230  | —    | 230  | ps    |
|                                                  |                                              | ECP2M100 | —    | 230  | —    | 230  | —    | 230  | ps    |
| XGMII I/O Pin Parameters (312 Mbps) <sup>5</sup> |                                              |          |      |      |      |      |      |      |       |
| t <sub>SUXGMII</sub>                             | Data Setup Before Read Clock                 | ECP2/M   | 480  | —    | 480  | —    | 480  | —    | ps    |
| t <sub>HXGMII</sub>                              | Data Hold After Read Clock                   | ECP2/M   | 480  | —    | 480  | —    | 480  | —    | ps    |
| t <sub>DVBCKXGMII</sub>                          | Data Valid Before Clock                      | ECP2/M   | 960  | —    | 960  | —    | 960  | —    | ps    |
| t <sub>DVACKXGMII</sub>                          | Data Valid After Clock                       | ECP2/M   | 960  | —    | 960  | —    | 960  | —    | ps    |
| Primary                                          |                                              |          |      |      |      |      |      |      |       |
| f <sub>MAX_PRI</sub> <sup>7</sup>                | Frequency for Primary Clock Tree             | ECP2/M   | —    | 420  | —    | 357  | —    | 311  | MHz   |
| t <sub>W_PRI</sub>                               | Clock Pulse Width for Primary Clock          | ECP2/M   | 0.95 | —    | 1.19 | —    | 2.00 | —    | ns    |
| t <sub>SKEW_PRI</sub>                            | Primary Clock Skew Within a Bank             | ECP2/M   | —    | 300  | —    | 360  | —    | 420  | ps    |
| Edge Clock                                       |                                              |          |      |      |      |      |      |      |       |
| f <sub>MAX_EDGE</sub> <sup>7</sup>               | Frequency for Edge Clock                     | ECP2/M   | —    | 420  | —    | 357  | —    | 311  | MHz   |
| t <sub>W_EDGE</sub>                              | Clock Pulse Width for Edge Clock             | ECP2/M   | 0.95 | —    | 1.19 | —    | 2.00 | —    | ns    |
| t <sub>SKEW_EDGE</sub>                           | Edge Clock Skew Within an Edge of the Device | ECP2/M   | —    | 300  | —    | 360  | —    | 420  | ps    |

- General timing numbers based on LVCMOS 2.5, 12mA, 0pf load.
- DDR timing numbers based on SSTL25 for BGA packages only.
- DDR2 timing numbers based on SSTL18 for BGA packages only.
- SPI4.2 and SFI4 timing numbers based on LVDS25 for BGA packages only.
- XGMII timing numbers based on HSTL class I. A corresponding left/right dedicated clock buffer is used when using the SPI4.2 interface to the left or right edge of the device. For SPI4.2 mode, the software tool will help in selecting the appropriate clock buffer.
- IP will be used to support DDR and DDR2 memory data rates down to 95MHz. This approach uses a free-running clock and PFU register to sample the data instead of the hardwired DDR memory interface.
- Using the LVDS I/O standard.
- ECP2-6 and ECP2-12 do not support SPI4.2
- The AC numbers do not apply to PCLK6 and PCLK7.
- Applies to CLKOP only.
- Please refer to TN1159, [LatticeECP2/M Pin Assignment Recommendations](#) for best performance.

**Figure 3-6. SPI4.2 Parameters**

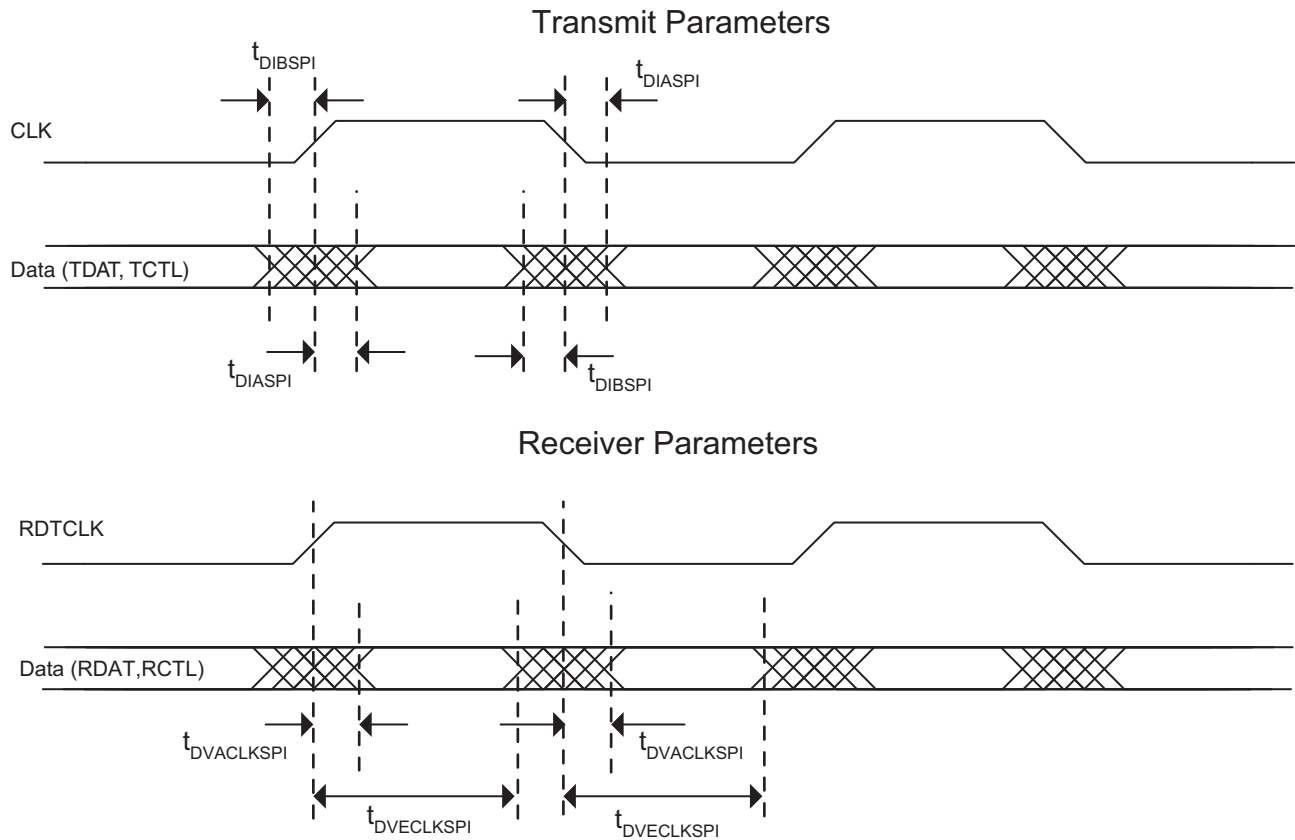


Figure 3-7. DDR and DDR2 Parameters

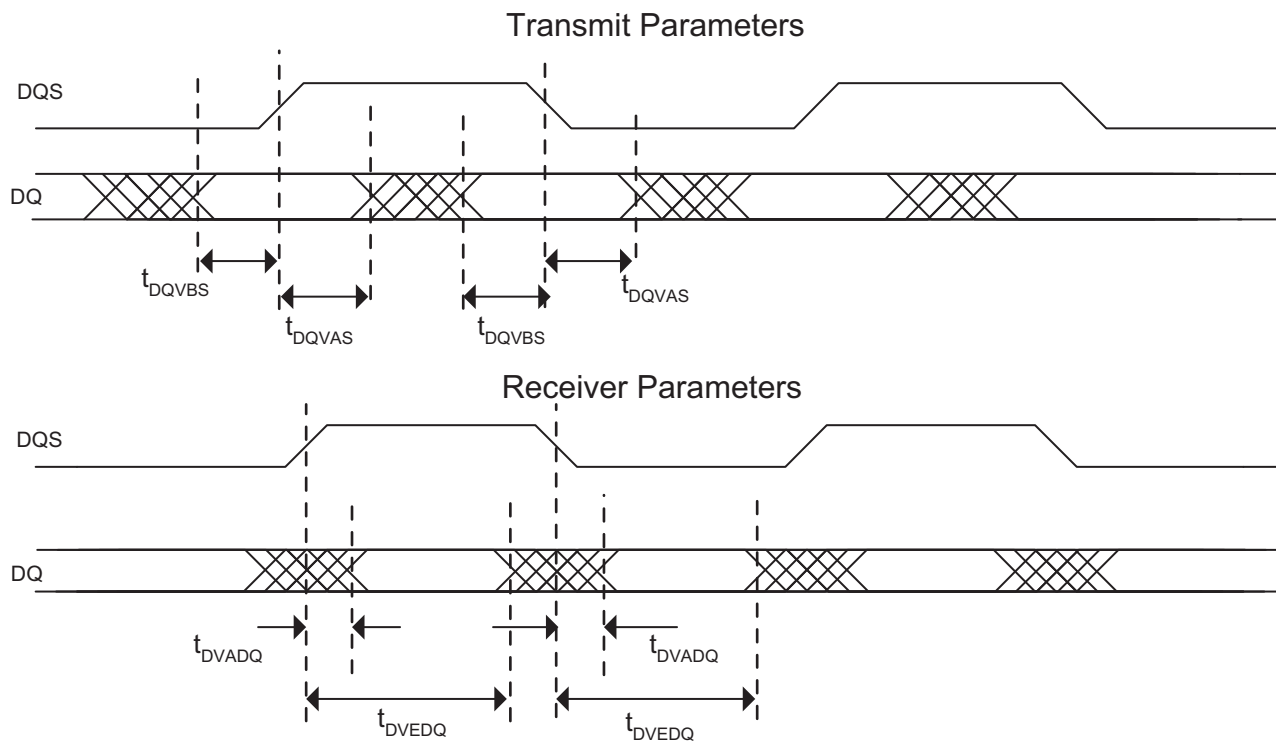
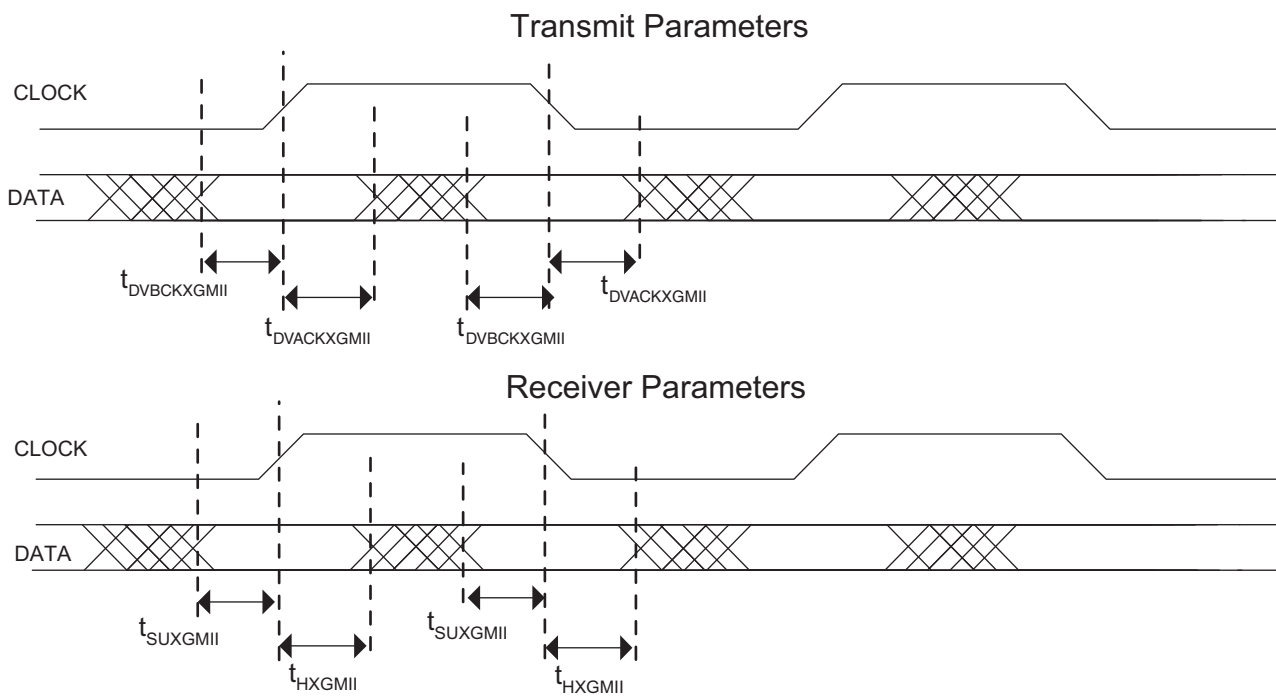


Figure 3-8. XGMII Parameters



# LatticeECP2/M Internal Switching Characteristics<sup>1</sup>

Over Recommended Operating Conditions

| Parameter                        | Description                                       | -7     |       | -6     |       | -5     |       | Units |
|----------------------------------|---------------------------------------------------|--------|-------|--------|-------|--------|-------|-------|
|                                  |                                                   | Min.   | Max.  | Min.   | Max.  | Min.   | Max.  |       |
| PFU/PFF Logic Mode Timing        |                                                   |        |       |        |       |        |       |       |
| t <sub>LUT4_PFU</sub>            | LUT4 delay (A to D inputs to F output)            | —      | 0.180 | —      | 0.198 | —      | 0.216 | ns    |
| t <sub>LUT6_PFU</sub>            | LUT6 delay (A to D inputs to OFX output)          | —      | 0.304 | —      | 0.331 | —      | 0.358 | ns    |
| t <sub>LSR_PFU</sub>             | Set/Reset to output of PFU (Asynchronous)         | —      | 0.600 | —      | 0.655 | —      | 0.711 | ns    |
| t <sub>SUM_PFU</sub>             | Clock to Mux (M0,M1) Input Setup Time             | 0.128  | —     | 0.129  | —     | 0.129  | —     | ns    |
| t <sub>HM_PFU</sub>              | Clock to Mux (M0,M1) Input Hold Time              | -0.051 | —     | -0.049 | —     | -0.046 | —     | ns    |
| t <sub>SUD_PFU</sub>             | Clock to D input setup time                       | 0.061  | —     | 0.071  | —     | 0.081  | —     | ns    |
| t <sub>HD_PFU</sub>              | Clock to D input hold time                        | 0.002  | —     | 0.003  | —     | 0.003  | —     | ns    |
| t <sub>CK2Q_PFU</sub>            | Clock to Q delay, (D-type Register Configuration) | —      | 0.285 | —      | 0.309 | —      | 0.333 | ns    |
| PFU Dual Port Memory Mode Timing |                                                   |        |       |        |       |        |       |       |
| t <sub>CORAM_PFU</sub>           | Clock to Output (F Port)                          | —      | 0.902 | —      | 1.083 | —      | 1.263 | ns    |
| t <sub>SUDATA_PFU</sub>          | Data Setup Time                                   | -0.172 | —     | -0.205 | —     | -0.238 | —     | ns    |
| t <sub>HDATA_PFU</sub>           | Data Hold Time                                    | 0.199  | —     | 0.235  | —     | 0.271  | —     | ns    |
| t <sub>SUADDR_PFU</sub>          | Address Setup Time                                | -0.245 | —     | -0.284 | —     | -0.323 | —     | ns    |
| t <sub>HADDR_PFU</sub>           | Address Hold Time                                 | 0.246  | —     | 0.285  | —     | 0.324  | —     | ns    |
| t <sub>SUWREN_PFU</sub>          | Write/Read Enable Setup Time                      | -0.122 | —     | -0.145 | —     | -0.168 | —     | ns    |
| t <sub>HWREN_PFU</sub>           | Write/Read Enable Hold Time                       | 0.132  | —     | 0.156  | —     | 0.180  | —     | ns    |
| PIC Timing                       |                                                   |        |       |        |       |        |       |       |
| PIO Input/Output Buffer Timing   |                                                   |        |       |        |       |        |       |       |
| t <sub>IN_PIO</sub>              | Input Buffer Delay (LVCMOS25)                     | —      | 0.613 | —      | 0.681 | —      | 0.749 | ns    |
| t <sub>OUT_PIO</sub>             | Output Buffer Delay (LVCMOS25)                    | —      | 1.115 | —      | 1.115 | —      | 1.343 | ns    |
| IOLOGIC Input/Output Timing      |                                                   |        |       |        |       |        |       |       |
| t <sub>SUI_PIO</sub>             | Input Register Setup Time (Data Before Clock)     | 0.596  | —     | 0.645  | —     | 0.694  | —     | ns    |
| t <sub>HI_PIO</sub>              | Input Register Hold Time (Data after Clock)       | -0.570 | —     | -0.614 | —     | -0.658 | —     | ns    |
| t <sub>COO_PIO</sub>             | Output Register Clock to Output Delay             | —      | 0.61  | —      | 0.66  | —      | 0.72  | ns    |
| t <sub>SUCE_PIO</sub>            | Input Register Clock Enable Setup Time            | 0.032  | —     | 0.037  | —     | 0.041  | —     | ns    |
| t <sub>HCE_PIO</sub>             | Input Register Clock Enable Hold Time             | -0.022 | —     | -0.025 | —     | -0.028 | —     | ns    |
| t <sub>SULSR_PIO</sub>           | Set/Reset Setup Time                              | 0.184  | —     | 0.201  | —     | 0.217  | —     | ns    |
| t <sub>HLSR_PIO</sub>            | Set/Reset Hold Time                               | -0.080 | —     | -0.086 | —     | -0.093 | —     | ns    |
| EBR Timing                       |                                                   |        |       |        |       |        |       |       |
| t <sub>CO_EBR</sub>              | Clock (Read) to output from Address or Data       | —      | 2.51  | —      | 2.75  | —      | 2.99  | ns    |
| t <sub>COO_EBR</sub>             | Clock (Write) to output from EBR output Register  | —      | 0.33  | —      | 0.36  | —      | 0.39  | ns    |
| t <sub>SUDATA_EBR</sub>          | Setup Data to EBR Memory                          | -0.157 | —     | -0.181 | —     | -0.205 | —     | ns    |
| t <sub>HDATA_EBR</sub>           | Hold Data to EBR Memory                           | 0.173  | —     | 0.195  | —     | 0.217  | —     | ns    |
| t <sub>SUADDR_EBR</sub>          | Setup Address to EBR Memory                       | -0.115 | —     | -0.130 | —     | -0.145 | —     | ns    |
| t <sub>HADDR_EBR</sub>           | Hold Address to EBR Memory                        | 0.138  | —     | 0.155  | —     | 0.172  | —     | ns    |
| t <sub>SUWREN_EBR</sub>          | Setup Write/Read Enable to PFU Memory             | -0.128 | —     | -0.149 | —     | -0.170 | —     | ns    |



## LatticeECP2/M Internal Switching Characteristics<sup>1</sup> (Continued)

Over Recommended Operating Conditions

| Parameter                             | Description                                         | -7     |      | -6     |      | -5     |      | Units |
|---------------------------------------|-----------------------------------------------------|--------|------|--------|------|--------|------|-------|
|                                       |                                                     | Min.   | Max. | Min.   | Max. | Min.   | Max. |       |
| t <sub>HWREN_EBR</sub>                | Hold Write/Read Enable to PFU Memory                | 0.139  | —    | 0.156  | —    | 0.173  | —    | ns    |
| t <sub>SUCE_EBR</sub>                 | Clock Enable Setup Time to EBR Output Register      | 0.123  | —    | 0.134  | —    | 0.145  | —    | ns    |
| t <sub>HCE_EBR</sub>                  | Clock Enable Hold Time to EBR Output Register       | -0.081 | —    | -0.090 | —    | -0.100 | —    | ns    |
| t <sub>RSTO_EBR</sub>                 | Reset To Output Delay Time from EBR Output Register | —      | 1.03 | —      | 1.15 | —      | 1.26 | ns    |
| t <sub>SUBE_EBR</sub>                 | Byte Enable Set-Up Time to EBR Output Register      | -0.115 | —    | -0.130 | —    | -0.145 | —    | ns    |
| t <sub>HBE_EBR</sub>                  | Byte Enable Hold Time to EBR Output Register        | 0.138  | —    | 0.155  | —    | 0.172  | —    | ns    |
| <b>GPLL Parameters</b>                |                                                     |        |      |        |      |        |      |       |
| t <sub>RSTREC_GPLL</sub>              | Reset Recovery to Rising Clock                      | 1.00   | —    | 1.00   | —    | 1.00   | —    | ns    |
| <b>SPLL Parameters</b>                |                                                     |        |      |        |      |        |      |       |
| t <sub>RSTREC_SPLL</sub>              | Reset Recovery to Rising Clock                      | 1.00   | —    | 1.00   | —    | 1.00   | —    | ns    |
| <b>DSP Block Timing<sup>2,3</sup></b> |                                                     |        |      |        |      |        |      |       |
| t <sub>SUI_DSP</sub>                  | Input Register Setup Time                           | 0.12   | —    | 0.13   | —    | 0.14   | —    | ns    |
| t <sub>HI_DSP</sub>                   | Input Register Hold Time                            | 0.02   | —    | -0.01  | —    | -0.03  | —    | ns    |
| t <sub>SUP_DSP</sub>                  | Pipeline Register Setup Time                        | 2.18   | —    | 2.42   | —    | 2.66   | —    | ns    |
| t <sub>HP_DSP</sub>                   | Pipeline Register Hold Time                         | -0.68  | —    | -0.77  | —    | -0.86  | —    | ns    |
| t <sub>SUO_DSP</sub>                  | Output Register Setup Time                          | 4.26   | —    | 4.71   | —    | 5.16   | —    | ns    |
| t <sub>HO_DSP</sub>                   | Output Register Hold Time                           | -1.25  | —    | -1.40  | —    | -1.54  | —    | ns    |
| t <sub>COI_DSP</sub>                  | Input Register Clock to Output Time                 | —      | 3.92 | —      | 4.30 | —      | 4.68 | ns    |
| t <sub>COP_DSP</sub>                  | Pipeline Register Clock to Output Time              | —      | 1.87 | —      | 1.98 | —      | 2.08 | ns    |
| t <sub>COO_DSP</sub>                  | Output Register Clock to Output Time                | —      | 0.50 | —      | 0.52 | —      | 0.55 | ns    |
| t <sub>SUADDSUB</sub>                 | AddSub Input Register Setup Time                    | -0.24  | —    | -0.26  | —    | -0.28  | —    | ns    |
| t <sub>HADDSUB</sub>                  | AddSub Input Register Hold Time                     | 0.27   | —    | 0.29   | —    | 0.32   | —    | ns    |

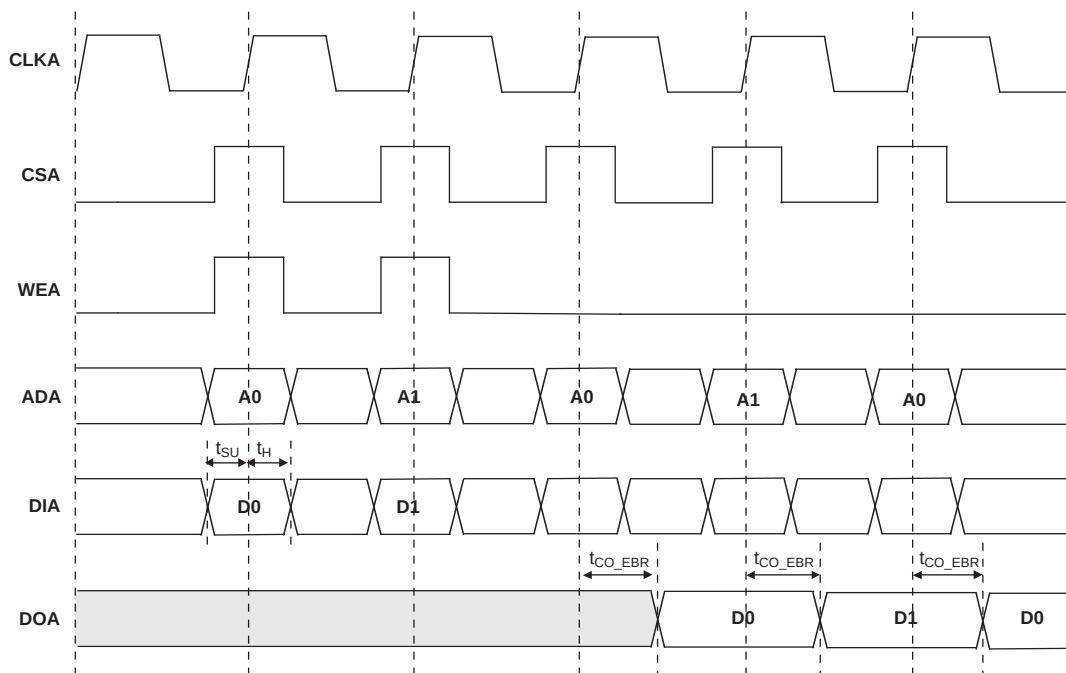
1. Internal parameters are characterized but not tested on every device.

2. These parameters apply to LatticeECP devices only.

3. DSP Block is configured in Multiply Add/Sub 18x18 Mode.

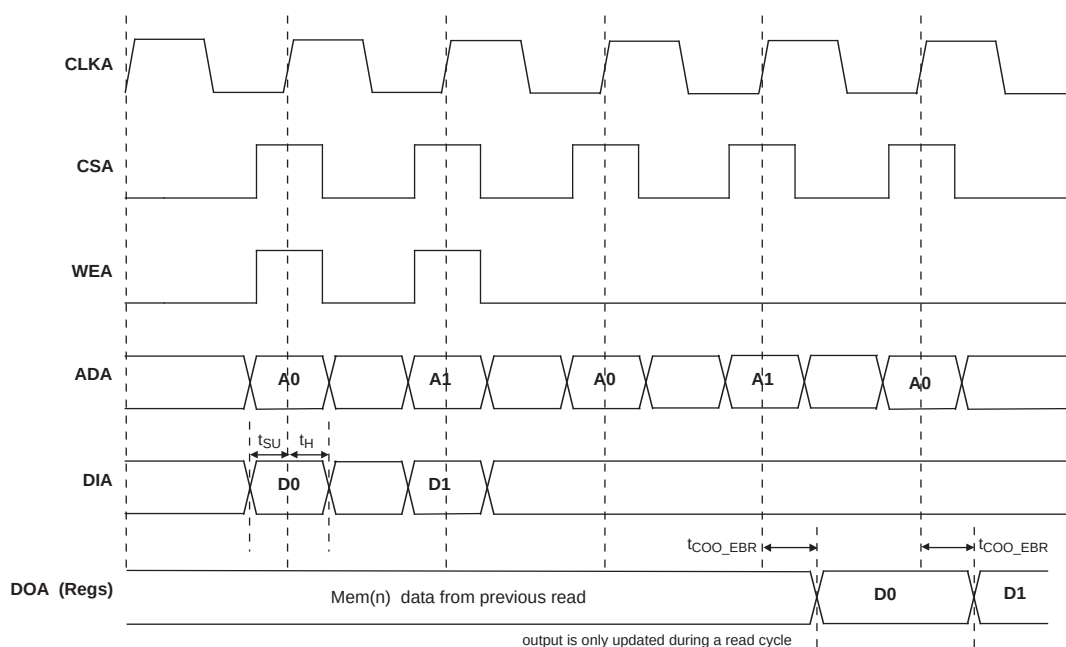
## Timing Diagrams

**Figure 3-9. Read/Write Mode (Normal)**

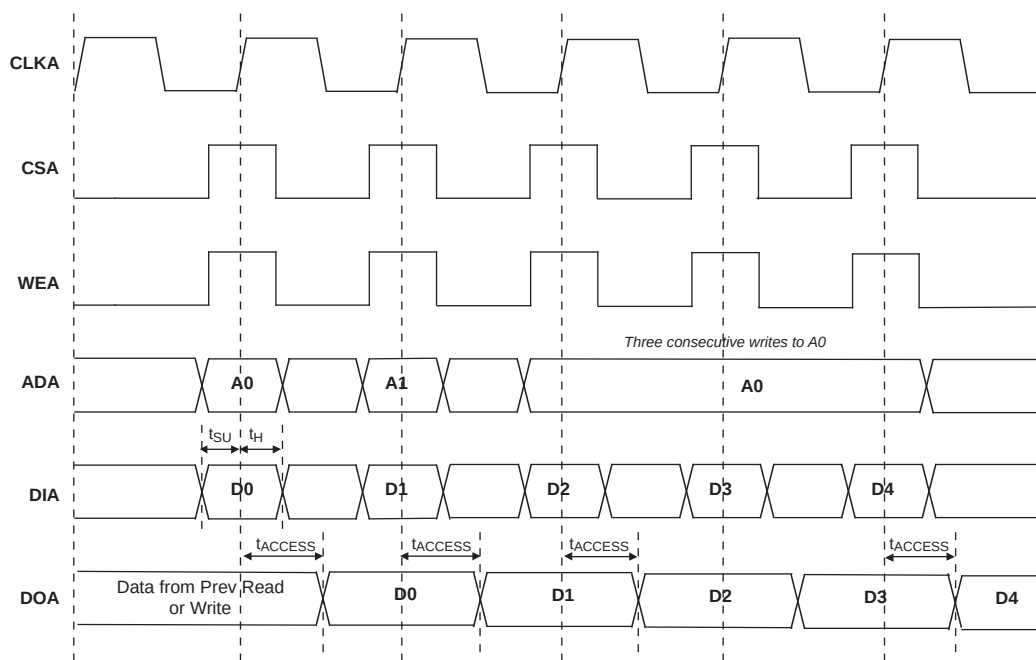


Note: Input data and address are registered at the positive edge of the clock and output data appears after the positive edge of the clock.

**Figure 3-10. Read/Write Mode with Input and Output Registers**



**Figure 3-11. Write Through (SP Read/Write on Port A, Input Registers Only)**



Note: Input data and address are registered at the positive edge of the clock and output data appears after the positive edge of the clock.

# LatticeECP2/M Family Timing Adders<sup>1, 2, 3</sup>

Over Recommended Operating Conditions

| Buffer Type             | Description                            | -7    | -6    | -5    | Units |
|-------------------------|----------------------------------------|-------|-------|-------|-------|
| <b>Input Adjusters</b>  |                                        |       |       |       |       |
| LVDS25                  | LVDS                                   | -0.04 | -0.02 | 0.00  | ns    |
| BLVDS25                 | BLVDS                                  | -0.04 | -0.09 | -0.15 | ns    |
| MLVDS                   | LVDS                                   | -0.15 | -0.15 | -0.15 | ns    |
| RSDS                    | RSDS                                   | -0.15 | -0.15 | -0.15 | ns    |
| LVPECL33                | LVPECL                                 | 0.16  | 0.15  | 0.13  | ns    |
| HSTL18_I                | HSTL_18 class I                        | 0.01  | -0.01 | -0.04 | ns    |
| HSTL18_II               | HSTL_18 class II                       | 0.01  | -0.01 | -0.04 | ns    |
| HSTL18D_I               | Differential HSTL 18 class I           | 0.01  | -0.01 | -0.04 | ns    |
| HSTL18D_II              | Differential HSTL 18 class II          | 0.01  | -0.01 | -0.04 | ns    |
| HSTL15_I                | HSTL_15 class I                        | 0.01  | -0.01 | -0.04 | ns    |
| HSTL15D_I               | Differential HSTL 15 class I           | 0.01  | -0.01 | -0.04 | ns    |
| SSTL33_I                | SSTL_3 class I                         | -0.03 | -0.07 | -0.10 | ns    |
| SSTL33_II               | SSTL_3 class II                        | -0.03 | -0.07 | -0.10 | ns    |
| SSTL33D_I               | Differential SSTL_3 class I            | -0.03 | -0.07 | -0.10 | ns    |
| SSTL33D_II              | Differential SSTL_3 class II           | -0.03 | -0.07 | -0.10 | ns    |
| SSTL25_I                | SSTL_2 class I                         | -0.04 | -0.07 | -0.10 | ns    |
| SSTL25_II               | SSTL_2 class II                        | -0.04 | -0.07 | -0.10 | ns    |
| SSTL25D_I               | Differential SSTL_2 class I            | -0.04 | -0.07 | -0.10 | ns    |
| SSTL25D_II              | Differential SSTL_2 class II           | -0.04 | -0.07 | -0.10 | ns    |
| SSTL18_I                | SSTL_18 class I                        | -0.01 | -0.04 | -0.07 | ns    |
| SSTL18_II               | SSTL_18 class II                       | -0.01 | -0.04 | -0.07 | ns    |
| SSTL18D_I               | Differential SSTL_18 class I           | -0.01 | -0.04 | -0.07 | ns    |
| SSTL18D_II              | Differential SSTL_18 class II          | -0.01 | -0.04 | -0.07 | ns    |
| LVTTTL33                | LVTTTL                                 | -0.16 | -0.16 | -0.16 | ns    |
| LVC MOS33               | LVC MOS 3.3                            | -0.08 | -0.12 | -0.16 | ns    |
| LVC MOS25               | LVC MOS 2.5                            | 0.00  | 0.00  | 0.00  | ns    |
| LVC MOS18               | LVC MOS 1.8                            | -0.16 | -0.17 | -0.17 | ns    |
| LVC MOS15               | LVC MOS 1.5                            | -0.14 | -0.14 | -0.14 | ns    |
| LVC MOS12               | LVC MOS 1.2                            | -0.04 | -0.01 | 0.01  | ns    |
| PCI33                   | PCI                                    | -0.08 | -0.12 | -0.16 | ns    |
| <b>Output Adjusters</b> |                                        |       |       |       |       |
| LVDS25E                 | LVDS 2.5 E <sup>4</sup>                | 0.25  | 0.19  | 0.13  | ns    |
| LVDS25                  | LVDS 2.5                               | 0.10  | 0.13  | 0.17  | ns    |
| BLVDS25                 | BLVDS 2.5                              | 0.00  | -0.01 | -0.03 | ns    |
| MLVDS                   | MLVDS 2.5 <sup>4</sup>                 | 0.00  | -0.01 | -0.03 | ns    |
| RSDS                    | RSDS 2.5 <sup>4</sup>                  | 0.25  | 0.19  | 0.13  | ns    |
| LVPECL33                | LVPECL 3.3 <sup>4</sup>                | -0.02 | -0.04 | -0.06 | ns    |
| HSTL18_I                | HSTL_18 class I 8mA drive              | -0.19 | -0.22 | -0.25 | ns    |
| HSTL18_II               | HSTL_18 class II                       | -0.30 | -0.34 | -0.37 | ns    |
| HSTL18D_I               | Differential HSTL 18 class I 8mA drive | -0.19 | -0.22 | -0.25 | ns    |
| HSTL18D_II              | Differential HSTL 18 class II          | -0.30 | -0.34 | -0.37 | ns    |

**LatticeECP2/M Family Timing Adders<sup>1, 2, 3</sup> (Continued)**
**Over Recommended Operating Conditions**

| Buffer Type    | Description                              | -7    | -6    | -5    | Units |
|----------------|------------------------------------------|-------|-------|-------|-------|
| HSTL15_I       | HSTL_15 class I 4mA drive                | -0.22 | -0.25 | -0.27 | ns    |
| HSTL15D_I      | Differential HSTL 15 class I 4mA drive   | -0.22 | -0.25 | -0.27 | ns    |
| SSTL33_I       | SSTL_3 class I                           | -0.12 | -0.15 | -0.18 | ns    |
| SSTL33_II      | SSTL_3 class II                          | -0.20 | -0.23 | -0.27 | ns    |
| SSTL33D_I      | Differential SSTL_3 class I              | -0.12 | -0.15 | -0.18 | ns    |
| SSTL33D_II     | Differential SSTL_3 class II             | -0.20 | -0.23 | -0.27 | ns    |
| SSTL25_I       | SSTL_2 class I 8mA drive                 | -0.16 | -0.19 | -0.22 | ns    |
| SSTL25_II      | SSTL_2 class II 16mA drive               | -0.19 | -0.22 | -0.25 | ns    |
| SSTL25D_I      | Differential SSTL_2 class I 8mA drive    | -0.16 | -0.19 | -0.22 | ns    |
| SSTL25D_II     | Differential SSTL_2 class II 16mA drive  | -0.19 | -0.22 | -0.25 | ns    |
| SSTL18_I       | SSTL_1.8 class I                         | -0.14 | -0.17 | -0.20 | ns    |
| SSTL18_II      | SSTL_1.8 class II 8mA drive              | -0.20 | -0.23 | -0.25 | ns    |
| SSTL18D_I      | Differential SSTL_1.8 class I            | -0.14 | -0.17 | -0.20 | ns    |
| SSTL18D_II     | Differential SSTL_1.8 class II 8mA drive | -0.20 | -0.23 | -0.25 | ns    |
| LVTTTL33_4mA   | LVTTTL 4mA drive                         | 0.52  | 0.60  | 0.68  | ns    |
| LVTTTL33_8mA   | LVTTTL 8mA drive                         | 0.06  | 0.08  | 0.09  | ns    |
| LVTTTL33_12mA  | LVTTTL 12mA drive                        | 0.04  | 0.04  | 0.05  | ns    |
| LVTTTL33_16mA  | LVTTTL 16mA drive                        | 0.03  | 0.02  | 0.02  | ns    |
| LVTTTL33_20mA  | LVTTTL 20mA drive                        | -0.09 | -0.09 | -0.10 | ns    |
| LVC MOS33_4mA  | LVC MOS 3.3 4mA drive, fast slew rate    | 0.52  | 0.60  | 0.68  | ns    |
| LVC MOS33_8mA  | LVC MOS 3.3 8mA drive, fast slew rate    | 0.06  | 0.08  | 0.09  | ns    |
| LVC MOS33_12mA | LVC MOS 3.3 12mA drive, fast slew rate   | 0.04  | 0.04  | 0.05  | ns    |
| LVC MOS33_16mA | LVC MOS 3.3 16mA drive, fast slew rate   | 0.03  | 0.02  | 0.02  | ns    |
| LVC MOS33_20mA | LVC MOS 3.3 20mA drive, fast slew rate   | -0.09 | -0.09 | -0.10 | ns    |
| LVC MOS25_4mA  | LVC MOS 2.5 4mA drive, fast slew rate    | 0.41  | 0.47  | 0.53  | ns    |
| LVC MOS25_8mA  | LVC MOS 2.5 8mA drive, fast slew rate    | 0.01  | 0.01  | 0.00  | ns    |
| LVC MOS25_12mA | LVC MOS 2.5 12mA drive, fast slew rate   | 0.00  | 0.00  | 0.00  | ns    |
| LVC MOS25_16mA | LVC MOS 2.5 16mA drive, fast slew rate   | 0.04  | 0.04  | 0.04  | ns    |
| LVC MOS25_20mA | LVC MOS 2.5 20mA drive, fast slew rate   | -0.09 | -0.10 | -0.11 | ns    |
| LVC MOS18_4mA  | LVC MOS 1.8 4mA drive, fast slew rate    | 0.37  | 0.40  | 0.43  | ns    |
| LVC MOS18_8mA  | LVC MOS 1.8 8mA drive, fast slew rate    | 0.10  | 0.12  | 0.13  | ns    |
| LVC MOS18_12mA | LVC MOS 1.8 12mA drive, fast slew rate   | -0.02 | -0.02 | -0.02 | ns    |
| LVC MOS18_16mA | LVC MOS 1.8 16mA drive, fast slew rate   | -0.02 | -0.03 | -0.03 | ns    |
| LVC MOS15_4mA  | LVC MOS 1.5 4mA drive, fast slew rate    | 0.29  | 0.31  | 0.32  | ns    |
| LVC MOS15_8mA  | LVC MOS 1.5 8mA drive, fast slew rate    | 0.05  | 0.05  | 0.06  | ns    |
| LVC MOS12_2mA  | LVC MOS 1.2 2mA drive, fast slew rate    | 0.58  | 0.69  | 0.79  | ns    |
| LVC MOS12_6mA  | LVC MOS 1.2 6mA drive, fast slew rate    | 0.13  | 0.19  | 0.26  | ns    |
| LVC MOS33_4mA  | LVC MOS 3.3 4mA drive, slow slew rate    | 2.17  | 2.44  | 2.71  | ns    |
| LVC MOS33_8mA  | LVC MOS 3.3 8mA drive, slow slew rate    | 2.50  | 2.67  | 2.83  | ns    |
| LVC MOS33_12mA | LVC MOS 3.3 12mA drive, slow slew rate   | 1.72  | 1.88  | 2.05  | ns    |
| LVC MOS33_16mA | LVC MOS 3.3 16mA drive, slow slew rate   | 1.64  | 1.63  | 1.62  | ns    |
| LVC MOS33_20mA | LVC MOS 3.3 20mA drive, slow slew rate   | 1.33  | 1.36  | 1.39  | ns    |

**LatticeECP2/M Family Timing Adders<sup>1, 2, 3</sup> (Continued)**
**Over Recommended Operating Conditions**

| Buffer Type    | Description                            | -7   | -6   | -5   | Units |
|----------------|----------------------------------------|------|------|------|-------|
| LVC MOS25_4mA  | LVC MOS 2.5 4mA drive, slow slew rate  | 2.18 | 2.26 | 2.33 | ns    |
| LVC MOS25_8mA  | LVC MOS 2.5 8mA drive, slow slew rate  | 2.19 | 2.35 | 2.51 | ns    |
| LVC MOS25_12mA | LVC MOS 2.5 12mA drive, slow slew rate | 1.50 | 1.66 | 1.82 | ns    |
| LVC MOS25_16mA | LVC MOS 2.5 16mA drive, slow slew rate | 1.60 | 1.59 | 1.58 | ns    |
| LVC MOS25_20mA | LVC MOS 2.5 20mA drive, slow slew rate | 1.43 | 1.39 | 1.34 | ns    |
| LVC MOS18_4mA  | LVC MOS 1.8 4mA drive, slow slew rate  | 2.22 | 2.27 | 2.32 | ns    |
| LVC MOS18_8mA  | LVC MOS 1.8 8mA drive, slow slew rate  | 1.93 | 2.08 | 2.23 | ns    |
| LVC MOS18_12mA | LVC MOS 1.8 12mA drive, slow slew rate | 1.43 | 1.51 | 1.58 | ns    |
| LVC MOS18_16mA | LVC MOS 1.8 16mA drive, slow slew rate | 1.47 | 1.46 | 1.45 | ns    |
| LVC MOS15_4mA  | LVC MOS 1.5 4mA drive, slow slew rate  | 2.32 | 2.38 | 2.43 | ns    |
| LVC MOS15_8mA  | LVC MOS 1.5 8mA drive, slow slew rate  | 1.84 | 1.98 | 2.12 | ns    |
| LVC MOS12_2mA  | LVC MOS 1.2 2mA drive, slow slew rate  | 2.52 | 2.63 | 2.74 | ns    |
| LVC MOS12_6mA  | LVC MOS 1.2 6mA drive, slow slew rate  | 1.69 | 1.83 | 1.96 | ns    |
| PCI33          | PCI33                                  | 0.04 | 0.04 | 0.04 | ns    |

1. Timing Adders are characterized but not tested on every device.
  2. LVC MOS timing measured with the load specified in Switching Test Condition table.
  3. All other standards tested according to the appropriate specifications.
  4. These timing adders are measured with the recommended resistor values.
- Timing v.A 0.11

## sysCLOCK GPLL Timing

Over Recommended Operating Conditions

| Parameter                       | Description                           | Conditions                               | Min.  | Typ. | Max.  | Units |
|---------------------------------|---------------------------------------|------------------------------------------|-------|------|-------|-------|
| f <sub>IN</sub>                 | Input Clock Frequency (CLKI, CLKFB)   | Without external capacitor               | 20    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5, 6</sup>  | 2     | —    | 420   | MHz   |
| f <sub>OUT</sub>                | Output Clock Frequency (CLKOP, CLKOS) | Without external capacitor               | 20    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 5     | —    | 50    | MHz   |
| f <sub>OUT2</sub>               | K-Divider Output Frequency (CLKOK)    | Without external capacitor               | 0.156 | —    | 210   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 0.039 | —    | 25    | MHz   |
| f <sub>VCO</sub>                | PLL VCO Frequency                     |                                          | 640   | —    | 1280  | MHz   |
| f <sub>PFD</sub>                | Phase Detector Input Frequency        | Without external capacitor               | 20    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5, 6</sup>  | 2     | —    | 50    | MHz   |
| AC Characteristics              |                                       |                                          |       |      |       |       |
| t <sub>DT</sub>                 | Output Clock Duty Cycle               | Default duty cycle selected <sup>3</sup> | 45    | 50   | 55    | %     |
| t <sub>PH</sub> <sup>4</sup>    | Output Phase Accuracy                 |                                          | —     | —    | ±0.05 | UI    |
| t <sub>OPJIT</sub> <sup>1</sup> | Output Clock Period Jitter            | f <sub>OUT</sub> ≥ 100 MHz               | —     | —    | ±125  | ps    |
|                                 |                                       | 50 ≤ f <sub>OUT</sub> < 100 MHz          | —     | —    | 0.025 | UIPP  |
|                                 |                                       | f <sub>OUT</sub> < 50 MHz                | —     | —    | 0.04  | UIPP  |
| t <sub>SK</sub>                 | Input Clock to Output Clock Skew      | N/M = integer                            | —     | —    | ±250  | ps    |
| t <sub>W</sub>                  | Output Clock Pulse Width              | At 90% or 10%                            | 1     | —    | —     | ns    |
| t <sub>LOCK</sub> <sup>2</sup>  | PLL Lock-in Time                      | Without external capacitor               | —     | —    | 150   | μs    |
|                                 |                                       | With external capacitor <sup>5</sup>     | —     | —    | 500   | μs    |
| t <sub>PA</sub>                 | Programmable Delay Unit               |                                          | 85    | 130  | 360   | ps    |
| t <sub>IPJIT</sub>              | Input Clock Period Jitter             |                                          | —     | —    | ±200  | ps    |
| t <sub>FBKDLY</sub>             | External Feedback Delay               |                                          | —     | —    | 10    | ns    |
| t <sub>HI</sub>                 | Input Clock High Time                 | 90% to 90%                               | 0.5   | —    | —     | ns    |
| t <sub>LO</sub>                 | Input Clock Low Time                  | 10% to 10%                               | 0.5   | —    | —     | ns    |
| t <sub>RST</sub>                | RST Pulse Width (RESETM/RESETK)       |                                          | 15    | —    | —     | ns    |
|                                 | Reset Signal Pulse Width (CNTRST)     | Without external capacitor               | 500   | —    | —     | ns    |
|                                 |                                       | With external capacitor <sup>5</sup>     | 20    | —    | —     | μs    |

1. Jitter sample is taken over 10,000 samples of the primary PLL output with clean reference clock and no additional I/O pins toggling.

2. Output clock is valid after  $t_{LOCK}$  for PLL reset and dynamic delay adjustment.

3. Using LVDS output buffers.

4. Relative to CLKOP.

5. Value of external capacitor: 5.6 nF ±20%, NPO dielectric, ceramic chip capacitor, 1206 or smaller package, connected to PLLCAP pin.

6.  $f_{OUT} (max) = f_{IN} * 10$  for  $f_{IN} < 5$  MHz.

## sysCLOCK SPLL Timing

### Over Recommended Operating Conditions

| Parameter                       | Description                           | Conditions                               | Min.  | Typ. | Max.  | Units |
|---------------------------------|---------------------------------------|------------------------------------------|-------|------|-------|-------|
| f <sub>IN</sub>                 | Input Clock Frequency (CLKI, CLKFB)   | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5, 6</sup>  | 2     | —    | 420   | MHz   |
| f <sub>OUT</sub>                | Output Clock Frequency (CLKOP, CLKOS) | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 5     | —    | 50    | MHz   |
| f <sub>OUT2</sub>               | K-Divider Output Frequency (CLKOK)    | Without external capacitor               | 0.258 | —    | 210   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 0.039 | —    | 25    | MHz   |
| f <sub>VCO</sub>                | PLL VCO Frequency                     |                                          | 640   | —    | 1280  | MHz   |
| f <sub>PFD</sub>                | Phase Detector Input Frequency        | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>6</sup>     | 2     | —    | 50    | MHz   |
| AC Characteristics              |                                       |                                          |       |      |       |       |
| t <sub>DT</sub>                 | Output Clock Duty Cycle               | Default Duty Cycle Selected <sup>3</sup> | 45    | 50   | 55    | %     |
| t <sub>PH</sub> <sup>4</sup>    | Output Phase Accuracy                 |                                          | —     | —    | ±0.05 | UI    |
| t <sub>OPJIT</sub> <sup>1</sup> | Output Clock Period Jitter            | f <sub>OUT</sub> ≥ 100 MHz               | —     | —    | ±125  | ps    |
|                                 |                                       | 50 ≤ f <sub>OUT</sub> < 100 MHz          | —     | —    | 0.025 | UIPP  |
|                                 |                                       | f <sub>OUT</sub> < 50 MHz                | —     | —    | 0.04  | UIPP  |
| t <sub>SK</sub>                 | Input Clock to Output Clock Skew      | Divider Ratio = Integer                  | —     | —    | ±250  | ps    |
| t <sub>W</sub>                  | Output Clock Pulse Width              | At 90% or 10%                            | 1     | —    | —     | ns    |
| t <sub>LOCK</sub> <sup>2</sup>  | PLL Lock-in Time                      | Without external capacitor               | —     | —    | 150   | μs    |
|                                 |                                       | With external capacitor <sup>5</sup>     | —     | —    | 500   | μs    |
| t <sub>IPJIT</sub>              | Input Clock Period Jitter             |                                          | —     | —    | ±200  | ps    |
| t <sub>FBKDLY</sub>             | External Feedback Delay               |                                          | —     | —    | 10    | ns    |
| t <sub>HI</sub>                 | Input Clock High Time                 | 90% to 90%                               | 0.5   | —    | —     | ns    |
| t <sub>LO</sub>                 | Input Clock Low Time                  | 10% to 10%                               | 0.5   | —    | —     | ns    |
| t <sub>RST</sub>                | RST Pulse Width (RSTK)                |                                          | 15    | —    | —     | ns    |
|                                 | Reset Signal Pulse Width (RST)        | Without external capacitor               | 500   | —    | —     | ns    |
|                                 |                                       | With external capacitor <sup>5</sup>     | 20    | —    | —     | μs    |

1. Jitter sample is taken over 10,000 samples of the primary PLL output with clean reference clock and no additional I/O pins toggling.

2. Output clock is valid after  $t_{LOCK}$  for PLL reset and dynamic delay adjustment.

3. Using LVDS output buffers.

4. Phase accuracy of CLKOS compared to CLKOP.

5. Value of external capacitor: 5.6 nF ±20%, NPO dielectric, ceramic chip capacitor, 1206 or smaller package, connected to PLLCAP pin.

6.  $f_{OUT}(\text{max}) = f_{IN} * 10$  for  $f_{IN} < 5$  MHz.



## DLL Timing

### Over Recommended Operating Conditions

| Parameter     | Description                                                                                                                             | Min.   | Typ. | Max.   | Units  |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------|------|--------|--------|
| $f_{REF}$     | Input reference clock frequency (on-chip or off-chip)                                                                                   | 100    | —    | 500    | MHz    |
| $f_{FB}$      | Feedback clock frequency (on-chip or off-chip)                                                                                          | 100    | —    | 500    | MHz    |
| $f_{CLKOP}^1$ | Output clock frequency, CLKOP                                                                                                           | 100    | —    | 500    | MHz    |
| $f_{CLKOS}^2$ | Output clock frequency, CLKOS                                                                                                           | 25     | —    | 500    | MHz    |
| $t_{PJIT}$    | Output clock period jitter (clean input)                                                                                                |        | —    | 250    | ps p-p |
| $t_{CYJIT}$   | Output clock cycle to cycle jitter (clean input)                                                                                        |        |      | 250    | ps p-p |
| $t_{DUTY}$    | Output clock duty cycle (at 50% levels, 50% duty cycle input clock, 50% duty cycle circuit turned off, time reference delay mode)       | 35     |      | 65     | %      |
| $t_{DUTYTRD}$ | Output clock duty cycle (at 50% levels, arbitrary duty cycle input clock, 50% duty cycle circuit enabled, time reference delay mode)    | 40     |      | 60     | %      |
| $t_{DUTYCIR}$ | Output clock duty cycle (at 50% levels, arbitrary duty cycle input clock, 50% duty cycle circuit enabled, clock injection removal mode) | 40     |      | 60     | %      |
| $t_{SKEW}^3$  | Output clock to clock skew between two outputs with the same phase setting                                                              | —      | —    | 100    | ps     |
| $t_{PWH}$     | Input clock minimum pulse width high (at 80% level)                                                                                     | 750    | —    | —      | ps     |
| $t_{PWL}$     | Input clock minimum pulse width low (at 20% level)                                                                                      | 750    | —    | —      | ps     |
| $t_{INSTB}$   | Input clock period jitter                                                                                                               | —      | —    | +/-250 | ps     |
| $t_{LOCK}$    | DLL lock time                                                                                                                           | 18,500 | —    | —      | cycles |
| $t_{RSWD}$    | Digital reset minimum pulse width (at 80% level)                                                                                        | 3      | —    | —      | ns     |
| $t_{PA}$      | Delay step size                                                                                                                         | 16.5   | 42   | 59.4   | ps     |
| $t_{RANGE1}$  | Max. delay setting for single delay block (144 taps)                                                                                    | 2.376  | 6    | 8.553  | ns     |
| $t_{RANGE4}$  | Max. delay setting for four chained delay blocks                                                                                        | 9.504  | 24   | 34.214 | ns     |

1. CLKOP runs at the same frequency as the input clock.

2. CLKOS minimum frequency is obtained with divide by 4.

3. This is intended to be a “path-matching” design guideline and is not a measurable specification.

## SERDES High-Speed Data Transmitter (LatticeECP2M Family Only)<sup>1, 2</sup>

**Table 3-7. Serial Output Timing and Levels**

| Symbol                        | Description                                        | Frequency          | Min.                     | Typ.                     | Max.                     | Units  |
|-------------------------------|----------------------------------------------------|--------------------|--------------------------|--------------------------|--------------------------|--------|
| V <sub>TX-DIFF-P-P-1</sub>    | Differential swing (1V setting) <sup>1, 2</sup>    | 0.25 to 3.125 Gbps | 0.79                     | 0.99                     | 1.19                     | V, p-p |
| V <sub>TX-DIFF-P-P-1.25</sub> | Differential swing (1.25V setting) <sup>1, 2</sup> | 0.25 to 3.125 Gbps | 1.00                     | 1.25                     | 1.50                     | V, p-p |
| V <sub>TX-DIFF-P-P-1.3</sub>  | Differential swing (1.3V setting) <sup>1, 2</sup>  | 0.25 to 3.125 Gbps | 1.04                     | 1.30                     | 1.56                     | V, p-p |
| V <sub>TX-DIFF-P-P-1.35</sub> | Differential swing (1.35V setting) <sup>1, 2</sup> | 0.25 to 3.125 Gbps | 1.08                     | 1.35                     | 1.62                     | V, p-p |
| V <sub>OCM</sub>              | Output common mode voltage                         | —                  | V <sub>CCOB</sub> - 0.75 | V <sub>CCOB</sub> - 0.60 | V <sub>CCOB</sub> - 0.45 | V      |
| T <sub>TX-R</sub>             | Rise time (20% to 80%)                             | —                  | —                        | 70                       | —                        | ps     |
| T <sub>TX-F</sub>             | Fall time (80% to 20%)                             | —                  | —                        | 70                       | —                        | ps     |
| Z <sub>TX-OI-SE</sub>         | Output impedance 50/75/HiZ K Ohms (single-ended)   | —                  | —                        | 50/70 HiZ                | —                        | Ohms   |
| R <sub>TX-RL</sub>            | Return loss (with package)                         | —                  | —                        | 9                        | —                        | dB     |

1. All measurements are with 50 ohm impedance.

2. See TN1124, [LatticeECP2M SERDES/PCS Usage Guide](#) for actual binary settings.

**Table 3-8. Channel Output Jitter - x10 Mode**

| Description   | Frequency  | Min. | Typ. | Max. | Units   |
|---------------|------------|------|------|------|---------|
| Deterministic | 3.125 Gbps | —    | 0.08 | 0.12 | UI, p-p |
| Random        | 3.125 Gbps | —    | 0.22 | 0.38 | UI, p-p |
| Total         | 3.125 Gbps | —    | 0.33 | 0.43 | UI, p-p |
| Deterministic | 2.5 Gbps   | —    | 0.08 | 0.17 | UI, p-p |
| Random        | 2.5 Gbps   | —    | 0.20 | 0.25 | UI, p-p |
| Total         | 2.5 Gbps   | —    | 0.25 | 0.35 | UI, p-p |
| Deterministic | 1.25 Gbps  | —    | 0.03 | 0.10 | UI, p-p |
| Random        | 1.25 Gbps  | —    | 0.14 | 0.19 | UI, p-p |
| Total         | 1.25 Gbps  | —    | 0.17 | 0.24 | UI, p-p |
| Deterministic | 250 Mbps   | —    | 0.04 | 0.17 | UI, p-p |
| Random        | 250 Mbps   | —    | 0.12 | 0.13 | UI, p-p |
| Total         | 250 Mbps   | —    | 0.15 | 0.29 | UI, p-p |

Note: Values are measured with PRBS 2<sup>7</sup>-1, all channels operating, FPGA Logic active, I/Os around SERDES pins quiet, reference clock at x10 mode.

**Table 3-9. Channel Output Jitter - x20 Mode**

| Description   | Frequency  | Min. | Typ. | Max. | Units   |
|---------------|------------|------|------|------|---------|
| Deterministic | 3.125 Gbps | —    | 0.08 | 0.12 | UI, p-p |
| Random        | 3.125 Gbps | —    | 0.27 | 0.51 | UI, p-p |
| Total         | 3.125 Gbps | —    | 0.35 | 0.59 | UI, p-p |
| Deterministic | 2.5 Gbps   | —    | 0.09 | 0.19 | UI, p-p |
| Random        | 2.5 Gbps   | —    | 0.23 | 0.34 | UI, p-p |
| Total         | 2.5 Gbps   | —    | 0.29 | 0.45 | UI, p-p |
| Deterministic | 1.25 Gbps  | —    | 0.05 | 0.11 | UI, p-p |
| Random        | 1.25 Gbps  | —    | 0.16 | 0.22 | UI, p-p |
| Total         | 1.25 Gbps  | —    | 0.20 | 0.28 | UI, p-p |

Note: Values are measured with PRBS 2<sup>7</sup>-1, all channels operating, FPGA Logic active, I/Os around SERDES pins quiet, reference clock at x20 mode.

**Table 3-10. SERDES/PCS Latency Breakdown (Parallel Clock Cycle)**

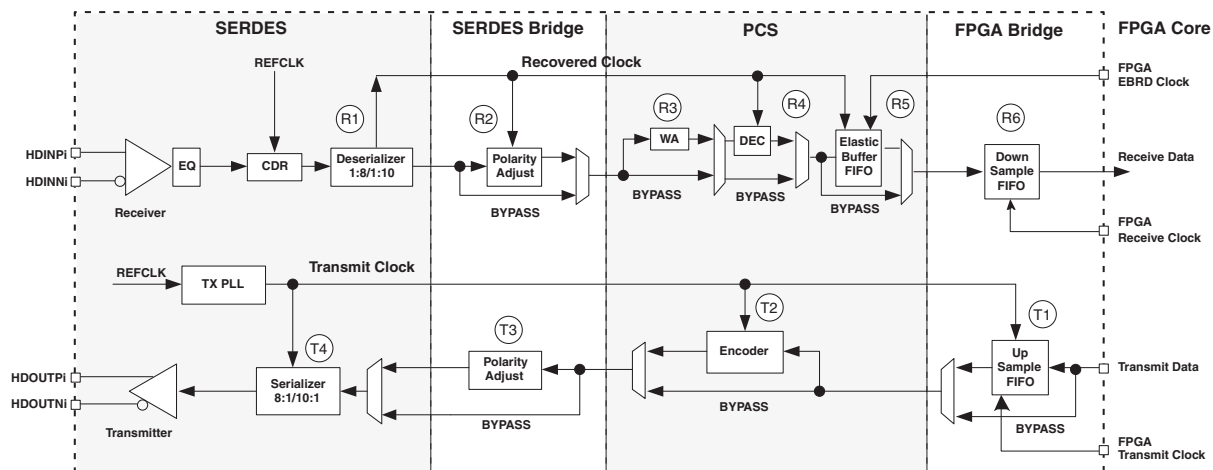
| Item                         | Description                       | Min. | Average | Max. | Fixed           | Bypass | Units    |
|------------------------------|-----------------------------------|------|---------|------|-----------------|--------|----------|
| <b>Transmit Data Latency</b> |                                   |      |         |      |                 |        |          |
| T1                           | FPGA Bridge Transmit <sup>2</sup> | 1    | 3       | 5    |                 | 1      | word clk |
| T2                           | 8b10b Encoder                     | —    | —       | —    | 2               | 1      | word clk |
| T3                           | SERDES Bridge Transmit            | —    | —       | —    | 2               | 1      | word clk |
| T4 <sup>3</sup>              | Serializer: 8-bit mode            | —    | —       | —    | 15 + $\Delta 1$ | —      | UI + ps  |
|                              | Serializer: 10-bit mode           | —    | —       | —    | 18 + $\Delta 1$ | —      | UI + ps  |
| <b>Receive Data Latency</b>  |                                   |      |         |      |                 |        |          |
| R1 <sup>3</sup>              | Deserializer: 8-bit mode          | —    | —       | —    | 10 + $\Delta 2$ | —      | UI + ps  |
|                              | Deserializer: 10-bit mode         | —    | —       | —    | 12 + $\Delta 2$ | —      | UI + ps  |
| R2                           | SERDES Bridge Receive             | —    | —       | —    | 2               | 1      | word clk |
| R3                           | Word Alignment                    | 3.1  | —       | 4    | —               | 0      | word clk |
| R4                           | 8b10b Decoder                     | —    | —       | —    | 1               | 1      | word clk |
| R5                           | Clock Tolerance Compensation      | 7    | 15      | 23   |                 | 1      | word clk |
| R6                           | FPGA Bridge Receive <sup>2</sup>  | 1    | 3       | 5    |                 | 1      | word clk |

1. PCS internal parallel clock. This clock rate is the same as rxfullclk.

2. FPGA Bridge latency varies by the upsample/downsample FIFO read/write. The numbers given are for the 8b10b interface. The depth of the downsample/upsample FIFO is 4. The earliest read can be done after the write clock cycle (one clock) in downsample FIFO. The latest read will be done after the FIFO is full (4 + 1 = 5). For the 16b20b interface, the numbers are doubled: min. = 2, max. = 10. This latency depends on the internal FIFO flag operation.

3.  $\Delta 1$  = -245ps,  $\Delta 2$  = 700ps

Figure 3-12. Transmitter and Receiver Block Diagram



## SERDES High Speed Data Receiver (LatticeECP2M Family Only)

**Table 3-11. Serial Input Data Specifications**

| Symbol                 | Description                                                                                           | Min. | Typ.                             | Max.                               | Units   |
|------------------------|-------------------------------------------------------------------------------------------------------|------|----------------------------------|------------------------------------|---------|
| RX-CID <sub>S</sub>    | Stream of nontransitions <sup>1</sup><br>(CID = Consecutive Identical Digits) @ 10 <sup>-12</sup> BER |      | 7 @ 3.125 Gbps<br>20 @ 1.25 Gbps |                                    | Bits    |
| V <sub>RX-DIFF-S</sub> | Differential input sensitivity                                                                        | 100  | —                                | —                                  | mV, p-p |
| V <sub>RX-IN</sub>     | Input levels                                                                                          | 0    | —                                | V <sub>CCR<sub>X</sub></sub> + 0.8 | V       |
| V <sub>RX-CM-DC</sub>  | Input common mode range (DC coupled)                                                                  | 0.5  | —                                | 1.2                                | V       |
| V <sub>RX-CM-AC</sub>  | Input common mode range (AC coupled) <sup>3</sup>                                                     | 0    | —                                | 1.5                                | V       |
| T <sub>RX-RELOCK</sub> | CDR re-lock time <sup>2</sup>                                                                         | —    | —                                | 3000                               | Bits    |
| Z <sub>RX-TERM</sub>   | Input termination 50/75 Ohm/High Z                                                                    | —    | 50                               |                                    | Ohms    |
| RL <sub>RX-RL</sub>    | Return loss (without package)                                                                         | —    | 9                                | —                                  | dB      |

1. This is the number of bits allowed without a transition on the incoming data stream when using DC coupling.
2. This is the typical number of bit times to re-lock to a new phase of frequency within +/- 300 ppm, assuming 8b10b encoded data and the CDR is in lock state. When CDR is in un-lock state, or reset is applied, the total re-lock settling time will be approximately 4ms including analog settle time, calibration time, and acquisition time.
3. AC coupling is used to interface to LVPECL and LVDS.

### Input Data Jitter Tolerance

A receiver's ability to tolerate incoming signal jitter is very dependent on jitter type. High speed serial interface standards have recognized the dependency on jitter type and have recently modified specifications to indicate tolerance levels for different jitter types as they relate to specific protocols (e.g. FC, etc.). Sinusoidal jitter is considered to be a worst case jitter type.

**Table 3-12. Receiver Total Jitter Tolerance Specification<sup>1</sup>**

| Description   | Frequency             | Condition               | Min. | Typ. | Max. | Units   |
|---------------|-----------------------|-------------------------|------|------|------|---------|
| Deterministic | 3.125 Gbps            | 600 mV differential eye | —    | —    | 0.54 | UI, p-p |
| Random        |                       | 600 mV differential eye | —    | —    | 0.26 | UI, p-p |
| Total         |                       | 600 mV differential eye | —    | —    | 0.80 | UI, p-p |
| Deterministic | 2.5 Gbps              | 600 mV differential eye | —    | —    | 0.61 | UI, p-p |
| Random        |                       | 600 mV differential eye | —    | —    | 0.22 | UI, p-p |
| Total         |                       | 600 mV differential eye | —    | —    | 0.81 | UI, p-p |
| Deterministic | 1.25 Gbps             | 600 mV differential eye | —    | —    | 0.53 | UI, p-p |
| Random        |                       | 600 mV differential eye | —    | —    | 0.22 | UI, p-p |
| Total         |                       | 600 mV differential eye | —    | —    | 0.80 | UI, p-p |
| Deterministic | 250 Mbps <sup>2</sup> | 600 mV differential eye | —    | —    | 0.42 | UI, p-p |
| Random        |                       | 600 mV differential eye | —    | —    | 0.10 | UI, p-p |
| Total         |                       | 600 mV differential eye | —    | —    | 0.60 | UI, p-p |

1. Values are measured with PRBS 2<sup>7</sup>-1, all channels operating, FPGA Logic active, I/Os around SERDES pins quiet, voltages are nominal, room temperature.
2. Jitter specification is limited by measurement equipment capability.

**Table 3-13. Periodic Receiver Jitter Tolerance Specification<sup>1</sup>**

| Description | Frequency             | Condition               | Min. | Typ. | Max. | Units   |
|-------------|-----------------------|-------------------------|------|------|------|---------|
| Periodic    | 3.125 Gbps            | 600 mV differential eye | —    | —    | 0.20 | UI, p-p |
|             | 2.5 Gbps              | 600 mV differential eye | —    | —    | 0.22 | UI, p-p |
|             | 1.25 Gbps             | 600 mV differential eye | —    | —    | 0.20 | UI, p-p |
|             | 250 Mbps <sup>2</sup> | 600 mV differential eye | —    | —    | 0.08 | UI, p-p |

1. Values are measured with PRBS 2<sup>7</sup>-1, all channels operating.

2. Jitter specification is limited by measurement equipment capability.

### SERDES External Reference Clock (LatticeECP2M Family Only)

The external reference clock selection and its interface are a critical part of system applications for this product. Table 3-14 specifies reference clock requirements, over the full range of operating conditions.

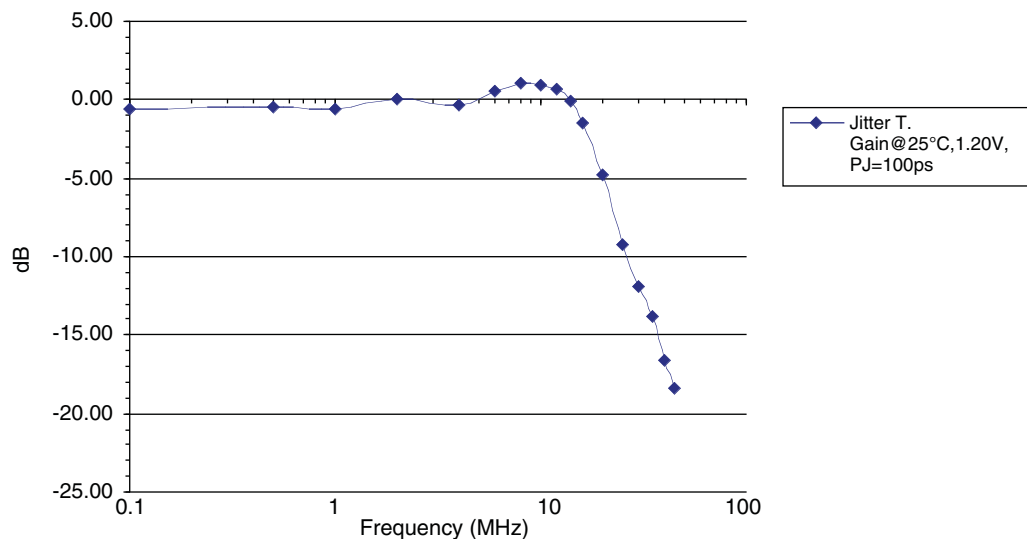
**Table 3-14. External Reference Clock Specification (refclkp/refclkn)**

| Symbol                   | Description                                       | Min. | Typ.  | Max.                   | Units   |
|--------------------------|---------------------------------------------------|------|-------|------------------------|---------|
| F <sub>REF</sub>         | Frequency range                                   | 25   | —     | 320                    | MHz     |
| F <sub>REF-PPM</sub>     | Frequency tolerance                               | -300 | —     | 300                    | ppm     |
| V <sub>REF-IN-SE</sub>   | Input swing, single-ended clock <sup>1</sup>      | 100  | —     | 1200                   | mV, p-p |
| V <sub>REF-IN</sub>      | Input levels                                      | 0    | —     | V <sub>CCP</sub> + 0.8 | V       |
| V <sub>REF-CM-DC</sub>   | Input common mode range (DC coupled)              | 0.5  | —     | 1.2                    | V       |
| V <sub>REF-CM-AC</sub>   | Input common mode range (AC coupled) <sup>2</sup> | 0    | —     | 1.5                    | V       |
| D <sub>REF</sub>         | Duty cycle <sup>3</sup>                           | 40   | —     | 60                     | %       |
| T <sub>REF-R</sub>       | Rise time (20% to 80%)                            |      | 500   | 1000                   | ps      |
| T <sub>REF-F</sub>       | Fall time (80% to 20%)                            |      | 500   | 1000                   | ps      |
| Z <sub>REF-IN-TERM</sub> | Input termination                                 |      | 50/2K |                        | Ohms    |
| C <sub>REF-IN-CAP</sub>  | Input capacitance <sup>4</sup>                    | —    | —     | 1.5                    | pF      |

1. The signal swing for a single-ended input clock must be as large as the p-p differential swing of a differential input clock to get the same gain at the input receiver. Lower swings for the clock may be possible, but will tend to increase jitter.
2. When AC coupled, the input common mode range is determined by:  

$$(\text{Min input level}) + (\text{Peak-to-peak input swing})/2 \leq (\text{Input common mode voltage}) \leq (\text{Max input level}) - (\text{Peak-to-peak input swing})/2$$
3. Measured at 50% amplitude.
4. Input capacitance of 1.5pF is total capacitance, including both device and package.

**Figure 3-13. Jitter Transfer**



Note: This graph is for a nominal device.

### SERDES Power-Down/Power-Up Specification

**Table 3-15. Power-Down and Power-Up Specification**

| Symbol             | Description                                                   | Max. | Units |
|--------------------|---------------------------------------------------------------|------|-------|
| t <sub>PWRDN</sub> | Power-down time after all power down register bits set to '0' | 10   | μs    |
| t <sub>PWRUP</sub> | Power-up time after all power down register bits set to '1'   | 100  | μs    |

## PCI Express Electrical and Timing Characteristics

### AC and DC Characteristics

**Table 3-16. Transmit<sup>1, 2</sup>**

| Symbol                                                | Description                                                | Test Conditions                                      | Min    | Typ  | Max                    | Units |
|-------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|--------|------|------------------------|-------|
| UI                                                    | Unit interval                                              |                                                      | 399.88 | 400  | 400.12                 | ps    |
| V <sub>TX-DIFF_P-P</sub>                              | Differential peak-to-peak output voltage                   |                                                      | 0.8    | 1.0  | 1.2                    | V     |
| V <sub>TX-DE-RATIO</sub>                              | De-emphasis differential output voltage ratio              |                                                      | 0      | -3.5 | -7.96                  | dB    |
| V <sub>TX-CM-AC_P</sub>                               | RMS AC peak common-mode output voltage                     |                                                      | —      | 20   | —                      | mV    |
| V <sub>TX-CM-DC-LINE-DELTA</sub>                      | Maximum Common mode voltage delta between n and p channels |                                                      | —      | —    | 25                     | mV    |
| V <sub>TX-DC-CM</sub>                                 | Tx DC common mode voltage                                  |                                                      | 0      | —    | V <sub>CCOB</sub> + 5% | V     |
| I <sub>TX-SHORT</sub>                                 | Output short circuit current                               | V <sub>TX-D+</sub> =0.0V<br>V <sub>TX-D-</sub> =0.0V | —      | —    | 90                     | mA    |
| Z <sub>TX-DIFF-DC</sub>                               | Differential output impedance                              |                                                      | 80     | 100  | 120                    | Ohms  |
| T <sub>TX-RISE</sub>                                  | Tx output rise time                                        | 20 to 80%                                            | 0.125  | —    | —                      | UI    |
| T <sub>TX-FALL</sub>                                  | Tx output fall time                                        | 20 to 80%                                            | 0.125  | —    | —                      | UI    |
| L <sub>TX-SKEW</sub>                                  | Lane-to-lane static output skew for all lanes in port/link |                                                      | —      | —    | 1.3                    | ns    |
| T <sub>TX-EYE</sub>                                   | Transmitter eye width                                      |                                                      | 0.75   | —    | —                      | UI    |
| T <sub>TX-EYE-MEDIAN-TO-MAX-JITTER</sub> <sup>3</sup> |                                                            |                                                      | —      | —    | 0.125                  | UI    |
| C <sub>TX</sub>                                       | AC coupling capacitor                                      |                                                      | 75     | —    | 200                    | nF    |

1. Values are measured at 2.5 Gbps.

2. Compliant to PCI Express v1.1.

3. Measured at 60ps with plug-in board and jitter due to socket removed.

**Table 3-17. Receive**

| Symbol                                   | Description                             | Test Conditions | Min.   | Typ. | Max.   | Units |
|------------------------------------------|-----------------------------------------|-----------------|--------|------|--------|-------|
| UI                                       | Unit Interval                           |                 | 399.88 | 400  | 400.12 | ps    |
| V <sub>RX-DIFF_P-P</sub>                 | Differential peak-to-peak input voltage |                 | 0.175  | —    | —      | V     |
| V <sub>RX-IDLE-DET-DIFF_P-P</sub>        | Idle detect threshold voltage           |                 | 65     | —    | 175    | mV    |
| Z <sub>RX-DIFF-DC</sub>                  | DC differential input impedance         |                 | 80     | 100  | 120    | Ohms  |
| Z <sub>RX-DC</sub>                       | DC input impedance                      |                 | 40     | 50   | 60     | Ohms  |
| Z <sub>RX-HIGH-IMP-DC</sub> <sup>1</sup> | Power-down DC input impedance           |                 | 200K   | —    | —      | Ohms  |
| T <sub>RX-EYE</sub>                      | Receiver eye width                      |                 | 0.4    | —    | —      | UI    |
| T <sub>RX-EYE-MEDIAN-TO-MAX-JITTER</sub> |                                         |                 | —      | —    | 0.3    | UI    |

Notes:

1. Measured with external AC-coupling on the receiver

2. Values are measured at 2.5 Gbps



**Table 3-18. Reference Clock**

| Symbol        | Description                      | Test Conditions | Min. | Typ. | Max. | Units |
|---------------|----------------------------------|-----------------|------|------|------|-------|
| $F_{REFCLK}$  | Reference clock frequency        |                 | —    | 100  | —    | MHz   |
| $V_{CM}$      | Input common mode voltage        |                 | —    | 0.65 | —    | V     |
| $T_R/T_F$     | Clock input rise/fall time       |                 | —    | —    | 1.0  | ns    |
| $V_{SW}$      | Differential input voltage swing |                 | 0.6  | —    | 1.6  | V     |
| $DC_{REFCLK}$ | Input clock duty cycle           |                 | 40   | 50   | 60   | %     |
| PPM           | Reference clock tolerance        |                 | -300 | —    | +300 | ppm   |

## LatticeECP2/M sysCONFIG Port Timing Specifications

Over Recommended Operating Conditions

| Parameter                                        | Description                                                  | Min.     | Max.     | Units  |
|--------------------------------------------------|--------------------------------------------------------------|----------|----------|--------|
| <b>sysCONFIG Byte Data Flow</b>                  |                                                              |          |          |        |
| t <sub>SUCBDI</sub>                              | Byte D[0:7] Setup Time to CCLK                               | 7        | —        | ns     |
| t <sub>HCBDI</sub>                               | Byte D[0:7] Hold Time to CCLK                                | 1        | —        | ns     |
| t <sub>CODO</sub>                                | CCLK to DOUT in Flowthrough Mode                             | —        | 12       | ns     |
| t <sub>SUCS</sub>                                | CSN[0:1] Setup Time to CCLK                                  | 7        | —        | ns     |
| t <sub>HCS</sub>                                 | CSN[0:1] Hold Time to CCLK                                   | 1        | —        | ns     |
| t <sub>SUWD</sub>                                | Write Signal Setup Time to CCLK                              | 7        | —        | ns     |
| t <sub>HWd</sub>                                 | Write Signal Hold Time to CCLK                               | 1        | —        | ns     |
| t <sub>DCB</sub>                                 | CCLK to BUSY Delay Time                                      | —        | 12       | ns     |
| t <sub>CORD</sub>                                | CCLK to Out for Read Data                                    | —        | 12       | ns     |
| <b>sysCONFIG Byte Slave Clocking</b>             |                                                              |          |          |        |
| t <sub>BSCH</sub>                                | Byte Slave CCLK Minimum High Pulse                           | 6        | —        | ns     |
| t <sub>BSCL</sub>                                | Byte Slave CCLK Minimum Low Pulse                            | 9        | —        | ns     |
| t <sub>BSCYC</sub>                               | Byte Slave CCLK Cycle Time                                   | 15       | —        | ns     |
| <b>sysCONFIG Serial (Bit) Data Flow</b>          |                                                              |          |          |        |
| t <sub>SUSCDI</sub>                              | DI Setup Time to CCLK Slave Mode                             | 7        | —        | ns     |
| t <sub>HSCDI</sub>                               | DI Hold Time to CCLK Slave Mode                              | 1        | —        | ns     |
| t <sub>CODO</sub>                                | CCLK to DOUT in Flowthrough Mode                             | —        | 12       | ns     |
| <b>sysCONFIG Serial Slave Clocking</b>           |                                                              |          |          |        |
| t <sub>SSCH</sub>                                | Serial Slave CCLK Minimum High Pulse                         | 6        | —        | ns     |
| t <sub>SSCL</sub>                                | Serial Slave CCLK Minimum Low Pulse                          | 6        | —        | ns     |
| <b>sysCONFIG POR, Initialization and Wake-up</b> |                                                              |          |          |        |
| t <sub>ICFG</sub>                                | Minimum Vcc to INITN High                                    | —        | 28       | ms     |
| t <sub>VMC</sub>                                 | Time from t <sub>ICFG</sub> to Valid Master CCLK             | —        | 2        | us     |
| t <sub>PRGMRJ</sub>                              | PROGRAMN Pin Pulse Rejection                                 | —        | 8        | ns     |
| t <sub>PRGM</sub>                                | PROGRAMN Low Time to Start Configuration                     | 25       | —        | ns     |
| t <sub>DINIT</sub>                               | PROGRAMN High to INITN High Delay <sup>1</sup>               | —        | 1.5      | ms     |
| t <sub>DPPINIT</sub>                             | Delay Time from PROGRAMN Low to INITN Low                    | —        | 37       | ns     |
| t <sub>DPPDONE</sub>                             | Delay Time from PROGRAMN Low to DONE Low                     | —        | 37       | ns     |
| t <sub>IODISS</sub>                              | User I/O Disable from PROGRAMN Low                           | —        | 35       | ns     |
| t <sub>IOENSS</sub>                              | User I/O Enabled Time from CCLK Edge During Wake-up Sequence | —        | 25       | ns     |
| t <sub>MWC</sub>                                 | Additional Wake Master Clock Signals after DONE Pin High     | 120      | —        | cycles |
| <b>sysCONFIG SPI Port<sup>2</sup></b>            |                                                              |          |          |        |
| t <sub>CFGX</sub>                                | INITN High to CCLK Low                                       | —        | 1        | μs     |
| t <sub>CSSPI</sub>                               | INITN High to CSSPIN Low                                     | —        | 2        | us     |
| t <sub>CSCCLK</sub>                              | CCLK Low before CSSPIN Low                                   | 0        | —        | ns     |
| t <sub>SOCDO</sub>                               | CCLK Low to Output Valid                                     | —        | 15       | ns     |
| t <sub>SOE</sub>                                 | CSSPIN[0:1] Active Setup Time                                | 300      | —        | ns     |
| t <sub>CSPID</sub>                               | CSSPIN[0:1] Low to First CCLK Edge Setup Time                | 300+3cyc | 600+6cyc | ns     |

## LatticeECP2/M sysCONFIG Port Timing Specifications (Continued)

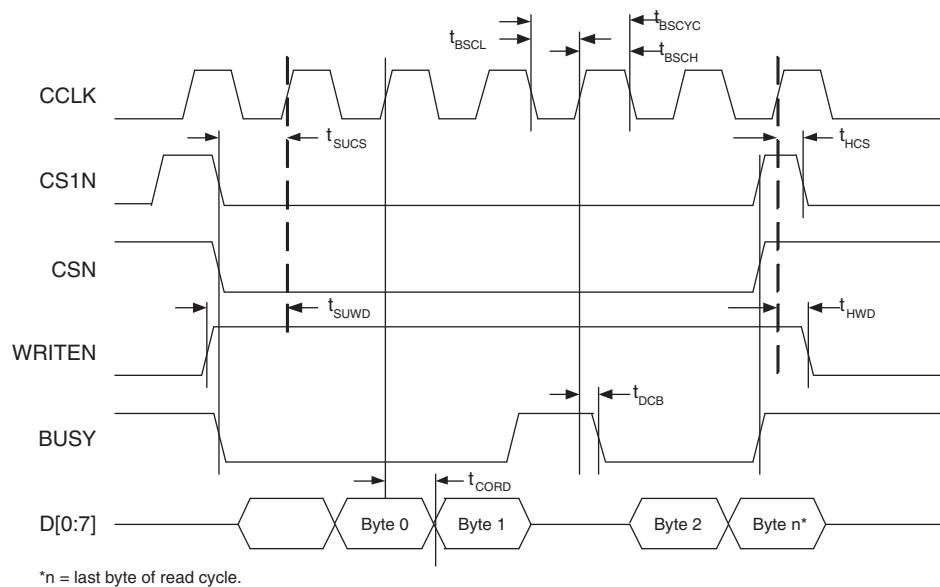
Over Recommended Operating Conditions

| Parameter           | Description                                                            | Min. | Max. | Units |
|---------------------|------------------------------------------------------------------------|------|------|-------|
| $f_{\text{MAXSPI}}$ | Max. CCLK Frequency - SPI Flash Read Opcode (0x03) (SPIFASTN = 1)      | —    | 20   | MHz   |
|                     | Max. CCLK Frequency - SPI Flash Fast Read Opcode (0x0B) (SPIFASTN = 0) | —    | 50   | MHz   |
|                     | Max. CCLK Frequency - Encrypted Bitstream                              | —    | 10   | MHz   |
| $t_{\text{SUSPI}}$  | SOSPI Data Setup Time Before CCLK                                      | 7    | —    | ns    |
| $t_{\text{HSPI}}$   | SOSPI Data Hold Time After CCLK                                        | 2    | —    | ns    |
| $t_{\text{SUMCDI}}$ | DI Setup to CCLK                                                       | 7    | —    | ns    |
| $t_{\text{HMCDI}}$  | DI Hold from CCLK                                                      | 1    | —    | ns    |

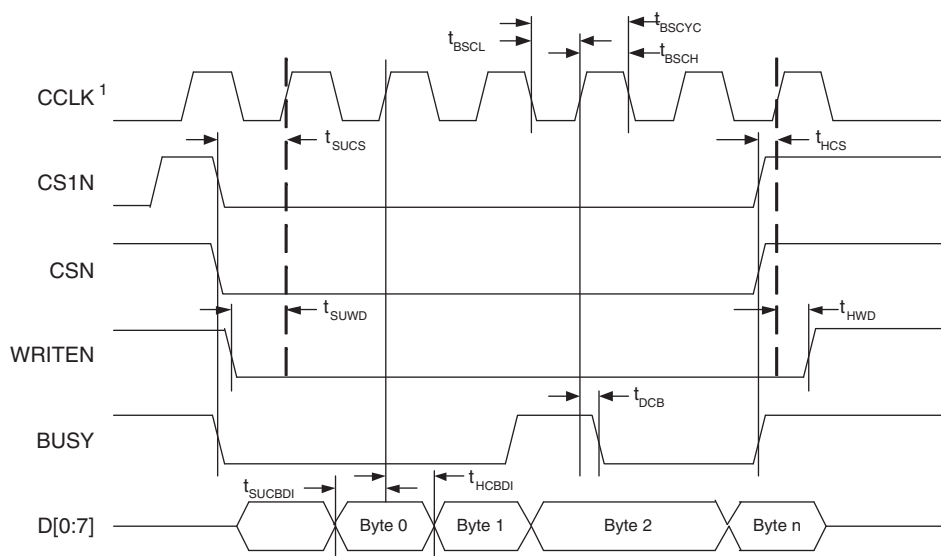
1. Re-toggling the PROGRAMN pin is not permitted until the INITN pin is high. Avoid consecutive toggling of the PROGRAMN.
2. For SED (Soft Error Detect), the SEDCLKIN operating frequency must be at least 20MHz. SEDCLKIN is derived from Master Clock Frequency that has a +/-30% variation..

| Parameter              | Min.                 | Max.                 | Units |
|------------------------|----------------------|----------------------|-------|
| Master Clock Frequency | Selected value - 30% | Selected value + 30% | MHz   |
| Duty Cycle             | 40                   | 60                   | %     |

Figure 3-14. sysCONFIG Parallel Port Read Cycle

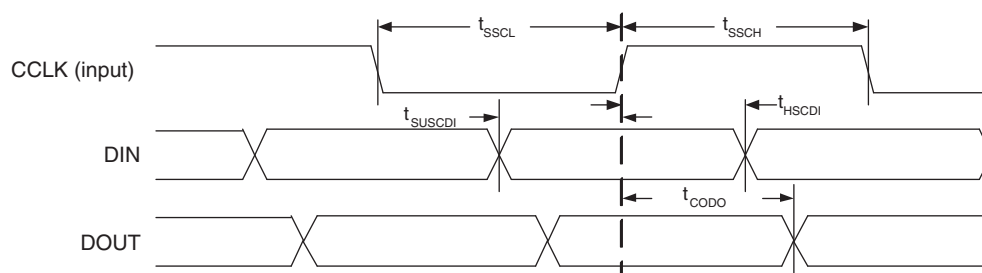


**Figure 3-15. sysCONFIG Parallel Port Write Cycle**

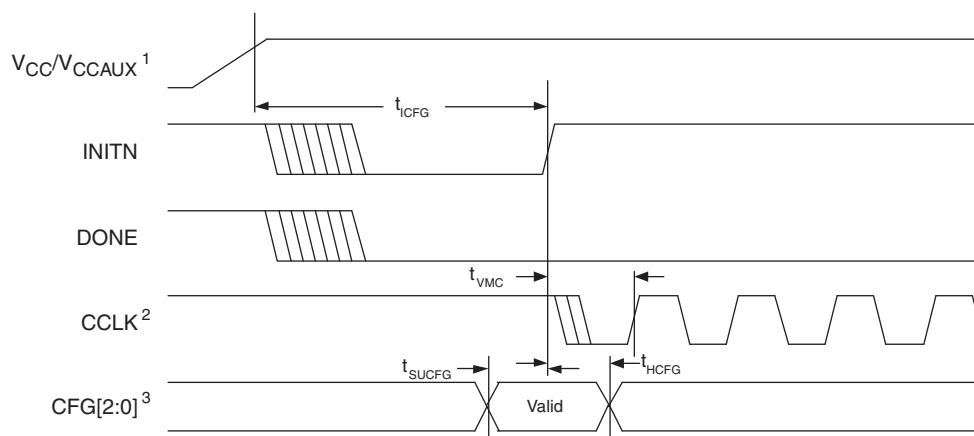


1. In Master Parallel Mode the FPGA provides CCLK. In Slave Parallel Mode the external device provides CCLK.

**Figure 3-16. sysCONFIG Slave Serial Port Timing**

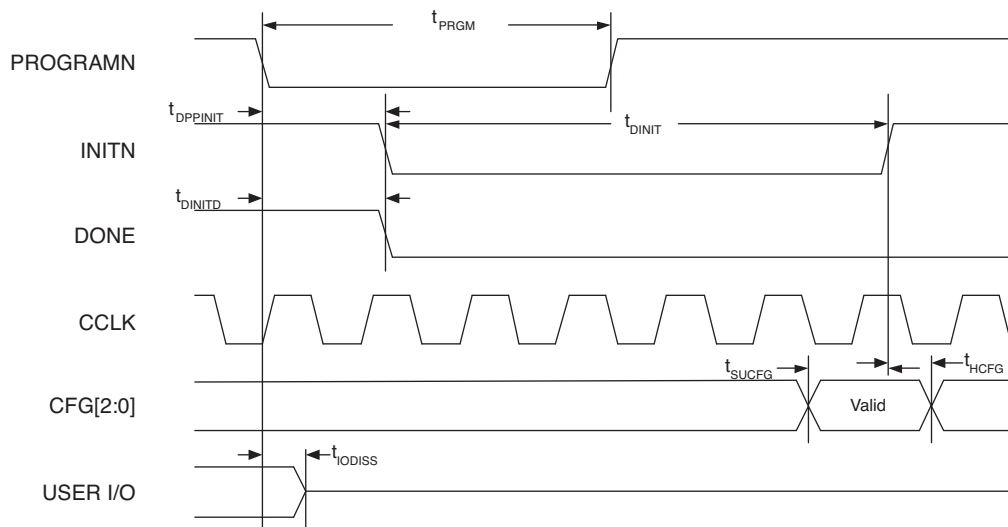


**Figure 3-17. Power-On-Reset (POR) Timing**



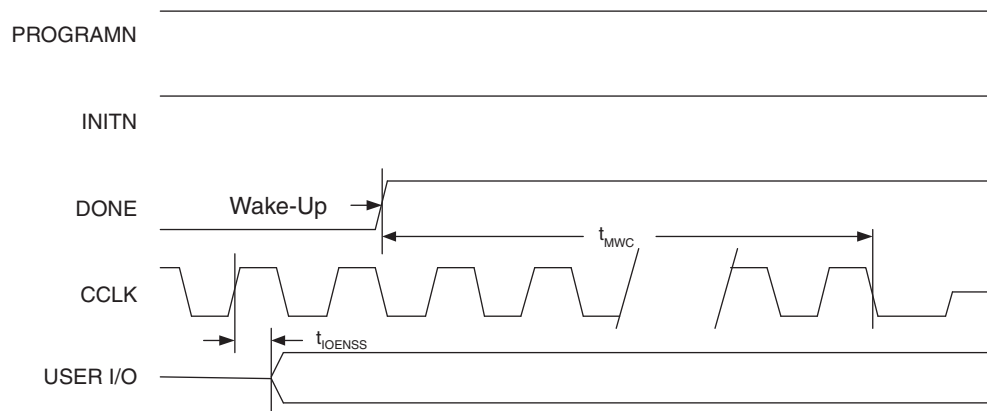
1. Time taken from  $V_{CC}$  or  $V_{CCAUX}$ , whichever is the last to reach its  $V_{MIN}$ .
2. Device is in a Master Mode.
3. The CFG pins are normally static (hard wired).

**Figure 3-18. Configuration from PROGRAMN Timing**

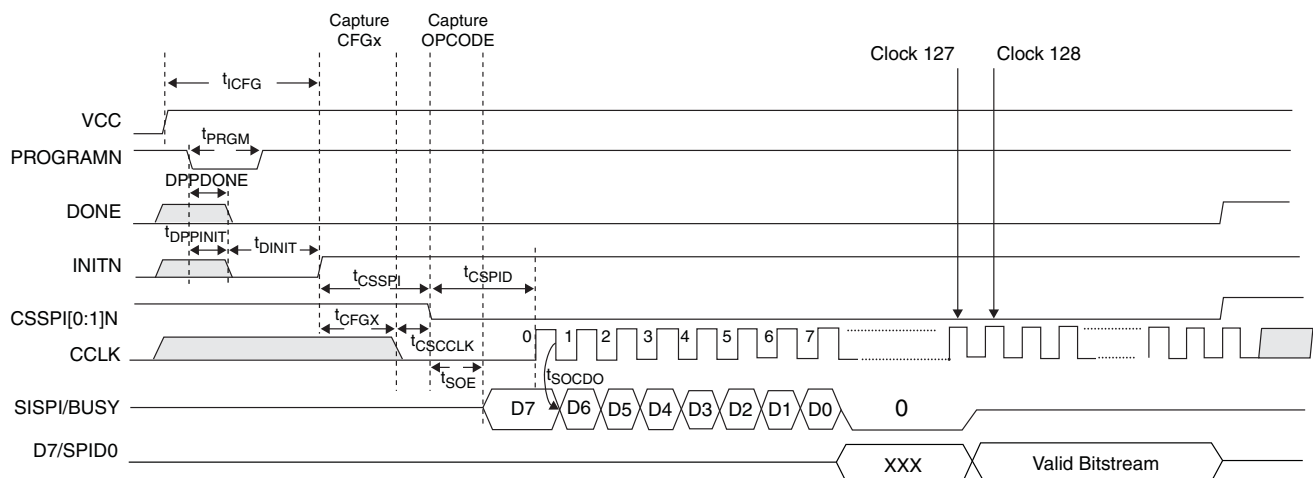


1. The CFG pins are normally static (hard wired)

**Figure 3-19. Wake-Up Timing**



**Figure 3-20. SPI/SPI<sub>m</sub> Configuration Waveforms**



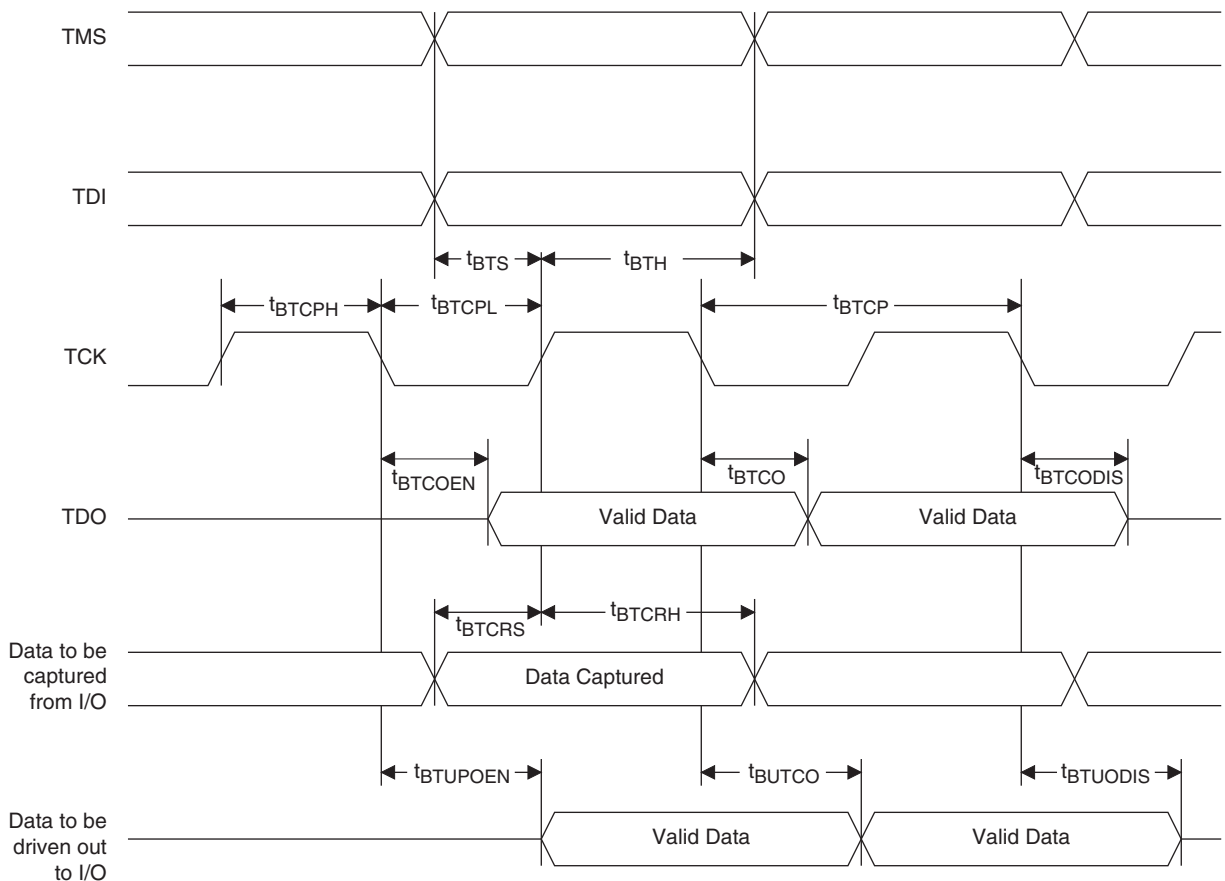
## JTAG Port Timing Specifications

Over Recommended Operating Conditions

| Symbol               | Parameter                                                          | Min | Max | Units |
|----------------------|--------------------------------------------------------------------|-----|-----|-------|
| $f_{\text{MAX}}$     | TCK clock frequency                                                | —   | 25  | MHz   |
| $t_{\text{BTCP}}$    | TCK [BSCAN] clock pulse width                                      | 40  | —   | ns    |
| $t_{\text{BTCPH}}$   | TCK [BSCAN] clock pulse width high                                 | 20  | —   | ns    |
| $t_{\text{BTCPL}}$   | TCK [BSCAN] clock pulse width low                                  | 20  | —   | ns    |
| $t_{\text{BTS}}$     | TCK [BSCAN] setup time                                             | 8   | —   | ns    |
| $t_{\text{BTH}}$     | TCK [BSCAN] hold time                                              | 10  | —   | ns    |
| $t_{\text{BTRF}}$    | TCK [BSCAN] rise/fall time                                         | 50  | —   | mV/ns |
| $t_{\text{BTCO}}$    | TAP controller falling edge of clock to valid output               | —   | 10  | ns    |
| $t_{\text{BTCODIS}}$ | TAP controller falling edge of clock to valid disable              | —   | 10  | ns    |
| $t_{\text{BTCOEN}}$  | TAP controller falling edge of clock to valid enable               | —   | 10  | ns    |
| $t_{\text{BTCRS}}$   | BSCAN test capture register setup time                             | 8   | —   | ns    |
| $t_{\text{BTCRH}}$   | BSCAN test capture register hold time                              | 25  | —   | ns    |
| $t_{\text{BUTCO}}$   | BSCAN test update register, falling edge of clock to valid output  | —   | 25  | ns    |
| $t_{\text{BTUODIS}}$ | BSCAN test update register, falling edge of clock to valid disable | —   | 25  | ns    |
| $t_{\text{BTUPOEN}}$ | BSCAN test update register, falling edge of clock to valid enable  | —   | 25  | ns    |

Timing v.A 0.11

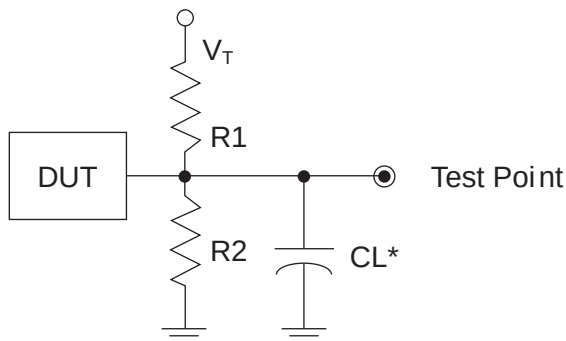
Figure 3-21. JTAG Port Timing Waveforms



### Switching Test Conditions

Figure 3-22 shows the output test load that is used for AC testing. The specific values for resistance, capacitance, voltage, and other test conditions are shown in Table 3-19.

**Figure 3-22. Output Test Load, LVTTTL and LVCMOS Standards**



\*CL Includes Test Fixture and Probe Capacitance

**Table 3-19. Test Fixture Required Components, Non-Terminated Interfaces**

| Test Condition                                    | R <sub>1</sub> | R <sub>2</sub> | C <sub>L</sub> | Timing Ref.               | V <sub>T</sub> |
|---------------------------------------------------|----------------|----------------|----------------|---------------------------|----------------|
| LVTTTL and other LVCMOS settings (L -> H, H -> L) | $\infty$       | $\infty$       | 0pF            | LVCMOS 3.3 = 1.5V         | —              |
|                                                   |                |                |                | LVCMOS 2.5 = $V_{CCIO}/2$ | —              |
|                                                   |                |                |                | LVCMOS 1.8 = $V_{CCIO}/2$ | —              |
|                                                   |                |                |                | LVCMOS 1.5 = $V_{CCIO}/2$ | —              |
|                                                   |                |                |                | LVCMOS 1.2 = $V_{CCIO}/2$ | —              |
| LVCMOS 2.5 I/O (Z -> H)                           | $\infty$       | 1M $\Omega$    |                | $V_{CCIO}/2$              | —              |
| LVCMOS 2.5 I/O (Z -> L)                           | 1M $\Omega$    | $\infty$       |                | $V_{CCIO}/2$              | $V_{CCIO}$     |
| LVCMOS 2.5 I/O (H -> Z)                           | $\infty$       | 100            |                | $V_{OH} - 0.10$           | —              |
| LVCMOS 2.5 I/O (L -> Z)                           | 100            | $\infty$       |                | $V_{OL} + 0.10$           | $V_{CCIO}$     |

Note: Output test conditions for all other interfaces are determined by the respective standards.

### Signal Descriptions

| Signal Name                                                                                                    | I/O | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Purpose</b>                                                                                         |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| P[Edge] [Row/Column Number*]_[A/B]                                                                             | I/O | <p>[Edge] indicates the edge of the device on which the pad is located. Valid edge designations are L (Left), B (Bottom), R (Right), T (Top).</p> <p>[Row/Column Number] indicates the PFU row or the column of the device on which the PIC exists. When Edge is T (Top) or B (Bottom), only need to specify Row Number. When Edge is L (Left) or R (Right), only need to specify Column Number.</p> <p>[A/B] indicates the PIO within the PIC to which the pad is connected. Some of these user-programmable pins are shared with special function pins. These pins, when not used as special purpose pins, can be programmed as I/Os for user logic. During configuration the user-programmable I/Os are tri-stated with an internal pull-up resistor enabled. If any pin is not used (or not bonded to a package pin), it is also tri-stated with an internal pull-up resistor enabled after configuration. See “<a href="#">Typical sysI/O I/O Behavior During Power-up</a>” for more information about I/O behavior during power-up.</p> |
| GSRN                                                                                                           | I   | Global RESET signal (active low). Any I/O pin can be GSRN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NC                                                                                                             | —   | No connect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| GND                                                                                                            | —   | Ground. Dedicated pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| V <sub>CC</sub>                                                                                                | —   | Power supply pins for core logic. Dedicated pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| V <sub>CCAUX</sub>                                                                                             | —   | Auxiliary power supply pin. This dedicated pin powers all the differential and referenced input buffers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| V <sub>CCIOx</sub>                                                                                             | —   | Dedicated power supply pins for I/O bank x.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCPLL</sub>                                                                                             | —   | PLL supply pins. Should be tied to V <sub>CC</sub> even when the corresponding PLL is unused.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| V <sub>REF1_x</sub> , V <sub>REF2_x</sub>                                                                      | —   | Reference supply pins for I/O bank x. Pre-determined pins in each bank are assigned as V <sub>REF</sub> inputs. When not used, they may be used as I/O pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| XRES <sup>4</sup>                                                                                              | —   | 10K ohm +/-1% resistor must be connected between this pad and ground.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PLLCAP <sup>4</sup>                                                                                            | —   | External capacitor connection for PLL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>PLL, DLL and Clock Functions</b> (Used as user programmable I/O pins when not in use for PLL or clock pins) |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| [LOC][num]_V <sub>CCPLL</sub>                                                                                  | —   | Power supply pin for PLL: LUM, LLM, RUM, RLM, num = row from center.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| [LOC][num]_GPLL[T, C]_IN_A                                                                                     | I   | General Purpose PLL (GPLL) input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| [LOC][num]_GPLL[T, C]_FB_A                                                                                     | I   | Optional feedback GPLL input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [LOC][num]_SPLL[T, C]_IN_A <sup>5</sup>                                                                        | I   | Secondary PLL (SPLL) input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| [LOC][num]_SPLL[T, C]_FB_A <sup>5</sup>                                                                        | I   | Optional feedback (SPLL) input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| [LOC][num]_DLL[T, C]_IN_A                                                                                      | I   | DLL input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| [LOC][num]_DLL[T, C]_FB_A                                                                                      | I   | Optional feedback (DLL) input pads: LUM, LLM, RUM, RLM, num = row from center, T = true and C = complement, index A,B,C...at each side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| PCLK[T, C]_[n:0]_[3:0]                                                                                         | I   | Primary Clock pads, T = true and C = complement, n per side, indexed by bank and 0,1,2,3 within bank.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## Signal Descriptions (Cont.)

| Signal Name                                       | I/O | Description                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [LOC]DQS[num]                                     | I/O | DQ input/output pads: T (top), R (right), B (bottom), L (left), DQS, num = ball function number.                                                                                                                                                                                                                                                             |
| [LOC]DQ[num]                                      | I/O | DQ input/output pads: T (top), R (right), B (bottom), L (left), DQ, associated DQS number.                                                                                                                                                                                                                                                                   |
| <b>Test and Programming (Dedicated Pins)</b>      |     |                                                                                                                                                                                                                                                                                                                                                              |
| TMS                                               | I   | Test Mode Select input, used to control the 1149.1 state machine. Pull-up is enabled during configuration.                                                                                                                                                                                                                                                   |
| TCK                                               | I   | Test Clock input pin, used to clock the 1149.1 state machine. No pull-up enabled.                                                                                                                                                                                                                                                                            |
| TDI                                               | I   | Test Data in pin. Used to load data into device using 1149.1 state machine. After power-up, this TAP port can be activated for configuration by sending appropriate command. (Note: once a configuration port is selected it is locked. Another configuration port cannot be selected until the power-up sequence). Pull-up is enabled during configuration. |
| TDO                                               | O   | Output pin. Test Data Out pin used to shift data out of a device using 1149.1.                                                                                                                                                                                                                                                                               |
| VCCJ                                              | —   | Power supply pin for JTAG Test Access Port.                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Pads (Used During sysCONFIG)</b> |     |                                                                                                                                                                                                                                                                                                                                                              |
| CFG[2:0]                                          | I   | Mode pins used to specify configuration mode values latched on rising edge of INITN. During configuration, a pull-up is enabled. These are dedicated pins.                                                                                                                                                                                                   |
| INITN                                             | I/O | Open Drain pin. Indicates the FPGA is ready to be configured. During configuration, a pull-up is enabled. It is a dedicated pin.                                                                                                                                                                                                                             |
| PROGRAMN                                          | I   | Initiates configuration sequence when asserted low. This pin always has an active pull-up. This is a dedicated pin.                                                                                                                                                                                                                                          |
| DONE                                              | I/O | Open Drain pin. Indicates that the configuration sequence is complete, and the startup sequence is in progress. This is a dedicated pin.                                                                                                                                                                                                                     |
| CCLK                                              | I/O | Configuration Clock for configuring an FPGA in sysCONFIG mode.                                                                                                                                                                                                                                                                                               |
| BUSY/SISPI                                        | I/O | Read control command in SPI or SPI <sub>m</sub> mode.                                                                                                                                                                                                                                                                                                        |
| CSN                                               | I   | sysCONFIG chip select (active low). During configuration, a pull-up is enabled.                                                                                                                                                                                                                                                                              |
| CS1N                                              | I   | sysCONFIG chip select (active low). During configuration, a pull-up is enabled.                                                                                                                                                                                                                                                                              |
| WRITEN                                            | I   | Write Data on Parallel port (active low).                                                                                                                                                                                                                                                                                                                    |
| D[0]/SPIFASTN                                     | I/O | sysCONFIG Port Data I/O for Parallel mode.<br>sysCONFIG Port Data I/O for SPI or SPI <sub>m</sub> . When using the SPI or SPI <sub>m</sub> mode, this pin should either be tied high or low, must not be left floating.                                                                                                                                      |
| D[1:6]                                            | I/O | sysCONFIG Port Data I/O for Parallel                                                                                                                                                                                                                                                                                                                         |
| D[7]/SPID0                                        | I/O | sysCONFIG Port Data I/O for Parallel, SPI, SPI <sub>m</sub>                                                                                                                                                                                                                                                                                                  |
| DOUT/CSN                                          | O   | Output for serial configuration data (rising edge of CCLK) when using sysCONFIG port.                                                                                                                                                                                                                                                                        |
| DI/CSSPI0N                                        | I/O | Input for serial configuration data (clocked with CCLK) when using sysCONFIG port. During configuration, a pull-up is enabled. Output when used in SPI/SPI <sub>m</sub> modes.                                                                                                                                                                               |
| <b>Dedicated SERDES Signals<sup>1, 2, 3</sup></b> |     |                                                                                                                                                                                                                                                                                                                                                              |
| [LOC]_SQ_VCCAUX33                                 | —   | Termination resistor switching power (3.3V). This pin must be tied to 3.3V even if the quad is unused.                                                                                                                                                                                                                                                       |
| [LOC]_SQ_REFCLKN                                  | I   | Negative Reference Clock Input                                                                                                                                                                                                                                                                                                                               |
| [LOC]_SQ_REFCLKP                                  | I   | Positive Reference Clock Input                                                                                                                                                                                                                                                                                                                               |
| [LOC]_SQ_VCCP                                     | —   | PLL and Reference clock buffer power (1.2V). This pin must be tied to 1.2V even if the quad is unused.                                                                                                                                                                                                                                                       |

## Signal Descriptions (Cont.)

| Signal Name                              | I/O | Description                                                                                                   |
|------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------|
| [LOC]_SQ_VCCI <sub>Bm</sub>              | —   | Input buffer power supply, channel m (1.2V/1.5V). This pin should be left floating if the channel is unused.  |
| [LOC]_SQ_VCCO <sub>Bm</sub>              | —   | Output buffer power supply, channel m (1.2V/1.5V). This pin should be left floating if the channel is unused. |
| [LOC]_SQ_HDOU <sub>TNm</sub>             | O   | High-speed output, negative channel m                                                                         |
| [LOC]_SQ_HDOU <sub>TPm</sub>             | O   | High-speed output, positive channel m                                                                         |
| [LOC]_SQ_HDIN <sub>Nm</sub>              | I   | High-speed input, negative channel m                                                                          |
| [LOC]_SQ_HDIN <sub>Pm</sub>              | I   | High-speed input, positive channel m                                                                          |
| [LOC]_SQ_VCCT <sub>Xm</sub> <sup>4</sup> | —   | Transmitter power supply, channel m (1.2V). This pin must be tied to 1.2V even if the channel is unused.      |
| [LOC]_SQ_VCCR <sub>Xm</sub> <sup>4</sup> | —   | Receiver power supply, channel m (1.2V). This pin must be tied to 1.2V even if the channel is unused.         |

1. These signals are relevant for LatticeECP2M family.
2. m defines the associated channel in the Quad.
3. These signals are defined in Quads [LOC] indicates the corner SERDES Quad is located: ULC (upper left), URC (upper right), LLC (lower left), LRC (lower right).
4. When placing switching I/Os around these critical pins that are designed to supply the device with the proper reference or supply voltage, care must be given. For more information, refer to TN1159, [LatticeECP2/M Pin Assignment Recommendations](#).
5. There may be SPLs that do not have dedicated I/Os.

## PICs and DDR Data (DQ) Pins Associated with the DDR Strobe (DQS) Pin

| PICs Associated with DQS Strobe               | PIO Within PIC | DDR Strobe (DQS) and Data (DQ) Pins |
|-----------------------------------------------|----------------|-------------------------------------|
| <b>For Left and Right Edges of the Device</b> |                |                                     |
| P[Edge] [n-4]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-3]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-2]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-1]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n]                                   | A              | [Edge]DQSn                          |
|                                               | B              | DQ                                  |
| P[Edge] [n+1]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n+2]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n+3]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| <b>For Bottom Edge of the Device</b>          |                |                                     |
| P[Edge] [n-4]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-3]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-2]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n-1]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n]                                   | A              | [Edge]DQSn                          |
|                                               | B              | DQ                                  |
| P[Edge] [n+1]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n+2]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n+3]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |
| P[Edge] [n+4]                                 | A              | DQ                                  |
|                                               | B              | DQ                                  |

**Notes:**

1. "n" is a row PIC number.
2. The DDR interface is designed for memories that support one DQS strobe up to 15 bits of data for the left and right edges and up to 17 bits of data for the bottom edge. In some packages, all the potential DDR data (DQ) pins may not be available. PIC numbering definitions are provided in the "Signal Names" column of the Signal Descriptions table.

**LatticeECP2 Pin Information Summary, LFE2-6 and LFE2-12**

| Pin Type                                                                          |                          | LFE2-6   |           | LFE2-12  |          |           |           |
|-----------------------------------------------------------------------------------|--------------------------|----------|-----------|----------|----------|-----------|-----------|
|                                                                                   |                          | 144 TQFP | 256 fpBGA | 144 TQFP | 208 PQFP | 256 fpBGA | 484 fpBGA |
| Single Ended User I/O                                                             |                          | 90       | 190       | 93       | 131      | 193       | 297       |
| Differential Pair User I/O                                                        |                          | 43       | 95        | 45       | 62       | 96        | 148       |
| Configuration                                                                     | TAP Pins                 | 5        | 5         | 5        | 5        | 5         | 5         |
|                                                                                   | Muxed Pins               | 14       | 14        | 14       | 14       | 14        | 14        |
|                                                                                   | Dedicated Pins (Non TAP) | 7        | 7         | 7        | 7        | 7         | 7         |
| Non Configuration                                                                 | Muxed Pins               | 34       | 54        | 33       | 40       | 54        | 57        |
|                                                                                   | Dedicated Pins           | 3        | 3         | 3        | 3        | 3         | 3         |
| VCC                                                                               |                          | 10       | 7         | 10       | 14       | 7         | 16        |
| VCCAUX                                                                            |                          | 4        | 4         | 4        | 8        | 4         | 16        |
| VCCPLL                                                                            |                          | 0        | 0         | 0        | 0        | 0         | 0         |
| VCCIO                                                                             | Bank0                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank1                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank2                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank3                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank4                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank5                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank6                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank7                    | 1        | 2         | 1        | 2        | 2         | 4         |
|                                                                                   | Bank8                    | 1        | 1         | 1        | 2        | 1         | 2         |
| GND, GND0 to GND7                                                                 |                          | 12       | 20        | 12       | 22       | 20        | 60        |
| NC                                                                                |                          | 4        | 3         | 1        | 0        | 0         | 44        |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 8/4      | 18/6      | 8/4      | 18/9     | 18/9      | 50/25     |
|                                                                                   | Bank1                    | 17/8     | 34/17     | 18/9     | 18/9     | 34/17     | 46/23     |
|                                                                                   | Bank2                    | 4/2      | 20/10     | 4/2      | 11/5     | 20/10     | 24/12     |
|                                                                                   | Bank3                    | 8/4      | 12/6      | 8/4      | 11/5     | 12/6      | 16/8      |
|                                                                                   | Bank4                    | 18/9     | 32/16     | 18/9     | 19/9     | 32/16     | 46/23     |
|                                                                                   | Bank5                    | 8/4      | 14/7      | 10/5     | 18/9     | 17/8      | 46/23     |
|                                                                                   | Bank6                    | 9/4      | 26/13     | 9/4      | 18/8     | 26/13     | 32/16     |
|                                                                                   | Bank7                    | 12/6     | 20/10     | 12/6     | 12/6     | 20/10     | 23/11     |
|                                                                                   | Bank8                    | 6/2      | 14/7      | 6/2      | 6/2      | 14/7      | 14/7      |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0        | 0         | 0        | 0        | 0         | 0         |
|                                                                                   | Bank1 (Top Edge)         | 0        | 0         | 0        | 0        | 0         | 0         |
|                                                                                   | Bank2 (Right Edge)       | 1        | 5         | 1        | 4        | 5         | 6         |
|                                                                                   | Bank3 (Right Edge)       | 3        | 3         | 3        | 3        | 3         | 4         |
|                                                                                   | Bank4 (Bottom Edge)      | 0        | 0         | 0        | 0        | 0         | 0         |
|                                                                                   | Bank5 (Bottom Edge)      | 0        | 0         | 0        | 0        | 0         | 0         |
|                                                                                   | Bank6 (Left Edge)        | 2        | 7         | 2        | 6        | 7         | 8         |
|                                                                                   | Bank7 (Left Edge)        | 5        | 5         | 5        | 5        | 5         | 5         |
|                                                                                   | Bank8 (Right Edge)       | 0        | 0         | 0        | 0        | 0         | 0         |

**LatticeECP2 Pin Information Summary, LFE2-6 and LFE2-12 (Cont.)**

| Pin Type                                           |       | LFE2-6      |              | LFE2-12     |             |              |              |
|----------------------------------------------------|-------|-------------|--------------|-------------|-------------|--------------|--------------|
|                                                    |       | 144<br>TQFP | 256<br>fpBGA | 144<br>TQFP | 208<br>PQFP | 256<br>fpBGA | 484<br>fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank1 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank2 | 0           | 1            | 0           | 0           | 1            | 1            |
|                                                    | Bank3 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank4 | 0           | 2            | 0           | 0           | 2            | 3            |
|                                                    | Bank5 | 0           | 1            | 0           | 0           | 1            | 3            |
|                                                    | Bank6 | 0           | 1            | 0           | 0           | 1            | 1            |
|                                                    | Bank7 | 0           | 1            | 0           | 0           | 1            | 1            |
|                                                    | Bank8 | 0           | 0            | 0           | 0           | 0            | 0            |
| PCI Capable I/Os per Bank                          | Bank0 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank1 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank2 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank3 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank4 | 18          | 32           | 18          | 19          | 32           | 46           |
|                                                    | Bank5 | 8           | 14           | 10          | 18          | 17           | 46           |
|                                                    | Bank6 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank7 | 0           | 0            | 0           | 0           | 0            | 0            |
|                                                    | Bank8 | 0           | 0            | 0           | 0           | 0            | 0            |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

**LatticeECP2 Pin Information Summary, LFE2-20 and LFE2-35**

| Pin Type                                                                          |                          | LFE2-20  |           |           |           | LFE2-35   |           |
|-----------------------------------------------------------------------------------|--------------------------|----------|-----------|-----------|-----------|-----------|-----------|
|                                                                                   |                          | 208 PQFP | 256 fpBGA | 484 fpBGA | 672 fpBGA | 484 fpBGA | 672 fpBGA |
| Single Ended User I/O                                                             |                          | 131      | 193       | 331       | 402       | 331       | 450       |
| Differential Pair User I/O                                                        |                          | 62       | 96        | 165       | 200       | 165       | 224       |
| Configuration                                                                     | TAP Pins                 | 5        | 5         | 5         | 5         | 5         | 5         |
|                                                                                   | Muxed Pins               | 14       | 14        | 14        | 14        | 14        | 14        |
|                                                                                   | Dedicated Pins (Non TAP) | 7        | 7         | 7         | 7         | 7         | 7         |
| Non Configuration                                                                 | Muxed Pins               | 42       | 54        | 60        | 64        | 60        | 68        |
|                                                                                   | Dedicated Pins           | 3        | 3         | 3         | 3         | 3         | 3         |
| VCC                                                                               |                          | 14       | 7         | 18        | 24        | 16        | 22        |
| VCCAUX                                                                            |                          | 8        | 4         | 16        | 16        | 16        | 16        |
| VCCPLL                                                                            |                          | 0        | 0         | 0         | 0         | 2         | 2         |
| VCCIO                                                                             | Bank0                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank1                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank2                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank3                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank4                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank5                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank6                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank7                    | 2        | 2         | 4         | 5         | 4         | 5         |
|                                                                                   | Bank8                    | 2        | 1         | 2         | 2         | 2         | 2         |
| GND, GND0 to GND7                                                                 |                          | 22       | 20        | 60        | 72        | 60        | 72        |
| NC                                                                                |                          | 0        | 1         | 8         | 101       | 8         | 102       |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 18/9     | 18/9      | 50/25     | 67/33     | 50/25     | 67/33     |
|                                                                                   | Bank1                    | 18/9     | 34/17     | 46/23     | 52/26     | 46/23     | 52/26     |
|                                                                                   | Bank2                    | 11/5     | 20/10     | 34/17     | 36/18     | 34/17     | 48/24     |
|                                                                                   | Bank3                    | 11/5     | 12/6      | 22/11     | 32/16     | 22/11     | 42/21     |
|                                                                                   | Bank4                    | 19/9     | 32/16     | 46/23     | 50/25     | 46/23     | 54/27     |
|                                                                                   | Bank5                    | 18/9     | 17/8      | 46/23     | 68/34     | 46/23     | 68/34     |
|                                                                                   | Bank6                    | 18/8     | 26/13     | 40/20     | 48/24     | 40/20     | 58/29     |
|                                                                                   | Bank7                    | 12/6     | 20/10     | 33/16     | 35/17     | 33/16     | 47/23     |
|                                                                                   | Bank8                    | 6/2      | 14/7      | 14/7      | 14/7      | 14/7      | 14/7      |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0        | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank1 (Top Edge)         | 0        | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank2 (Right Edge)       | 4        | 5         | 9         | 9         | 9         | 12        |
|                                                                                   | Bank3 (Right Edge)       | 3        | 3         | 5         | 8         | 5         | 9         |
|                                                                                   | Bank4 (Bottom Edge)      | 0        | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank5 (Bottom Edge)      | 0        | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank6 (Left Edge)        | 6        | 7         | 10        | 12        | 10        | 13        |
|                                                                                   | Bank7 (Left Edge)        | 5        | 5         | 8         | 8         | 8         | 11        |
|                                                                                   | Bank8 (Right Edge)       | 0        | 0         | 0         | 0         | 0         | 0         |

**LatticeECP2 Pin Information Summary, LFE2-20 and LFE2-35 (Cont.)**

| Pin Type                                           |       | LFE2-20     |              |              |              | LFE2-35      |              |
|----------------------------------------------------|-------|-------------|--------------|--------------|--------------|--------------|--------------|
|                                                    |       | 208<br>PQFP | 256<br>fpBGA | 484<br>fpBGA | 672<br>fpBGA | 484<br>fpBGA | 672<br>fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank1 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank2 | 0           | 1            | 2            | 2            | 2            | 3            |
|                                                    | Bank3 | 0           | 0            | 0            | 2            | 0            | 2            |
|                                                    | Bank4 | 0           | 2            | 3            | 3            | 3            | 3            |
|                                                    | Bank5 | 0           | 1            | 3            | 4            | 3            | 4            |
|                                                    | Bank6 | 0           | 1            | 2            | 3            | 1            | 3            |
|                                                    | Bank7 | 0           | 1            | 2            | 2            | 2            | 3            |
|                                                    | Bank8 | 0           | 0            | 0            | 0            | 0            | 0            |
| PCI Capable I/Os per Bank                          | Bank0 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank1 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank2 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank3 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank4 | 19          | 32           | 46           | 50           | 46           | 54           |
|                                                    | Bank5 | 18          | 17           | 46           | 68           | 46           | 68           |
|                                                    | Bank6 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank7 | 0           | 0            | 0            | 0            | 0            | 0            |
|                                                    | Bank8 | 0           | 0            | 0            | 0            | 0            | 0            |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

**LatticeECP2 Pin Information Summary, LFE2-50 and LFE2-70**

| Pin Type                                                                          |                          | LFE2-50   |           | LFE2-70   |           |
|-----------------------------------------------------------------------------------|--------------------------|-----------|-----------|-----------|-----------|
|                                                                                   |                          | 484 fpBGA | 672 fpBGA | 672 fpBGA | 900 fpBGA |
| Single Ended User I/O                                                             |                          | 339       | 500       | 500       | 583       |
| Differential Pair User I/O                                                        |                          | 169       | 249       | 249       | 290       |
| Configuration                                                                     | TAP Pins                 | 5         | 5         | 5         | 5         |
|                                                                                   | Muxed Pins               | 14        | 14        | 14        | 14        |
|                                                                                   | Dedicated Pins (Non TAP) | 7         | 7         | 7         | 7         |
| Non Configuration                                                                 | Muxed Pins               | 68        | 79        | 79        | 89        |
|                                                                                   | Dedicated Pins           | 3         | 3         | 3         | 3         |
| VCC                                                                               |                          | 16        | 20        | 20        | 26        |
| VCCAUX                                                                            |                          | 16        | 16        | 16        | 17        |
| VCCPLL                                                                            |                          | 4         | 4         | 2         | 4         |
| VCCIO                                                                             | Bank0                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank1                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank2                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank3                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank4                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank5                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank6                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank7                    | 4         | 5         | 5         | 6         |
|                                                                                   | Bank8                    | 2         | 2         | 2         | 2         |
| GND, GND0 to GND7                                                                 |                          | 60        | 72        | 72        | 104       |
| NC                                                                                |                          | 0         | 3         | 5         | 101       |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 50/25     | 67/33     | 67/33     | 84/42     |
|                                                                                   | Bank1                    | 46/23     | 66/33     | 66/33     | 76/38     |
|                                                                                   | Bank2                    | 38/19     | 56/28     | 56/28     | 74/37     |
|                                                                                   | Bank3                    | 22/11     | 48/24     | 48/24     | 48/24     |
|                                                                                   | Bank4                    | 46/23     | 62/31     | 62/31     | 72/35     |
|                                                                                   | Bank5                    | 46/23     | 68/34     | 68/34     | 80/40     |
|                                                                                   | Bank6                    | 40/20     | 64/32     | 64/32     | 64/32     |
|                                                                                   | Bank7                    | 37/18     | 55/27     | 55/27     | 71/35     |
|                                                                                   | Bank8                    | 14/7      | 14/7      | 14/7      | 14/7      |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank1 (Top Edge)         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank2 (Right Edge)       | 9         | 13        | 13        | 18        |
|                                                                                   | Bank3 (Right Edge)       | 5         | 12        | 12        | 12        |
|                                                                                   | Bank4 (Bottom Edge)      | 0         | 0         | 0         | 0         |
|                                                                                   | Bank5 (Bottom Edge)      | 0         | 0         | 0         | 0         |
|                                                                                   | Bank6 (Left Edge)        | 10        | 16        | 16        | 16        |
|                                                                                   | Bank7 (Left Edge)        | 8         | 12        | 12        | 16        |
|                                                                                   | Bank8 (Right Edge)       | 0         | 0         | 0         | 0         |



**LatticeECP2 Pin Information Summary, LFE2-50 and LFE2-70 (Cont.)**

| Pin Type                                           |       | LFE2-50   |           | LFE2-70   |           |
|----------------------------------------------------|-------|-----------|-----------|-----------|-----------|
|                                                    |       | 484 fpBGA | 672 fpBGA | 672 fpBGA | 900 fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 2         | 3         | 3         | 4         |
|                                                    | Bank3 | 0         | 3         | 3         | 3         |
|                                                    | Bank4 | 3         | 4         | 4         | 4         |
|                                                    | Bank5 | 3         | 4         | 4         | 5         |
|                                                    | Bank6 | 1         | 4         | 4         | 4         |
|                                                    | Bank7 | 2         | 3         | 3         | 4         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         |
| PCI Capable I/Os per Bank                          | Bank0 | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 0         | 0         | 0         | 0         |
|                                                    | Bank3 | 0         | 0         | 0         | 0         |
|                                                    | Bank4 | 46        | 62        | 62        | 72        |
|                                                    | Bank5 | 46        | 68        | 68        | 80        |
|                                                    | Bank6 | 0         | 0         | 0         | 0         |
|                                                    | Bank7 | 0         | 0         | 0         | 0         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

**LatticeECP2M Pin Information Summary, LFE2M20 and LFE2M35**

| Pin Type                                                                          |                          | LFE2M20   |           | LFE2M35   |           |           |
|-----------------------------------------------------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|
|                                                                                   |                          | 256 fpBGA | 484 fpBGA | 256 fpBGA | 484 fpBGA | 672 fpBGA |
| Single Ended User I/O                                                             |                          | 140       | 304       | 140       | 303       | 410       |
| Differential Pair User I/O                                                        |                          | 70        | 152       | 70        | 151       | 199       |
| Configuration                                                                     | TAP Pins                 | 5         | 5         | 5         | 5         | 5         |
|                                                                                   | Muxed Pins               | 14        | 14        | 14        | 14        | 14        |
|                                                                                   | Dedicated Pins (Non TAP) | 7         | 7         | 7         | 7         | 7         |
| Non Configuration                                                                 | Muxed Pins               | 64        | 84        | 60        | 84        | 89        |
|                                                                                   | Dedicated Pins           | 3         | 3         | 3         | 3         | 3         |
| VCC                                                                               |                          | 6         | 16        | 6         | 16        | 29        |
| VCCAUX                                                                            |                          | 4         | 8         | 4         | 8         | 17        |
| VCCPLL                                                                            |                          | 1         | 4         | 1         | 4         | 8         |
| VCCIO                                                                             | Bank0                    | 1         | 4         | 1         | 4         | 5         |
|                                                                                   | Bank1                    | 1         | 3         | 1         | 3         | 4         |
|                                                                                   | Bank2                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank3                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank4                    | 2         | 4         | 2         | 4         | 4         |
|                                                                                   | Bank5                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank6                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank7                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank8                    | 1         | 2         | 1         | 2         | 2         |
| GND, GND0 to GND7                                                                 |                          | 22        | 57        | 22        | 57        | 80        |
| NC                                                                                |                          | 17        | 11        | 17        | 12        | 37        |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 0/0       | 36/18     | 0/0       | 36/18     | 63/31     |
|                                                                                   | Bank1                    | 0/0       | 18/9      | 0/0       | 18/9      | 18/9      |
|                                                                                   | Bank2                    | 14/7      | 30/15     | 14/7      | 30/15     | 50/25     |
|                                                                                   | Bank3                    | 16/8      | 36/18     | 16/8      | 36/18     | 43/21     |
|                                                                                   | Bank4                    | 32/16     | 62/31     | 32/16     | 62/31     | 50/21     |
|                                                                                   | Bank5                    | 20/10     | 28/14     | 20/10     | 28/14     | 60/30     |
|                                                                                   | Bank6                    | 16/8      | 40/20     | 16/8      | 39/19     | 52/25     |
|                                                                                   | Bank7                    | 28/14     | 40/20     | 28/14     | 40/20     | 60/30     |
|                                                                                   | Bank8                    | 14/7      | 14/7      | 14/7      | 14/7      | 14/7      |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank1 (Top Edge)         | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank2 (Right Edge)       | 3         | 7         | 3         | 7         | 12        |
|                                                                                   | Bank3 (Right Edge)       | 4         | 9         | 4         | 9         | 11        |
|                                                                                   | Bank4 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank5 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank6 (Left Edge)        | 4         | 10        | 4         | 10        | 14        |
|                                                                                   | Bank7 (Left Edge)        | 7         | 10        | 7         | 10        | 15        |
|                                                                                   | Bank8 (Right Edge)       | 0         | 0         | 0         | 0         | 0         |

**LatticeECP2M Pin Information Summary, LFE2M20 and LFE2M35 (Cont.)**

| Pin Type                                           |       | LFE2M20   |           | LFE2M35   |           |           |
|----------------------------------------------------|-------|-----------|-----------|-----------|-----------|-----------|
|                                                    |       | 256 fpBGA | 484 fpBGA | 256 fpBGA | 484 fpBGA | 672 fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 0         | 1         | 0         | 1         | 3         |
|                                                    | Bank3 | 0         | 1         | 0         | 1         | 2         |
|                                                    | Bank4 | 2         | 4         | 2         | 4         | 3         |
|                                                    | Bank5 | 1         | 2         | 1         | 2         | 3         |
|                                                    | Bank6 | 0         | 3         | 0         | 1         | 2         |
|                                                    | Bank7 | 1         | 2         | 1         | 2         | 3         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         | 0         |
| PCI Capable I/Os per Bank                          | Bank0 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank3 | 0         | 0         | 0         | 0         | 0         |
|                                                    | Bank4 | 32        | 62        | 32        | 62        | 50        |
|                                                    | Bank5 | 20        | 28        | 20        | 28        | 60        |
|                                                    | Bank6 | 16        | 40        | 16        | 39        | 52        |
|                                                    | Bank7 | 28        | 40        | 28        | 40        | 60        |
|                                                    | Bank8 | 0         | 0         | 0         | 0         | 0         |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

## LatticeECP2M Pin Information Summary, LFE2M50, LFE2M70 and LFE2M100

| Pin Type                                                                          |                          | LFE2M50   |           |           | LFE2M70   |            | LFE2M100  |            |
|-----------------------------------------------------------------------------------|--------------------------|-----------|-----------|-----------|-----------|------------|-----------|------------|
|                                                                                   |                          | 484 fpBGA | 672 fpBGA | 900 fpBGA | 900 fpBGA | 1152 fpBGA | 900 fpBGA | 1152 fpBGA |
| Single Ended User I/O                                                             |                          | 270       | 372       | 410       | 416       | 436        | 416       | 520        |
| Differential Pair User I/O                                                        |                          | 135       | 185       | 205       | 208       | 218        | 207       | 260        |
| Configuration                                                                     | TAP Pins                 | 5         | 5         | 5         | 5         | 5          | 5         | 5          |
|                                                                                   | Muxed Pins               | 14        | 14        | 14        | 14        | 14         | 14        | 14         |
|                                                                                   | Dedicated Pins (Non TAP) | 7         | 7         | 7         | 7         | 7          | 7         | 7          |
| Non Configuration                                                                 | Muxed Pins               | 69        | 72        | 72        | 75        | 76         | 74        | 78         |
|                                                                                   | Dedicated Pins           | 3         | 3         | 3         | 3         | 3          | 3         | 3          |
| VCC                                                                               |                          | 16        | 20        | 62        | 44        | 44         | 44        | 44         |
| VCCAUX                                                                            |                          | 8         | 26        | 18        | 16        | 12         | 16        | 12         |
| VCCPLL                                                                            |                          | 4         | 8         | 4         | 4         | 4          | 4         | 4          |
| VCCIO                                                                             | Bank0                    | 4         | 5         | 6         | 6         | 7          | 6         | 7          |
|                                                                                   | Bank1                    | 3         | 4         | 6         | 6         | 7          | 6         | 7          |
|                                                                                   | Bank2                    | 4         | 5         | 9         | 9         | 9          | 9         | 9          |
|                                                                                   | Bank3                    | 4         | 5         | 9         | 9         | 9          | 9         | 9          |
|                                                                                   | Bank4                    | 4         | 4         | 6         | 6         | 7          | 6         | 7          |
|                                                                                   | Bank5                    | 4         | 5         | 6         | 6         | 7          | 6         | 7          |
|                                                                                   | Bank6                    | 4         | 5         | 9         | 9         | 9          | 9         | 9          |
|                                                                                   | Bank7                    | 4         | 5         | 9         | 9         | 9          | 9         | 9          |
|                                                                                   | Bank8                    | 2         | 2         | 2         | 2         | 2          | 2         | 2          |
| GND, GND0 to GND7                                                                 |                          | 57        | 80        | 122       | 122       | 134        | 122       | 134        |
| NC                                                                                |                          | 31        | 35        | 121       | 63        | 283        | 63        | 199        |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 36/18     | 63/31     | 56/28     | 34/17     | 46/23      | 34/17     | 54/27      |
|                                                                                   | Bank1                    | 18/9      | 18/9      | 36/18     | 42/21     | 34/17      | 42/21     | 44/22      |
|                                                                                   | Bank2                    | 30/15     | 50/25     | 54/27     | 70/35     | 72/36      | 70/35     | 80/40      |
|                                                                                   | Bank3                    | 36/18     | 43/21     | 44/22     | 60/30     | 64/32      | 60/30     | 80/40      |
|                                                                                   | Bank4                    | 42/21     | 24/12     | 38/19     | 38/19     | 40/20      | 38/19     | 44/22      |
|                                                                                   | Bank5                    | 28/14     | 60/30     | 58/29     | 40/20     | 40/20      | 40/20     | 46/23      |
|                                                                                   | Bank6                    | 40/20     | 54/27     | 60/30     | 62/31     | 66/33      | 62/31     | 82/41      |
|                                                                                   | Bank7                    | 40/20     | 60/30     | 64/32     | 70/35     | 74/37      | 70/35     | 90/45      |
|                                                                                   | Bank8                    | 0/0       | 0/0       | 0/0       | 0/0       | 0/0        | 0/0       | 0/0        |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                                                   | Bank1 (Top Edge)         | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                                                   | Bank2 (Right Edge)       | 7         | 12        | 13        | 17        | 18         | 17        | 20         |
|                                                                                   | Bank3 (Right Edge)       | 9         | 11        | 11        | 15        | 16         | 15        | 20         |
|                                                                                   | Bank4 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                                                   | Bank5 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                                                   | Bank6 (Left Edge)        | 10        | 14        | 15        | 15        | 16         | 15        | 20         |
|                                                                                   | Bank7 (Left Edge)        | 10        | 15        | 17        | 17        | 18         | 17        | 22         |
|                                                                                   | Bank8 (Right Edge)       | 0         | 0         | 0         | 0         | 0          | 0         | 0          |

## LatticeECP2M Pin Information Summary, LFE2M50, LFE2M70 and LFE2M100 (Cont.)

| Pin Type                                           |       | LFE2M50   |           |           | LFE2M70   |            | LFE2M100  |            |
|----------------------------------------------------|-------|-----------|-----------|-----------|-----------|------------|-----------|------------|
|                                                    |       | 484 fpBGA | 672 fpBGA | 900 fpBGA | 900 fpBGA | 1152 fpBGA | 900 fpBGA | 1152 fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                    | Bank1 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                    | Bank2 | 2         | 2         | 2         | 4         | 4          | 4         | 4          |
|                                                    | Bank3 | 2         | 1         | 1         | 3         | 4          | 3         | 5          |
|                                                    | Bank4 | 3         | 1         | 3         | 3         | 3          | 3         | 3          |
|                                                    | Bank5 | 2         | 3         | 3         | 2         | 3          | 2         | 3          |
|                                                    | Bank6 | 1         | 2         | 2         | 3         | 4          | 3         | 5          |
|                                                    | Bank7 | 3         | 3         | 3         | 4         | 4          | 4         | 5          |
|                                                    | Bank8 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
| PCI Capable I/Os per Bank                          | Bank0 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                    | Bank1 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |
|                                                    | Bank2 | 0         | 0         | 0         | 0         | 72         | 0         | 80         |
|                                                    | Bank3 | 0         | 0         | 0         | 0         | 64         | 0         | 80         |
|                                                    | Bank4 | 50        | 24        | 48        | 48        | 40         | 48        | 44         |
|                                                    | Bank5 | 60        | 60        | 50        | 40        | 40         | 40        | 46         |
|                                                    | Bank6 | 52        | 54        | 60        | 62        | 66         | 62        | 82         |
|                                                    | Bank7 | 60        | 60        | 68        | 70        | 74         | 70        | 90         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         | 0          | 0         | 0          |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

### Available Device Resources by Package, LatticeECP2

| Resource | Device  | 256 fpBGA | 484 fpBGA | 672 fpBGA | 900 fpBGA |
|----------|---------|-----------|-----------|-----------|-----------|
| PLL/DLL  | ECP2-6  | 4         | —         | —         | —         |
|          | ECP2-12 | 4         | 4         | —         | —         |
|          | ECP2-20 | 4         | 4         | 4         | —         |
|          | ECP2-35 | —         | 4         | 4         | —         |
|          | ECP2-50 | —         | 6         | 6         | —         |
|          | ECP2-70 | —         | —         | 8         | 8         |

### Available Device Resources by Package, LatticeECP2M

| Resource | Device   | 256 fpBGA | 484 fpBGA | 672 fpBGA | 900 fpBGA | 1152 fpBGA |
|----------|----------|-----------|-----------|-----------|-----------|------------|
| PLL/DLL  | ECP2M20  | 10        | 10        | —         | —         | —          |
|          | ECP2M35  | 10        | 10        | 10        | —         | —          |
|          | ECP2M50  | —         | 10        | 10        | 10        | —          |
|          | ECP2M70  | —         | —         | —         | 10        | 10         |
|          | ECP2M100 | —         | —         | —         | 10        | 10         |

## LatticeECP2 Power Supply and NC

| Signals          | 144 TQFP <sup>3</sup>                                  | 208 PQFP <sup>3</sup>                                                                            | 256 fpBGA <sup>4</sup>                                                                                | 484 fpBGA <sup>4</sup>                                                                                                                                                                                                                                                                                             |
|------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VCC              | 16, 22, 29, 48, 54, 83, 94, 102, 128, 135              | 12, 19, 28, 40, 74, 80, 97, 116, 129, 140, 146, 171, 188, 198                                    | <b>LFE2-6:</b> G7, G9, G10, H7, J10, K10, K8<br><b>LFE2-12/LFE2-20:</b> G7, G9, G10, H7, J10, K10, K8 | <b>LFE2-12/LFE2-20:</b> N6, N18, J10, J11, J12, J13, K14, K9, L14, L9, M14, M9, N14, N9, P10, P11, P12, P13<br><b>LFE2-35/LFE2-50:</b> J10, J11, J12, J13, K14, K9, L14, L9, M14, M9, N14, N9, P10, P11, P12, P13                                                                                                  |
| VCCIO0           | 139                                                    | 195, 206                                                                                         | C5, E7                                                                                                | G10, G9, H8, H9                                                                                                                                                                                                                                                                                                    |
| VCCIO1           | 117                                                    | 162, 170                                                                                         | C12, E10                                                                                              | G11, G12, G13, G14                                                                                                                                                                                                                                                                                                 |
| VCCIO2           | 106                                                    | 143, 148                                                                                         | E14, G12                                                                                              | H14, H15, J15, K16                                                                                                                                                                                                                                                                                                 |
| VCCIO3           | 89                                                     | 123, 135                                                                                         | K12, M14                                                                                              | L16, M16, N16, P16                                                                                                                                                                                                                                                                                                 |
| VCCIO4           | 64                                                     | 93, 100                                                                                          | M10, P12                                                                                              | R14, T12, T13, T14                                                                                                                                                                                                                                                                                                 |
| VCCIO5           | 42                                                     | 55, 63                                                                                           | M7, P5                                                                                                | R9, T10, T11, T9                                                                                                                                                                                                                                                                                                   |
| VCCIO6           | 31                                                     | 38, 44                                                                                           | K5, M3                                                                                                | N7, P7, P8, R8                                                                                                                                                                                                                                                                                                     |
| VCCIO7           | 9                                                      | 10, 14                                                                                           | E3, G5                                                                                                | J8, K7, L7, M7                                                                                                                                                                                                                                                                                                     |
| VCCIO8           | 85                                                     | 113, 118                                                                                         | T15                                                                                                   | P15, R15                                                                                                                                                                                                                                                                                                           |
| VCCJ             | 35                                                     | 51                                                                                               | K7                                                                                                    | T8                                                                                                                                                                                                                                                                                                                 |
| VCCAUX           | 6, 39, 90, 142                                         | 7, 30, 70, 86, 125, 151, 174, 190                                                                | G8, H10, J7, K9                                                                                       | G5, K5, R5, V7, V11, V8, V13, V15, M17, P17, E17, G18, D11, F13, C5, E6                                                                                                                                                                                                                                            |
| VCCPLL           | None                                                   | None                                                                                             | None                                                                                                  | <b>LFE2-12/LFE2-20:</b> None<br><b>LFE2-35:</b> N6, N18<br><b>LFE2-50:</b> N6, N18, K6, J16                                                                                                                                                                                                                        |
| GND <sup>1</sup> | 11, 21, 30, 47, 51, 61, 81, 95, 105, 120, 133, 138     | 5, 13, 17, 25, 32, 42, 60, 68, 77, 81, 89, 102, 115, 122, 139, 145, 159, 169, 175, 184, 192, 201 | A1, A16, B12, B5, C8, E15, E2, H14, H8, H9, J3, J8, J9, M15, M2, P9, R12, R5, T1, T16                 | A22, AA19, AA4, AB1, AB22, B19, B4, C14, C9, D2, D21, F17, F6, H10, H11, H12, H13, J14, J20, J3, J9, K10, K11, K12, K13, K15, K8, L10, L11, L12, L13, L15, L8, M10, M11, M12, M13, M15, M8, N10, N11, N12, N13, N15, N8, P14, P20, P3, P9, R10, R11, R12, R13, U17, U6, W2, W21, Y14, Y9, A1                       |
| NC <sup>2</sup>  | <b>LFE2-6:</b> 45, 46, 124, 127<br><b>LFE2-12:</b> 127 | None                                                                                             | <b>LFE2-6:</b> K6, R3, P4<br><b>LFE2-12/LFE2-20:</b> None                                             | <b>LFE2-12:</b> E3, F3, F1, H4, F2, H5, G1, G3, G2, G4, K6, N1, M2, N2, M1, N3, N5, N4, P5, N19, M19, J22, L22, H22, K22, J16, D22, F21, E21, E22, H19, G20, G19, F20, C21, C22, H6, J6, H3, H2, H17, H16, H20, H18<br><b>LFE2-20/LFE2-35:</b> K6, J16, H6, J6, H3, H2, H17, H16, H20, H18<br><b>LFE2-50:</b> None |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. Pin orientation follows the conventional order from the pin 1 marking of the top side view and counter-clockwise.
4. Pin orientation A1 starts from the upper left corner of the top side view with alphabetical order ascending vertically and numerical order ascending horizontally.

## LatticeECP2 Power Supply and NC (Cont.)

| Signals          | 672 fpBGA <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 900 fpBGA <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VCC              | <b>LFE2-20:</b> R8, P18, M8, L20, L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15<br><b>LFE2-35/LFE2-50:</b> L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15<br><b>LFE2-70:</b> L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | AA11, AA20, K11, K21, K22, L11, L12, L13, L18, L19, L20, M11, M20, N11, N20, V11, V20, W11, W20, Y10, Y11, Y12, Y13, Y18, Y19, Y20                                                                                                                                                                                                                                                                                                                                                                                                     |
| VCCIO0           | D11, D6, G9, J12, K12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | J13, J14, K12, K13, K14, K15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VCCIO1           | D16, D21, G18, J15, K15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | J17, J18, J20, K17, K18, K20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VCCIO2           | F23, J20, L23, M17, M18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | L21, M21, M22, N21, N22, R21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VCCIO3           | AA23, R17, R18, T23, V20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | U21, U22, V21, V22, W21, Y22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VCCIO4           | AC16, AC21, U15, V15, Y18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AA16, AA17, AA18, AA19, AB17, AB18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| VCCIO5           | AC11, AC6, U12, V12, Y9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | AA12, AA13, AA14, AB12, AB13, AB14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| VCCIO6           | AA4, R10, R9, T4, V7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | U10, U9, V10, W10, W9, Y9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| VCCIO7           | F4, J7, L4, M10, M9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L10, L9, M10, N10, P10, R10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| VCCIO8           | AE25, V18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | AA21, Y21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| VCCJ             | AB5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | AD3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VCCAUX           | J10, J11, J16, J17, K18, L18, T18, U18, V16, V17, V10, V11, T9, U9, K9, L9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | AA15, AB11, AB19, AB20, J11, J12, J19, K19, L22, M9, N9, P21, P9, T10, T21, V9, W22                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VCCPLL           | <b>LFE2-20:</b> None<br><b>LFE2-35/LFE2-70:</b> R8, P18<br><b>LFE2-50:</b> R8, P18, M8, L20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | P22, P8, T22, Y7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| GND <sup>1</sup> | A2, A25, AA18, AA24, AA3, AA9, AD11, AD16, AD21, AD6, AE1, AE26, AF2, AF25, B1, B26, C11, C16, C21, C6, F18, F24, F3, F9, J13, J14, J21, J6, K10, K11, K13, K14, K16, K17, L10, L11, L16, L17, L24, L3, M13, M14, N10, N12, N13, N14, N15, N17, P10, P12, P13, P14, P15, P17, R13, R14, T10, T11, T16, T17, T24, T3, U10, U11, U13, U14, U16, U17, V13, V14, V21, V6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A1, A30, AC28, AC3, AH13, AH18, AH23, AH28, AH3, AH8, AK1, AK30, C13, C18, C23, C28, C3, C8, H28, H3, L14, L15, L16, L17, M12, M13, M14, M15, M16, M17, M18, M19, N12, N13, N14, N15, N16, N17, N18, N19, N28, N3, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20, V12, V13, V14, V15, V16, V17, V18, V19, V28, V3, W12, W13, W14, W15, W16, W17, W18, W19, Y14, Y15, Y16, Y17 |
| NC <sup>2</sup>  | <b>LFE2-20:</b> E4, E3, E2, E1, H6, H5, F2, F1, H8, J9, G4, G3, K3, K2, K1, L2, L1, M2, M1, N2, T1, T2, P8, P6, P5, P4, U1, V1, P3, R3, R4, U2, V2, W2, T6, R5, AA19, W17, Y19, Y17, AF20, AE20, AA20, W18, AD20, AE21, AF21, AF22, R22, T21, P26, P25, R24, R23, P20, R19, P21, P19, P23, P22, N22, R21, N26, N25, J26, J25, J23, K23, H26, H25, H24, H23, F22, E24, D25, C25, D24, B25, H21, G22, B24, C24, D23, C23, E19, C19, B21, B20, D19, B19, G17, E18, G19, F17, A20, A19, E17, D18, M3, N6, P24<br><b>LFE2-35:</b> K3, K2, K1, L2, L1, M2, M1, N2, M8, P3, R3, R4, U2, V2, W2, AF20, AE20, AA20, W18, AD20, AE21, AF21, AF22, P26, P25, R24, R23, P20, R19, L20, J26, J25, J23, K23, H26, H25, H24, H23, E19, C19, B21, B20, D19, B19, G17, E18, G19, F17, A20, A19, E17, D18, M3, N6, P24<br><b>LFE2-50:</b> N6, P24, M3<br><b>LFE2-70:</b> M8, L20, M3, P24, N6 | A2, A3, A4, A5, AB28, AC4, AD23, AE1, AE2, AE29, AE3, AE30, AE4, AE5, AE6, AF1, AF2, AF23, AF26, AF27, AF28, AF29, AF3, AF30, AF4, AF5, AG1, AG13, AG16, AG18, AG2, AG26, AG27, AG28, AG29, AG3, AG30, AG4, AG8, AH1, AH16, AH2, AH26, AH27, AH29, AH30, AH4, AJ1, AJ2, AJ27, AJ28, AJ29, AJ3, AJ30, AK2, AK27, AK28, AK29, AK3, B1, B2, B3, B30, B4, B5, C1, C2, C29, C30, C4, D13, D18, D23, D28, D29, D3, D30, D4, E25, E26, E27, E28, E29, E3, E30, E4, E5, E6, F25, F5, F6, G6, G7, K10, K9, N27, N4, R1, R2, V27, V4             |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.

2. NC pins should not be connected to any active signals, VCC or GND.

3. Pin orientation A1 starts from the upper left corner of the top side view with alphabetical order ascending vertically and numerical order ascending horizontally.



## LatticeECP2M Power Supply and NC

| Signal                    | 256 fpBGA                                                                                      | 484 fpBGA                                                                                                                                                                                                                                                                                                                       |
|---------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V <sub>CC</sub>           | G7, G9, H7, J10, K10, K8                                                                       | J10, J11, J12, J13, K14, K9, L14, L9, M14, M9, N14, N9, P10, P11, P12, P13                                                                                                                                                                                                                                                      |
| V <sub>CCIO0</sub>        | E7                                                                                             | B5, B9, E7, H9                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO1</sub>        | E10                                                                                            | D13, E16, H14                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO2</sub>        | E14, G12                                                                                       | E21, G18, J15, K19                                                                                                                                                                                                                                                                                                              |
| V <sub>CCIO3</sub>        | K12, M14                                                                                       | N19, P15, T18, V21                                                                                                                                                                                                                                                                                                              |
| V <sub>CCIO4</sub>        | M10, P12                                                                                       | AA18, R14, V16, W13                                                                                                                                                                                                                                                                                                             |
| V <sub>CCIO5</sub>        | M7, P5                                                                                         | AA5, R9, V7, W10                                                                                                                                                                                                                                                                                                                |
| V <sub>CCIO6</sub>        | K5, M3                                                                                         | N4, P8, T5, V2                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO7</sub>        | E3, G5                                                                                         | E2, G5, J8, K4                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO8</sub>        | T15                                                                                            | AA22, U19                                                                                                                                                                                                                                                                                                                       |
| V <sub>CCJ</sub>          | K7                                                                                             | W4                                                                                                                                                                                                                                                                                                                              |
| V <sub>CCAUX</sub>        | G8, H10, J7, K9                                                                                | H11, H12, L15, L8, M15, M8, R11, R12                                                                                                                                                                                                                                                                                            |
| V <sub>CCPLL</sub>        | G10                                                                                            | R8, H15, H8, R15                                                                                                                                                                                                                                                                                                                |
| SERDES Power <sup>3</sup> | C15, B15, C12, A12, C11, C10, C14, C13, B9, C9, C5, C4, C8, C7, A6, C6, B3, C3                 | C22, B22, C19, A19, C18, C17, C21, C20, B16, C16, C12, C11, C15, C14, A13, C13, B10, C10                                                                                                                                                                                                                                        |
| GND <sup>1</sup>          | A1, A15, A16, A3, A9, B12, B6, E15, E2, H14, H8, H9, J3, J8, J9, M15, M2, P9, R12, R5, T1, T16 | A1, A10, A16, A22, AA19, AA4, AB1, AB22, B13, B19, B4, D16, D2, D21, D7, G19, G4, H10, H13, J14, J9, K10, K11, K12, K13, K15, K20, K3, K8, L10, L11, L12, L13, M10, M11, M12, M13, N10, N11, N12, N13, N15, N20, N3, N8, P14, P9, R10, R13, T19, T4, W16, W2, W21, W7, Y10, Y13                                                 |
| NC <sup>2</sup>           | D10, D11, D12, D13, D14, D4, D5, D6, D7, E11, E6, E8, E9, F10, F7, F8, F9                      | <b>LFE2M20:</b> D14, D15, E14, E15, F13, F14, F15, G12, G13, G14, G15<br><b>LFE2M35:</b> D14, D15, E14, E15, F13, F14, F15, G12, G13, G14, G15, U6<br><b>LFE2M50:</b> Y15, W15, AB20, AB21, AA20, AB19, AB18, Y22, Y21, Y17, Y18, Y16, W17, Y19, Y20, W19, W18, V17, V18, D15, G14, G15, D14, E15, E14, F15, F14, F13, G12, G13 |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. For package migration across device densities, the designer must comprehend the package pin requirements for the SERDES blocks. Specifically, the SERDES power pins of the largest density device must be accounted to accommodate migration to other smaller devices using the same package. Please refer to TN1160, [LatticeECP2/M Density Migration](#) for more details.

**LatticeECP2M Power Supply and NC (Cont.)**

| Signal                    | 672 fpBGA                                                                                                                                                                                                                                                                                                                            | 900 fpBGA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V <sub>CC</sub>           | <b>LFE2M35:</b> AD13, AD14, AD16, AD17, AD19, AD21, AD22, AD24, AD25, L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15<br><br><b>LFE2M50:</b> L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15                                   | <b>LFE2M50:</b> AH1, AH4, AH5, AH2, AH7, AH12, AH9, AH10, AH13, C13, C10, C9, C12, C7, C2, C5, C4, C1, L12, L13, L18, L19, M11, M12, M13, M14, M15, M16, M17, M18, M19, M20, N11, N12, N19, N20, P12, P19, R12, R19, T12, T19, U12, U19, V11, V12, V19, V20, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, Y12, Y13, Y18, Y19<br><br><b>LFE2M70/LFE2M100:</b> L12, L13, L18, L19, M11, M12, M13, M14, M15, M16, M17, M18, M19, M20, N11, N12, N19, N20, P12, P19, R12, R19, T12, T19, U12, U19, V11, V12, V19, V20, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, Y12, Y13, Y18, Y19                                            |
| V <sub>CCIO0</sub>        | B12, B7, F11, J13, K12                                                                                                                                                                                                                                                                                                               | D14, E6, E9, F12, K12, K13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| V <sub>CCIO1</sub>        | D18, F16, J14, K15                                                                                                                                                                                                                                                                                                                   | D17, E22, E25, F19, K18, K19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| V <sub>CCIO2</sub>        | G25, L21, M17, M25, N18                                                                                                                                                                                                                                                                                                              | F28, J25, K28, M21, M24, N21, N28, P21, R25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| V <sub>CCIO3</sub>        | P18, R17, R25, T21, Y25                                                                                                                                                                                                                                                                                                              | AA28, AB25, AE28, T25, U21, V21, V28, W21, W24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| V <sub>CCIO4</sub>        | AA16, AC18, U15, V14                                                                                                                                                                                                                                                                                                                 | AA18, AA19, AE19, AF22, AG17, AG25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| V <sub>CCIO5</sub>        | AA11, AE12, AE7, U12, V13                                                                                                                                                                                                                                                                                                            | AA12, AA13, AE12, AF9, AG14, AG6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| V <sub>CCIO6</sub>        | P9, R10, R2, T6, Y2                                                                                                                                                                                                                                                                                                                  | AA3, AB6, AE3, T6, U10, V10, V3, W10, W7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| V <sub>CCIO7</sub>        | G2, L6, M10, M2, N9                                                                                                                                                                                                                                                                                                                  | F3, J6, K3, M10, M7, N10, N3, P10, R6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO8</sub>        | AC24, U17                                                                                                                                                                                                                                                                                                                            | AA25, AD28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| V <sub>CCJ</sub>          | AA7                                                                                                                                                                                                                                                                                                                                  | AG1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| V <sub>CCAUX</sub>        | <b>LFE2M35:</b> AE19, J11, J12, J15, J16, L18, L9, M18, M9, R18, R9, T18, T9, V11, V12, V15, V16<br><br><b>LFE2M50:</b> J11, J12, J15, J16, L18, L9, M18, M9, R18, R9, T18, T9, V11, V12, V15, V16                                                                                                                                   | <b>LFE2M50:</b> AJ7, B7, AA10, AA11, AA20, AA21, K10, K11, K20, K21, L10, L11, L20, L21, Y10, Y11, Y20, Y21<br><br><b>LFE2M70/LFE2M100:</b> AA10, AA11, AA20, AA21, K10, K11, K20, K21, L10, L11, L20, L21, Y10, Y11, Y20, Y21                                                                                                                                                                                                                                                                                                                                                                                                          |
| V <sub>CCPLL</sub>        | H7, K6, P7, R8, V18, P20, J17, G19                                                                                                                                                                                                                                                                                                   | N13, N18, V13, V18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SERDES Power <sup>3</sup> | <b>LFE2M35:</b> C25, B25, C22, A22, C21, C20, C24, C23, B19, C19, C15, C14, C18, C17, A16, C16, B13, C13<br><br><b>LFE2M50:</b> AD13, AE13, AD16, AF16, AD17, AD18, AD14, AD15, AD19, AE19, AD23, AD24, AD20, AD21, AF22, AD22, AE25, AD25, C25, B25, C22, A22, C21, C20, C24, C23, B19, C19, C15, C14, C18, C17, A16, C16, B13, C13 | <b>LFE2M50:</b> AH18, AJ18, AH21, AK21, AH22, AH23, AH19, AH20, AH24, AJ24, AH28, AH29, AH25, AH26, AK27, AH27, AJ30, AH30, C30, B30, C27, A27, C26, C25, C29, C28, B24, C24, C20, C19, C23, C22, A21, C21, B18, C18<br><br><b>LFE2M70/LFE2M100:</b> C13, B13, C10, A10, C9, C8, C12, C11, B7, C7, C3, C2, C6, C5, A4, C4, B1, C1, C30, B30, C27, A27, C26, C25, C29, C28, B24, C24, C20, C19, C23, C22, A21, C21, B18, C18, AH18, AJ18, AH21, AK21, AH22, AH23, AH19, AH20, AH24, AJ24, AH28, AH29, AH25, AH26, AK27, AH27, AJ30, AH30, AH1, AJ1, AH4, AK4, AH5, AH6, AH2, AH3, AH7, AJ7, AH11, AH12, AH8, AH9, AK10, AH10, AJ13, AH13 |

## LatticeECP2M Power Supply and NC (Cont.)

| Signal           | 672 fpBGA                                                                                                                                                                                                                                                                                                                                                                                                                | 900 fpBGA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GND <sup>1</sup> | A13, A19, A2, A25, AA2, AA25, AB18, AB22, AB5, AB9, AE1, AE11, AE16, AE22, AE26, AE6, AF13, AF19, AF2, AF25, B1, B11, B16, B22, B26, B6, E18, E22, E5, E9, F2, F25, G11, G16, J22, J5, K11, K13, K14, K16, L10, L11, L16, L17, L2, L20, L25, L7, M13, M14, N10, N12, N13, N14, N15, N17, P10, P12, P13, P14, P15, P17, R13, R14, T10, T11, T16, T17, T2, T20, T25, T7, U11, U13, U14, U16, V22, V5, Y11, Y16             | <p><b>LFE2M50:</b> A1, A13, A18, A24, A30, A7, AA14, AA15, AA16, AA17, AA24, AA27, AA4, AB24, AB7, AD12, AD19, AD27, AE22, AE27, AE4, AE9, AF14, AF17, AF25, AF6, AJ10, AJ21, AJ27, AJ4, AK1, AK13, AK18, AK24, AK30, AK7, B10, B21, B27, B4, D25, D6, E14, E17, F22, F27, F4, F9, G12, G19, J24, J7, K14, K15, K16, K17, K27, K4, L14, L15, L16, L17, M23, M8, N14, N15, N16, N17, N27, N4, P11, P13, P14, P15, P16, P17, P18, P20, R10, R11, R13, R14, R15, R16, R17, R18, R20, R21, R24, R7, T10, T11, T13, T14, T15, T16, T17, T18, T20, T21, T24, T7, U11, U13, U14, U15, U16, U17, U18, U20, V14, V15, V16, V17, V27, V4, W23, W8, Y14, Y15, Y16, Y17</p> <p><b>LFE2M70/LFE2M100:</b> A1, A13, A18, A24, A30, A7, AA14, AA15, AA16, AA17, AA24, AA27, AA4, AB24, AB7, AD12, AD19, AD27, AE22, AE27, AE4, AE9, AF14, AF17, AF25, AF6, AJ10, AJ21, AJ27, AJ4, AK1, AK13, AK18, AK24, AK30, AK7, B10, B21, B27, B4, D25, D6, E14, E17, F22, F27, F4, F9, G12, G19, J24, J7, K14, K15, K16, K17, K27, K4, L14, L15, L16, L17, M23, M8, N14, N15, N16, N17, N27, N4, P11, P13, P14, P15, P16, P17, P18, P20, R10, R11, R13, R14, R15, R16, R17, R18, R20, R21, R24, R7, T10, T11, T13, T14, T15, T16, T17, T18, T20, T21, T24, T7, U11, U13, U14, U15, U16, U17, U18, U20, V14, V15, V16, V17, V27, V4, W23, W8, Y14, Y15, Y16, Y17</p> |
| NC <sup>2</sup>  | <p><b>LFE2M35:</b> AB3, AB4, AC1, AC2, AD15, AD18, AD20, AD23, AE13, AE25, AF16, AF22, B4, B5, C26, D20, D21, D22, D23, D24, D25, D26, E20, E21, E25, E26, F20, G20, K10, K17, R4, U10, U23, V10, W7, N7, V7</p> <p><b>LFE2M50:</b> AB3, AB4, AC1, AC2, B4, B5, C26, D20, D21, D22, D23, D24, D25, D26, E20, E21, E25, E26, F20, G20, K10, K17, R4, U10, U23, V10, W7, AB21, AC20, AC21, AC22, AC23, AC25, AD26, W20</p> | <p><b>LFE2M50:</b> G5, G4, K7, K8, E1, F2, F1, G3, G2, G1, L9, L7, K6, K5, L8, L6, AA1, AA2, Y3, AB1, Y9, Y8, Y7, AA7, AB2, AB3, AA5, AA6, AB4, AB5, AA8, AA9, AJ1, AK4, AH6, AH3, AH11, AH8, AK10, AJ13, AB26, AB27, Y24, Y25, AA29, Y28, Y30, Y29, W22, V22, Y27, Y26, W30, W29, W25, W26, L24, L23, D30, D29, K24, K25, J27, K26, J26, H26, H27, G26, H23, H24, D28, E28, J18, J19, H17, J17, F18, F17, B13, A10, C8, C11, C3, C6, A4, B1, AA26, AB11, AB12, AB13, AB14, AB15, AB16, AB17, AB19, AB20, AB21, AC11, AC21, AC22, AD21, AD22, AE23, AF20, AF23, AG23, AG26, F20, F23, G10, G20, G21, H19, H20, H21, H22, J20, J21, R9, U22, W9</p> <p><b>LFE2M70/LFE2M100:</b> AA26, AB10, AB11, AB12, AB13, AB14, AB15, AB16, AB17, AB19, AB20, AB21, AB9, AC10, AC11, AC21, AC22, AC8, AC9, AD21, AD22, AD4, AD5, AD6, AD7, AD8, AE23, AE5, AE6, AE7, AF20, AF23, AF5, AG23, AG26, D10, E10, E11, F10, F20, F23, F8, G10, G20, G21, G7, G8, G9, H19, H20, H21, H22, H6, H8, H9, J10, J20, J21, J9, K9, R9, U22, W9</p>                                                                                                                                                                                                                                                                                                                 |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. For package migration across device densities, the designer must comprehend the package pin requirements for the SERDES blocks. Specifically, the SERDES power pins of the largest density device must be accounted to accommodate migration to other smaller devices using the same package. Please refer to TN1160, [LatticeECP2/M Density Migration](#) for more details.

## LatticeECP2M Power Supply and NC (Cont.)

| Signal                    | 1152 fpBGA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V <sub>CC</sub>           | AA13, AA14, AA15, AA16, AA17, AA18, AA19, AA20, AA21, AA22, AB14, AB15, AB20, AB21, N14, N15, N20, N21, P13, P14, P15, P16, P17, P18, P19, P20, P21, P22, R13, R14, R21, R22, T14, T21, U14, U21, V14, V21, W14, W21, Y13, Y14, Y21, Y22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| V <sub>CCIO0</sub>        | C12, C16, E14, H12, H16, M14, M15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO1</sub>        | C19, C23, E21, H19, H23, M20, M21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO2</sub>        | G32, K28, K32, N27, N32, P23, R23, T27, T32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| V <sub>CCIO3</sub>        | AA23, AB27, AB32, AE28, AE32, AH32, W27, W32, Y23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO4</sub>        | AC20, AC21, AG19, AG23, AK21, AM19, AM23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| V <sub>CCIO5</sub>        | AC14, AC15, AG12, AG16, AK14, AM12, AM16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| V <sub>CCIO6</sub>        | AA12, AB3, AB8, AE3, AE7, AH3, W3, W8, Y12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| V <sub>CCIO7</sub>        | G3, K3, K7, N3, N8, P12, R12, T3, T8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| V <sub>CCIO8</sub>        | AD28, AG32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| V <sub>CCJ</sub>          | AK3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| V <sub>CCAUX</sub>        | AB12, AB13, AB22, AB23, AC13, AC22, M13, M22, N12, N13, N22, N23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| V <sub>CCPLL</sub>        | R15, R20, Y15, Y20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SERDES Power <sup>3</sup> | D7, B9, B8, D9, B7, E7, B6, D8, E6, D6, D4, B5, D3, B4, C1, B3, B1, B2, B33, B34, B32, C34, B31, D32, B30, D31, E29, D29, D27, B29, E28, B28, D26, B27, B26, D28, AL28, AN26, AN27, AL26, AN28, AK28, AN29, AL27, AL29, AK29, AL31, AN30, AL32, AN31, AM34, AN32, AN34, AN33, AN2, AN1, AN3, AM1, AN4, AL3, AN5, AL4, AL6, AK6, AL8, AN6, AK7, AN7, AL9, AN8, AN9, AL7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| GND <sup>1</sup>          | A1, A10, A13, A22, A25, A34, AB16, AB17, AB18, AB19, AB26, AB31, AB4, AB9, AC16, AC17, AC18, AC19, AD27, AE27, AE31, AE4, AE8, AF12, AF16, AF19, AF23, AG31, AH31, AH4, AJ14, AJ21, AK27, AK8, AL10, AL16, AL19, AL2, AL25, AL33, AP1, AP10, AP13, AP22, AP25, AP34, D10, D16, D19, D2, D25, D33, E27, E8, F14, F21, G31, G4, J12, J16, J19, J23, K27, K31, K4, K8, M16, M17, M18, M19, N16, N17, N18, N19, N26, N31, N4, N9, R16, R17, R18, R19, T12, T13, T15, T16, T17, T18, T19, T20, T22, T23, T26, T31, T4, T9, U12, U13, U15, U16, U17, U18, U19, U20, U22, U23, V12, V13, V15, V16, V17, V18, V19, V20, V22, V23, W12, W13, W15, W16, W17, W18, W19, W20, W22, W23, W26, W31, W4, W9, Y16, Y17, Y18, Y19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NC <sup>2</sup>           | <p><b>LFE2M70:</b> H2, H1, G5, G6, M9, M10, H3, H4, P3, P4, P9, M7, P1, P2, N7, P7, AC7, AC5, AC6, AD5, AD4, AD3, AD10, AD8, AD2, AD1, AD9, AC11, AD6, AD7, AE1, AE2, AJ12, AH12, AL13, AK13, AE14, AG13, AH22, AH21, AG22, AG21, AF33, AF34, AC27, AC28, AD29, AD30, AE33, AE34, AD32, AD31, AB25, AC25, AB28, AA26, AD33, AD34, P30, P29, P31, P32, R25, T24, N34, N33, F24, G23, J22, G22, H21, K21, L19, L20, L18, K19, J14, L15, H14, K14, F12, D11, F11, E11, A11, A12, A23, A24, AA11, AB11, AC26, AC30, AD11, AD12, AD13, AD14, AD15, AD19, AD21, AD22, AD23, AE10, AE11, AE12, AE13, AE19, AE21, AE22, AE23, AF11, AF21, AF22, AF24, AF8, AF9, AG10, AG11, AG24, AG25, AG26, AG3, AG7, AG8, AG9, AH10, AH11, AH13, AH24, AH25, AH26, AH27, AH5, AH6, AH7, AH8, AH9, AJ10, AJ11, AJ13, AJ24, AJ25, AJ26, AJ27, AJ3, AJ4, AJ5, AJ6, AJ7, AJ8, AJ9, AK10, AK11, AK12, AK24, AK25, AK26, AK4, AK9, AL11, AL12, AL34, AM10, AM11, AM13, AM25, AN10, AN11, AN12, AN13, AN24, AN25, AP11, AP12, AP24, B10, B11, B12, B13, B22, B23, B24, B25, C10, C11, C13, C22, C24, C25, D1, D15, D24, D34, E10, E24, E25, E26, E3, E31, E32, E33, E34, E4, E9, F10, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F5, F6, F7, F8, F9, G10, G11, G24, G25, G26, G27, G28, G29, G30, G33, G34, G7, G8, G9, H10, H11, H24, H25, H26, H27, H28, H29, H8, H9, J10, J11, J24, J25, J26, J9, K10, K11, K12, K13, K23, K24, K25, K26, L11, L12, L13, L14, L21, L22, L23, L24, L25, L26, M11, M24, M25, M6, M8, N10, N11, P10, P25, P26, R9, T11, U11, W11, Y10, Y11</p> <p><b>LFE2M100:</b> A11, A12, A23, A24, AA11, AB11, AC26, AC30, AD11, AD12, AD13, AD14, AD15, AD19, AD21, AD22, AD23, AE10, AE11, AE12, AE13, AE19, AE21, AE22, AE23, AF11, AF21, AF22, AF24, AF8, AF9, AG10, AG11, AG24, AG25, AG26, AG3, AG7, AG8, AG9, AH10, AH11, AH13, AH24, AH25, AH26, AH27, AH5, AH6, AH7, AH8, AH9, AJ10, AJ11, AJ13, AJ24, AJ25, AJ26, AJ27, AJ3, AJ4, AJ5, AJ6, AJ7, AJ8, AJ9, AK10, AK11, AK12, AK24, AK25, AK26, AK4, AK9, AL11, AL12, AL34, AM10, AM11, AM13, AM25, AN10, AN11, AN12, AN13, AN24, AN25, AP11, AP12, AP24, B10, B11, B12, B13, B22, B23, B24, B25, C10, C11, C13, C22, C24, C25, D1, D15, D24, D34, E10, E24, E25, E26, E3, E31, E32, E33, E34, E4, E9, F10, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F5, F6, F7, F8, F9, G10, G11, G24, G25, G26, G27, G28, G29, G30, G33, G34, G7, G8, G9, H10, H11, H24, H25, H26, H27, H28, H29, H8, H9, J10, J11, J24, J25, J26, J9, K10, K11, K12, K13, K23, K24, K25, K26, L11, L12, L13, L14, L21, L22, L23, L24, L25, L26, M11, M24, M25, M6, M8, N10, N11, P10, P25, P26, R9, T11, U11, W11, Y10, Y11</p> |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. For package migration across device densities, the designer must comprehend the package pin requirements for the SERDES blocks. Specifically, the SERDES power pins of the largest density device must be accounted to accommodate migration to other smaller devices using the same package. Please refer to TN1160, [LatticeECP2/M Density Migration](#) for more details.

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 144 TQFP**

| LFE2-6E/SE |                  |      |                   |              | LFE2-12E/12SE    |      |                   |              |  |
|------------|------------------|------|-------------------|--------------|------------------|------|-------------------|--------------|--|
| Pin Number | Pin/Pad Function | Bank | Dual Function     | Differential | Pin/Pad Function | Bank | Dual Function     | Differential |  |
| 1          | PL2A             | 7    | VREF2_7           | T (LVDS)*    | PL2A             | 7    | VREF2_7           | T (LVDS)*    |  |
| 2          | PL2B             | 7    | VREF1_7           | C (LVDS)*    | PL2B             | 7    | VREF1_7           | C (LVDS)*    |  |
| 3          | PL4A             | 7    |                   | T (LVDS)*    | PL4A             | 7    |                   | T (LVDS)*    |  |
| 4          | PL4B             | 7    |                   | C (LVDS)*    | PL4B             | 7    |                   | C (LVDS)*    |  |
| 5          | PL6A             | 7    | LDQ10             | T (LVDS)*    | PL6A             | 7    | LDQ10             | T (LVDS)*    |  |
| 6          | VCCAUX           | -    |                   |              | VCCAUX           | -    |                   |              |  |
| 7          | PL6B             | 7    | LDQ10             | C (LVDS)*    | PL6B             | 7    | LDQ10             | C (LVDS)*    |  |
| 8          | PL8A             | 7    | LDQ10             | T (LVDS)*    | PL8A             | 7    | LDQ10             | T (LVDS)*    |  |
| 9          | VCCIO7           | 7    |                   |              | VCCIO7           | 7    |                   |              |  |
| 10         | PL8B             | 7    | LDQ10             | C (LVDS)*    | PL8B             | 7    | LDQ10             | C (LVDS)*    |  |
| 11         | GND              | -    |                   |              | GND              | -    |                   |              |  |
| 12         | PL12A            | 7    | LDQ10             | T (LVDS)*    | PL12A            | 7    | LDQ10             | T (LVDS)*    |  |
| 13         | PL12B            | 7    | LDQ10             | C (LVDS)*    | PL12B            | 7    | LDQ10             | C (LVDS)*    |  |
| 14         | PL13A            | 7    | PCLKT7_0/LDQ10    | T            | PL13A            | 7    | PCLKT7_0/LDQ10    | T            |  |
| 15         | PL13B            | 7    | PCLKC7_0/LDQ10    | C            | PL13B            | 7    | PCLKC7_0/LDQ10    | C            |  |
| 16         | VCC              | -    |                   |              | VCC              | -    |                   |              |  |
| 17         | PL15A            | 6    | PCLKT6_0          | T (LVDS)*    | PL15A            | 6    | PCLKT6_0          | T (LVDS)*    |  |
| 18         | PL15B            | 6    | PCLKC6_0          | C (LVDS)*    | PL15B            | 6    | PCLKC6_0          | C (LVDS)*    |  |
| 19         | PL16A            | 6    | VREF2_6           | T            | PL16A            | 6    | VREF2_6           | T            |  |
| 20         | PL16B            | 6    | VREF1_6           | C            | PL16B            | 6    | VREF1_6           | C            |  |
| 21         | GND              | -    |                   |              | GND              | -    |                   |              |  |
| 22         | VCC              | -    |                   |              | VCC              | -    |                   |              |  |
| 23         | PL18A            | 6    | LLM0_GDLLT_FB_A   | T            | PL18A            | 6    | LLM0_GDLLT_FB_A   | T            |  |
| 24         | PL18B            | 6    | LLM0_GDLLC_FB_A   | C            | PL18B            | 6    | LLM0_GDLLC_FB_A   | C            |  |
| 25         | LLM0_PLLCAP      | 6    |                   |              | LLM0_PLLCAP      | 6    |                   |              |  |
| 26         | PL20A            | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL20A            | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    |  |
| 27         | PL20B            | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL20B            | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    |  |
| 28         | PL22A            | 6    |                   |              | PL22A            | 6    |                   |              |  |
| 29         | VCC              | -    |                   |              | VCC              | -    |                   |              |  |
| 30         | GND              | -    |                   |              | GND              | -    |                   |              |  |
| 31         | VCCIO6           | 6    |                   |              | VCCIO6           | 6    |                   |              |  |
| 32         | TCK              | -    |                   |              | TCK              | -    |                   |              |  |
| 33         | TDI              | -    |                   |              | TDI              | -    |                   |              |  |
| 34         | TDO              | -    |                   |              | TDO              | -    |                   |              |  |
| 35         | VCCJ             | -    |                   |              | VCCJ             | -    |                   |              |  |
| 36         | TMS              | -    |                   |              | TMS              | -    |                   |              |  |
| 37         | PB2A             | 5    | VREF2_5/BDQ6      | T            | PB2A             | 5    | VREF2_5/BDQ6      | T            |  |
| 38         | PB2B             | 5    | VREF1_5/BDQ6      | C            | PB2B             | 5    | VREF1_5/BDQ6      | C            |  |
| 39         | VCCAUX           | -    |                   |              | VCCAUX           | -    |                   |              |  |
| 40         | PB4A             | 5    | BDQ6              | T            | PB6A             | 5    | BDQS6             | T            |  |
| 41         | PB4B             | 5    | BDQ6              | C            | PB6B             | 5    | BDQ6              | C            |  |
| 42         | VCCIO5           | 5    |                   |              | VCCIO5           | 5    |                   |              |  |
| 43         | PB6A             | 5    | BDQS6             | T            | PB12A            | 5    | BDQ15             | T            |  |
| 44         | PB6B             | 5    | BDQ6              | C            | PB12B            | 5    | BDQ15             | C            |  |
| 45         | NC               | 5    |                   |              | PB16A            | 5    | BDQ15             | T            |  |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 144 TQFP (Cont.)**

| LFE2-6E/SE |                  |      |                |              | LFE2-12E/12SE    |      |                |              |
|------------|------------------|------|----------------|--------------|------------------|------|----------------|--------------|
| Pin Number | Pin/Pad Function | Bank | Dual Function  | Differential | Pin/Pad Function | Bank | Dual Function  | Differential |
| 46         | NC               | 5    |                |              | PB16B            | 5    | BDQ15          | C            |
| 47         | GND              | -    |                |              | GND              | -    |                |              |
| 48         | VCC              |      |                |              | VCC              | -    |                |              |
| 49         | PB8A             | 5    | PCLKT5_0/BDQ6  | T            | PB26A            | 5    | PCLKT5_0/BDQ24 | T            |
| 50         | PB8B             | 5    | PCLKC5_0/BDQ6  | C            | PB26B            | 5    | PCLKC5_0/BDQ24 | C            |
| 51         | GND              | -    |                |              | GND              | -    |                |              |
| 52         | PB13A            | 4    | PCLKT4_0/BDQ15 | T            | PB31A            | 4    | PCLKT4_0/BDQ33 | T            |
| 53         | PB13B            | 4    | PCLKC4_0/BDQ15 | C            | PB31B            | 4    | PCLKC4_0/BDQ33 | C            |
| 54         | VCC              | -    |                |              | VCC              | -    |                |              |
| 55         | PB14A            | 4    | BDQ15          | T            | PB34A            | 4    | BDQ33          | T            |
| 56         | PB14B            | 4    | BDQ15          | C            | PB34B            | 4    | BDQ33          | C            |
| 57         | PB16A            | 4    | BDQ15          | T            | PB40A            | 4    | BDQ42          | T            |
| 58         | PB16B            | 4    | BDQ15          | C            | PB40B            | 4    | BDQ42          | C            |
| 59         | PB18A            | 4    | BDQ15          | T            | PB44A            | 4    | BDQ42          | T            |
| 60         | PB18B            | 4    | BDQ15          | C            | PB44B            | 4    | BDQ42          | C            |
| 61         | GND              | -    |                |              | GND              | -    |                |              |
| 62         | PB20A            | 4    | BDQ24          | T            | PB48A            | 4    | BDQ51          | T            |
| 63         | PB20B            | 4    | BDQ24          | C            | PB48B            | 4    | BDQ51          | C            |
| 64         | VCCIO4           | 4    |                |              | VCCIO4           | 4    |                |              |
| 65         | PB22A            | 4    | BDQ24          | T            | PB50A            | 4    | BDQ51          | T            |
| 66         | PB22B            | 4    | BDQ24          | C            | PB50B            | 4    | BDQ51          | C            |
| 67         | PB24A            | 4    | BDQS24         | T            | PB52A            | 4    | BDQ51          | T            |
| 68         | PB24B            | 4    | BDQ24          | C            | PB52B            | 4    | BDQ51          | C            |
| 69         | PB26A            | 4    | BDQ24          | T            | PB54A            | 4    | BDQ51          | T            |
| 70         | PB26B            | 4    | BDQ24          | C            | PB54B            | 4    | BDQ51          | C            |
| 71         | PB28A            | 4    | VREF2_4/BDQ24  | T            | PB55A            | 4    | VREF2_4/BDQ51  | T            |
| 72         | PB28B            | 4    | VREF1_4/BDQ24  | C            | PB55B            | 4    | VREF1_4/BDQ51  | C            |
| 73         | CFG1             | 8    |                |              | CFG1             | 8    |                |              |
| 74         | CFG2             | 8    |                |              | CFG2             | 8    |                |              |
| 75         | PROGRAMN         | 8    |                |              | PROGRAMN         | 8    |                |              |
| 76         | INITN            | 8    |                |              | INITN            | 8    |                |              |
| 77         | CFG0             | 8    |                |              | CFG0             | 8    |                |              |
| 78         | CCLK             | 8    |                |              | CCLK             | 8    |                |              |
| 79         | DONE             | 8    |                |              | DONE             | 8    |                |              |
| 80         | PR29A            | 8    | D0/SPIFASTN    |              | PR29A            | 8    | D0/SPIFASTN    |              |
| 81         | GND              | -    |                |              | GND              | -    |                |              |
| 82         | PR26A            | 8    | D6             |              | PR26A            | 8    | D6             |              |
| 83         | VCC              | -    |                |              | VCC              | -    |                |              |
| 84         | PR25B            | 8    | D7/SPID0       | C            | PR25B            | 8    | D7/SPID0       | C            |
| 85         | VCCIO8           | 8    |                |              | VCCIO8           | 8    |                |              |
| 86         | PR25A            | 8    | DI/CSSPI0N     | T            | PR25A            | 8    | DI/CSSPI0N     | T            |
| 87         | PR24B            | 8    | DOUT/CSON      | C            | PR24B            | 8    | DOUT/CSON      | C            |
| 88         | PR24A            | 8    | BUSY/SISPI     | T            | PR24A            | 8    | BUSY/SISPI     | T            |
| 89         | VCCIO3           | 3    |                |              | VCCIO3           | 3    |                |              |
| 90         | VCCAUX           | -    |                |              | VCCAUX           | -    |                |              |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 144 TQFP (Cont.)**

| LFE2-6E/SE |                  |      |                    |              | LFE2-12E/12SE    |      |                    |              |  |
|------------|------------------|------|--------------------|--------------|------------------|------|--------------------|--------------|--|
| Pin Number | Pin/Pad Function | Bank | Dual Function      | Differential | Pin/Pad Function | Bank | Dual Function      | Differential |  |
| 91         | PR20B            | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    | PR20B            | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    |  |
| 92         | PR20A            | 3    | RLM0_GPLL_T_IN_A** | T (LVDS)*    | PR20A            | 3    | RLM0_GPLL_T_IN_A** | T (LVDS)*    |  |
| 93         | RLM0_PLLCAP      | 3    |                    |              | RLM0_PLLCAP      | 3    |                    |              |  |
| 94         | VCC              | -    |                    |              | VCC              | -    |                    |              |  |
| 95         | GND              | -    |                    |              | GND              | -    |                    |              |  |
| 96         | PR17B            | 3    | RLM0_GDLL_C_IN_A** | C (LVDS)*    | PR17B            | 3    | RLM0_GDLL_C_IN_A** | C (LVDS)*    |  |
| 97         | PR17A            | 3    | RLM0_GDLL_T_IN_A** | T (LVDS)*    | PR17A            | 3    | RLM0_GDLL_T_IN_A** | T (LVDS)*    |  |
| 98         | PR16B            | 3    | VREF2_3            | C            | PR16B            | 3    | VREF2_3            | C            |  |
| 99         | PR16A            | 3    | VREF1_3            | T            | PR16A            | 3    | VREF1_3            | T            |  |
| 100        | PR15B            | 3    | PCLKC3_0           | C (LVDS)*    | PR15B            | 3    | PCLKC3_0           | C (LVDS)*    |  |
| 101        | PR15A            | 3    | PCLKT3_0           | T (LVDS)*    | PR15A            | 3    | PCLKT3_0           | T (LVDS)*    |  |
| 102        | VCC              | -    |                    |              | VCC              | -    |                    |              |  |
| 103        | PR13B            | 2    | PCLKC2_0/RDQ10     | C            | PR13B            | 2    | PCLKC2_0/RDQ10     | C            |  |
| 104        | PR13A            | 2    | PCLKT2_0/RDQ10     | T            | PR13A            | 2    | PCLKT2_0/RDQ10     | T            |  |
| 105        | GND              | -    |                    |              | GND              | -    |                    |              |  |
| 106        | VCCIO2           | 2    |                    |              | VCCIO2           | 2    |                    |              |  |
| 107        | PR2B             | 2    | VREF2_2            | C (LVDS)*    | PR2B             | 2    | VREF2_2            | C (LVDS)*    |  |
| 108        | PR2A             | 2    | VREF1_2            | T (LVDS)*    | PR2A             | 2    | VREF1_2            | T (LVDS)*    |  |
| 109        | PT28B            | 1    | VREF2_1            | C            | PT55B            | 1    | VREF2_1            | C            |  |
| 110        | PT28A            | 1    | VREF1_1            | T            | PT55A            | 1    | VREF1_1            | T            |  |
| 111        | PT26B            | 1    |                    | C            | PT54B            | 1    |                    | C            |  |
| 112        | PT26A            | 1    |                    | T            | PT54A            | 1    |                    | T            |  |
| 113        | PT24B            | 1    |                    | C            | PT52B            | 1    |                    | C            |  |
| 114        | PT24A            | 1    |                    | T            | PT52A            | 1    |                    | T            |  |
| 115        | PT22B            | 1    |                    | C            | PT50B            | 1    |                    | C            |  |
| 116        | PT22A            | 1    |                    | T            | PT50A            | 1    |                    | T            |  |
| 117        | VCCIO1           | 1    |                    |              | VCCIO1           | 1    |                    |              |  |
| 118        | PT20B            | 1    |                    | C            | PT48B            | 1    |                    | C            |  |
| 119        | PT20A            | 1    |                    | T            | PT48A            | 1    |                    | T            |  |
| 120        | GND              | -    |                    |              | GND              | -    |                    |              |  |
| 121        | PT18B            | 1    |                    | C            | PT44B            | 1    |                    | C            |  |
| 122        | PT18A            | 1    |                    | T            | PT44A            | 1    |                    | T            |  |
| 123        | PT16A            | 1    |                    |              | PT40B            | 1    |                    | C            |  |
| 124        | NC               | 1    |                    |              | PT40A            | 1    |                    | T            |  |
| 125        | PT14B            | 1    |                    | C            | PT34B            | 1    |                    | C            |  |
| 126        | PT14A            | 1    |                    | T            | PT34A            | 1    |                    | T            |  |
| 127        | NC               | 1    |                    |              | NC               | 1    |                    |              |  |
| 128        | VCC              | -    |                    |              | VCC              | -    |                    |              |  |
| 129        | PT12B            | 1    | PCLKC1_0           | C            | PT30B            | 1    | PCLKC1_0           | C            |  |
| 130        | PT12A            | 1    | PCLKT1_0           | T            | PT30A            | 1    | PCLKT1_0           | T            |  |
| 131        | PT10B            | 0    | PCLKC0_0           | C            | PT28B            | 0    | PCLKC0_0           | C            |  |
| 132        | XRES             | 0    |                    |              | XRES             | 0    |                    |              |  |
| 133        | GND              | -    |                    |              | GND              | -    |                    |              |  |
| 134        | PT10A            | 0    | PCLKT0_0           | T            | PT28A            | 0    | PCLKT0_0           | T            |  |
| 135        | VCC              | -    |                    |              | VCC              | -    |                    |              |  |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 144 TQFP (Cont.)**

| LFE2-6E/SE |                  |      |               |              | LFE2-12E/12SE    |      |               |              |
|------------|------------------|------|---------------|--------------|------------------|------|---------------|--------------|
| Pin Number | Pin/Pad Function | Bank | Dual Function | Differential | Pin/Pad Function | Bank | Dual Function | Differential |
| 136        | PT6B             | 0    |               | C            | PT16B            | 0    |               | C            |
| 137        | PT6A             | 0    |               | T            | PT16A            | 0    |               | T            |
| 138        | GND              | -    |               |              | GND              | -    |               |              |
| 139        | VCCIO0           | 0    |               |              | VCCIO0           | 0    |               |              |
| 140        | PT4B             | 0    |               | C            | PT6B             | 0    |               | C            |
| 141        | PT4A             | 0    |               | T            | PT6A             | 0    |               | T            |
| 142        | VCCAUX           | -    |               |              | VCCAUX           | -    |               |              |
| 143        | PT2B             | 0    | VREF2_0       | C            | PT2B             | 0    | VREF2_0       | C            |
| 144        | PT2A             | 0    | VREF1_0       | T            | PT2A             | 0    | VREF1_0       | T            |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one-to-one connection with a package ball or pin.



## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 208 PQFP

| LFE2-12E/SE |                  |      |                   |              | LFE2-20E/SE      |      |                         |              |  |
|-------------|------------------|------|-------------------|--------------|------------------|------|-------------------------|--------------|--|
| Pin Number  | Pin/Pad Function | Bank | Dual Function     | Differential | Pin/Pad Function | Bank | Dual Function           | Differential |  |
| 1           | PL2A             | 7    | VREF2_7           | T (LVDS)*    | PL2A             | 7    | VREF2_7                 | T (LVDS)*    |  |
| 2           | PL2B             | 7    | VREF1_7           | C (LVDS)*    | PL2B             | 7    | VREF1_7                 | C (LVDS)*    |  |
| 3           | PL4A             | 7    |                   | T (LVDS)*    | PL6A             | 7    | LDQ8                    | T (LVDS)*    |  |
| 4           | PL4B             | 7    |                   | C (LVDS)*    | PL6B             | 7    | LDQ8                    | C (LVDS)*    |  |
| 5           | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 6           | PL6A             | 7    | LDQ10             | T (LVDS)*    | PL12A            | 7    | LDQ16                   | T (LVDS)*    |  |
| 7           | VCCAUX           | -    |                   |              | VCCAUX           | -    |                         |              |  |
| 8           | PL6B             | 7    | LDQ10             | C (LVDS)*    | PL12B            | 7    | LDQ16                   | C (LVDS)*    |  |
| 9           | PL8A             | 7    | LDQ10             | T (LVDS)*    | PL14A            | 7    | LDQ16                   | T (LVDS)*    |  |
| 10          | VCCIO7           | 7    |                   |              | VCCIO7           | 7    |                         |              |  |
| 11          | PL8B             | 7    | LDQ10             | C (LVDS)*    | PL14B            | 7    | LDQ16                   | C (LVDS)*    |  |
| 12          | VCC              | -    |                   |              | VCC              | -    |                         |              |  |
| 13          | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 14          | VCCIO7           | 7    |                   |              | VCCIO7           | 7    |                         |              |  |
| 15          | PL12A            | 7    | LDQ10             | T (LVDS)*    | PL18A            | 7    | LDQ16                   | T (LVDS)*    |  |
| 16          | PL12B            | 7    | LDQ10             | C (LVDS)*    | PL18B            | 7    | LDQ16                   | C (LVDS)*    |  |
| 17          | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 18          | PL13A            | 7    | PCLKT7_0/LDQ10    | T            | PL19A            | 7    | PCLKT7_0/LDQ16          | T            |  |
| 19          | VCC              | -    |                   |              | VCC              | -    |                         |              |  |
| 20          | PL13B            | 7    | PCLKC7_0/LDQ10    | C            | PL19B            | 7    | PCLKC7_0/LDQ16          | C            |  |
| 21          | PL15A            | 6    | PCLKT6_0          | T (LVDS)*    | PL21A            | 6    | PCLKT6_0/LDQ25          | T (LVDS)*    |  |
| 22          | PL15B            | 6    | PCLKC6_0          | C (LVDS)*    | PL21B            | 6    | PCLKC6_0/LDQ25          | C (LVDS)*    |  |
| 23          | PL16A            | 6    | VREF2_6           | T            | PL22A            | 6    | VREF2_6/LDQ25           | T            |  |
| 24          | PL16B            | 6    | VREF1_6           | C            | PL22B            | 6    | VREF1_6/LDQ25           | C            |  |
| 25          | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 26          | PL17A            | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL27A            | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    |  |
| 27          | PL17B            | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL27B            | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    |  |
| 28          | VCC              | -    |                   |              | VCC              | -    |                         |              |  |
| 29          | LLM0_PLLCAP      | 6    |                   |              | LLM0_PLLCAP      | 6    |                         |              |  |
| 30          | VCCAUX           | -    |                   |              | VCCAUX           | -    |                         |              |  |
| 31          | PL20A            | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL30A            | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    |  |
| 32          | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 33          | PL21A            | 6    | LLM0_GPLLT_FB_A   | T            | PL31A            | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            |  |
| 34          | PL20B            | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL30B            | 6    | LLM0_GPLLC_IN_A**/LDQ34 | C (LVDS)*    |  |
| 35          | PL21B            | 6    | LLM0_GPLLC_FB_A   | C            | PL31B            | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            |  |
| 36          | PL23A            | 6    |                   |              | PL33A            | 6    | LDQ34                   |              |  |
| 37          | PL24A            | 6    | LDQ28             | T (LVDS)*    | PL38A            | 6    | LDQ42                   | T (LVDS)*    |  |
| 38          | VCCIO6           | 6    |                   |              | VCCIO6           | 6    |                         |              |  |
| 39          | PL24B            | 6    | LDQ28             | C (LVDS)*    | PL38B            | 6    | LDQ42                   | C (LVDS)*    |  |
| 40          | VCC              | -    |                   |              | VCC              | -    |                         |              |  |
| 41          | PL26A            | 6    | LDQ28             | T (LVDS)*    | PL40A            | 6    | LDQ42                   | T (LVDS)*    |  |
| 42          | GND              | -    |                   |              | GND              | -    |                         |              |  |
| 43          | PL26B            | 6    | LDQ28             | C (LVDS)*    | PL40B            | 6    | LDQ42                   | C (LVDS)*    |  |
| 44          | VCCIO6           | 6    |                   |              | VCCIO6           | 6    |                         |              |  |
| 45          | PL28A            | 6    | LDQS28            | T (LVDS)*    | PL42A            | 6    | LDQS42                  | T (LVDS)*    |  |

**LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 208 PQFP (Cont.)**

| LFE2-12E/SE |                  |      |                |              | LFE2-20E/SE      |      |                |              |  |
|-------------|------------------|------|----------------|--------------|------------------|------|----------------|--------------|--|
| Pin Number  | Pin/Pad Function | Bank | Dual Function  | Differential | Pin/Pad Function | Bank | Dual Function  | Differential |  |
| 46          | PL28B            | 6    | LDQ28          | C (LVDS)*    | PL42B            | 6    | LDQ42          | C (LVDS)*    |  |
| 47          | PL30A            | 6    | LDQ28          |              | PL44A            | 6    | LDQ42          |              |  |
| 48          | TCK              | -    |                |              | TCK              | -    |                |              |  |
| 49          | TDI              | -    |                |              | TDI              | -    |                |              |  |
| 50          | TDO              | -    |                |              | TDO              | -    |                |              |  |
| 51          | VCCJ             | -    |                |              | VCCJ             | -    |                |              |  |
| 52          | TMS              | -    |                |              | TMS              | -    |                |              |  |
| 53          | PB2A             | 5    | VREF2_5/BDQ6   | T            | PB2A             | 5    | VREF2_5/BDQ6   | T            |  |
| 54          | PB2B             | 5    | VREF1_5/BDQ6   | C            | PB2B             | 5    | VREF1_5/BDQ6   | C            |  |
| 55          | VCCIO5           | 5    |                |              | VCCIO5           | 5    |                |              |  |
| 56          | PB6A             | 5    | BDQS6          | T            | PB6A             | 5    | BDQS6          | T            |  |
| 57          | PB6B             | 5    | BDQ6           | C            | PB6B             | 5    | BDQ6           | C            |  |
| 58          | PB8A             | 5    | BDQ6           | T            | PB8A             | 5    | BDQ6           | T            |  |
| 59          | PB8B             | 5    | BDQ6           | C            | PB8B             | 5    | BDQ6           | C            |  |
| 60          | GND              | -    |                |              | GND              | -    |                |              |  |
| 61          | PB12A            | 5    | BDQ15          | T            | PB12A            | 5    | BDQ15          | T            |  |
| 62          | PB12B            | 5    | BDQ15          | C            | PB12B            | 5    | BDQ15          | C            |  |
| 63          | VCCIO5           | 5    |                |              | VCCIO5           | 5    |                |              |  |
| 64          | PB16A            | 5    | BDQ15          | T            | PB16A            | 5    | BDQ15          | T            |  |
| 65          | PB16B            | 5    | BDQ15          | C            | PB16B            | 5    | BDQ15          | C            |  |
| 66          | PB18A            | 5    | BDQ15          | T            | PB18A            | 5    | BDQ15          | T            |  |
| 67          | PB18B            | 5    | BDQ15          | C            | PB18B            | 5    | BDQ15          | C            |  |
| 68          | GND              | -    |                |              | GND              | -    |                |              |  |
| 69          | PB20A            | 5    | BDQ24          | T            | PB30A            | 5    | BDQ33          | T            |  |
| 70          | VCCAUX           | -    |                |              | VCCAUX           | -    |                |              |  |
| 71          | PB20B            | 5    | BDQ24          | C            | PB30B            | 5    | BDQ33          | C            |  |
| 72          | PB22A            | 5    | BDQ24          | T            | PB32A            | 5    | BDQ33          | T            |  |
| 73          | PB22B            | 5    | BDQ24          | C            | PB32B            | 5    | BDQ33          | C            |  |
| 74          | VCC              | -    |                |              | VCC              | -    |                |              |  |
| 75          | PB26A            | 5    | PCLKT5_0/BDQ24 | T            | PB35A            | 5    | PCLKT5_0/BDQ33 | T            |  |
| 76          | PB26B            | 5    | PCLKC5_0/BDQ24 | C            | PB35B            | 5    | PCLKC5_0/BDQ33 | C            |  |
| 77          | GND              | -    |                |              | GND              | -    |                |              |  |
| 78          | PB31A            | 4    | PCLKT4_0/BDQ33 | T            | PB40A            | 4    | PCLKT4_0/BDQ42 | T            |  |
| 79          | PB31B            | 4    | PCLKC4_0/BDQ33 | C            | PB40B            | 4    | PCLKC4_0/BDQ42 | C            |  |
| 80          | VCC              | -    |                |              | VCC              | -    |                |              |  |
| 81          | GND              | -    |                |              | GND              | -    |                |              |  |
| 82          | PB34A            | 4    | BDQ33          | T            | PB42A            | 4    | BDQS42         | T            |  |
| 83          | PB34B            | 4    | BDQ33          | C            | PB42B            | 4    | BDQ42          | C            |  |
| 84          | PB36A            | 4    | BDQ33          | T            | PB44A            | 4    | BDQ42          | T            |  |
| 85          | PB36B            | 4    | BDQ33          | C            | PB44B            | 4    | BDQ42          | C            |  |
| 86          | VCCAUX           | -    |                |              | VCCAUX           | -    |                |              |  |
| 87          | PB40A            | 4    | BDQ42          | T            | PB50A            | 4    | BDQ51          | T            |  |
| 88          | PB40B            | 4    | BDQ42          | C            | PB50B            | 4    | BDQ51          | C            |  |
| 89          | GND              | -    |                |              | GND              | -    |                |              |  |
| 90          | PB42A            | 4    | BDQS42         | T            | PB52A            | 4    | BDQ51          | T            |  |
| 91          | PB42B            | 4    | BDQ42          | C            | PB52B            | 4    | BDQ51          | C            |  |

**LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 208 PQFP (Cont.)**

| LFE2-12E/SE |                  |      |                    |              | LFE2-20E/SE      |      |                          |              |  |
|-------------|------------------|------|--------------------|--------------|------------------|------|--------------------------|--------------|--|
| Pin Number  | Pin/Pad Function | Bank | Dual Function      | Differential | Pin/Pad Function | Bank | Dual Function            | Differential |  |
| 92          | PB44A            | 4    | BDQ42              | T            | PB54A            | 4    | BDQ51                    | T            |  |
| 93          | VCCIO4           | 4    |                    |              | VCCIO4           | 4    |                          |              |  |
| 94          | PB44B            | 4    | BDQ42              | C            | PB54B            | 4    | BDQ51                    | C            |  |
| 95          | PB48A            | 4    | BDQ51              | T            | PB58A            | 4    | BDQ60                    | T            |  |
| 96          | PB48B            | 4    | BDQ51              | C            | PB58B            | 4    | BDQ60                    | C            |  |
| 97          | VCC              | -    |                    |              | VCC              | -    |                          |              |  |
| 98          | PB52A            | 4    | BDQ51              | T            | PB60A            | 4    | BDQS60                   | T            |  |
| 99          | PB52B            | 4    | BDQ51              | C            | PB60B            | 4    | BDQ60                    | C            |  |
| 100         | VCCIO4           | 4    |                    |              | VCCIO4           | 4    |                          |              |  |
| 101         | PB54A            | 4    | BDQ51              |              | PB63A            | 4    | BDQ60                    |              |  |
| 102         | GND              | -    |                    |              | GND              | -    |                          |              |  |
| 103         | PB55A            | 4    | VREF2_4/BDQ51      | T            | PB64A            | 4    | VREF2_4/BDQ60            | T            |  |
| 104         | PB55B            | 4    | VREF1_4/BDQ51      | C            | PB64B            | 4    | VREF1_4/BDQ60            | C            |  |
| 105         | CFG1             | 8    |                    |              | CFG1             | 8    |                          |              |  |
| 106         | PROGRAMN         | 8    |                    |              | PROGRAMN         | 8    |                          |              |  |
| 107         | CFG2             | 8    |                    |              | CFG2             | 8    |                          |              |  |
| 108         | INITN            | 8    |                    |              | INITN            | 8    |                          |              |  |
| 109         | CFG0             | 8    |                    |              | CFG0             | 8    |                          |              |  |
| 110         | CCLK             | 8    |                    |              | CCLK             | 8    |                          |              |  |
| 111         | DONE             | 8    |                    |              | DONE             | 8    |                          |              |  |
| 112         | PR29A            | 8    | D0/SPIFASTN        |              | PR43A            | 8    | D0/SPIFASTN              |              |  |
| 113         | VCCIO8           | 8    |                    |              | VCCIO8           | 8    |                          |              |  |
| 114         | PR26A            | 8    | D6                 |              | PR40A            | 8    | D6                       |              |  |
| 115         | GND              | -    |                    |              | GND              | -    |                          |              |  |
| 116         | VCC              | -    |                    |              | VCC              | -    |                          |              |  |
| 117         | PR25B            | 8    | D7/SPID0           | C            | PR39B            | 8    | D7/SPID0                 | C            |  |
| 118         | VCCIO8           | 8    |                    |              | VCCIO8           | 8    |                          |              |  |
| 119         | PR25A            | 8    | DI/CSSPI0N         | T            | PR39A            | 8    | DI/CSSPI0N               | T            |  |
| 120         | PR24B            | 8    | DOU/CSON           | C            | PR38B            | 8    | DOU/CSON                 | C            |  |
| 121         | PR24A            | 8    | BUSY/SISPI         | T            | PR38A            | 8    | BUSY/SISPI               | T            |  |
| 122         | GND              | -    |                    |              | GND              | -    |                          |              |  |
| 123         | VCCIO3           | 3    |                    |              | VCCIO3           | 3    |                          |              |  |
| 124         | PR21A            | 3    | RLM0_GPLLT_FB_A    |              | PR31A            | 3    | RLM0_GPLLT_FB_A/RDQ34    |              |  |
| 125         | VCCAUX           | -    |                    |              | VCCAUX           | -    |                          |              |  |
| 126         | PR20B            | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    | PR30B            | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    |  |
| 127         | PR20A            | 3    | RLM0_GPLL_T_IN_A** | T (LVDS)*    | PR30A            | 3    | RLM0_GPLL_T_IN_A**/RDQ34 | T (LVDS)*    |  |
| 128         | RLM0_PLLCAP      | 3    |                    |              | RLM0_PLLCAP      | 3    |                          |              |  |
| 129         | VCC              | -    |                    |              | VCC              | -    |                          |              |  |
| 130         | PR18B            | 3    | RLM0_GDLLC_FB_A    | C            | PR28B            | 3    | RLM0_GDLLC_FB_A/RDQ25    | C            |  |
| 131         | PR18A            | 3    | RLM0_GDLLT_FB_A    | T            | PR28A            | 3    | RLM0_GDLLT_FB_A/RDQ25    | T            |  |
| 132         | PR17B            | 3    | RLM0_GDLLC_IN_A**  | C (LVDS)*    | PR27B            | 3    | RLM0_GDLLC_IN_A**/RDQ25  | C (LVDS)*    |  |
| 133         | PR17A            | 3    | RLM0_GDLLT_IN_A**  | T (LVDS)*    | PR27A            | 3    | RLM0_GDLLT_IN_A**/RDQ25  | T (LVDS)*    |  |
| 134         | PR16B            | 3    | VREF2_3            | C            | PR22B            | 3    | VREF2_3/RDQ25            | C            |  |
| 135         | VCCIO3           | 3    |                    |              | VCCIO3           | 3    |                          |              |  |
| 136         | PR16A            | 3    | VREF1_3            | T            | PR22A            | 3    | VREF1_3/RDQ25            | T            |  |
| 137         | PR15B            | 3    | PCLKC3_0           | C (LVDS)*    | PR21B            | 3    | PCLKC3_0/RDQ25           | C (LVDS)*    |  |

**LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 208 PQFP (Cont.)**

| LFE2-12E/SE |                  |      |                |              | LFE2-20E/SE      |      |                |              |  |
|-------------|------------------|------|----------------|--------------|------------------|------|----------------|--------------|--|
| Pin Number  | Pin/Pad Function | Bank | Dual Function  | Differential | Pin/Pad Function | Bank | Dual Function  | Differential |  |
| 138         | PR15A            | 3    | PCLKT3_0       | T (LVDS)*    | PR21A            | 3    | PCLKT3_0/RDQ25 | T (LVDS)*    |  |
| 139         | GND              | -    |                |              | GND              | -    |                |              |  |
| 140         | VCC              | -    |                |              | VCC              | -    |                |              |  |
| 141         | PR13B            | 2    | PCLKC2_0/RDQ10 | C            | PR19B            | 2    | PCLKC2_0/RDQ16 | C            |  |
| 142         | PR13A            | 2    | PCLKT2_0/RDQ10 | T            | PR19A            | 2    | PCLKT2_0/RDQ16 | T            |  |
| 143         | VCCIO2           | 2    |                |              | VCCIO2           | 2    |                |              |  |
| 144         | PR12A            | 2    | RDQ10          |              | PR16A            | 2    | RDQS16         |              |  |
| 145         | GND              | -    |                |              | GND              | -    |                |              |  |
| 146         | VCC              | -    |                |              | VCC              | -    |                |              |  |
| 147         | PR8B             | 2    | RDQ10          | C (LVDS)*    | PR14B            | 2    | RDQ16          | C (LVDS)*    |  |
| 148         | VCCIO2           | 2    |                |              | VCCIO2           | 2    |                |              |  |
| 149         | PR8A             | 2    | RDQ10          | T (LVDS)*    | PR14A            | 2    | RDQ16          | T (LVDS)*    |  |
| 150         | PR6B             | 2    | RDQ10          | C (LVDS)*    | PR12B            | 2    | RDQ16          | C (LVDS)*    |  |
| 151         | VCCAUX           | -    |                |              | VCCAUX           | -    |                |              |  |
| 152         | PR6A             | 2    | RDQ10          | T (LVDS)*    | PR12A            | 2    | RDQ16          | T (LVDS)*    |  |
| 153         | PR4B             | 2    |                | C (LVDS)*    | PR6B             | 2    | RDQ8           | C (LVDS)*    |  |
| 154         | PR4A             | 2    |                | T (LVDS)*    | PR6A             | 2    | RDQ8           | T (LVDS)*    |  |
| 155         | PR2B             | 2    | VREF2_2        | C (LVDS)*    | PR2B             | 2    | VREF2_2        | C (LVDS)*    |  |
| 156         | PR2A             | 2    | VREF1_2        | T (LVDS)*    | PR2A             | 2    | VREF1_2        | T (LVDS)*    |  |
| 157         | PT55B            | 1    | VREF2_1        | C            | PT64B            | 1    | VREF2_1        | C            |  |
| 158         | PT55A            | 1    | VREF1_1        | T            | PT64A            | 1    | VREF1_1        | T            |  |
| 159         | GND              | -    |                |              | GND              | -    |                |              |  |
| 160         | PT54B            | 1    |                | C            | PT62B            | 1    |                | C            |  |
| 161         | PT54A            | 1    |                | T            | PT62A            | 1    |                | T            |  |
| 162         | VCCIO1           | 1    |                |              | VCCIO1           | 1    |                |              |  |
| 163         | PT52B            | 1    |                | C            | PT60B            | 1    |                | C            |  |
| 164         | PT52A            | 1    |                | T            | PT60A            | 1    |                | T            |  |
| 165         | PT50B            | 1    |                | C            | PT58B            | 1    |                | C            |  |
| 166         | PT50A            | 1    |                | T            | PT58A            | 1    |                | T            |  |
| 167         | PT48B            | 1    |                | C            | PT56B            | 1    |                | C            |  |
| 168         | PT48A            | 1    |                | T            | PT56A            | 1    |                | T            |  |
| 169         | GND              | -    |                |              | GND              | -    |                |              |  |
| 170         | VCCIO1           | 1    |                |              | VCCIO1           | 1    |                |              |  |
| 171         | VCC              | -    |                |              | VCC              | -    |                |              |  |
| 172         | PT40B            | 1    |                | C            | PT50B            | 1    |                | C            |  |
| 173         | PT40A            | 1    |                | T            | PT50A            | 1    |                | T            |  |
| 174         | VCCAUX           | -    |                |              | VCCAUX           | -    |                |              |  |
| 175         | GND              | -    |                |              | GND              | -    |                |              |  |
| 176         | PT36B            | 1    |                | C            | PT44B            | 1    |                | C            |  |
| 177         | PT36A            | 1    |                | T            | PT44A            | 1    |                | T            |  |
| 178         | PT34B            | 1    |                | C            | PT42B            | 1    |                | C            |  |
| 179         | PT34A            | 1    |                | T            | PT42A            | 1    |                | T            |  |
| 180         | PT30B            | 1    | PCLKC1_0       | C            | PT39B            | 1    | PCLKC1_0       | C            |  |
| 181         | PT30A            | 1    | PCLKT1_0       | T            | PT39A            | 1    | PCLKT1_0       | T            |  |
| 182         | XRES             | 1    |                |              | XRES             | 1    |                |              |  |
| 183         | PT28B            | 0    | PCLKC0_0       | C            | PT37B            | 0    | PCLKC0_0       | C            |  |

**LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 208 PQFP (Cont.)**

| LFE2-12E/SE |                  |      |               |              | LFE2-20E/SE      |      |               |              |  |
|-------------|------------------|------|---------------|--------------|------------------|------|---------------|--------------|--|
| Pin Number  | Pin/Pad Function | Bank | Dual Function | Differential | Pin/Pad Function | Bank | Dual Function | Differential |  |
| 184         | GND              | -    |               |              | GND              | -    |               |              |  |
| 185         | PT28A            | 0    | PCLKT0_0      | T            | PT37A            | 0    | PCLKT0_0      | T            |  |
| 186         | PT26B            | 0    |               | C            | PT36B            | 0    |               | C            |  |
| 187         | PT26A            | 0    |               | T            | PT36A            | 0    |               | T            |  |
| 188         | VCC              | -    |               |              | VCC              | -    |               |              |  |
| 189         | PT20B            | 0    |               | C            | PT30B            | 0    |               | C            |  |
| 190         | VCCAUX           | -    |               |              | VCCAUX           | -    |               |              |  |
| 191         | PT20A            | 0    |               | T            | PT30A            | 0    |               | T            |  |
| 192         | GND              | -    |               |              | GND              | -    |               |              |  |
| 193         | PT18B            | 0    |               | C            | PT26B            | 0    |               | C            |  |
| 194         | PT18A            | 0    |               | T            | PT26A            | 0    |               | T            |  |
| 195         | VCCIO0           | 0    |               |              | VCCIO0           | 0    |               |              |  |
| 196         | PT16B            | 0    |               | C            | PT20B            | 0    |               | C            |  |
| 197         | PT16A            | 0    |               | T            | PT20A            | 0    |               | T            |  |
| 198         | VCC              | -    |               |              | VCC              | -    |               |              |  |
| 199         | PT12B            | 0    |               | C            | PT12B            | 0    |               | C            |  |
| 200         | PT12A            | 0    |               | T            | PT12A            | 0    |               | T            |  |
| 201         | GND              | -    |               |              | GND              | -    |               |              |  |
| 202         | PT8B             | 0    |               | C            | PT8B             | 0    |               | C            |  |
| 203         | PT8A             | 0    |               | T            | PT8A             | 0    |               | T            |  |
| 204         | PT6B             | 0    |               | C            | PT6B             | 0    |               | C            |  |
| 205         | PT6A             | 0    |               | T            | PT6A             | 0    |               | T            |  |
| 206         | VCCIO0           | 0    |               |              | VCCIO0           | 0    |               |              |  |
| 207         | PT2B             | 0    | VREF2_0       | C            | PT2B             | 0    | VREF2_0       | C            |  |
| 208         | PT2A             | 0    | VREF1_0       | T            | PT2A             | 0    | VREF1_0       | T            |  |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA

| LFE2-6E/SE  |                   |      |                   |              | LFE2-12E/SE       |      |                   |              |  |
|-------------|-------------------|------|-------------------|--------------|-------------------|------|-------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function     | Differential |  |
| C3          | PL2A              | 7    | VREF2_7           | T (LVDS)*    | PL2A              | 7    | VREF2_7           | T (LVDS)*    |  |
| C2          | PL2B              | 7    | VREF1_7           | C (LVDS)*    | PL2B              | 7    | VREF1_7           | C (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| -           | -                 | -    |                   |              | -                 | -    |                   |              |  |
| D3          | PL5A              | 7    |                   | T            | PL5A              | 7    |                   | T            |  |
| D4          | PL4A              | 7    |                   | T (LVDS)*    | PL4A              | 7    |                   | T (LVDS)*    |  |
| D2          | PL5B              | 7    |                   | C            | PL5B              | 7    |                   | C            |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| E4          | PL4B              | 7    |                   | C (LVDS)*    | PL4B              | 7    |                   | C (LVDS)*    |  |
| B1          | PL7A              | 7    | LDQ10             | T            | PL7A              | 7    | LDQ10             | T            |  |
| C1          | PL7B              | 7    | LDQ10             | C            | PL7B              | 7    | LDQ10             | C            |  |
| F5          | PL9A              | 7    | LDQ10             | T            | PL9A              | 7    | LDQ10             | T            |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| F4          | PL8A              | 7    | LDQ10             | T (LVDS)*    | PL8A              | 7    | LDQ10             | T (LVDS)*    |  |
| G6          | PL9B              | 7    | LDQ10             | C            | PL9B              | 7    | LDQ10             | C            |  |
| G4          | PL8B              | 7    | LDQ10             | C (LVDS)*    | PL8B              | 7    | LDQ10             | C (LVDS)*    |  |
| D1          | PL10A             | 7    | LDQS10            | T (LVDS)*    | PL10A             | 7    | LDQS10            | T (LVDS)*    |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| E1          | PL10B             | 7    | LDQ10             | C (LVDS)*    | PL10B             | 7    | LDQ10             | C (LVDS)*    |  |
| F3          | PL11A             | 7    | LDQ10             | T            | PL11A             | 7    | LDQ10             | T            |  |
| G3          | PL11B             | 7    | LDQ10             | C            | PL11B             | 7    | LDQ10             | C            |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| F2          | PL12A             | 7    | LDQ10             | T (LVDS)*    | PL12A             | 7    | LDQ10             | T (LVDS)*    |  |
| F1          | PL12B             | 7    | LDQ10             | C (LVDS)*    | PL12B             | 7    | LDQ10             | C (LVDS)*    |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| G2          | PL13A             | 7    | PCLKT7_0/LDQ10    | T            | PL13A             | 7    | PCLKT7_0/LDQ10    | T            |  |
| G1          | PL13B             | 7    | PCLKC7_0/LDQ10    | C            | PL13B             | 7    | PCLKC7_0/LDQ10    | C            |  |
| H6          | PL15A             | 6    | PCLKT6_0          | T (LVDS)*    | PL15A             | 6    | PCLKT6_0          | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                   |              |  |
| H5          | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    |  |
| H4          | PL16A             | 6    | VREF2_6           | T            | PL16A             | 6    | VREF2_6           | T            |  |
| GND         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                   |              |  |
| H3          | PL16B             | 6    | VREF1_6           | C            | PL16B             | 6    | VREF1_6           | C            |  |
| H2          | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    |  |
| H1          | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    |  |
| G10         | VCC               | -    |                   |              | VCC               | -    |                   |              |  |
| J4          | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            |  |
| J5          | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            |  |
| J6          | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                   |              |  |
| K4          | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    |  |
| GND         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                   |              |  |
| J1          | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            |  |
| K3          | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                   |              |  |
| J2          | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            |  |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |                |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |                |              |
| L2          | PL24A             | 6    | LDQ28         | T (LVDS)*    | PL24A             | 6    | LDQ28          | T (LVDS)*    |
| K2          | PL25A             | 6    | LDQ28         | T            | PL25A             | 6    | LDQ28          | T            |
| L3          | PL24B             | 6    | LDQ28         | C (LVDS)*    | PL24B             | 6    | LDQ28          | C (LVDS)*    |
| K1          | PL25B             | 6    | LDQ28         | C            | PL25B             | 6    | LDQ28          | C            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |                |              |
| L4          | PL26A             | 6    | LDQ28         | T (LVDS)*    | PL26A             | 6    | LDQ28          | T (LVDS)*    |
| L1          | PL27A             | 6    | LDQ28         | T            | PL27A             | 6    | LDQ28          | T            |
| L5          | PL26B             | 6    | LDQ28         | C (LVDS)*    | PL26B             | 6    | LDQ28          | C (LVDS)*    |
| M1          | PL27B             | 6    | LDQ28         | C            | PL27B             | 6    | LDQ28          | C            |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |                |              |
| N1          | PL29A             | 6    | LDQ28         | T            | PL29A             | 6    | LDQ28          | T            |
| N2          | PL28A             | 6    | LDQS28        | T (LVDS)*    | PL28A             | 6    | LDQS28         | T (LVDS)*    |
| P1          | PL29B             | 6    | LDQ28         | C            | PL29B             | 6    | LDQ28          | C            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |                |              |
| P2          | PL28B             | 6    | LDQ28         | C (LVDS)*    | PL28B             | 6    | LDQ28          | C (LVDS)*    |
| R1          | PL30A             | 6    | LDQ28         | T (LVDS)*    | PL30A             | 6    | LDQ28          | T (LVDS)*    |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |                |              |
| R2          | PL30B             | 6    | LDQ28         | C (LVDS)*    | PL30B             | 6    | LDQ28          | C (LVDS)*    |
| N4          | TDI               | -    |               |              | TDI               | -    |                |              |
| M4          | TCK               | -    |               |              | TCK               | -    |                |              |
| P3          | TDO               | -    |               |              | TDO               | -    |                |              |
| N3          | TMS               | -    |               |              | TMS               | -    |                |              |
| K7          | VCCJ              | -    |               |              | VCCJ              | -    |                |              |
| M5          | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6   | T            |
| K6          | NC                | -    |               |              | PB3A              | 5    | BDQ6           |              |
| M6          | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6   | C            |
| R3          | NC                | -    |               |              | PB5A              | 5    | BDQ6           | T            |
| P4          | NC                | -    |               |              | PB5B              | 5    | BDQ6           | C            |
| -           | -                 | -    |               |              | VCCIO             | 5    |                |              |
| -           | -                 | -    |               |              | GNDIO5            | 5    |                |              |
| N5          | PB3A              | 5    | BDQ6          | T            | PB21A             | 5    | BDQ24          | T            |
| N6          | PB3B              | 5    | BDQ6          | C            | PB21B             | 5    | BDQ24          | C            |
| T2          | PB4A              | 5    | BDQ6          | T            | PB22A             | 5    | BDQ24          | T            |
| P6          | PB5A              | 5    | BDQ6          | T            | PB23A             | 5    | BDQ24          | T            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |                |              |
| T3          | PB4B              | 5    | BDQ6          | C            | PB22B             | 5    | BDQ24          | C            |
| R6          | PB5B              | 5    | BDQ6          | C            | PB23B             | 5    | BDQ24          | C            |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |                |              |
| R4          | PB6A              | 5    | BDQS6         | T            | PB24A             | 5    | BDQS24         | T            |
| L6          | PB7A              | 5    | BDQ6          | T            | PB25A             | 5    | BDQ24          | T            |
| T4          | PB6B              | 5    | BDQ6          | C            | PB24B             | 5    | BDQ24          | C            |
| L7          | PB7B              | 5    | BDQ6          | C            | PB25B             | 5    | BDQ24          | C            |
| N7          | PB8A              | 5    | PCLKT5_0/BDQ6 | T            | PB26A             | 5    | PCLKT5_0/BDQ24 | T            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |                |              |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |                |              | LFE2-12E/SE       |      |                |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| M8          | PB8B              | 5    | PCLKC5_0/BDQ6  | C            | PB26B             | 5    | PCLKC5_0/BDQ24 | C            |
| GND         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| P7          | PB13A             | 4    | PCLKT4_0/BDQ15 | T            | PB31A             | 4    | PCLKT4_0/BDQ33 | T            |
| R8          | PB13B             | 4    | PCLKC4_0/BDQ15 | C            | PB31B             | 4    | PCLKC4_0/BDQ33 | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T5          | PB14A             | 4    | BDQ15          | T            | PB32A             | 4    | BDQ33          | T            |
| T6          | PB14B             | 4    | BDQ15          | C            | PB32B             | 4    | BDQ33          | C            |
| T8          | PB15A             | 4    | BDQS15         | T            | PB33A             | 4    | BDQS33         | T            |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| R7          | PB16A             | 4    | BDQ15          | T            | PB34A             | 4    | BDQ33          | T            |
| T9          | PB15B             | 4    | BDQ15          | C            | PB33B             | 4    | BDQ33          | C            |
| T7          | PB16B             | 4    | BDQ15          | C            | PB34B             | 4    | BDQ33          | C            |
| L8          | PB17A             | 4    | BDQ15          | T            | PB35A             | 4    | BDQ33          | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| P8          | PB18A             | 4    | BDQ15          | T            | PB36A             | 4    | BDQ33          | T            |
| L9          | PB17B             | 4    | BDQ15          | C            | PB35B             | 4    | BDQ33          | C            |
| N8          | PB18B             | 4    | BDQ15          | C            | PB36B             | 4    | BDQ33          | C            |
| R9          | PB19A             | 4    | BDQ15          | T            | PB37A             | 4    | BDQ33          | T            |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| R10         | PB19B             | 4    | BDQ15          | C            | PB37B             | 4    | BDQ33          | C            |
| -           | -                 | -    |                |              | VCCIO             | 4    |                |              |
| -           | -                 | -    |                |              | GNDIO4            | 4    |                |              |
| N9          | PB20A             | 4    | BDQ24          | T            | PB47A             | 4    | BDQ51          | T            |
| T10         | PB21A             | 4    | BDQ24          | T            | PB48A             | 4    | BDQ51          | T            |
| M9          | PB20B             | 4    | BDQ24          | C            | PB47B             | 4    | BDQ51          | C            |
| R11         | PB21B             | 4    | BDQ24          | C            | PB48B             | 4    | BDQ51          | C            |
| P10         | PB22A             | 4    | BDQ24          | T            | PB49A             | 4    | BDQ51          | T            |
| N11         | PB23A             | 4    | BDQ24          | T            | PB50A             | 4    | BDQ51          | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| N10         | PB22B             | 4    | BDQ24          | C            | PB49B             | 4    | BDQ51          | C            |
| P11         | PB23B             | 4    | BDQ24          | C            | PB50B             | 4    | BDQ51          | C            |
| T11         | PB24A             | 4    | BDQS24         | T            | PB51A             | 4    | BDQS51         | T            |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| M11         | PB25A             | 4    | BDQ24          | T            | PB52A             | 4    | BDQ51          | T            |
| T12         | PB24B             | 4    | BDQ24          | C            | PB51B             | 4    | BDQ51          | C            |
| L11         | PB25B             | 4    | BDQ24          | C            | PB52B             | 4    | BDQ51          | C            |
| T13         | PB26A             | 4    | BDQ24          | T            | PB53A             | 4    | BDQ51          | T            |
| R13         | PB27A             | 4    | BDQ24          | T            | PB54A             | 4    | BDQ51          | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T14         | PB26B             | 4    | BDQ24          | C            | PB53B             | 4    | BDQ51          | C            |
| P13         | PB27B             | 4    | BDQ24          | C            | PB54B             | 4    | BDQ51          | C            |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| N12         | PB28A             | 4    | VREF2_4/BDQ24  | T            | PB55A             | 4    | VREF2_4/BDQ51  | T            |
| M12         | PB28B             | 4    | VREF1_4/BDQ24  | C            | PB55B             | 4    | VREF1_4/BDQ51  | C            |
| R15         | CFG2              | 8    |                |              | CFG2              | 8    |                |              |



**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |                    |              | LFE2-12E/SE       |      |                    |              |
|-------------|-------------------|------|--------------------|--------------|-------------------|------|--------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function      | Differential | Ball/Pad Function | Bank | Dual Function      | Differential |
| N14         | CFG1              | 8    |                    |              | CFG1              | 8    |                    |              |
| N13         | PROGRAMN          | 8    |                    |              | PROGRAMN          | 8    |                    |              |
| N15         | CFG0              | 8    |                    |              | CFG0              | 8    |                    |              |
| P15         | PR30B             | 8    | WRITEN             | C            | PR30B             | 8    | WRITEN             | C            |
| L12         | INITN             | 8    |                    |              | INITN             | 8    |                    |              |
| N16         | PR29B             | 8    | CSN                | C            | PR29B             | 8    | CSN                | C            |
| GND         | GNDIO8            | -    |                    |              | GNDIO8            | -    |                    |              |
| R14         | CCLK              | 8    |                    |              | CCLK              | 8    |                    |              |
| P14         | PR30A             | 8    | CS1N               | T            | PR30A             | 8    | CS1N               | T            |
| M13         | DONE              | 8    |                    |              | DONE              | 8    |                    |              |
| R16         | PR28B             | 8    | D1                 | C            | PR28B             | 8    | D1                 | C            |
| VCCIO       | VCCIO8            | 8    |                    |              | VCCIO8            | 8    |                    |              |
| M16         | PR29A             | 8    | D0/SPIFASTN        | T            | PR29A             | 8    | D0/SPIFASTN        | T            |
| P16         | PR28A             | 8    | D2                 | T            | PR28A             | 8    | D2                 | T            |
| L15         | PR27B             | 8    | D3                 | C            | PR27B             | 8    | D3                 | C            |
| GND         | GNDIO8            | -    |                    |              | GNDIO8            | -    |                    |              |
| L14         | PR26A             | 8    | D6                 | T            | PR26A             | 8    | D6                 | T            |
| L16         | PR27A             | 8    | D4                 | T            | PR27A             | 8    | D4                 | T            |
| L10         | PR25B             | 8    | D7/SPID0           | C            | PR25B             | 8    | D7/SPID0           | C            |
| L13         | PR26B             | 8    | D5                 | C            | PR26B             | 8    | D5                 | C            |
| VCCIO       | VCCIO8            | 8    |                    |              | VCCIO8            | 8    |                    |              |
| K11         | PR25A             | 8    | DI/CSSPI0N         | T            | PR25A             | 8    | DI/CSSPI0N         | T            |
| K14         | PR24B             | 8    | DOU/CSON           | C            | PR24B             | 8    | DOU/CSON           | C            |
| K13         | PR24A             | 8    | BUSY/SISPI         | T            | PR24A             | 8    | BUSY/SISPI         | T            |
| GND         | GNDIO8            | -    |                    |              | GNDIO8            | -    |                    |              |
| K15         | PR21B             | 3    | RLM0_GPLL_C_FB_A   | C            | PR21B             | 3    | RLM0_GPLL_C_FB_A   | C            |
| VCCIO       | VCCIO3            | 3    |                    |              | VCCIO3            | 3    |                    |              |
| K16         | PR21A             | 3    | RLM0_GPLL_T_FB_A   | T            | PR21A             | 3    | RLM0_GPLL_T_FB_A   | T            |
| GND         | GNDIO3            | -    |                    |              | GNDIO3            | -    |                    |              |
| J16         | PR20B             | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    | PR20B             | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    |
| J15         | PR20A             | 3    | RLM0_GPLL_T_IN_A** | T (LVDS)*    | PR20A             | 3    | RLM0_GPLL_T_IN_A** | T (LVDS)*    |
| J14         | RLM0_PLLCAP       | 3    |                    |              | RLM0_PLLCAP       | 3    |                    |              |
| J13         | PR18B             | 3    | RLM0_GDLL_C_FB_A   | C            | PR18B             | 3    | RLM0_GDLL_C_FB_A   | C            |
| J12         | PR18A             | 3    | RLM0_GDLL_T_FB_A   | T            | PR18A             | 3    | RLM0_GDLL_T_FB_A   | T            |
| H12         | PR17B             | 3    | RLM0_GDLL_C_IN_A** | C (LVDS)*    | PR17B             | 3    | RLM0_GDLL_C_IN_A** | C (LVDS)*    |
| GND         | GNDIO3            | -    |                    |              | GNDIO3            | -    |                    |              |
| H13         | PR17A             | 3    | RLM0_GDLL_T_IN_A** | T (LVDS)*    | PR17A             | 3    | RLM0_GDLL_T_IN_A** | T (LVDS)*    |
| H15         | PR16B             | 3    | VREF2_3            | C            | PR16B             | 3    | VREF2_3            | C            |
| VCCIO       | VCCIO3            | 3    |                    |              | VCCIO3            | 3    |                    |              |
| H16         | PR16A             | 3    | VREF1_3            | T            | PR16A             | 3    | VREF1_3            | T            |
| H11         | PR15B             | 3    | PCLKC3_0           | C (LVDS)*    | PR15B             | 3    | PCLKC3_0           | C (LVDS)*    |
| J11         | PR15A             | 3    | PCLKT3_0           | T (LVDS)*    | PR15A             | 3    | PCLKT3_0           | T (LVDS)*    |
| G16         | PR13B             | 2    | PCLKC2_0/RDQ10     | C            | PR13B             | 2    | PCLKC2_0/RDQ10     | C            |
| GND         | GNDIO2            | -    |                    |              | GNDIO2            | -    |                    |              |
| G15         | PR13A             | 2    | PCLKT2_0/RDQ10     | T            | PR13A             | 2    | PCLKT2_0/RDQ10     | T            |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| F15         | PR11B             | 2    | RDQ10         | C            | PR11B             | 2    | RDQ10         | C            |
| G11         | PR12B             | 2    | RDQ10         | C (LVDS)*    | PR12B             | 2    | RDQ10         | C (LVDS)*    |
| F14         | PR11A             | 2    | RDQ10         | T            | PR11A             | 2    | RDQ10         | T            |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| F12         | PR12A             | 2    | RDQ10         | T (LVDS)*    | PR12A             | 2    | RDQ10         | T (LVDS)*    |
| G14         | PR10B             | 2    | RDQ10         | C (LVDS)*    | PR10B             | 2    | RDQ10         | C (LVDS)*    |
| G13         | PR10A             | 2    | RDQS10        | T (LVDS)*    | PR10A             | 2    | RDQS10        | T (LVDS)*    |
| GND         | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| F16         | PR8B              | 2    | RDQ10         | C (LVDS)*    | PR8B              | 2    | RDQ10         | C (LVDS)*    |
| F9          | PR9B              | 2    | RDQ10         | C            | PR9B              | 2    | RDQ10         | C            |
| E16         | PR8A              | 2    | RDQ10         | T (LVDS)*    | PR8A              | 2    | RDQ10         | T (LVDS)*    |
| F10         | PR9A              | 2    | RDQ10         | T            | PR9A              | 2    | RDQ10         | T            |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| D16         | PR7B              | 2    | RDQ10         | C            | PR7B              | 2    | RDQ10         | C            |
| D15         | PR7A              | 2    | RDQ10         | T            | PR7A              | 2    | RDQ10         | T            |
| C15         | PR4B              | 2    |               | C (LVDS)*    | PR4B              | 2    |               | C (LVDS)*    |
| C16         | PR5B              | 2    |               | C            | PR5B              | 2    |               | C            |
| GND         | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| D14         | PR4A              | 2    |               | T (LVDS)*    | PR4A              | 2    |               | T (LVDS)*    |
| B16         | PR5A              | 2    |               | T            | PR5A              | 2    |               | T            |
| F13         | PR2B              | 2    | VREF2_2       | C (LVDS)*    | PR2B              | 2    | VREF2_2       | C (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| E13         | PR2A              | 2    | VREF1_2       | T (LVDS)*    | PR2A              | 2    | VREF1_2       | T (LVDS)*    |
| F11         | PT28B             | 1    | VREF2_1       | C            | PT55B             | 1    | VREF2_1       | C            |
| E11         | PT28A             | 1    | VREF1_1       | T            | PT55A             | 1    | VREF1_1       | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A15         | PT27B             | 1    |               | C            | PT54B             | 1    |               | C            |
| E12         | PT26B             | 1    |               | C            | PT53B             | 1    |               | C            |
| B15         | PT27A             | 1    |               | T            | PT54A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| D12         | PT26A             | 1    |               | T            | PT53A             | 1    |               | T            |
| B14         | PT25B             | 1    |               | C            | PT52B             | 1    |               | C            |
| C14         | PT24B             | 1    |               | C            | PT51B             | 1    |               | C            |
| A14         | PT25A             | 1    |               | T            | PT52A             | 1    |               | T            |
| D13         | PT24A             | 1    |               | T            | PT51A             | 1    |               | T            |
| C13         | PT23B             | 1    |               | C            | PT50B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A13         | PT22B             | 1    |               | C            | PT49B             | 1    |               | C            |
| B13         | PT23A             | 1    |               | T            | PT50A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A12         | PT22A             | 1    |               | T            | PT49A             | 1    |               | T            |
| B11         | PT21B             | 1    |               | C            | PT48B             | 1    |               | C            |
| D11         | PT20B             | 1    |               | C            | PT47B             | 1    |               | C            |
| A11         | PT21A             | 1    |               | T            | PT48A             | 1    |               | T            |
| C11         | PT20A             | 1    |               | T            | PT47A             | 1    |               | T            |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| -           | -                 | -    |               |              | GNDIO1            | 1    |               |              |
| -           | -                 | -    |               |              | VCCIO             | 1    |               |              |
| D10         | PT19B             | 1    |               | C            | PT37B             | 1    |               | C            |
| C10         | PT19A             | 1    |               | T            | PT37A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B10         | PT18B             | 1    |               | C            | PT36B             | 1    |               | C            |
| A9          | PT17B             | 1    |               | C            | PT35B             | 1    |               | C            |
| A10         | PT18A             | 1    |               | T            | PT36A             | 1    |               | T            |
| B9          | PT17A             | 1    |               | T            | PT35A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A8          | PT16B             | 1    |               | C            | PT34B             | 1    |               | C            |
| D9          | PT15B             | 1    |               | C            | PT33B             | 1    |               | C            |
| B8          | PT16A             | 1    |               | T            | PT34A             | 1    |               | T            |
| C9          | PT15A             | 1    |               | T            | PT33A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B7          | PT14B             | 1    |               | C            | PT32B             | 1    |               | C            |
| E9          | PT13B             | 1    |               | C            | PT31B             | 1    |               | C            |
| A7          | PT14A             | 1    |               | T            | PT32A             | 1    |               | T            |
| D8          | PT13A             | 1    |               | T            | PT31A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A6          | PT12B             | 1    | PCLKC1_0      | C            | PT30B             | 1    | PCLKC1_0      | C            |
| B6          | PT12A             | 1    | PCLKT1_0      | T            | PT30A             | 1    | PCLKT1_0      | T            |
| E6          | XRES              | -    |               |              | XRES              | 1    |               |              |
| F8          | PT10B             | 0    | PCLKC0_0      | C            | PT28B             | 0    | PCLKC0_0      | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E8          | PT10A             | 0    | PCLKT0_0      | T            | PT28A             | 0    | PCLKT0_0      | T            |
| A5          | PT9B              | 0    |               | C            | PT27B             | 0    |               | C            |
| A3          | PT8B              | 0    |               | C            | PT26B             | 0    |               | C            |
| A4          | PT9A              | 0    |               | T            | PT27A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B3          | PT8A              | 0    |               | T            | PT26A             | 0    |               | T            |
| A2          | PT7B              | 0    |               | C            | PT25B             | 0    |               | C            |
| C7          | PT6B              | 0    |               | C            | PT24B             | 0    |               | C            |
| B2          | PT7A              | 0    |               | T            | PT25A             | 0    |               | T            |
| D7          | PT6A              | 0    |               | T            | PT24A             | 0    |               | T            |
| D6          | PT5B              | 0    |               | C            | PT23B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| F7          | PT4B              | 0    |               | C            | PT22B             | 0    |               | C            |
| C6          | PT5A              | 0    |               | T            | PT23A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F6          | PT4A              | 0    |               | T            | PT22A             | 0    |               | T            |
| C4          | PT3B              | 0    |               | C            | PT21B             | 0    |               | C            |
| B4          | PT3A              | 0    |               | T            | PT21A             | 0    |               | T            |
| -           | -                 | -    |               |              | GNDIO0            | 0    |               |              |
| -           | -                 | -    |               |              | VCCIO             | 0    |               |              |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| D5          | PT2B              | 0    | VREF2_0       | C            | PT2B              | 0    | VREF2_0       | C            |
| E5          | PT2A              | 0    | VREF1_0       | T            | PT2A              | 0    | VREF1_0       | T            |
| G7          | VCC               | -    |               |              | VCC               | -    |               |              |
| G9          | VCC               | -    |               |              | VCC               | -    |               |              |
| H7          | VCC               | -    |               |              | VCC               | -    |               |              |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |
| K10         | VCC               | -    |               |              | VCC               | -    |               |              |
| K8          | VCC               | -    |               |              | VCC               | -    |               |              |
| G8          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| H10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J7          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| K9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| C5          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| E7          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C12         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| E10         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| E14         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| G12         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K12         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| M14         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| M10         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| P12         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| M7          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| P5          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| K5          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| M3          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| E3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| G5          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| T15         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| A1          | GND               | -    |               |              | GND               | -    |               |              |
| A16         | GND               | -    |               |              | GND               | -    |               |              |
| B12         | GND               | -    |               |              | GND               | -    |               |              |
| B5          | GND               | -    |               |              | GND               | -    |               |              |
| C8          | GND               | -    |               |              | GND               | -    |               |              |
| E15         | GND               | -    |               |              | GND               | -    |               |              |
| E2          | GND               | -    |               |              | GND               | -    |               |              |
| H14         | GND               | -    |               |              | GND               | -    |               |              |
| H8          | GND               | -    |               |              | GND               | -    |               |              |
| H9          | GND               | -    |               |              | GND               | -    |               |              |
| J3          | GND               | -    |               |              | GND               | -    |               |              |
| J8          | GND               | -    |               |              | GND               | -    |               |              |
| J9          | GND               | -    |               |              | GND               | -    |               |              |
| M15         | GND               | -    |               |              | GND               | -    |               |              |
| M2          | GND               | -    |               |              | GND               | -    |               |              |
| P9          | GND               | -    |               |              | GND               | -    |               |              |

## LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| R12         | GND               | -    |               |              | GND               | -    |               |              |
| R5          | GND               | -    |               |              | GND               | -    |               |              |
| T1          | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA**

| LFE2-20E/SE |             |                   |      |                         |              |
|-------------|-------------|-------------------|------|-------------------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential |
| C3          | C3          | PL2A              | 7    | VREF2_7                 | T (LVDS)*    |
| C2          | C2          | PL2B              | 7    | VREF1_7                 | C (LVDS)*    |
| VCCIO       | VCCIO       | VCCIO7            | 7    |                         |              |
| -           | GND         | GNDIO7            | 7    |                         |              |
| D3          | D3          | PL7A              | 7    | LDQ8                    | T            |
| D4          | D4          | PL6A              | 7    | LDQ8                    | T (LVDS)*    |
| D2          | D2          | PL7B              | 7    | LDQ8                    | C            |
| GND         | GND         | GNDIO7            | -    |                         |              |
| E4          | E4          | PL6B              | 7    | LDQ8                    | C (LVDS)*    |
| B1          | B1          | PL13A             | 7    | LDQ16                   | T            |
| C1          | C1          | PL13B             | 7    | LDQ16                   | C            |
| F5          | F5          | PL15A             | 7    | LDQ16                   | T            |
| VCCIO       | VCC         | VCCIO             | 7    |                         |              |
| F4          | F4          | PL14A             | 7    | LDQ16                   | T (LVDS)*    |
| G6          | G6          | PL15B             | 7    | LDQ16                   | C            |
| G4          | G4          | PL14B             | 7    | LDQ16                   | C (LVDS)*    |
| D1          | D1          | PL16A             | 7    | LDQS16                  | T (LVDS)*    |
| GND         | GND         | GNDIO7            | -    |                         |              |
| E1          | E1          | PL16B             | 7    | LDQ16                   | C (LVDS)*    |
| F3          | F3          | PL17A             | 7    | LDQ16                   | T            |
| G3          | G3          | PL17B             | 7    | LDQ16                   | C            |
| VCCIO       | VCCIO       | VCCIO7            | 7    |                         |              |
| F2          | F2          | PL18A             | 7    | LDQ16                   | T (LVDS)*    |
| F1          | F1          | PL18B             | 7    | LDQ16                   | C (LVDS)*    |
| GND         | GND         | GNDIO7            | -    |                         |              |
| G2          | G2          | PL19A             | 7    | PCLKT7_0/LDQ16          | T            |
| G1          | G1          | PL19B             | 7    | PCLKC7_0/LDQ16          | C            |
| H6          | H6          | PL21A             | 6    | PCLKT6_0/LDQ25          | T (LVDS)*    |
| VCCIO       | VCCIO       | VCCIO6            | 6    |                         |              |
| H5          | H5          | PL21B             | 6    | PCLKC6_0/LDQ25          | C (LVDS)*    |
| H4          | H4          | PL22A             | 6    | VREF2_6/LDQ25           | T            |
| GND         | GND         | GNDIO6            | -    |                         |              |
| H3          | H3          | PL22B             | 6    | VREF1_6/LDQ25           | C            |
| H2          | H2          | PL27A             | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    |
| H1          | H1          | PL27B             | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    |
| G10         | G10         | VCC               | -    |                         |              |
| J4          | J4          | PL28A             | 6    | LLM0_GDLLT_FB_A/LDQ25   | T            |
| J5          | J5          | PL28B             | 6    | LLM0_GDLLC_FB_A/LDQ25   | C            |
| J6          | J6          | LLM0_PLLCAP       | 6    |                         |              |
| K4          | K4          | PL30A             | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    |
| GND         | GND         | GNDIO6            | -    |                         |              |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |                         |              |
|-------------|-------------|-------------------|------|-------------------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential |
| J1          | J1          | PL31A             | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            |
| K3          | K3          | PL30B             | 6    | LLM0_GPLLC_IN_A**/LDQ34 | C (LVDS)*    |
| VCCIO       | VCCIO       | VCCIO6            | 6    |                         |              |
| J2          | J2          | PL31B             | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            |
| GND         | GND         | GNDIO6            | -    |                         |              |
| L2          | L2          | PL38A             | 6    | LDQ42                   | T (LVDS)*    |
| K2          | K2          | PL39A             | 6    | LDQ42                   | T            |
| L3          | L3          | PL38B             | 6    | LDQ42                   | C (LVDS)*    |
| K1          | K1          | PL39B             | 6    | LDQ42                   | C            |
| VCCIO       | VCCIO       | VCCIO6            | 6    |                         |              |
| L4          | L4          | PL40A             | 6    | LDQ42                   | T (LVDS)*    |
| L1          | L1          | PL41A             | 6    | LDQ42                   | T            |
| L5          | L5          | PL40B             | 6    | LDQ42                   | C (LVDS)*    |
| M1          | M1          | PL41B             | 6    | LDQ42                   | C            |
| GND         | GND         | GNDIO6            | -    |                         |              |
| N1          | N1          | PL43A             | 6    | LDQ42                   | T            |
| N2          | N2          | PL42A             | 6    | LDQS42                  | T (LVDS)*    |
| P1          | P1          | PL43B             | 6    | LDQ42                   | C            |
| VCCIO       | VCCIO       | VCCIO6            | 6    |                         |              |
| P2          | P2          | PL42B             | 6    | LDQ42                   | C (LVDS)*    |
| R1          | R1          | PL44A             | 6    | LDQ42                   | T (LVDS)*    |
| GND         | GND         | GNDIO6            | -    |                         |              |
| R2          | R2          | PL44B             | 6    | LDQ42                   | C (LVDS)*    |
| N4          | N4          | TDI               | -    |                         |              |
| M4          | M4          | TCK               | -    |                         |              |
| P3          | P3          | TDO               | -    |                         |              |
| N3          | N3          | TMS               | -    |                         |              |
| K7          | K7          | VCCJ              | -    |                         |              |
| M5          | M5          | PB2A              | 5    | VREF2_5/BDQ6            | T            |
| K6          | K6          | PB3A              | 5    | BDQ6                    |              |
| M6          | M6          | PB2B              | 5    | VREF1_5/BDQ6            | C            |
| R3          | R3          | PB5A              | 5    | BDQ6                    | T            |
| P4          | P4          | PB5B              | 5    | BDQ6                    | C            |
| -           | VCC         | VCCIO             | 5    |                         |              |
| -           | GND         | GNDIO5            | 5    |                         |              |
| N5          | N5          | PB30A             | 5    | BDQ33                   | T            |
| N6          | N6          | PB30B             | 5    | BDQ33                   | C            |
| T2          | T2          | PB31A             | 5    | BDQ33                   | T            |
| P6          | P6          | PB32A             | 5    | BDQ33                   | T            |
| VCCIO       | VCCIO       | VCCIO5            | 5    |                         |              |
| T3          | T3          | PB31B             | 5    | BDQ33                   | C            |
| R6          | R6          | PB32B             | 5    | BDQ33                   | C            |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |                |              |
|-------------|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| GND         | GND         | GNDIO5            | -    |                |              |
| R4          | R4          | PB33A             | 5    | BDQS33         | T            |
| L6          | L6          | PB34A             | 5    | BDQ33          | T            |
| T4          | T4          | PB33B             | 5    | BDQ33          | C            |
| L7          | L7          | PB34B             | 5    | BDQ33          | C            |
| N7          | N7          | PB35A             | 5    | PCLKT5_0/BDQ33 | T            |
| VCCIO       | VCCIO       | VCCIO5            | 5    |                |              |
| M8          | M8          | PB35B             | 5    | PCLKC5_0/BDQ33 | C            |
| GND         | GND         | GNDIO5            | -    |                |              |
| P7          | P7          | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |
| R8          | R8          | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |
| VCCIO       | VCCIO       | VCCIO4            | 4    |                |              |
| T5          | T5          | PB41A             | 4    | BDQ42          | T            |
| T6          | T6          | PB41B             | 4    | BDQ42          | C            |
| T8          | T8          | PB42A             | 4    | BDQS42         | T            |
| GND         | GND         | GNDIO4            | -    |                |              |
| R7          | R7          | PB43A             | 4    | BDQ42          | T            |
| T9          | T9          | PB42B             | 4    | BDQ42          | C            |
| T7          | T7          | PB43B             | 4    | BDQ42          | C            |
| L8          | L8          | PB44A             | 4    | BDQ42          | T            |
| VCCIO       | VCCIO       | VCCIO4            | 4    |                |              |
| P8          | P8          | PB45A             | 4    | BDQ42          | T            |
| L9          | L9          | PB44B             | 4    | BDQ42          | C            |
| N8          | N8          | PB45B             | 4    | BDQ42          | C            |
| R9          | R9          | PB46A             | 4    | BDQ42          | T            |
| GND         | GND         | GNDIO4            | -    |                |              |
| R10         | R10         | PB46B             | 4    | BDQ42          | C            |
| -           | VCC         | VCCIO             | 4    |                |              |
| -           | GND         | GNDIO4            | 4    |                |              |
| N9          | N9          | PB56A             | 4    | BDQ60          | T            |
| T10         | T10         | PB57A             | 4    | BDQ60          | T            |
| M9          | M9          | PB56B             | 4    | BDQ60          | C            |
| R11         | R11         | PB57B             | 4    | BDQ60          | C            |
| P10         | P10         | PB58A             | 4    | BDQ60          | T            |
| N11         | N11         | PB59A             | 4    | BDQ60          | T            |
| VCCIO       | VCCIO       | VCCIO4            | 4    |                |              |
| N10         | N10         | PB58B             | 4    | BDQ60          | C            |
| P11         | P11         | PB59B             | 4    | BDQ60          | C            |
| T11         | T11         | PB60A             | 4    | BDQS60         | T            |
| GND         | GND         | GNDIO4            | -    |                |              |
| M11         | M11         | PB61A             | 4    | BDQ60          | T            |
| T12         | T12         | PB60B             | 4    | BDQ60          | C            |



**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |                          |              |
|-------------|-------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential |
| L11         | L11         | PB61B             | 4    | BDQ60                    | C            |
| T13         | T13         | PB62A             | 4    | BDQ60                    | T            |
| R13         | R13         | PB63A             | 4    | BDQ60                    | T            |
| VCCIO       | VCCIO       | VCCIO4            | 4    |                          |              |
| T14         | T14         | PB62B             | 4    | BDQ60                    | C            |
| P13         | P13         | PB63B             | 4    | BDQ60                    | C            |
| GND         | GND         | GNDIO4            | -    |                          |              |
| N12         | N12         | PB64A             | 4    | VREF2_4/BDQ60            | T            |
| M12         | M12         | PB64B             | 4    | VREF1_4/BDQ60            | C            |
| R15         | R15         | CFG2              | 8    |                          |              |
| N14         | N14         | CFG1              | 8    |                          |              |
| N13         | N13         | PROGRAMN          | 8    |                          |              |
| N15         | N15         | CFG0              | 8    |                          |              |
| P15         | P15         | PR44B             | 8    | WRITEN                   | C            |
| L12         | L12         | INITN             | 8    |                          |              |
| N16         | N16         | PR43B             | 8    | CSN                      | C            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| R14         | R14         | CCLK              | 8    |                          |              |
| P14         | P14         | PR44A             | 8    | CS1N                     | T            |
| M13         | M13         | DONE              | 8    |                          |              |
| R16         | R16         | PR42B             | 8    | D1                       | C            |
| VCCIO       | VCCIO       | VCCIO8            | 8    |                          |              |
| M16         | M16         | PR43A             | 8    | D0/SPIFASTN              | T            |
| P16         | P16         | PR42A             | 8    | D2                       | T            |
| L15         | L15         | PR41B             | 8    | D3                       | C            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| L14         | L14         | PR40A             | 8    | D6                       | T            |
| L16         | L16         | PR41A             | 8    | D4                       | T            |
| L10         | L10         | PR39B             | 8    | D7/SPID0                 | C            |
| L13         | L13         | PR40B             | 8    | D5                       | C            |
| VCCIO       | VCCIO       | VCCIO8            | 8    |                          |              |
| K11         | K11         | PR39A             | 8    | DI/CSSPI0N               | T            |
| K14         | K14         | PR38B             | 8    | DOU/CSON                 | C            |
| K13         | K13         | PR38A             | 8    | BUSY/SISPI               | T            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| K15         | K15         | PR31B             | 3    | RLM0_GPLL_C_FB_A/RDQ34   | C            |
| VCCIO       | VCCIO       | VCCIO3            | 3    |                          |              |
| K16         | K16         | PR31A             | 3    | RLM0_GPLL_C_FB_A/RDQ34   | T            |
| GND         | GND         | GNDIO3            | -    |                          |              |
| J16         | J16         | PR30B             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    |
| J15         | J15         | PR30A             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | T (LVDS)*    |
| J14         | J14         | RLM0_PLLCAP       | 3    |                          |              |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |                         |              |
|-------------|-------------|-------------------|------|-------------------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential |
| J13         | J13         | PR28B             | 3    | RLM0_GDLLC_FB_A/RDQ25   | C            |
| J12         | J12         | PR28A             | 3    | RLM0_GDLLT_FB_A/RDQ25   | T            |
| H12         | H12         | PR27B             | 3    | RLM0_GDLLC_IN_A**/RDQ25 | C (LVDS)*    |
| GND         | GND         | GNDIO3            | -    |                         |              |
| H13         | H13         | PR27A             | 3    | RLM0_GDLLT_IN_A**/RDQ25 | T (LVDS)*    |
| H15         | H15         | PR22B             | 3    | VREF2_3/RDQ25           | C            |
| VCCIO       | VCCIO       | VCCIO3            | 3    |                         |              |
| H16         | H16         | PR22A             | 3    | VREF1_3/RDQ25           | T            |
| H11         | H11         | PR21B             | 3    | PCLKC3_0/RDQ25          | C (LVDS)*    |
| J11         | J11         | PR21A             | 3    | PCLKT3_0/RDQ25          | T (LVDS)*    |
| G16         | G16         | PR19B             | 2    | PCLKC2_0/RDQ16          | C            |
| GND         | GND         | GNDIO2            | -    |                         |              |
| G15         | G15         | PR19A             | 2    | PCLKT2_0/RDQ16          | T            |
| F15         | F15         | PR17B             | 2    | RDQ16                   | C            |
| G11         | G11         | PR18B             | 2    | RDQ16                   | C (LVDS)*    |
| F14         | F14         | PR17A             | 2    | RDQ16                   | T            |
| VCCIO       | VCCIO       | VCCIO2            | 2    |                         |              |
| F12         | F12         | PR18A             | 2    | RDQ16                   | T (LVDS)*    |
| G14         | G14         | PR16B             | 2    | RDQ16                   | C (LVDS)*    |
| G13         | G13         | PR16A             | 2    | RDQS16                  | T (LVDS)*    |
| GND         | GND         | GNDIO2            | -    |                         |              |
| F16         | F16         | PR14B             | 2    | RDQ16                   | C (LVDS)*    |
| F9          | F9          | PR15B             | 2    | RDQ16                   | C            |
| E16         | E16         | PR14A             | 2    | RDQ16                   | T (LVDS)*    |
| F10         | F10         | PR15A             | 2    | RDQ16                   | T            |
| VCCIO       | VCCIO       | VCCIO2            | 2    |                         |              |
| D16         | D16         | PR13B             | 2    | RDQ16                   | C            |
| D15         | D15         | PR13A             | 2    | RDQ16                   | T            |
| C15         | C15         | PR6B              | 2    | RDQ8                    | C (LVDS)*    |
| C16         | C16         | PR7B              | 2    | RDQ8                    | C            |
| GND         | GND         | GNDIO2            | -    |                         |              |
| D14         | D14         | PR6A              | 2    | RDQ8                    | T (LVDS)*    |
| B16         | B16         | PR7A              | 2    | RDQ8                    | T            |
| F13         | F13         | PR2B              | 2    | VREF2_2                 | C (LVDS)*    |
| VCCIO       | VCCIO       | VCCIO2            | 2    |                         |              |
| E13         | E13         | PR2A              | 2    | VREF1_2                 | T (LVDS)*    |
| F11         | F11         | PT64B             | 1    | VREF2_1                 | C            |
| E11         | E11         | PT64A             | 1    | VREF1_1                 | T            |
| GND         | GND         | GNDIO1            | -    |                         |              |
| A15         | A15         | PT63B             | 1    |                         | C            |
| E12         | E12         | PT62B             | 1    |                         | C            |
| B15         | B15         | PT63A             | 1    |                         | T            |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |               |              |
|-------------|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| D12         | D12         | PT62A             | 1    |               | T            |
| B14         | B14         | PT61B             | 1    |               | C            |
| C14         | C14         | PT60B             | 1    |               | C            |
| A14         | A14         | PT61A             | 1    |               | T            |
| D13         | D13         | PT60A             | 1    |               | T            |
| C13         | C13         | PT59B             | 1    |               | C            |
| GND         | GND         | GNDIO1            | -    |               |              |
| A13         | A13         | PT58B             | 1    |               | C            |
| B13         | B13         | PT59A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A12         | A12         | PT58A             | 1    |               | T            |
| B11         | B11         | PT57B             | 1    |               | C            |
| D11         | D11         | PT56B             | 1    |               | C            |
| A11         | A11         | PT57A             | 1    |               | T            |
| C11         | C11         | PT56A             | 1    |               | T            |
| -           | GND         | GNDIO1            | 1    |               |              |
| -           | VCC         | VCCIO             | 1    |               |              |
| D10         | D10         | PT46B             | 1    |               | C            |
| C10         | C10         | PT46A             | 1    |               | T            |
| GND         | GND         | GNDIO1            | -    |               |              |
| B10         | B10         | PT45B             | 1    |               | C            |
| A9          | A9          | PT44B             | 1    |               | C            |
| A10         | A10         | PT45A             | 1    |               | T            |
| B9          | B9          | PT44A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A8          | A8          | PT43B             | 1    |               | C            |
| D9          | D9          | PT42B             | 1    |               | C            |
| B8          | B8          | PT43A             | 1    |               | T            |
| C9          | C9          | PT42A             | 1    |               | T            |
| GND         | GND         | GNDIO1            | -    |               |              |
| B7          | B7          | PT41B             | 1    |               | C            |
| E9          | E9          | PT40B             | 1    |               | C            |
| A7          | A7          | PT41A             | 1    |               | T            |
| D8          | D8          | PT40A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A6          | A6          | PT39B             | 1    | PCLKC1_0      | C            |
| B6          | B6          | PT39A             | 1    | PCLKT1_0      | T            |
| E6          | E6          | XRES              | 1    |               |              |
| F8          | F8          | PT37B             | 0    | PCLKC0_0      | C            |
| GND         | GND         | GNDIO0            | -    |               |              |
| E8          | E8          | PT37A             | 0    | PCLKT0_0      | T            |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |               |              |
|-------------|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| A5          | A5          | PT36B             | 0    |               | C            |
| A3          | A3          | PT35B             | 0    |               | C            |
| A4          | A4          | PT36A             | 0    |               | T            |
| VCCIO       | VCCIO       | VCCIO0            | 0    |               |              |
| B3          | B3          | PT35A             | 0    |               | T            |
| A2          | A2          | PT34B             | 0    |               | C            |
| C7          | C7          | PT33B             | 0    |               | C            |
| B2          | B2          | PT34A             | 0    |               | T            |
| D7          | D7          | PT33A             | 0    |               | T            |
| D6          | D6          | PT32B             | 0    |               | C            |
| GND         | GND         | GNDIO0            | -    |               |              |
| F7          | F7          | PT31B             | 0    |               | C            |
| C6          | C6          | PT32A             | 0    |               | T            |
| VCCIO       | VCCIO       | VCCIO0            | 0    |               |              |
| F6          | F6          | PT31A             | 0    |               | T            |
| C4          | C4          | PT30B             | 0    |               | C            |
| B4          | B4          | PT30A             | 0    |               | T            |
| -           | GND         | GNDIO0            | 0    |               |              |
| -           | VCC         | VCCIO             | 0    |               |              |
| D5          | D5          | PT2B              | 0    | VREF2_0       | C            |
| E5          | E5          | PT2A              | 0    | VREF1_0       | T            |
| G7          | G7          | VCC               | -    |               |              |
| G9          | G9          | VCC               | -    |               |              |
| H7          | H7          | VCC               | -    |               |              |
| J10         | J10         | VCC               | -    |               |              |
| K10         | K10         | VCC               | -    |               |              |
| K8          | K8          | VCC               | -    |               |              |
| G8          | G8          | VCCAUX            | -    |               |              |
| H10         | H10         | VCCAUX            | -    |               |              |
| J7          | J7          | VCCAUX            | -    |               |              |
| K9          | K9          | VCCAUX            | -    |               |              |
| C5          | C5          | VCCIO0            | 0    |               |              |
| E7          | E7          | VCCIO0            | 0    |               |              |
| C12         | C12         | VCCIO1            | 1    |               |              |
| E10         | E10         | VCCIO1            | 1    |               |              |
| E14         | E14         | VCCIO2            | 2    |               |              |
| G12         | G12         | VCCIO2            | 2    |               |              |
| K12         | K12         | VCCIO3            | 3    |               |              |
| M14         | M14         | VCCIO3            | 3    |               |              |
| M10         | M10         | VCCIO4            | 4    |               |              |
| P12         | P12         | VCCIO4            | 4    |               |              |
| M7          | M7          | VCCIO5            | 5    |               |              |

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |               |              |
|-------------|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| P5          | P5          | VCCIO5            | 5    |               |              |
| K5          | K5          | VCCIO6            | 6    |               |              |
| M3          | M3          | VCCIO6            | 6    |               |              |
| E3          | E3          | VCCIO7            | 7    |               |              |
| G5          | G5          | VCCIO7            | 7    |               |              |
| T15         | T15         | VCCIO8            | 8    |               |              |
| A1          | A1          | GND               | -    |               |              |
| A16         | A16         | GND               | -    |               |              |
| B12         | B12         | GND               | -    |               |              |
| B5          | B5          | GND               | -    |               |              |
| C8          | C8          | GND               | -    |               |              |
| E15         | E15         | GND               | -    |               |              |
| E2          | E2          | GND               | -    |               |              |
| H14         | H14         | GND               | -    |               |              |
| H8          | H8          | GND               | -    |               |              |
| H9          | H9          | GND               | -    |               |              |
| J3          | J3          | GND               | -    |               |              |
| J8          | J8          | GND               | -    |               |              |
| J9          | J9          | GND               | -    |               |              |
| M15         | M15         | GND               | -    |               |              |
| M2          | M2          | GND               | -    |               |              |
| P9          | P9          | GND               | -    |               |              |
| R12         | R12         | GND               | -    |               |              |
| R5          | R5          | GND               | -    |               |              |
| T1          | T1          | GND               | -    |               |              |
| T16         | T16         | GND               | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA**

| LFE2-12E/12SE |                   |      |                |              | LFE2-20E/20SE     |      |                |              |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| E4            | PL2A              | 7    | VREF2_7        | T (LVDS)*    | PL2A              | 7    | VREF2_7        | T (LVDS)*    |
| E5            | PL2B              | 7    | VREF1_7        | C (LVDS)*    | PL2B              | 7    | VREF1_7        | C (LVDS)*    |
| -             | -                 | -    |                |              | GNDIO7            | -    |                |              |
| E3            | NC                | -    |                |              | PL4A              | 7    | LDQ8           | T (LVDS)*    |
| F4            | PL3A              | 7    |                | T            | PL5A              | 7    | LDQ8           | T            |
| F3            | NC                | -    |                |              | PL4B              | 7    | LDQ8           | C (LVDS)*    |
| F5            | PL3B              | 7    |                | C            | PL5B              | 7    | LDQ8           | C            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| E2            | PL4A              | 7    |                | T (LVDS)*    | PL6A              | 7    | LDQ8           | T (LVDS)*    |
| G6            | PL5A              | 7    |                | T            | PL7A              | 7    | LDQ8           | T            |
| E1            | PL4B              | 7    |                | C (LVDS)*    | PL6B              | 7    | LDQ8           | C (LVDS)*    |
| G7            | PL5B              | 7    |                | C            | PL7B              | 7    | LDQ8           | C            |
| GNDIO         | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| F1            | NC                | -    |                |              | PL9A              | 7    | LDQ8           | T            |
| H4            | NC                | -    |                |              | PL8A              | 7    | LDQS8          | T (LVDS)*    |
| F2            | NC                | -    |                |              | PL9B              | 7    | LDQ8           | C            |
| -             | -                 | -    |                |              | VCCIO7            | 7    |                |              |
| H5            | NC                | -    |                |              | PL8B              | 7    | LDQ8           | C (LVDS)*    |
| G1            | NC                | -    |                |              | PL11A             | 7    | LDQ8           | T            |
| G3            | NC                | -    |                |              | PL10A             | 7    | LDQ8           | T (LVDS)*    |
| G2            | NC                | -    |                |              | PL11B             | 7    | LDQ8           | C            |
| -             | -                 | -    |                |              | GNDIO             | -    |                |              |
| G4            | NC                | -    |                |              | PL10B             | 7    | LDQ8           | C (LVDS)*    |
| J4            | PL7A              | 7    | LDQ10          | T            | PL13A             | 7    | LDQ16          | T            |
| H1            | PL6A              | 7    | LDQ10          |              | PL12A             | 7    | LDQ16          | T (LVDS)*    |
| J5            | PL7B              | 7    | LDQ10          | C            | PL13B             | 7    | LDQ16          | C            |
| L6            | PL9A              | 7    | LDQ10          | T            | PL15A             | 7    | LDQ16          | T            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| J2            | PL8A              | 7    | LDQ10          | T (LVDS)*    | PL14A             | 7    | LDQ16          | T (LVDS)*    |
| L5            | PL9B              | 7    | LDQ10          | C            | PL15B             | 7    | LDQ16          | C            |
| J1            | PL8B              | 7    | LDQ10          | C (LVDS)*    | PL14B             | 7    | LDQ16          | C (LVDS)*    |
| K3            | PL10A             | 7    | LDQS10         | T (LVDS)*    | PL16A             | 7    | LDQS16         | T (LVDS)*    |
| GNDIO         | GNDIO7            | -    |                |              | GNDIO             | -    |                |              |
| K4            | PL10B             | 7    | LDQ10          | C (LVDS)*    | PL16B             | 7    | LDQ16          | C (LVDS)*    |
| K2            | PL11A             | 7    | LDQ10          | T            | PL17A             | 7    | LDQ16          | T            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| K1            | PL11B             | 7    | LDQ10          | C            | PL17B             | 7    | LDQ16          | C            |
| L4            | PL12A             | 7    | LDQ10          | T (LVDS)*    | PL18A             | 7    | LDQ16          | T (LVDS)*    |
| GNDIO         | GNDIO7            | -    |                |              | GNDIO             | -    |                |              |
| L3            | PL12B             | 7    | LDQ10          | C (LVDS)*    | PL18B             | 7    | LDQ16          | C (LVDS)*    |
| L2            | PL13A             | 7    | PCLKT7_0/LDQ10 | T            | PL19A             | 7    | PCLKT7_0/LDQ16 | T            |
| L1            | PL13B             | 7    | PCLKC7_0/LDQ10 | C            | PL19B             | 7    | PCLKC7_0/LDQ16 | C            |
| M5            | PL15A             | 6    | PCLKT6_0       | T (LVDS)*    | PL21A             | 6    | PCLKT6_0/LDQ25 | T (LVDS)*    |
| VCCIO         | VCCIO6            | 6    |                |              | -                 | -    |                |              |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |                   |              | LFE2-20E/20SE     |      |                         |              |
|---------------|-------------------|------|-------------------|--------------|-------------------|------|-------------------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function           | Differential |
| M6            | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    | PL21B             | 6    | PCLKC6_0/LDQ25          | C (LVDS)*    |
| M3            | PL16A             | 6    | VREF2_6           | T            | PL22A             | 6    | VREF2_6/LDQ25           | T            |
| GNDIO         | GNDIO6            | -    |                   |              | -                 | -    |                         |              |
| M4            | PL16B             | 6    | VREF1_6           | C            | PL22B             | 6    | VREF1_6/LDQ25           | C            |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| N1            | NC                | -    |                   |              | PL24A             | 6    | LDQ25                   | T            |
| M2            | NC                | -    |                   |              | PL23A             | 6    | LDQ25                   | T (LVDS)*    |
| N2            | NC                | -    |                   |              | PL24B             | 6    | LDQ25                   | C            |
| M1            | NC                | -    |                   |              | PL23B             | 6    | LDQ25                   | C (LVDS)*    |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| N3            | NC                | -    |                   |              | PL25A             | 6    | LDQS25                  | T (LVDS)*    |
| N5            | NC                | -    |                   |              | PL26A             | 6    | LDQ25                   | T            |
| N4            | NC                | -    |                   |              | PL25B             | 6    | LDQ25                   | C (LVDS)*    |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| P5            | NC                | -    |                   |              | PL26B             | 6    | LDQ25                   | C            |
| P1            | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL27A             | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    |
| P2            | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL27B             | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    |
| P4            | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            | PL28A             | 6    | LLM0_GDLLT_FB_A/LDQ25   | T            |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| R4            | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            | PL28B             | 6    | LLM0_GDLLC_FB_A/LDQ25   | C            |
| P6            | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                         |              |
| R1            | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL30A             | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    |
| GNDIO         | GNDIO6            | -    |                   |              | -                 | -    |                         |              |
| R3            | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            | PL31A             | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            |
| R2            | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL30B             | 6    | LLM0_GPLLC_IN_A/LDQ34   | C (LVDS)*    |
| T4            | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            | PL31B             | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            |
| T5            | PL23A             | 6    |                   | T            | PL33A             | 6    | LDQ34                   | T            |
| VCCIO         | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                         |              |
| T1            | PL22A             | 6    |                   | T (LVDS)*    | PL32A             | 6    | LDQ34                   | T (LVDS)*    |
| T3            | PL23B             | 6    |                   | C            | PL33B             | 6    | LDQ34                   | C            |
| T2            | PL22B             | 6    |                   | C (LVDS)*    | PL32B             | 6    | LDQ34                   | C (LVDS)*    |
| GNDIO         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                         |              |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| V1            | PL25A             | 6    | LDQ28             | T            | PL39A             | 6    | LDQ42                   | T            |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| V2            | PL25B             | 6    | LDQ28             | C            | PL39B             | 6    | LDQ42                   | C            |
| U1            | PL24A             | 6    | LDQ28             | T (LVDS)*    | PL38A             | 6    | LDQ42                   | T (LVDS)*    |
| U3            | PL27A             | 6    | LDQ28             | T            | PL41A             | 6    | LDQ42                   | T            |
| VCCIO         | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                         |              |
| U2            | PL24B             | 6    | LDQ28             | C (LVDS)*    | PL38B             | 6    | LDQ42                   | C (LVDS)*    |
| U4            | PL27B             | 6    | LDQ28             | C            | PL41B             | 6    | LDQ42                   | C            |
| R6            | PL26A             | 6    | LDQ28             | T (LVDS)*    | PL40A             | 6    | LDQ42                   | T (LVDS)*    |
| R7            | PL29A             | 6    | LDQ28             | T            | PL43A             | 6    | LDQ42                   | T            |
| GNDIO         | GNDIO6            | -    |                   |              | GNDIO             | -    |                         |              |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| T7            | PL29B             | 6    | LDQ28         | C            | PL43B             | 6    | LDQ42         | C            |  |
| T6            | PL26B             | 6    | LDQ28         | C (LVDS)*    | PL40B             | 6    | LDQ42         | C (LVDS)*    |  |
| AA2           | PL31A             | 6    | LDQ28         | T            | PL45A             | 6    | LDQ42         | T            |  |
| VCCIO         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| Y1            | PL28A             | 6    | LDQS28        | T (LVDS)*    | PL42A             | 6    | LDQS42        | T (LVDS)*    |  |
| AA1           | PL31B             | 6    | LDQ28         | C            | PL45B             | 6    | LDQ42         | C            |  |
| W1            | PL28B             | 6    | LDQ28         | C (LVDS)*    | PL42B             | 6    | LDQ42         | C (LVDS)*    |  |
| V3            | PL30B             | 6    | LDQ28         | C (LVDS)*    | PL44B             | 6    | LDQ42         | C (LVDS)*    |  |
| GNDIO         | GNDIO6            | -    |               |              | GNDIO             | -    |               |              |  |
| V4            | PL30A             | 6    | LDQ28         | T (LVDS)*    | PL44A             | 6    | LDQ42         | T (LVDS)*    |  |
| U5            | TDI               | -    |               |              | TDI               | -    |               |              |  |
| U7            | TCK               | -    |               |              | TCK               | -    |               |              |  |
| V6            | TDO               | -    |               |              | TDO               | -    |               |              |  |
| V5            | TMS               | -    |               |              | TMS               | -    |               |              |  |
| T8            | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| W4            | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| Y3            | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6  | T            |  |
| W3            | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| Y2            | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6  | C            |  |
| AB3           | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| W5            | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| AB2           | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| W6            | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| AB5           | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| GNDIO         | GNDIO5            | -    |               |              | GNDIO             | -    |               |              |  |
| Y4            | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| AB4           | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| AA3           | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| AB6           | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AA5           | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| AA6           | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| Y5            | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| GNDIO         | GNDIO5            | -    |               |              | GNDIO             | -    |               |              |  |
| -             | -                 | -    |               |              | VCCIO5            | 5    |               |              |  |
| Y6            | PB12A             | 5    | BDQ15         | T            | PB21A             | 5    | BDQ24         | T            |  |
| W7            | PB11A             | 5    | BDQ15         | T            | PB20A             | 5    | BDQ24         | T            |  |
| Y7            | PB12B             | 5    | BDQ15         | C            | PB21B             | 5    | BDQ24         | C            |  |
| W8            | PB11B             | 5    | BDQ15         | C            | PB20B             | 5    | BDQ24         | C            |  |
| U8            | PB14A             | 5    | BDQ15         | T            | PB23A             | 5    | BDQ24         | T            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AA7           | PB13A             | 5    | BDQ15         | T            | PB22A             | 5    | BDQ24         | T            |  |
| U9            | PB14B             | 5    | BDQ15         | C            | PB23B             | 5    | BDQ24         | C            |  |



## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |                |              | LFE2-20E/20SE     |      |                |              |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| AB7           | PB13B             | 5    | BDQ15          | C            | PB22B             | 5    | BDQ24          | C            |
| Y8            | PB16A             | 5    | BDQ15          | T            | PB25A             | 5    | BDQ24          | T            |
| GNDIO         | GNDIO5            | -    |                |              | GNDIO             | -    |                |              |
| W9            | PB15A             | 5    | BDQS15         | T            | PB24A             | 5    | BDQS24         | T            |
| AA8           | PB16B             | 5    | BDQ15          | C            | PB25B             | 5    | BDQ24          | C            |
| V9            | PB15B             | 5    | BDQ15          | C            | PB24B             | 5    | BDQ24          | C            |
| AB8           | PB18A             | 5    | BDQ15          | T            | PB27A             | 5    | BDQ24          | T            |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| W10           | PB17A             | 5    | BDQ15          | T            | PB26A             | 5    | BDQ24          | T            |
| AA9           | PB18B             | 5    | BDQ15          | C            | PB27B             | 5    | BDQ24          | C            |
| V10           | PB17B             | 5    | BDQ15          | C            | PB26B             | 5    | BDQ24          | C            |
| GNDIO         | GNDIO5            | -    |                |              | GNDIO             | -    |                |              |
| Y10           | PB21A             | 5    | BDQ24          | T            | PB30A             | 5    | BDQ33          | T            |
| AB9           | PB20A             | 5    | BDQ24          | T            | PB29A             | 5    | BDQ33          | T            |
| AA10          | PB21B             | 5    | BDQ24          | C            | PB30B             | 5    | BDQ33          | C            |
| AB10          | PB20B             | 5    | BDQ24          | C            | PB29B             | 5    | BDQ33          | C            |
| AB11          | PB23A             | 5    | BDQ24          | T            | PB32A             | 5    | BDQ33          | T            |
| U10           | PB22A             | 5    | BDQ24          | T            | PB31A             | 5    | BDQ33          | T            |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| AA11          | PB23B             | 5    | BDQ24          | C            | PB32B             | 5    | BDQ33          | C            |
| U11           | PB22B             | 5    | BDQ24          | C            | PB31B             | 5    | BDQ33          | C            |
| GNDIO         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AB12          | PB25A             | 5    | BDQ24          | T            | PB34A             | 5    | BDQ33          | T            |
| Y11           | PB24A             | 5    | BDQS24         | T            | PB33A             | 5    | BDQS33         | T            |
| AA12          | PB25B             | 5    | BDQ24          | C            | PB34B             | 5    | BDQ33          | C            |
| W11           | PB24B             | 5    | BDQ24          | C            | PB33B             | 5    | BDQ33          | C            |
| AB13          | PB26A             | 5    | PCLKT5_0/BDQ24 | T            | PB35A             | 5    | PCLKT5_0/BDQ33 | T            |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| AB14          | PB26B             | 5    | PCLKC5_0/BDQ24 | C            | PB35B             | 5    | PCLKC5_0/BDQ33 | C            |
| GNDIO         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| Y12           | PB32A             | 4    | BDQ33          | T            | PB41A             | 4    | BDQ42          | T            |
| W12           | PB32B             | 4    | BDQ33          | C            | PB41B             | 4    | BDQ42          | C            |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| U12           | PB31A             | 4    | PCLKT4_0/BDQ33 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |
| V12           | PB31B             | 4    | PCLKC4_0/BDQ33 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |
| U13           | PB34A             | 4    | BDQ33          | T            | PB43A             | 4    | BDQ42          | T            |
| GNDIO         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| AA13          | PB33A             | 4    | BDQS33         | T            | PB42A             | 4    | BDQS42         | T            |
| U14           | PB34B             | 4    | BDQ33          | C            | PB43B             | 4    | BDQ42          | C            |
| Y13           | PB33B             | 4    | BDQ33          | C            | PB42B             | 4    | BDQ42          | C            |
| AB16          | PB36A             | 4    | BDQ33          | T            | PB45A             | 4    | BDQ42          | T            |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| AB15          | PB35A             | 4    | BDQ33          | T            | PB44A             | 4    | BDQ42          | T            |
| AB17          | PB36B             | 4    | BDQ33          | C            | PB45B             | 4    | BDQ42          | C            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AA14          | PB35B             | 4    | BDQ33         | C            | PB44B             | 4    | BDQ42         | C            |
| W13           | PB37A             | 4    | BDQ33         | T            | PB46A             | 4    | BDQ42         | T            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| W14           | PB37B             | 4    | BDQ33         | C            | PB46B             | 4    | BDQ42         | C            |
| AB18          | PB39A             | 4    | BDQ42         | T            | PB48A             | 4    | BDQ51         | T            |
| AB19          | PB39B             | 4    | BDQ42         | C            | PB48B             | 4    | BDQ51         | C            |
| Y15           | PB41A             | 4    | BDQ42         | T            | PB50A             | 4    | BDQ51         | T            |
| V14           | PB40A             | 4    | BDQ42         | T            | PB49A             | 4    | BDQ51         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AA15          | PB41B             | 4    | BDQ42         | C            | PB50B             | 4    | BDQ51         | C            |
| W15           | PB40B             | 4    | BDQ42         | C            | PB49B             | 4    | BDQ51         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO             | -    |               |              |
| AB20          | PB43A             | 4    | BDQ42         | T            | PB52A             | 4    | BDQ51         | T            |
| AA16          | PB42A             | 4    | BDQS42        | T            | PB51A             | 4    | BDQS51        | T            |
| AB21          | PB43B             | 4    | BDQ42         | C            | PB52B             | 4    | BDQ51         | C            |
| AA17          | PB42B             | 4    | BDQ42         | C            | PB51B             | 4    | BDQ51         | C            |
| Y16           | PB45A             | 4    | BDQ42         | T            | PB54A             | 4    | BDQ51         | T            |
| U15           | PB44A             | 4    | BDQ42         | T            | PB53A             | 4    | BDQ51         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| W16           | PB45B             | 4    | BDQ42         | C            | PB54B             | 4    | BDQ51         | C            |
| U16           | PB44B             | 4    | BDQ42         | C            | PB53B             | 4    | BDQ51         | C            |
| AA18          | PB46A             | 4    | BDQ42         | T            | PB55A             | 4    | BDQ51         | T            |
| AA20          | PB46B             | 4    | BDQ42         | C            | PB55B             | 4    | BDQ51         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO             | -    |               |              |
| V16           | PB49A             | 4    | BDQ51         | T            | PB58A             | 4    | BDQ60         | T            |
| V17           | PB49B             | 4    | BDQ51         | C            | PB58B             | 4    | BDQ60         | C            |
| AA21          | PB48A             | 4    | BDQ51         | T            | PB57A             | 4    | BDQ60         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| Y19           | PB51A             | 4    | BDQS51        | T            | PB60A             | 4    | BDQS60        | T            |
| AA22          | PB48B             | 4    | BDQ51         | C            | PB57B             | 4    | BDQ60         | C            |
| Y20           | PB51B             | 4    | BDQ51         | C            | PB60B             | 4    | BDQ60         | C            |
| Y18           | PB50A             | 4    | BDQ51         | T            | PB59A             | 4    | BDQ60         | T            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| Y21           | PB53A             | 4    | BDQ51         | T            | PB62A             | 4    | BDQ60         | T            |
| Y17           | PB50B             | 4    | BDQ51         | C            | PB59B             | 4    | BDQ60         | C            |
| Y22           | PB53B             | 4    | BDQ51         | C            | PB62B             | 4    | BDQ60         | C            |
| W17           | PB52A             | 4    | BDQ51         | T            | PB61A             | 4    | BDQ60         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| U18           | PB54A             | 4    | BDQ51         | T            | PB63A             | 4    | BDQ60         | T            |
| W18           | PB52B             | 4    | BDQ51         | C            | PB61B             | 4    | BDQ60         | C            |
| V18           | PB54B             | 4    | BDQ51         | C            | PB63B             | 4    | BDQ60         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| T15           | PB55A             | 4    | VREF2_4/BDQ51 | T            | PB64A             | 4    | VREF2_4/BDQ60 | T            |
| T16           | PB55B             | 4    | VREF1_4/BDQ51 | C            | PB64B             | 4    | VREF1_4/BDQ60 | C            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |                    |              | LFE2-20E/20SE     |      |                          |              |
|---------------|-------------------|------|--------------------|--------------|-------------------|------|--------------------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function      | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |
| W19           | CFG2              | 8    |                    |              | CFG2              | 8    |                          |              |
| V19           | CFG1              | 8    |                    |              | CFG1              | 8    |                          |              |
| V20           | PROGRAMN          | 8    |                    |              | PROGRAMN          | 8    |                          |              |
| W20           | CFG0              | 8    |                    |              | CFG0              | 8    |                          |              |
| U22           | PR28B             | 8    | D1                 | C            | PR42B             | 8    | D1                       | C            |
| V22           | INITN             | 8    |                    |              | INITN             | 8    |                          |              |
| R16           | PR30B             | 8    | WRITEN             | C            | PR44B             | 8    | WRITEN                   | C            |
| GNDIO         | GNDIO8            | -    |                    |              | GNDIO8            | -    |                          |              |
| W22           | CCLK              | 8    |                    |              | CCLK              | 8    |                          |              |
| R17           | PR30A             | 8    | CS1N               | T            | PR44A             | 8    | CS1N                     | T            |
| V21           | DONE              | 8    |                    |              | DONE              | 8    |                          |              |
| VCCIO         | VCCIO8            | 8    |                    |              | VCCIO8            | 8    |                          |              |
| U19           | PR29B             | 8    | CSN                | C            | PR43B             | 8    | CSN                      | C            |
| T17           | PR26B             | 8    | D5                 | C            | PR40B             | 8    | D5                       | C            |
| U20           | PR29A             | 8    | D0/SPIFASTN        | T            | PR43A             | 8    | D0/SPIFASTN              | T            |
| U21           | PR28A             | 8    | D2                 | T            | PR42A             | 8    | D2                       | T            |
| GNDIO         | GNDIO8            | -    |                    |              | GNDIO8            | -    |                          |              |
| T18           | PR26A             | 8    | D6                 | T            | PR40A             | 8    | D6                       | T            |
| T20           | PR27B             | 8    | D3                 | C            | PR41B             | 8    | D3                       | C            |
| T21           | PR25B             | 8    | D7/SPID0           | C            | PR39B             | 8    | D7/SPID0                 | C            |
| T19           | PR27A             | 8    | D4                 | T            | PR41A             | 8    | D4                       | T            |
| VCCIO         | VCCIO8            | 8    |                    |              | VCCIO8            | 8    |                          |              |
| T22           | PR25A             | 8    | DI/CSSPI0N         | T            | PR39A             | 8    | DI/CSSPI0N               | T            |
| R18           | PR24B             | 8    | DOUT/CSN           | C            | PR38B             | 8    | DOUT/CSN                 | C            |
| R19           | PR24A             | 8    | BUSY/SISPI         | T            | PR38A             | 8    | BUSY/SISPI               | T            |
| -             | -                 | -    |                    |              | VCCIO3            | 3    |                          |              |
| GNDIO         | GNDIO3            | -    |                    |              | GNDIO3            | -    |                          |              |
| P18           | PR22B             | 3    |                    | C (LVDS)*    | PR32B             | 3    | RDQ34                    | C (LVDS)*    |
| R22           | PR23B             | 3    |                    | C            | PR33B             | 3    | RDQ34                    | C            |
| P19           | PR22A             | 3    |                    | T (LVDS)*    | PR32A             | 3    | RDQ34                    | T (LVDS)*    |
| R21           | PR23A             | 3    |                    | T            | PR33A             | 3    | RDQ34                    | T            |
| VCCIO         | VCCIO3            | 3    |                    |              | VCCIO3            | 3    |                          |              |
| R20           | PR21B             | 3    | RLM0_GPLL_C_FB_A   | C            | PR31B             | 3    | RLM0_GPLL_C_FB_A/RDQ34   | C            |
| P22           | PR21A             | 3    | RLM0_GPLLT_FB_A    | T            | PR31A             | 3    | RLM0_GPLLT_FB_A/RDQ34    | T            |
| P21           | PR20B             | 3    | RLM0_GPLL_C_IN_A** | C (LVDS)*    | PR30B             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    |
| N21           | PR20A             | 3    | RLM0_GPLLT_IN_A**  | T (LVDS)*    | PR30A             | 3    | RLM0_GPLLT_IN_A**/RDQ34  | T (LVDS)*    |
| N17           | RLM0_PLLCAP       | 3    |                    |              | RLM0_PLLCAP       | 3    |                          |              |
| N22           | PR18B             | 3    | RLM0_GDLL_C_FB_A   | C            | PR28B             | 3    | RLM0_GDLL_C_FB_A/RDQ25   | C            |
| M22           | PR17B             | 3    | RLM0_GDLL_C_IN_A** | C (LVDS)*    | PR27B             | 3    | RLM0_GDLL_C_IN_A**/RDQ25 | C (LVDS)*    |
| GNDIO         | GNDIO3            | -    |                    |              | GNDIO3            | -    |                          |              |
| N20           | PR18A             | 3    | RLM0_GDLLT_FB_A    | T            | PR28A             | 3    | RLM0_GDLLT_FB_A/RDQ25    | T            |
| M21           | PR17A             | 3    | RLM0_GDLLT_IN_A**  | T (LVDS)*    | PR27A             | 3    | RLM0_GDLLT_IN_A**/RDQ25  | T (LVDS)*    |
| N19           | NC                | -    |                    |              | PR26B             | 3    | RDQ25                    | C            |
| -             | -                 | -    |                    |              | VCCIO3            | 3    |                          |              |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |                |              | LFE2-20E/20SE     |      |                |              |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| M19           | NC                | -    |                |              | PR26A             | 3    | RDQ25          | T            |
| J22           | NC                | -    |                |              | PR23B             | 3    | RDQ25          | C (LVDS)*    |
| -             | -                 | -    |                |              | GNDIO             | -    |                |              |
| L22           | NC                | -    |                |              | PR24B             | 3    | RDQ25          | C            |
| H22           | NC                | -    |                |              | PR23A             | 3    | RDQ25          | T (LVDS)*    |
| K22           | NC                | -    |                |              | PR24A             | 3    | RDQ25          | T            |
| M20           | PR16B             | 3    | VREF2_3        | C            | PR22B             | 3    | VREF2_3/RDQ25  | C            |
| VCCIO         | VCCIO3            | 3    |                |              | VCCIO3            | 3    |                |              |
| L21           | PR16A             | 3    | VREF1_3        | T            | PR22A             | 3    | VREF1_3/RDQ25  | T            |
| K21           | PR15B             | 3    | PCLKC3_0       | C (LVDS)*    | PR21B             | 3    | PCLKC3_0/RDQ25 | C (LVDS)*    |
| J21           | PR15A             | 3    | PCLKT3_0       | T (LVDS)*    | PR21A             | 3    | PCLKT3_0/RDQ25 | T (LVDS)*    |
| M18           | PR13B             | 2    | PCLKC2_0/RDQ10 | C            | PR19B             | 2    | PCLKC2_0/RDQ16 | C            |
| GNDIO         | GNDIO2            | -    |                |              | GNDIO2            | -    |                |              |
| L17           | PR13A             | 2    | PCLKT2_0/RDQ10 | T            | PR19A             | 2    | PCLKT2_0/RDQ16 | T            |
| L19           | PR12B             | 2    | RDQ10          | C (LVDS)*    | PR18B             | 2    | RDQ16          | C (LVDS)*    |
| K18           | PR10B             | 2    | RDQ10          | C (LVDS)*    | PR16B             | 2    | RDQ16          | C (LVDS)*    |
| L20           | PR12A             | 2    | RDQ10          | T (LVDS)*    | PR18A             | 2    | RDQ16          | T (LVDS)*    |
| VCCIO         | VCCIO2            | 2    |                |              | VCCIO2            | 2    |                |              |
| K19           | PR10A             | 2    | RDQS10         | T (LVDS)*    | PR16A             | 2    | RDQS16         | T (LVDS)*    |
| L18           | PR11B             | 2    | RDQ10          | C            | PR17B             | 2    | RDQ16          | C            |
| K17           | PR11A             | 2    | RDQ10          | T            | PR17A             | 2    | RDQ16          | T            |
| GNDIO         | GNDIO2            | -    |                |              | GNDIO2            | -    |                |              |
| J17           | PR8B              | 2    | RDQ10          | C (LVDS)*    | PR14B             | 2    | RDQ16          | C (LVDS)*    |
| G22           | PR9B              | 2    | RDQ10          | C            | PR15B             | 2    | RDQ16          | C            |
| J18           | PR8A              | 2    | RDQ10          | T (LVDS)*    | PR14A             | 2    | RDQ16          | T (LVDS)*    |
| F22           | PR9A              | 2    | RDQ10          | T            | PR15A             | 2    | RDQ16          | T            |
| VCCIO         | VCCIO2            | 2    |                |              | VCCIO2            | 2    |                |              |
| H21           | PR6B              | 2    | RDQ10          | C (LVDS)*    | PR12B             | 2    | RDQ16          | C (LVDS)*    |
| K20           | PR7B              | 2    | RDQ10          | C            | PR13B             | 2    | RDQ16          | C            |
| G21           | PR6A              | 2    | RDQ10          | T (LVDS)*    | PR12A             | 2    | RDQ16          | T (LVDS)*    |
| J19           | PR7A              | 2    | RDQ10          | T            | PR13A             | 2    | RDQ16          | T            |
| D22           | NC                | -    |                |              | PR10B             | 2    | RDQ8           | C (LVDS)*    |
| F21           | NC                | -    |                |              | PR11B             | 2    | RDQ8           | C            |
| -             | -                 | -    |                |              | GNDIO             | -    |                |              |
| E21           | NC                | -    |                |              | PR10A             | 2    | RDQ8           | T (LVDS)*    |
| E22           | NC                | -    |                |              | PR11A             | 2    | RDQ8           | T            |
| H19           | NC                | -    |                |              | PR8B              | 2    | RDQ8           | C (LVDS)*    |
| G20           | NC                | -    |                |              | PR9B              | 2    | RDQ8           | C            |
| -             | -                 | -    |                |              | VCCIO2            | 2    |                |              |
| G19           | NC                | -    |                |              | PR8A              | 2    | RDQS8          | T (LVDS)*    |
| F20           | NC                | -    |                |              | PR9A              | 2    | RDQ8           | T            |
| G17           | PR5B              | 2    |                | C            | PR7B              | 2    | RDQ8           | C            |
| GNDIO         | GNDIO2            | -    |                |              | GNDIO2            | -    |                |              |
| E20           | PR4B              | 2    |                | C (LVDS)*    | PR6B              | 2    | RDQ8           | C (LVDS)*    |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| F19           | PR5A              | 2    |               | T            | PR7A              | 2    | RDQ8          | T            |
| D20           | PR4A              | 2    |               | T (LVDS)*    | PR6A              | 2    | RDQ8          | T (LVDS)*    |
| F18           | PR3B              | 2    |               | C            | PR5B              | 2    | RDQ8          | C            |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| C21           | NC                | -    |               |              | PR4B              | 2    | RDQ8          | C (LVDS)*    |
| F16           | PR3A              | 2    |               | T            | PR5A              | 2    | RDQ8          | T            |
| C22           | NC                | -    |               |              | PR4A              | 2    | RDQ8          | T (LVDS)*    |
| -             | -                 | -    |               |              | GNDIO             | -    |               |              |
| D19           | PR2B              | 2    | VREF2_2       | C (LVDS)*    | PR2B              | 2    | VREF2_2       | C (LVDS)*    |
| E19           | PR2A              | 2    | VREF1_2       | T (LVDS)*    | PR2A              | 2    | VREF1_2       | T (LVDS)*    |
| B21           | PT55B             | 1    | VREF2_1       | C            | PT64B             | 1    | VREF2_1       | C            |
| B22           | PT55A             | 1    | VREF1_1       | T            | PT64A             | 1    | VREF1_1       | T            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| D18           | PT53B             | 1    |               | C            | PT62B             | 1    |               | C            |
| C20           | PT54B             | 1    |               | C            | PT63B             | 1    |               | C            |
| E18           | PT53A             | 1    |               | T            | PT62A             | 1    |               | T            |
| C19           | PT54A             | 1    |               | T            | PT63A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| D17           | PT51B             | 1    |               | C            | PT60B             | 1    |               | C            |
| B20           | PT52B             | 1    |               | C            | PT61B             | 1    |               | C            |
| C18           | PT51A             | 1    |               | T            | PT60A             | 1    |               | T            |
| A19           | PT52A             | 1    |               | T            | PT61A             | 1    |               | T            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A18           | PT49B             | 1    |               | C            | PT58B             | 1    |               | C            |
| A21           | PT50B             | 1    |               | C            | PT59B             | 1    |               | C            |
| B18           | PT49A             | 1    |               | T            | PT58A             | 1    |               | T            |
| A20           | PT50A             | 1    |               | T            | PT59A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| D16           | PT47B             | 1    |               | C            | PT56B             | 1    |               | C            |
| G16           | PT48B             | 1    |               | C            | PT57B             | 1    |               | C            |
| E16           | PT47A             | 1    |               | T            | PT56A             | 1    |               | T            |
| G15           | PT48A             | 1    |               | T            | PT57A             | 1    |               | T            |
| C17           | PT46B             | 1    |               | C            | PT55B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C16           | PT46A             | 1    |               | T            | PT55A             | 1    |               | T            |
| A17           | PT44B             | 1    |               | C            | PT53B             | 1    |               | C            |
| B17           | PT45B             | 1    |               | C            | PT54B             | 1    |               | C            |
| A16           | PT44A             | 1    |               | T            | PT53A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| B16           | PT45A             | 1    |               | T            | PT54A             | 1    |               | T            |
| E15           | PT42B             | 1    |               | C            | PT51B             | 1    |               | C            |
| C15           | PT43B             | 1    |               | C            | PT52B             | 1    |               | C            |
| F15           | PT42A             | 1    |               | T            | PT51A             | 1    |               | T            |
| D15           | PT43A             | 1    |               | T            | PT52A             | 1    |               | T            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| B15           | PT40B             | 1    |               | C            | PT49B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A15           | PT40A             | 1    |               | T            | PT49A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A14           | PT39A             | 1    |               | T            | PT48A             | 1    |               | T            |
| B14           | PT39B             | 1    |               | C            | PT48B             | 1    |               | C            |
| D14           | PT37B             | 1    |               | C            | PT46B             | 1    |               | C            |
| E14           | PT36B             | 1    |               | C            | PT45B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C13           | PT37A             | 1    |               | T            | PT46A             | 1    |               | T            |
| F14           | PT36A             | 1    |               | T            | PT45A             | 1    |               | T            |
| A13           | PT35B             | 1    |               | C            | PT44B             | 1    |               | C            |
| E13           | PT34B             | 1    |               | C            | PT43B             | 1    |               | C            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| B13           | PT35A             | 1    |               | T            | PT44A             | 1    |               | T            |
| D13           | PT34A             | 1    |               | T            | PT43A             | 1    |               | T            |
| E12           | PT33B             | 1    |               | C            | PT42B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| D12           | PT33A             | 1    |               | T            | PT42A             | 1    |               | T            |
| A12           | PT31B             | 1    |               | C            | PT40B             | 1    |               | C            |
| B12           | PT30B             | 1    | PCLKC1_0      | C            | PT39B             | 1    | PCLKC1_0      | C            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A11           | PT31A             | 1    |               | T            | PT40A             | 1    |               | T            |
| C12           | PT30A             | 1    | PCLKT1_0      | T            | PT39A             | 1    | PCLKT1_0      | T            |
| F12           | XRES              | 1    |               |              | XRES              | 1    |               |              |
| B10           | PT28B             | 0    | PCLKC0_0      | C            | PT37B             | 0    | PCLKC0_0      | C            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| B11           | PT28A             | 0    | PCLKT0_0      | T            | PT37A             | 0    | PCLKT0_0      | T            |
| C11           | PT26B             | 0    |               | C            | PT35B             | 0    |               | C            |
| A10           | PT27B             | 0    |               | C            | PT36B             | 0    |               | C            |
| C10           | PT26A             | 0    |               | T            | PT35A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| A9            | PT27A             | 0    |               | T            | PT36A             | 0    |               | T            |
| A8            | PT24B             | 0    |               | C            | PT33B             | 0    |               | C            |
| E11           | PT25B             | 0    |               | C            | PT34B             | 0    |               | C            |
| A7            | PT24A             | 0    |               | T            | PT33A             | 0    |               | T            |
| F11           | PT25A             | 0    |               | T            | PT34A             | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| B8            | PT23B             | 0    |               | C            | PT32B             | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B9            | PT23A             | 0    |               | T            | PT32A             | 0    |               | T            |
| C8            | PT20B             | 0    |               | C            | PT29B             | 0    |               | C            |
| B7            | PT21B             | 0    |               | C            | PT30B             | 0    |               | C            |
| D8            | PT20A             | 0    |               | T            | PT29A             | 0    |               | T            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A6            | PT21A             | 0    |               | T            | PT30A             | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C7            | PT17B             | 0    |               | C            | PT26B             | 0    |               | C            |
| D10           | PT18B             | 0    |               | C            | PT27B             | 0    |               | C            |
| C6            | PT17A             | 0    |               | T            | PT26A             | 0    |               | T            |
| E10           | PT18A             | 0    |               | T            | PT27A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F10           | PT15B             | 0    |               | C            | PT24B             | 0    |               | C            |
| B6            | PT16B             | 0    |               | C            | PT25B             | 0    |               | C            |
| D9            | PT15A             | 0    |               | T            | PT24A             | 0    |               | T            |
| B5            | PT16A             | 0    |               | T            | PT25A             | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| A5            | PT13B             | 0    |               | C            | PT22B             | 0    |               | C            |
| F9            | PT14B             | 0    |               | C            | PT23B             | 0    |               | C            |
| A4            | PT13A             | 0    |               | T            | PT22A             | 0    |               | T            |
| E9            | PT14A             | 0    |               | T            | PT23A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G8            | PT11B             | 0    |               | C            | PT20B             | 0    |               | C            |
| A3            | PT12B             | 0    |               | C            | PT21B             | 0    |               | C            |
| E8            | PT11A             | 0    |               | T            | PT20A             | 0    |               | T            |
| A2            | PT12A             | 0    |               | T            | PT21A             | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| -             | -                 | -    |               |              | VCCIO0            | 0    |               |              |
| C3            | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |
| B3            | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |
| -             | -                 | -    |               |              | GNDIO0            | -    |               |              |
| E7            | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |
| F8            | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |
| F7            | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |
| D7            | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D4            | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |
| D5            | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |
| C4            | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |
| D6            | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO             | -    |               |              |
| J7            | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |
| B2            | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |
| H7            | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |
| B1            | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D1            | PT2B              | 0    | VREF2_0       | C            | PT2B              | 0    | VREF2_0       | C            |
| D3            | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |
| C1            | PT2A              | 0    | VREF1_0       | T            | PT2A              | 0    | VREF1_0       | T            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C2            | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| J10           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J11           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J12           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J13           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P10           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P13           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| G10           | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G9            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H9            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H8            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G11           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G12           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G13           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G14           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H14           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H15           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| J15           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K16           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| L16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| M16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| N16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| P16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| R14           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T12           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T13           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T14           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| R9            | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T10           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T11           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T9            | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| N7            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| P7            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| P8            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |



## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| R8            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| J8            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K7            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| L7            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M7            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| P15           | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| R15           | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| C5            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| D11           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| E17           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| E6            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| F13           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| G18           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| G5            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K5            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| M17           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| P17           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| R5            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V11           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V13           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V15           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V7            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V8            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A1            | GND               | -    |               |              | GND               | -    |               |              |  |
| A22           | GND               | -    |               |              | GND               | -    |               |              |  |
| AA19          | GND               | -    |               |              | GND               | -    |               |              |  |
| AA4           | GND               | -    |               |              | GND               | -    |               |              |  |
| AB1           | GND               | -    |               |              | GND               | -    |               |              |  |
| AB22          | GND               | -    |               |              | GND               | -    |               |              |  |
| B19           | GND               | -    |               |              | GND               | -    |               |              |  |
| B4            | GND               | -    |               |              | GND               | -    |               |              |  |
| C14           | GND               | -    |               |              | GND               | -    |               |              |  |
| C9            | GND               | -    |               |              | GND               | -    |               |              |  |
| D2            | GND               | -    |               |              | GND               | -    |               |              |  |
| D21           | GND               | -    |               |              | GND               | -    |               |              |  |
| F17           | GND               | -    |               |              | GND               | -    |               |              |  |
| F6            | GND               | -    |               |              | GND               | -    |               |              |  |
| H10           | GND               | -    |               |              | GND               | -    |               |              |  |
| H11           | GND               | -    |               |              | GND               | -    |               |              |  |
| H12           | GND               | -    |               |              | GND               | -    |               |              |  |
| H13           | GND               | -    |               |              | GND               | -    |               |              |  |
| J14           | GND               | -    |               |              | GND               | -    |               |              |  |
| J20           | GND               | -    |               |              | GND               | -    |               |              |  |
| J3            | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| J9            | GND               | -    |               |              | GND               | -    |               |              |  |
| K10           | GND               | -    |               |              | GND               | -    |               |              |  |
| K11           | GND               | -    |               |              | GND               | -    |               |              |  |
| K12           | GND               | -    |               |              | GND               | -    |               |              |  |
| K13           | GND               | -    |               |              | GND               | -    |               |              |  |
| K15           | GND               | -    |               |              | GND               | -    |               |              |  |
| K8            | GND               | -    |               |              | GND               | -    |               |              |  |
| L10           | GND               | -    |               |              | GND               | -    |               |              |  |
| L11           | GND               | -    |               |              | GND               | -    |               |              |  |
| L12           | GND               | -    |               |              | GND               | -    |               |              |  |
| L13           | GND               | -    |               |              | GND               | -    |               |              |  |
| L15           | GND               | -    |               |              | GND               | -    |               |              |  |
| L8            | GND               | -    |               |              | GND               | -    |               |              |  |
| M10           | GND               | -    |               |              | GND               | -    |               |              |  |
| M11           | GND               | -    |               |              | GND               | -    |               |              |  |
| M12           | GND               | -    |               |              | GND               | -    |               |              |  |
| M13           | GND               | -    |               |              | GND               | -    |               |              |  |
| M15           | GND               | -    |               |              | GND               | -    |               |              |  |
| M8            | GND               | -    |               |              | GND               | -    |               |              |  |
| N10           | GND               | -    |               |              | GND               | -    |               |              |  |
| N11           | GND               | -    |               |              | GND               | -    |               |              |  |
| N12           | GND               | -    |               |              | GND               | -    |               |              |  |
| N13           | GND               | -    |               |              | GND               | -    |               |              |  |
| N15           | GND               | -    |               |              | GND               | -    |               |              |  |
| N8            | GND               | -    |               |              | GND               | -    |               |              |  |
| P14           | GND               | -    |               |              | GND               | -    |               |              |  |
| P20           | GND               | -    |               |              | GND               | -    |               |              |  |
| P3            | GND               | -    |               |              | GND               | -    |               |              |  |
| P9            | GND               | -    |               |              | GND               | -    |               |              |  |
| R10           | GND               | -    |               |              | GND               | -    |               |              |  |
| R11           | GND               | -    |               |              | GND               | -    |               |              |  |
| R12           | GND               | -    |               |              | GND               | -    |               |              |  |
| R13           | GND               | -    |               |              | GND               | -    |               |              |  |
| U17           | GND               | -    |               |              | GND               | -    |               |              |  |
| U6            | GND               | -    |               |              | GND               | -    |               |              |  |
| W2            | GND               | -    |               |              | GND               | -    |               |              |  |
| W21           | GND               | -    |               |              | GND               | -    |               |              |  |
| Y14           | GND               | -    |               |              | GND               | -    |               |              |  |
| Y9            | GND               | -    |               |              | GND               | -    |               |              |  |
| H6            | NC                | -    |               |              | NC                | -    |               |              |  |
| J6            | NC                | -    |               |              | NC                | -    |               |              |  |
| H3            | NC                | -    |               |              | NC                | -    |               |              |  |
| H2            | NC                | -    |               |              | NC                | -    |               |              |  |
| H17           | NC                | -    |               |              | NC                | -    |               |              |  |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| H16           | NC                | -    |               |              | NC                | -    |               |              |
| H20           | NC                | -    |               |              | NC                | -    |               |              |
| H18           | NC                | -    |               |              | NC                | -    |               |              |
| K6            | NC                | -    |               |              | NC                | -    |               |              |
| J16           | NC                | -    |               |              | NC                | -    |               |              |
| N18           | VCC               | -    |               |              | VCC               | -    |               |              |
| N6            | VCC               | -    |               |              | VCC               | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |                       |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| E4          | PL2A              | 7    | VREF2_7/LDQ6  | T (LVDS)*    | PL2A              | 7    | VREF2_7               | T (LVDS)*    |
| E5          | PL2B              | 7    | VREF1_7/LDQ6  | C (LVDS)*    | PL2B              | 7    | VREF1_7               | C (LVDS)*    |
| VCCIO       | VCCIO7            | -    |               |              | GNDIO7            | -    |                       |              |
| GNDIO       | GNDIO7            | -    |               |              | VCCIO             | 7    |                       |              |
| E3          | PL10A             | 7    | LDQ14         | T (LVDS)*    | PL12A             | 7    | LDQ16                 | T (LVDS)*    |
| F3          | PL10B             | 7    | LDQ14         | C (LVDS)*    | PL12B             | 7    | LDQ16                 | C (LVDS)*    |
| F4          | PL11A             | 7    | LDQ14         | T            | PL13A             | 7    | LDQ16                 | T            |
| F5          | PL11B             | 7    | LDQ14         | C            | PL13B             | 7    | LDQ16                 | C            |
| E2          | PL12A             | 7    | LDQ14         | T (LVDS)*    | PL14A             | 7    | LDQ16                 | T (LVDS)*    |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO             | 7    |                       |              |
| E1          | PL12B             | 7    | LDQ14         | C (LVDS)*    | PL14B             | 7    | LDQ16                 | C (LVDS)*    |
| G6          | PL13A             | 7    | LDQ14         | T            | PL15A             | 7    | LDQ16                 | T            |
| G7          | PL13B             | 7    | LDQ14         | C            | PL15B             | 7    | LDQ16                 | C            |
| H4          | PL14A             | 7    | LDQS14        | T (LVDS)*    | PL16A             | 7    | LDQS16                | T (LVDS)*    |
| GNDIO       | GNDIO7            | -    |               |              | GNDIO7            | -    |                       |              |
| H5          | PL14B             | 7    | LDQ14         | C (LVDS)*    | PL16B             | 7    | LDQ16                 | C (LVDS)*    |
| F1          | PL15A             | 7    | LDQ14         | T            | PL17A             | 7    | LDQ16                 | T            |
| F2          | PL15B             | 7    | LDQ14         | C            | PL17B             | 7    | LDQ16                 | C            |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO             | 7    |                       |              |
| G3          | PL16A             | 7    | LDQ14         | T (LVDS)*    | PL18A             | 7    | LDQ16                 | T (LVDS)*    |
| G4          | PL16B             | 7    | LDQ14         | C (LVDS)*    | PL18B             | 7    | LDQ16                 | C (LVDS)*    |
| G1          | PL17A             | 7    | LDQ14         | T            | PL19A             | 7    | LDQ16                 | T            |
| G2          | PL17B             | 7    | LDQ14         | C            | PL19B             | 7    | LDQ16                 | C            |
| GNDIO       | GNDIO7            | -    |               |              | GNDIO7            | -    |                       |              |
| -           | -                 | -    |               |              | VCCIO             | 7    |                       |              |
| H6          | NC                | -    |               |              | PL25A             | 7    | LUM0_SPLLT_IN_A/LDQ24 | T            |
| -           | -                 | -    |               |              | VCCIO             | 7    |                       |              |
| J6          | NC                | -    |               |              | PL25B             | 7    | LUM0_SPLLC_IN_A/LDQ24 | C            |
| H3          | NC                | -    |               |              | PL26A             | 7    | LUM0_SPLLT_FB_A/LDQ24 | T            |
| H2          | NC                | -    |               |              | PL26B             | 7    | LUM0_SPLLC_FB_A/LDQ24 | C            |
| -           | -                 | -    |               |              | GNDIO7            | -    |                       |              |
| -           | -                 | -    |               |              | VCCIO             | 7    |                       |              |
| H1          | PL18A             | 7    | LDQ22         |              | PL37A             | 7    | LDQ41                 |              |
| J4          | PL19A             | 7    | LDQ22         | T            | PL38A             | 7    | LDQ41                 | T            |
| J5          | PL19B             | 7    | LDQ22         | C            | PL38B             | 7    | LDQ41                 | C            |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO             | 7    |                       |              |
| J2          | PL20A             | 7    | LDQ22         | T (LVDS)*    | PL39A             | 7    | LDQ41                 | T (LVDS)*    |
| J1          | PL20B             | 7    | LDQ22         | C (LVDS)*    | PL39B             | 7    | LDQ41                 | C (LVDS)*    |
| L6          | PL21A             | 7    | LDQ22         | T            | PL40A             | 7    | LDQ41                 | T            |
| L5          | PL21B             | 7    | LDQ22         | C            | PL40B             | 7    | LDQ41                 | C            |
| GNDIO       | GNDIO7            | -    |               |              | GNDIO7            | -    |                       |              |
| K3          | PL22A             | 7    | LDQS22        | T (LVDS)*    | PL41A             | 7    | LDQS41                | T (LVDS)*    |
| K4          | PL22B             | 7    | LDQ22         | C (LVDS)*    | PL41B             | 7    | LDQ41                 | C (LVDS)*    |
| K2          | PL23A             | 7    | LDQ22         | T            | PL42A             | 7    | LDQ41                 | T            |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO             | 7    |                       |              |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |                         |              | LFE2-50E/SE       |      |                         |              |  |
|-------------|-------------------|------|-------------------------|--------------|-------------------|------|-------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential | Ball/Pad Function | Bank | Dual Function           | Differential |  |
| K1          | PL23B             | 7    | LDQ22                   | C            | PL42B             | 7    | LDQ41                   | C            |  |
| L4          | PL24A             | 7    | LDQ22                   | T (LVDS)*    | PL43A             | 7    | LDQ41                   | T (LVDS)*    |  |
| L3          | PL24B             | 7    | LDQ22                   | C (LVDS)*    | PL43B             | 7    | LDQ41                   | C (LVDS)*    |  |
| L2          | PL25A             | 7    | PCLKT7_0/LDQ22          | T            | PL44A             | 7    | PCLKT7_0/LDQ41          | T            |  |
| GNDIO       | GNDIO7            | -    |                         |              | GNDIO7            | -    |                         |              |  |
| L1          | PL25B             | 7    | PCLKC7_0/LDQ22          | C            | PL44B             | 7    | PCLKC7_0/LDQ41          | C            |  |
| M5          | PL27A             | 6    | PCLKT6_0/LDQ31          | T (LVDS)*    | PL46A             | 6    | PCLKT6_0/LDQ50          | T (LVDS)*    |  |
| M6          | PL27B             | 6    | PCLKC6_0/LDQ31          | C (LVDS)*    | PL46B             | 6    | PCLKC6_0/LDQ50          | C (LVDS)*    |  |
| M3          | PL28A             | 6    | VREF2_6/LDQ31           | T            | PL47A             | 6    | VREF2_6/LDQ50           | T            |  |
| M4          | PL28B             | 6    | VREF1_6/LDQ31           | C            | PL47B             | 6    | VREF1_6/LDQ50           | C            |  |
| M2          | PL29A             | 6    | LDQ31                   | T (LVDS)*    | PL48A             | 6    | LDQ50                   | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO             | 6    |                         |              |  |
| M1          | PL29B             | 6    | LDQ31                   | C (LVDS)*    | PL48B             | 6    | LDQ50                   | C (LVDS)*    |  |
| N1          | PL30A             | 6    | LDQ31                   | T            | PL49A             | 6    | LDQ50                   | T            |  |
| N2          | PL30B             | 6    | LDQ31                   | C            | PL49B             | 6    | LDQ50                   | C            |  |
| GNDIO       | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO             | 6    |                         |              |  |
| N3          | PL39A             | 6    | LDQS39***               | T (LVDS)*    | PL58A             | 6    | LDQS58***               | T (LVDS)*    |  |
| N4          | PL39B             | 6    | LDQ39                   | C (LVDS)*    | PL58B             | 6    | LDQ58                   | C (LVDS)*    |  |
| N5          | PL40A             | 6    | LDQ39                   | T            | PL59A             | 6    | LDQ58                   | T            |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO             | 6    |                         |              |  |
| P5          | PL40B             | 6    | LDQ39                   | C            | PL59B             | 6    | LDQ58                   | C            |  |
| P1          | PL41A             | 6    | LLM0_GDLLT_IN_A**/LDQ39 | T (LVDS)*    | PL60A             | 6    | LLM0_GDLLT_IN_A**/LDQ58 | T (LVDS)*    |  |
| P2          | PL41B             | 6    | LLM0_GDLLC_IN_A**/LDQ39 | C (LVDS)*    | PL60B             | 6    | LLM0_GDLLC_IN_A**/LDQ58 | C (LVDS)*    |  |
| P4          | PL42A             | 6    | LLM0_GDLLT_FB_A/LDQ39   | T            | PL61A             | 6    | LLM0_GDLLT_FB_A/LDQ58   | T            |  |
| GNDIO       | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| R4          | PL42B             | 6    | LLM0_GDLLC_FB_A/LDQ39   | C            | PL61B             | 6    | LLM0_GDLLC_FB_D/LDQ58   | C            |  |
| P6          | LLM0_PLLCAP       | 6    |                         |              | LLM0_PLLCAP       | 6    |                         |              |  |
| R1          | PL44A             | 6    | LLM0_GPLLT_IN_A**/LDQ48 | T (LVDS)*    | PL63A             | 6    | LLM0_GPLLT_IN_A**/LDQ67 | T (LVDS)*    |  |
| R2          | PL44B             | 6    | LLM0_GPLLC_IN_A**/LDQ48 | C (LVDS)*    | PL63B             | 6    | LLM0_GPLLC_IN_A**/LDQ67 | C (LVDS)*    |  |
| R3          | PL45A             | 6    | LLM0_GPLLT_FB_A/LDQ48   | T            | PL64A             | 6    | LLM0_GPLLT_FB_A/LDQ67   | T            |  |
| T4          | PL45B             | 6    | LLM0_GPLLC_FB_A/LDQ48   | C            | PL64B             | 6    | LLM0_GPLLC_FB_A/LDQ67   | C            |  |
| T1          | PL46A             | 6    | LDQ48                   | T (LVDS)*    | PL65A             | 6    | LDQ67                   | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO             | 6    |                         |              |  |
| T2          | PL46B             | 6    | LDQ48                   | C (LVDS)*    | PL65B             | 6    | LDQ67                   | C (LVDS)*    |  |
| T5          | PL47A             | 6    | LDQ48                   | T            | PL66A             | 6    | LDQ67                   | T            |  |
| T3          | PL47B             | 6    | LDQ48                   | C            | PL66B             | 6    | LDQ67                   | C            |  |
| GNDIO       | GNDIO6            | -    |                         |              | VCCIO             | 6    |                         |              |  |
| VCCIO       | VCCIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| U1          | PL52A             | 6    | LDQ56                   | T (LVDS)*    | PL71A             | 6    | LDQ75                   | T (LVDS)*    |  |
| U2          | PL52B             | 6    | LDQ56                   | C (LVDS)*    | PL71B             | 6    | LDQ75                   | C (LVDS)*    |  |
| V1          | PL53A             | 6    | LDQ56                   | T            | PL72A             | 6    | LDQ75                   | T            |  |
| V2          | PL53B             | 6    | LDQ56                   | C            | PL72B             | 6    | LDQ75                   | C            |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO             | 6    |                         |              |  |
| R6          | PL54A             | 6    | LDQ56                   | T (LVDS)*    | PL73A             | 6    | LDQ75                   | T (LVDS)*    |  |
| T6          | PL54B             | 6    | LDQ56                   | C (LVDS)*    | PL73B             | 6    | LDQ75                   | C (LVDS)*    |  |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| U3          | PL55A             | 6    | LDQ56         | T            | PL74A             | 6    | LDQ75         | T            |
| U4          | PL55B             | 6    | LDQ56         | C            | PL74B             | 6    | LDQ75         | C            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| Y1          | PL56A             | 6    | LDQS56        | T (LVDS)*    | PL75A             | 6    | LDQS75        | T (LVDS)*    |
| W1          | PL56B             | 6    | LDQ56         | C (LVDS)*    | PL75B             | 6    | LDQ75         | C (LVDS)*    |
| R7          | PL57A             | 6    | LDQ56         | T            | PL76A             | 6    | LDQ75         | T            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO             | 6    |               |              |
| T7          | PL57B             | 6    | LDQ56         | C            | PL76B             | 6    | LDQ75         | C            |
| V4          | PL58A             | 6    | LDQ56         | T (LVDS)*    | PL77A             | 6    | LDQ75         | T (LVDS)*    |
| V3          | PL58B             | 6    | LDQ56         | C (LVDS)*    | PL77B             | 6    | LDQ75         | C (LVDS)*    |
| AA2         | PL59A             | 6    | LDQ56         | T            | PL78A             | 6    | LDQ75         | T            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AA1         | PL59B             | 6    | LDQ56         | C            | PL78B             | 6    | LDQ75         | C            |
| U7          | TCK               | -    |               |              | TCK               | -    |               |              |
| U5          | TDI               | -    |               |              | TDI               | -    |               |              |
| V5          | TMS               | -    |               |              | TMS               | -    |               |              |
| V6          | TDO               | -    |               |              | TDO               | -    |               |              |
| T8          | VCCJ              | -    |               |              | VCCJ              | -    |               |              |
| Y3          | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6  | T            |
| Y2          | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6  | C            |
| W4          | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |
| W3          | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |
| W5          | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |
| W6          | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO             | 5    |               |              |
| AB3         | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |
| AB2         | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |
| Y4          | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |
| AA3         | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |
| AB5         | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |
| AB4         | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |
| AA5         | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |
| Y5          | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO             | 5    |               |              |
| AB6         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |
| AA6         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO             | 5    |               |              |
| W7          | PB20A             | 5    | BDQ24         | T            | PB29A             | 5    | BDQ33         | T            |
| W8          | PB20B             | 5    | BDQ24         | C            | PB29B             | 5    | BDQ33         | C            |
| Y6          | PB21A             | 5    | BDQ24         | T            | PB30A             | 5    | BDQ33         | T            |
| Y7          | PB21B             | 5    | BDQ24         | C            | PB30B             | 5    | BDQ33         | C            |
| AA7         | PB22A             | 5    | BDQ24         | T            | PB31A             | 5    | BDQ33         | T            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO             | 5    |               |              |
| AB7         | PB22B             | 5    | BDQ24         | C            | PB31B             | 5    | BDQ33         | C            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |                |              | LFE2-50E/SE       |      |                |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| U8          | PB23A             | 5    | BDQ24          | T            | PB32A             | 5    | BDQ33          | T            |
| U9          | PB23B             | 5    | BDQ24          | C            | PB32B             | 5    | BDQ33          | C            |
| W9          | PB24A             | 5    | BDQS24         | T            | PB33A             | 5    | BDQS33         | T            |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| V9          | PB24B             | 5    | BDQ24          | C            | PB33B             | 5    | BDQ33          | C            |
| Y8          | PB25A             | 5    | BDQ24          | T            | PB34A             | 5    | BDQ33          | T            |
| AA8         | PB25B             | 5    | BDQ24          | C            | PB34B             | 5    | BDQ33          | C            |
| W10         | PB26A             | 5    | BDQ24          | T            | PB35A             | 5    | BDQ33          | T            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO             | 5    |                |              |
| V10         | PB26B             | 5    | BDQ24          | C            | PB35B             | 5    | BDQ33          | C            |
| AB8         | PB27A             | 5    | BDQ24          | T            | PB36A             | 5    | BDQ33          | T            |
| AA9         | PB27B             | 5    | BDQ24          | C            | PB36B             | 5    | BDQ33          | C            |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AB9         | PB29A             | 5    | BDQ33          | T            | PB38A             | 5    | BDQ42          | T            |
| AB10        | PB29B             | 5    | BDQ33          | C            | PB38B             | 5    | BDQ42          | C            |
| Y10         | PB30A             | 5    | BDQ33          | T            | PB39A             | 5    | BDQ42          | T            |
| AA10        | PB30B             | 5    | BDQ33          | C            | PB39B             | 5    | BDQ42          | C            |
| U10         | PB31A             | 5    | BDQ33          | T            | PB40A             | 5    | BDQ42          | T            |
| U11         | PB31B             | 5    | BDQ33          | C            | PB40B             | 5    | BDQ42          | C            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO             | 5    |                |              |
| AB11        | PB32A             | 5    | BDQ33          | T            | PB41A             | 5    | BDQ42          | T            |
| AA11        | PB32B             | 5    | BDQ33          | C            | PB41B             | 5    | BDQ42          | C            |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| Y11         | PB33A             | 5    | BDQS33         | T            | PB42A             | 5    | BDQS42         | T            |
| W11         | PB33B             | 5    | BDQ33          | C            | PB42B             | 5    | BDQ42          | C            |
| AB12        | PB34A             | 5    | BDQ33          | T            | PB43A             | 5    | BDQ42          | T            |
| AA12        | PB34B             | 5    | BDQ33          | C            | PB43B             | 5    | BDQ42          | C            |
| AB13        | PB35A             | 5    | PCLKT5_0/BDQ33 | T            | PB44A             | 5    | PCLKT5_0/BDQ42 | T            |
| AB14        | PB35B             | 5    | PCLKC5_0/BDQ33 | C            | PB44B             | 5    | PCLKC5_0/BDQ42 | C            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO             | 5    |                |              |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| U12         | PB40A             | 4    | PCLKT4_0/BDQ42 | T            | PB49A             | 4    | PCLKT4_0/BDQ51 | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO             | 4    |                |              |
| V12         | PB40B             | 4    | PCLKC4_0/BDQ42 | C            | PB49B             | 4    | PCLKC4_0/BDQ51 | C            |
| Y12         | PB41A             | 4    | BDQ42          | T            | PB50A             | 4    | BDQ51          | T            |
| W12         | PB41B             | 4    | BDQ42          | C            | PB50B             | 4    | BDQ51          | C            |
| AA13        | PB42A             | 4    | BDQS42         | T            | PB51A             | 4    | BDQS51         | T            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| Y13         | PB42B             | 4    | BDQ42          | C            | PB51B             | 4    | BDQ51          | C            |
| U13         | PB43A             | 4    | BDQ42          | T            | PB52A             | 4    | BDQ51          | T            |
| U14         | PB43B             | 4    | BDQ42          | C            | PB52B             | 4    | BDQ51          | C            |
| AB15        | PB44A             | 4    | BDQ42          | T            | PB53A             | 4    | BDQ51          | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO             | 4    |                |              |
| AA14        | PB44B             | 4    | BDQ42          | C            | PB53B             | 4    | BDQ51          | C            |
| AB16        | PB45A             | 4    | BDQ42          | T            | PB54A             | 4    | BDQ51          | T            |
| AB17        | PB45B             | 4    | BDQ42          | C            | PB54B             | 4    | BDQ51          | C            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| W13         | PB46A             | 4    | BDQ42         | T            | PB55A             | 4    | BDQ51         | T            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| W14         | PB46B             | 4    | BDQ42         | C            | PB55B             | 4    | BDQ51         | C            |
| AB18        | PB48A             | 4    | BDQ51         | T            | PB57A             | 4    | BDQ60         | T            |
| AB19        | PB48B             | 4    | BDQ51         | C            | PB57B             | 4    | BDQ60         | C            |
| V14         | PB49A             | 4    | BDQ51         | T            | PB58A             | 4    | BDQ60         | T            |
| W15         | PB49B             | 4    | BDQ51         | C            | PB58B             | 4    | BDQ60         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO             | 4    |               |              |
| Y15         | PB50A             | 4    | BDQ51         | T            | PB59A             | 4    | BDQ60         | T            |
| AA15        | PB50B             | 4    | BDQ51         | C            | PB59B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AA16        | PB51A             | 4    | BDQS51        | T            | PB60A             | 4    | BDQS60        | T            |
| AA17        | PB51B             | 4    | BDQ51         | C            | PB60B             | 4    | BDQ60         | C            |
| AB20        | PB52A             | 4    | BDQ51         | T            | PB61A             | 4    | BDQ60         | T            |
| AB21        | PB52B             | 4    | BDQ51         | C            | PB61B             | 4    | BDQ60         | C            |
| U15         | PB53A             | 4    | BDQ51         | T            | PB62A             | 4    | BDQ60         | T            |
| U16         | PB53B             | 4    | BDQ51         | C            | PB62B             | 4    | BDQ60         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO             | 4    |               |              |
| Y16         | PB54A             | 4    | BDQ51         | T            | PB63A             | 4    | BDQ60         | T            |
| W16         | PB54B             | 4    | BDQ51         | C            | PB63B             | 4    | BDQ60         | C            |
| AA18        | PB55A             | 4    | BDQ51         | T            | PB64A             | 4    | BDQ60         | T            |
| AA20        | PB55B             | 4    | BDQ51         | C            | PB64B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO             | 4    |               |              |
| AA21        | PB66A             | 4    | BDQ69         | T            | PB75A             | 4    | BDQ78         | T            |
| AA22        | PB66B             | 4    | BDQ69         | C            | PB75B             | 4    | BDQ78         | C            |
| V16         | PB67A             | 4    | BDQ69         | T            | PB76A             | 4    | BDQ78         | T            |
| V17         | PB67B             | 4    | BDQ69         | C            | PB76B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO             | 4    |               |              |
| Y18         | PB68A             | 4    | BDQ69         | T            | PB77A             | 4    | BDQ78         | T            |
| Y17         | PB68B             | 4    | BDQ69         | C            | PB77B             | 4    | BDQ78         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| Y19         | PB69A             | 4    | BDQS69        | T            | PB78A             | 4    | BDQS78        | T            |
| Y20         | PB69B             | 4    | BDQ69         | C            | PB78B             | 4    | BDQ78         | C            |
| W17         | PB70A             | 4    | BDQ69         | T            | PB79A             | 4    | BDQ78         | T            |
| W18         | PB70B             | 4    | BDQ69         | C            | PB79B             | 4    | BDQ78         | C            |
| Y21         | PB71A             | 4    | BDQ69         | T            | PB80A             | 4    | BDQ78         | T            |
| Y22         | PB71B             | 4    | BDQ69         | C            | PB80B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO             | 4    |               |              |
| U18         | PB72A             | 4    | BDQ69         | T            | PB81A             | 4    | BDQ78         | T            |
| V18         | PB72B             | 4    | BDQ69         | C            | PB81B             | 4    | BDQ78         | C            |
| T15         | PB73A             | 4    | VREF2_4/BDQ69 | T            | PB82A             | 4    | VREF2_4/BDQ78 | T            |
| T16         | PB73B             | 4    | VREF1_4/BDQ69 | C            | PB82B             | 4    | VREF1_4/BDQ78 | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| W19         | CFG2              | 8    |               |              | CFG2              | 8    |               |              |
| V19         | CFG1              | 8    |               |              | CFG1              | 8    |               |              |



## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |                          |              | LFE2-50E/SE       |      |                          |              |
|-------------|-------------------|------|--------------------------|--------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |
| W20         | CFG0              | 8    |                          |              | CFG0              | 8    |                          |              |
| V20         | PROGRAMN          | 8    |                          |              | PROGRAMN          | 8    |                          |              |
| W22         | CCLK              | 8    |                          |              | CCLK              | 8    |                          |              |
| V22         | INITN             | 8    |                          |              | INITN             | 8    |                          |              |
| V21         | DONE              | 8    |                          |              | DONE              | 8    |                          |              |
| GNDIO       | GNDIO8            | -    |                          |              | GNDIO8            | -    |                          |              |
| R16         | PR58B             | 8    | WRITEN                   | C            | PR77B             | 8    | WRITEN                   | C            |
| R17         | PR58A             | 8    | CS1N                     | T            | PR77A             | 8    | CS1N                     | T            |
| U19         | PR57B             | 8    | CSN                      | C            | PR76B             | 8    | CSN                      | C            |
| U20         | PR57A             | 8    | D0/SPIFASTN              | T            | PR76A             | 8    | D0/SPIFASTN              | T            |
| VCCIO       | VCCIO8            | 8    |                          |              | VCCIO             | 8    |                          |              |
| U22         | PR56B             | 8    | D1                       | C            | PR75B             | 8    | D1                       | C            |
| U21         | PR56A             | 8    | D2                       | T            | PR75A             | 8    | D2                       | T            |
| T20         | PR55B             | 8    | D3                       | C            | PR74B             | 8    | D3                       | C            |
| GNDIO       | GNDIO8            | -    |                          |              | GNDIO8            | -    |                          |              |
| T19         | PR55A             | 8    | D4                       | T            | PR74A             | 8    | D4                       | T            |
| T17         | PR54B             | 8    | D5                       | C            | PR73B             | 8    | D5                       | C            |
| T18         | PR54A             | 8    | D6                       | T            | PR73A             | 8    | D6                       | T            |
| T21         | PR53B             | 8    | D7/SPID0                 | C            | PR72B             | 8    | D7/SPID0                 | C            |
| VCCIO       | VCCIO8            | 8    |                          |              | VCCIO             | 8    |                          |              |
| T22         | PR53A             | 8    | DI/CSSPION               | T            | PR72A             | 8    | DI/CSSPION               | T            |
| R18         | PR52B             | 8    | DOUT/CSON                | C            | PR71B             | 8    | DOUT/CSON                | C            |
| R19         | PR52A             | 8    | BUSY/SISPI               | T            | PR71A             | 8    | BUSY/SISPI               | T            |
| GNDIO       | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO             | 3    |                          |              |
| R22         | PR47B             | 3    | RDQ48                    | C            | PR66B             | 3    | RDQ67                    | C            |
| R21         | PR47A             | 3    | RDQ48                    | T            | PR66A             | 3    | RDQ67                    | T            |
| P18         | PR46B             | 3    | RDQ48                    | C (LVDS)*    | PR65B             | 3    | RDQ67                    | C (LVDS)*    |
| P19         | PR46A             | 3    | RDQ48                    | T (LVDS)*    | PR65A             | 3    | RDQ67                    | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO             | 3    |                          |              |
| R20         | PR45B             | 3    | RLM0_GPLL_C_FB_A/RDQ48   | C            | PR64B             | 3    | RLM0_GPLL_C_FB_A/RDQ67   | C            |
| P22         | PR45A             | 3    | RLM0_GPLL_T_FB_A/RDQ48   | T            | PR64A             | 3    | RLM0_GPLL_T_FB_A/RDQ67   | T            |
| P21         | PR44B             | 3    | RLM0_GPLL_C_IN_A**/RDQ48 | C (LVDS)*    | PR63B             | 3    | RLM0_GPLL_C_IN_A**/RDQ67 | C (LVDS)*    |
| N21         | PR44A             | 3    | RLM0_GPLL_T_IN_A**/RDQ48 | T (LVDS)*    | PR63A             | 3    | RLM0_GPLL_T_IN_A**/RDQ67 | T (LVDS)*    |
| N17         | RLM0_PLLCAP       | 3    |                          |              | RLM0_PLLCAP       | 3    |                          |              |
| N22         | PR42B             | 3    | RLM0_GDLL_C_FB_A/RDQ39   | C            | PR61B             | 3    | RLM0_GDLL_C_FB_A/RDQ58   | C            |
| N20         | PR42A             | 3    | RLM0_GDLL_T_FB_A/RDQ39   | T            | PR61A             | 3    | RLM0_GDLL_T_FB_A/RDQ58   | T            |
| GNDIO       | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |
| M22         | PR41B             | 3    | RLM0_GDLL_C_IN_A**/RDQ39 | C (LVDS)*    | PR60B             | 3    | RLM0_GDLL_C_IN_A**/RDQ58 | C (LVDS)*    |
| M21         | PR41A             | 3    | RLM0_GDLL_T_IN_A**/RDQ39 | T (LVDS)*    | PR60A             | 3    | RLM0_GDLL_T_IN_A**/RDQ58 | T (LVDS)*    |
| N19         | PR40B             | 3    | RDQ39                    | C            | PR59B             | 3    | RDQ58                    | C            |
| M19         | PR40A             | 3    | RDQ39                    | T            | PR59A             | 3    | RDQ58                    | T            |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO             | 3    |                          |              |
| GNDIO       | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |
| L22         | PR30B             | 3    | RDQ31                    | C            | PR49B             | 3    | RDQ50                    | C            |
| K22         | PR30A             | 3    | RDQ31                    | T            | PR49A             | 3    | RDQ50                    | T            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |                |              | LFE2-50E/SE       |      |                       |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| J22         | PR29B             | 3    | RDQ31          | C (LVDS)*    | PR48B             | 3    | RDQ50                 | C (LVDS)*    |
| H22         | PR29A             | 3    | RDQ31          | T (LVDS)*    | PR48A             | 3    | RDQ50                 | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                |              | VCCIO             | 3    |                       |              |
| M20         | PR28B             | 3    | VREF2_3/RDQ31  | C            | PR47B             | 3    | VREF2_3/RDQ50         | C            |
| L21         | PR28A             | 3    | VREF1_3/RDQ31  | T            | PR47A             | 3    | VREF1_3/RDQ50         | T            |
| K21         | PR27B             | 3    | PCLKC3_0/RDQ31 | C (LVDS)*    | PR46B             | 3    | PCLKC3_0/RDQ50        | C (LVDS)*    |
| J21         | PR27A             | 3    | PCLKT3_0/RDQ31 | T (LVDS)*    | PR46A             | 3    | PCLKT3_0/RDQ50        | T (LVDS)*    |
| M18         | PR25B             | 2    | PCLKC2_0/RDQ22 | C            | PR44B             | 2    | PCLKC2_0/RDQ41        | C            |
| L17         | PR25A             | 2    | PCLKT2_0/RDQ22 | T            | PR44A             | 2    | PCLKT2_0/RDQ41        | T            |
| GNDIO       | GNDIO2            | -    |                |              | GNDIO2            | -    |                       |              |
| L19         | PR24B             | 2    | RDQ22          | C (LVDS)*    | PR43B             | 2    | RDQ41                 | C (LVDS)*    |
| L20         | PR24A             | 2    | RDQ22          | T (LVDS)*    | PR43A             | 2    | RDQ41                 | T (LVDS)*    |
| L18         | PR23B             | 2    | RDQ22          | C            | PR42B             | 2    | RDQ41                 | C            |
| K17         | PR23A             | 2    | RDQ22          | T            | PR42A             | 2    | RDQ41                 | T            |
| VCCIO       | VCCIO2            | 2    |                |              | VCCIO             | 2    |                       |              |
| K18         | PR22B             | 2    | RDQ22          | C (LVDS)*    | PR41B             | 2    | RDQ41                 | C (LVDS)*    |
| K19         | PR22A             | 2    | RDQS22         | T (LVDS)*    | PR41A             | 2    | RDQS41                | T (LVDS)*    |
| G22         | PR21B             | 2    | RDQ22          | C            | PR40B             | 2    | RDQ41                 | C            |
| GNDIO       | GNDIO2            | -    |                |              | GNDIO2            | -    |                       |              |
| F22         | PR21A             | 2    | RDQ22          | T            | PR40A             | 2    | RDQ41                 | T            |
| J17         | PR20B             | 2    | RDQ22          | C (LVDS)*    | PR39B             | 2    | RDQ41                 | C (LVDS)*    |
| J18         | PR20A             | 2    | RDQ22          | T (LVDS)*    | PR39A             | 2    | RDQ41                 | T (LVDS)*    |
| K20         | PR19B             | 2    | RDQ22          | C            | PR38B             | 2    | RDQ41                 | C            |
| VCCIO       | VCCIO2            | 2    |                |              | VCCIO             | 2    |                       |              |
| J19         | PR19A             | 2    | RDQ22          | T            | PR38A             | 2    | RDQ41                 | T            |
| H21         | PR18B             | 2    | RDQ22          | C (LVDS)*    | PR37B             | 2    | RDQ41                 | C (LVDS)*    |
| G21         | PR18A             | 2    | RDQ22          | T (LVDS)*    | PR37A             | 2    | RDQ41                 | T (LVDS)*    |
| -           | -                 | -    |                |              | GNDIO2            | -    |                       |              |
| -           | -                 | -    |                |              | VCCIO             | 2    |                       |              |
| H17         | NC                | -    |                |              | PR26B             | 2    | RUM0_SPLLC_FB_A/RDQ24 | C            |
| H16         | NC                | -    |                |              | PR26A             | 2    | RUM0_SPLLT_FB_A/RDQ24 | T            |
| H20         | NC                | -    |                |              | PR25B             | 2    | RUM0_SPLLC_IN_A/RDQ24 | C            |
| H18         | NC                | -    |                |              | PR25A             | 2    | RUM0_SPLLT_IN_A/RDQ24 | T            |
| -           | -                 | -    |                |              | GNDIO2            | -    |                       |              |
| -           | -                 | -    |                |              | VCCIO             | 2    |                       |              |
| F21         | PR17B             | 2    | RDQ14          | C            | PR19B             | 2    | RDQ16                 | C            |
| GNDIO       | GNDIO2            | -    |                |              | GNDIO2            | -    |                       |              |
| E22         | PR17A             | 2    | RDQ14          | T            | PR19A             | 2    | RDQ16                 | T            |
| D22         | PR16B             | 2    | RDQ14          | C (LVDS)*    | PR18B             | 2    | RDQ16                 | C (LVDS)*    |
| E21         | PR16A             | 2    | RDQ14          | T (LVDS)*    | PR18A             | 2    | RDQ16                 | T (LVDS)*    |
| G20         | PR15B             | 2    | RDQ14          | C            | PR17B             | 2    | RDQ16                 | C            |
| VCCIO       | VCCIO2            | 2    |                |              | VCCIO             | 2    |                       |              |
| F20         | PR15A             | 2    | RDQ14          | T            | PR17A             | 2    | RDQ16                 | T            |
| H19         | PR14B             | 2    | RDQ14          | C (LVDS)*    | PR16B             | 2    | RDQ16                 | C (LVDS)*    |
| G19         | PR14A             | 2    | RDQS14         | T (LVDS)*    | PR16A             | 2    | RDQS16                | T (LVDS)*    |
| GNDIO       | GNDIO2            | -    |                |              | GNDIO2            | -    |                       |              |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| G17         | PR13B             | 2    | RDQ14         | C            | PR15B             | 2    | RDQ16         | C            |
| F19         | PR13A             | 2    | RDQ14         | T            | PR15A             | 2    | RDQ16         | T            |
| E20         | PR12B             | 2    | RDQ14         | C (LVDS)*    | PR14B             | 2    | RDQ16         | C (LVDS)*    |
| D20         | PR12A             | 2    | RDQ14         | T (LVDS)*    | PR14A             | 2    | RDQ16         | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO             | 2    |               |              |
| F18         | PR11B             | 2    | RDQ14         | C            | PR13B             | 2    | RDQ16         | C            |
| F16         | PR11A             | 2    | RDQ14         | T            | PR13A             | 2    | RDQ16         | T            |
| C21         | PR10B             | 2    | RDQ14         | C (LVDS)*    | PR12B             | 2    | RDQ16         | C (LVDS)*    |
| C22         | PR10A             | 2    | RDQ14         | T (LVDS)*    | PR12A             | 2    | RDQ16         | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO             | 2    |               |              |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| D19         | PR2B              | 2    | VREF2_2/RDQ6  | C (LVDS)*    | PR2B              | 2    | VREF2_2       | C (LVDS)*    |
| E19         | PR2A              | 2    | VREF1_2/RDQ6  | T (LVDS)*    | PR2A              | 2    | VREF1_2       | T (LVDS)*    |
| B21         | PT73B             | 1    | VREF2_1       | C            | PT82B             | 1    | VREF2_1       | C            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B22         | PT73A             | 1    | VREF1_1       | T            | PT82A             | 1    | VREF1_1       | T            |
| C20         | PT72B             | 1    |               | C            | PT81B             | 1    |               | C            |
| C19         | PT72A             | 1    |               | T            | PT81A             | 1    |               | T            |
| D18         | PT71B             | 1    |               | C            | PT80B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| E18         | PT71A             | 1    |               | T            | PT80A             | 1    |               | T            |
| B20         | PT70B             | 1    |               | C            | PT79B             | 1    |               | C            |
| A19         | PT70A             | 1    |               | T            | PT79A             | 1    |               | T            |
| D17         | PT69B             | 1    |               | C            | PT78B             | 1    |               | C            |
| C18         | PT69A             | 1    |               | T            | PT78A             | 1    |               | T            |
| A21         | PT68B             | 1    |               | C            | PT77B             | 1    |               | C            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A20         | PT68A             | 1    |               | T            | PT77A             | 1    |               | T            |
| A18         | PT67B             | 1    |               | C            | PT76B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| B18         | PT67A             | 1    |               | T            | PT76A             | 1    |               | T            |
| G16         | PT66B             | 1    |               | C            | PT75B             | 1    |               | C            |
| G15         | PT66A             | 1    |               | T            | PT75A             | 1    |               | T            |
| D16         | PT65B             | 1    |               | C            | PT74B             | 1    |               | C            |
| E16         | PT65A             | 1    |               | T            | PT74A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| C17         | PT55B             | 1    |               | C            | PT64B             | 1    |               | C            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C16         | PT55A             | 1    |               | T            | PT64A             | 1    |               | T            |
| B17         | PT54B             | 1    |               | C            | PT63B             | 1    |               | C            |
| B16         | PT54A             | 1    |               | T            | PT63A             | 1    |               | T            |
| A17         | PT53B             | 1    |               | C            | PT62B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| A16         | PT53A             | 1    |               | T            | PT62A             | 1    |               | T            |
| C15         | PT52B             | 1    |               | C            | PT61B             | 1    |               | C            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| D15         | PT52A             | 1    |               | T            | PT61A             | 1    |               | T            |
| E15         | PT51B             | 1    |               | C            | PT60B             | 1    |               | C            |
| F15         | PT51A             | 1    |               | T            | PT60A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B15         | PT49B             | 1    |               | C            | PT58B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| A15         | PT49A             | 1    |               | T            | PT58A             | 1    |               | T            |
| B14         | PT48B             | 1    |               | C            | PT57B             | 1    |               | C            |
| A14         | PT48A             | 1    |               | T            | PT57A             | 1    |               | T            |
| D14         | PT46B             | 1    |               | C            | PT55B             | 1    |               | C            |
| C13         | PT46A             | 1    |               | T            | PT55A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| E14         | PT45B             | 1    |               | C            | PT54B             | 1    |               | C            |
| F14         | PT45A             | 1    |               | T            | PT54A             | 1    |               | T            |
| A13         | PT44B             | 1    |               | C            | PT53B             | 1    |               | C            |
| B13         | PT44A             | 1    |               | T            | PT53A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| E13         | PT43B             | 1    |               | C            | PT52B             | 1    |               | C            |
| D13         | PT43A             | 1    |               | T            | PT52A             | 1    |               | T            |
| E12         | PT42B             | 1    |               | C            | PT51B             | 1    |               | C            |
| D12         | PT42A             | 1    |               | T            | PT51A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A12         | PT40B             | 1    |               | C            | PT49B             | 1    |               | C            |
| A11         | PT40A             | 1    |               | T            | PT49A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO             | 1    |               |              |
| B12         | PT39B             | 1    | PCLKC1_0      | C            | PT48B             | 1    | PCLKC1_0      | C            |
| C12         | PT39A             | 1    | PCLKT1_0      | T            | PT48A             | 1    | PCLKT1_0      | T            |
| F12         | XRES              | 1    |               |              | XRES              | 1    |               |              |
| B10         | PT37B             | 0    | PCLKC0_0      | C            | PT46B             | 0    | PCLKC0_0      | C            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| B11         | PT37A             | 0    | PCLKT0_0      | T            | PT46A             | 0    | PCLKT0_0      | T            |
| A10         | PT36B             | 0    |               | C            | PT45B             | 0    |               | C            |
| A9          | PT36A             | 0    |               | T            | PT45A             | 0    |               | T            |
| C11         | PT35B             | 0    |               | C            | PT44B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| C10         | PT35A             | 0    |               | T            | PT44A             | 0    |               | T            |
| E11         | PT34B             | 0    |               | C            | PT43B             | 0    |               | C            |
| F11         | PT34A             | 0    |               | T            | PT43A             | 0    |               | T            |
| A8          | PT33B             | 0    |               | C            | PT42B             | 0    |               | C            |
| A7          | PT33A             | 0    |               | T            | PT42A             | 0    |               | T            |
| B8          | PT32B             | 0    |               | C            | PT41B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| B9          | PT32A             | 0    |               | T            | PT41A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| B7          | PT30B             | 0    |               | C            | PT39B             | 0    |               | C            |
| A6          | PT30A             | 0    |               | T            | PT39A             | 0    |               | T            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| C8          | PT29B             | 0    |               | C            | PT38B             | 0    |               | C            |
| D8          | PT29A             | 0    |               | T            | PT38A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| D10         | PT27B             | 0    |               | C            | PT36B             | 0    |               | C            |
| E10         | PT27A             | 0    |               | T            | PT36A             | 0    |               | T            |
| C7          | PT26B             | 0    |               | C            | PT35B             | 0    |               | C            |
| C6          | PT26A             | 0    |               | T            | PT35A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| B6          | PT25B             | 0    |               | C            | PT34B             | 0    |               | C            |
| B5          | PT25A             | 0    |               | T            | PT34A             | 0    |               | T            |
| F10         | PT24B             | 0    |               | C            | PT33B             | 0    |               | C            |
| D9          | PT24A             | 0    |               | T            | PT33A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| F9          | PT23B             | 0    |               | C            | PT32B             | 0    |               | C            |
| E9          | PT23A             | 0    |               | T            | PT32A             | 0    |               | T            |
| A5          | PT22B             | 0    |               | C            | PT31B             | 0    |               | C            |
| A4          | PT22A             | 0    |               | T            | PT31A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| A3          | PT21B             | 0    |               | C            | PT30B             | 0    |               | C            |
| A2          | PT21A             | 0    |               | T            | PT30A             | 0    |               | T            |
| G8          | PT20B             | 0    |               | C            | PT29B             | 0    |               | C            |
| E8          | PT20A             | 0    |               | T            | PT29A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| C3          | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |
| B3          | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| F8          | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |
| D7          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |
| E7          | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| F7          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |
| D5          | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |
| D6          | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |
| D4          | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |
| C4          | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | 0    |               |              |
| B2          | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |
| B1          | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |
| J7          | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO             | 0    |               |              |
| H7          | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |
| D3          | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |
| C2          | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |
| D1          | PT2B              | 0    | VREF2_0       | C            | PT2B              | 0    | VREF2_0       | C            |
| C1          | PT2A              | 0    | VREF1_0       | T            | PT2A              | 0    | VREF1_0       | T            |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |
| J11         | VCC               | -    |               |              | VCC               | -    |               |              |
| J12         | VCC               | -    |               |              | VCC               | -    |               |              |
| J13         | VCC               | -    |               |              | VCC               | -    |               |              |
| K14         | VCC               | -    |               |              | VCC               | -    |               |              |
| K9          | VCC               | -    |               |              | VCC               | -    |               |              |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |
| L9          | VCC               | -    |               |              | VCC               | -    |               |              |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |
| M9          | VCC               | -    |               |              | VCC               | -    |               |              |
| N14         | VCC               | -    |               |              | VCC               | -    |               |              |
| N9          | VCC               | -    |               |              | VCC               | -    |               |              |
| P10         | VCC               | -    |               |              | VCC               | -    |               |              |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |
| P13         | VCC               | -    |               |              | VCC               | -    |               |              |
| G5          | VCCAUX            | -    |               |              | VCCAUX            | 0    |               |              |
| K5          | VCCAUX            | -    |               |              | VCCAUX            | 0    |               |              |
| R5          | VCCAUX            | -    |               |              | VCCAUX            | 1    |               |              |
| V7          | VCCAUX            | -    |               |              | VCCAUX            | 1    |               |              |
| V11         | VCCAUX            | -    |               |              | VCCAUX            | 2    |               |              |
| V8          | VCCAUX            | -    |               |              | VCCAUX            | 2    |               |              |
| V13         | VCCAUX            | -    |               |              | VCCAUX            | 3    |               |              |
| V15         | VCCAUX            | -    |               |              | VCCAUX            | 3    |               |              |
| M17         | VCCAUX            | -    |               |              | VCCAUX            | 4    |               |              |
| P17         | VCCAUX            | -    |               |              | VCCAUX            | 4    |               |              |
| E17         | VCCAUX            | -    |               |              | VCCAUX            | 5    |               |              |
| G18         | VCCAUX            | -    |               |              | VCCAUX            | 5    |               |              |
| D11         | VCCAUX            | -    |               |              | VCCAUX            | 6    |               |              |
| F13         | VCCAUX            | -    |               |              | VCCAUX            | 6    |               |              |
| C5          | VCCAUX            | -    |               |              | VCCAUX            | 7    |               |              |
| E6          | VCCAUX            | -    |               |              | VCCAUX            | 7    |               |              |
| G10         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H8          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G11         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G12         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G13         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G14         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H14         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| H15         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| J15         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K16         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| L16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| M16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| N16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| P16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| R14         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| T12         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| T13         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| T14         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| R9          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| T10         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| T11         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| T9          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| N7          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| P7          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| P8          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| R8          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| J8          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| K7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| L7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| M7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| P15         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| R15         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| A22         | GND               | -    |               |              | GND               | -    |               |              |
| AA19        | GND               | -    |               |              | GND               | -    |               |              |
| AA4         | GND               | -    |               |              | GND               | -    |               |              |
| AB1         | GND               | -    |               |              | GND               | -    |               |              |
| AB22        | GND               | -    |               |              | GND               | -    |               |              |
| B19         | GND               | -    |               |              | GND               | -    |               |              |
| B4          | GND               | -    |               |              | GND               | -    |               |              |
| C14         | GND               | -    |               |              | GND               | -    |               |              |
| C9          | GND               | -    |               |              | GND               | -    |               |              |
| D2          | GND               | -    |               |              | GND               | -    |               |              |
| D21         | GND               | -    |               |              | GND               | -    |               |              |
| F17         | GND               | -    |               |              | GND               | -    |               |              |
| F6          | GND               | -    |               |              | GND               | -    |               |              |
| H10         | GND               | -    |               |              | GND               | -    |               |              |
| H11         | GND               | -    |               |              | GND               | -    |               |              |
| H12         | GND               | -    |               |              | GND               | -    |               |              |
| H13         | GND               | -    |               |              | GND               | -    |               |              |
| J14         | GND               | -    |               |              | GND               | -    |               |              |
| J20         | GND               | -    |               |              | GND               | -    |               |              |
| J3          | GND               | -    |               |              | GND               | -    |               |              |
| J9          | GND               | -    |               |              | GND               | -    |               |              |
| K10         | GND               | -    |               |              | GND               | -    |               |              |
| K11         | GND               | -    |               |              | GND               | -    |               |              |
| K12         | GND               | -    |               |              | GND               | -    |               |              |
| K13         | GND               | -    |               |              | GND               | -    |               |              |
| K15         | GND               | -    |               |              | GND               | -    |               |              |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| K8          | GND               | -    |               |              | GND               | -    |               |              |
| L10         | GND               | -    |               |              | GND               | -    |               |              |
| L11         | GND               | -    |               |              | GND               | -    |               |              |
| L12         | GND               | -    |               |              | GND               | -    |               |              |
| L13         | GND               | -    |               |              | GND               | -    |               |              |
| L15         | GND               | -    |               |              | GND               | -    |               |              |
| L8          | GND               | -    |               |              | GND               | -    |               |              |
| M10         | GND               | -    |               |              | GND               | -    |               |              |
| M11         | GND               | -    |               |              | GND               | -    |               |              |
| M12         | GND               | -    |               |              | GND               | -    |               |              |
| M13         | GND               | -    |               |              | GND               | -    |               |              |
| M15         | GND               | -    |               |              | GND               | -    |               |              |
| M8          | GND               | -    |               |              | GND               | -    |               |              |
| N10         | GND               | -    |               |              | GND               | -    |               |              |
| N11         | GND               | -    |               |              | GND               | -    |               |              |
| N12         | GND               | -    |               |              | GND               | -    |               |              |
| N13         | GND               | -    |               |              | GND               | -    |               |              |
| N15         | GND               | -    |               |              | GND               | -    |               |              |
| N8          | GND               | -    |               |              | GND               | -    |               |              |
| P14         | GND               | -    |               |              | GND               | -    |               |              |
| P20         | GND               | -    |               |              | GND               | -    |               |              |
| P3          | GND               | -    |               |              | GND               | -    |               |              |
| P9          | GND               | -    |               |              | GND               | -    |               |              |
| R10         | GND               | -    |               |              | GND               | -    |               |              |
| R11         | GND               | -    |               |              | GND               | -    |               |              |
| R12         | GND               | -    |               |              | GND               | -    |               |              |
| R13         | GND               | -    |               |              | GND               | -    |               |              |
| U17         | GND               | -    |               |              | GND               | -    |               |              |
| U6          | GND               | -    |               |              | GND               | -    |               |              |
| W2          | GND               | -    |               |              | GND               | -    |               |              |
| W21         | GND               | -    |               |              | GND               | -    |               |              |
| Y14         | GND               | -    |               |              | GND               | -    |               |              |
| Y9          | GND               | -    |               |              | GND               | -    |               |              |
| A1          | GND               | -    |               |              | GND               | -    |               |              |
| N18         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |
| K6          | NC                | -    |               |              | VCCPLL            | -    |               |              |
| N6          | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |
| J16         | NC                | -    |               |              | VCCPLL            | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.



## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| D2            | PL2A              | 7    | VREF2_7       | T (LVDS)*    | PL2A              | 7    | VREF2_7/LDQ6  | T (LVDS)*    |  |
| D1            | PL2B              | 7    | VREF1_7       | C (LVDS)*    | PL2B              | 7    | VREF1_7/LDQ6  | C (LVDS)*    |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| F6            | PL3A              | 7    |               | T            | PL3A              | 7    | LDQ6          | T            |  |
| F5            | PL3B              | 7    |               | C            | PL3B              | 7    | LDQ6          | C            |  |
| VCCIO         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| E4            | NC                | -    |               |              | PL4A              | 7    | LDQ6          | T (LVDS)*    |  |
| E3            | NC                | -    |               |              | PL4B              | 7    | LDQ6          | C (LVDS)*    |  |
| E2            | NC                | -    |               |              | PL5A              | 7    | LDQ6          | T            |  |
| E1            | NC                | -    |               |              | PL5B              | 7    | LDQ6          | C            |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| H6            | NC                | -    |               |              | PL6A              | 7    | LDQS6         | T (LVDS)*    |  |
| H5            | NC                | -    |               |              | PL6B              | 7    | LDQ6          | C (LVDS)*    |  |
| F2            | NC                | -    |               |              | PL7A              | 7    | LDQ6          | T            |  |
| VCCIO         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| F1            | NC                | -    |               |              | PL7B              | 7    | LDQ6          | C            |  |
| H8            | NC                | -    |               |              | PL8A              | 7    | LDQ6          | T (LVDS)*    |  |
| J9            | NC                | -    |               |              | PL8B              | 7    | LDQ6          | C (LVDS)*    |  |
| G4            | NC                | -    |               |              | PL9A              | 7    | LDQ6          | T            |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| G3            | NC                | -    |               |              | PL9B              | 7    | LDQ6          | C            |  |
| H7            | PL4A              | 7    | LDQ8          | T (LVDS)*    | PL10A             | 7    | LDQ14         | T (LVDS)*    |  |
| J8            | PL4B              | 7    | LDQ8          | C (LVDS)*    | PL10B             | 7    | LDQ14         | C (LVDS)*    |  |
| G2            | PL5A              | 7    | LDQ8          | T            | PL11A             | 7    | LDQ14         | T            |  |
| G1            | PL5B              | 7    | LDQ8          | C            | PL11B             | 7    | LDQ14         | C            |  |
| H3            | PL6A              | 7    | LDQ8          | T (LVDS)*    | PL12A             | 7    | LDQ14         | T (LVDS)*    |  |
| VCCIO         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| H4            | PL6B              | 7    | LDQ8          | C (LVDS)*    | PL12B             | 7    | LDQ14         | C (LVDS)*    |  |
| J5            | PL7A              | 7    | LDQ8          | T            | PL13A             | 7    | LDQ14         | T            |  |
| J4            | PL7B              | 7    | LDQ8          | C            | PL13B             | 7    | LDQ14         | C            |  |
| J3            | PL8A              | 7    | LDQS8         | T (LVDS)*    | PL14A             | 7    | LDQS14        | T (LVDS)*    |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| K4            | PL8B              | 7    | LDQ8          | C (LVDS)*    | PL14B             | 7    | LDQ14         | C (LVDS)*    |  |
| H1            | PL9A              | 7    | LDQ8          | T            | PL15A             | 7    | LDQ14         | T            |  |
| H2            | PL9B              | 7    | LDQ8          | C            | PL15B             | 7    | LDQ14         | C            |  |
| VCCIO         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K6            | PL10A             | 7    | LDQ8          | T (LVDS)*    | PL16A             | 7    | LDQ14         | T (LVDS)*    |  |
| K7            | PL10B             | 7    | LDQ8          | C (LVDS)*    | PL16B             | 7    | LDQ14         | C (LVDS)*    |  |
| J1            | PL11A             | 7    | LDQ8          | T            | PL17A             | 7    | LDQ14         | T            |  |
| J2            | PL11B             | 7    | LDQ8          | C            | PL17B             | 7    | LDQ14         | C            |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| VCCIO         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K3            | NC                | -    |               |              | NC                | -    |               |              |  |
| K2            | NC                | -    |               |              | NC                | -    |               |              |  |
| GND           | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| K1            | NC                | -    |               |              | NC                | -    |               |              |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                |              | LFE2-35E/35SE     |      |                |              |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| L2            | NC                | -    |                |              | NC                | -    |                |              |
| L1            | NC                | -    |                |              | NC                | -    |                |              |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| M2            | NC                | -    |                |              | NC                | -    |                |              |
| M1            | NC                | -    |                |              | NC                | -    |                |              |
| N2            | NC                | -    |                |              | NC                | -    |                |              |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| M8            | VCC               | -    |                |              | NC                | -    |                |              |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| N1            | PL12A             | 7    | LDQ16          |              | PL18A             | 7    | LDQ22          |              |
| L8            | PL13A             | 7    | LDQ16          | T            | PL19A             | 7    | LDQ22          | T            |
| K8            | PL13B             | 7    | LDQ16          | C            | PL19B             | 7    | LDQ22          | C            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| L6            | PL14A             | 7    | LDQ16          | T (LVDS)*    | PL20A             | 7    | LDQ22          | T (LVDS)*    |
| K5            | PL14B             | 7    | LDQ16          | C (LVDS)*    | PL20B             | 7    | LDQ22          | C (LVDS)*    |
| L7            | PL15A             | 7    | LDQ16          | T            | PL21A             | 7    | LDQ22          | T            |
| L5            | PL15B             | 7    | LDQ16          | C            | PL21B             | 7    | LDQ22          | C            |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| P1            | PL16A             | 7    | LDQS16         | T (LVDS)*    | PL22A             | 7    | LDQS22         | T (LVDS)*    |
| P2            | PL16B             | 7    | LDQ16          | C (LVDS)*    | PL22B             | 7    | LDQ22          | C (LVDS)*    |
| M6            | PL17A             | 7    | LDQ16          | T            | PL23A             | 7    | LDQ22          | T            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| N8            | PL17B             | 7    | LDQ16          | C            | PL23B             | 7    | LDQ22          | C            |
| R1            | PL18A             | 7    | LDQ16          | T (LVDS)*    | PL24A             | 7    | LDQ22          | T (LVDS)*    |
| R2            | PL18B             | 7    | LDQ16          | C (LVDS)*    | PL24B             | 7    | LDQ22          | C (LVDS)*    |
| M7            | PL19A             | 7    | PCLKT7_0/LDQ16 | T            | PL25A             | 7    | PCLKT7_0/LDQ22 | T            |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| N9            | PL19B             | 7    | PCLKC7_0/LDQ16 | C            | PL25B             | 7    | PCLKC7_0/LDQ22 | C            |
| M4            | PL21A             | 6    | PCLKT6_0/LDQ25 | T (LVDS)*    | PL27A             | 6    | PCLKT6_0/LDQ31 | T (LVDS)*    |
| M5            | PL21B             | 6    | PCLKC6_0/LDQ25 | C (LVDS)*    | PL27B             | 6    | PCLKC6_0/LDQ31 | C (LVDS)*    |
| N7            | PL22A             | 6    | VREF2_6/LDQ25  | T            | PL28A             | 6    | VREF2_6/LDQ31  | T            |
| P9            | PL22B             | 6    | VREF1_6/LDQ25  | C            | PL28B             | 6    | VREF1_6/LDQ31  | C            |
| N3            | PL23A             | 6    | LDQ25          | T (LVDS)*    | PL29A             | 6    | LDQ31          | T (LVDS)*    |
| VCCIO         | VCCIO6            | 6    |                |              | VCCIO6            | 6    |                |              |
| N4            | PL23B             | 6    | LDQ25          | C (LVDS)*    | PL29B             | 6    | LDQ31          | C (LVDS)*    |
| N5            | PL24A             | 6    | LDQ25          | T            | PL30A             | 6    | LDQ31          | T            |
| P7            | PL24B             | 6    | LDQ25          | C            | PL30B             | 6    | LDQ31          | C            |
| T1            | NC                | -    |                |              | PL31A             | 6    | LDQS31         | T (LVDS)*    |
| GND           | GNDIO6            | -    |                |              | GNDIO6            | -    |                |              |
| T2            | NC                | -    |                |              | PL31B             | 6    | LDQ31          | C (LVDS)*    |
| P8            | NC                | -    |                |              | PL32A             | 6    | LDQ31          | T            |
| P6            | NC                | -    |                |              | PL32B             | 6    | LDQ31          | C            |
| VCCIO         | VCCIO6            | 6    |                |              | VCCIO6            | 6    |                |              |
| P5            | NC                | -    |                |              | PL33A             | 6    | LDQ31          | T (LVDS)*    |
| P4            | NC                | -    |                |              | PL33B             | 6    | LDQ31          | C (LVDS)*    |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                         |              | LFE2-35E/35SE     |      |                         |              |
|---------------|-------------------|------|-------------------------|--------------|-------------------|------|-------------------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function           | Differential | Ball/Pad Function | Bank | Dual Function           | Differential |
| U1            | NC                | -    |                         |              | PL34A             | 6    | LDQ31                   | T            |
| V1            | NC                | -    |                         |              | PL34B             | 6    | LDQ31                   | C            |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |
| P3            | NC                | -    |                         |              | NC                | -    |                         |              |
| R3            | NC                | -    |                         |              | NC                | -    |                         |              |
| R4            | NC                | -    |                         |              | NC                | -    |                         |              |
| U2            | NC                | -    |                         |              | NC                | -    |                         |              |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |
| V2            | NC                | -    |                         |              | NC                | -    |                         |              |
| W2            | NC                | -    |                         |              | NC                | -    |                         |              |
| T6            | NC                | -    |                         |              | PL38A             | 6    | LDQ39                   | T            |
| R5            | NC                | -    |                         |              | PL38B             | 6    | LDQ39                   | C            |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |
| R6            | PL25A             | 6    | LDQS25***               | T (LVDS)*    | PL39A             | 6    | LDQS39***               | T (LVDS)*    |
| R7            | PL25B             | 6    | LDQ25                   | C (LVDS)*    | PL39B             | 6    | LDQ39                   | C (LVDS)*    |
| W1            | PL26A             | 6    | LDQ25                   | T            | PL40A             | 6    | LDQ39                   | T            |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |
| Y2            | PL26B             | 6    | LDQ25                   | C            | PL40B             | 6    | LDQ39                   | C            |
| Y1            | PL27A             | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    | PL41A             | 6    | LLM0_GDLLT_IN_A**/LDQ39 | T (LVDS)*    |
| AA2           | PL27B             | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    | PL41B             | 6    | LLM0_GDLLC_IN_A**/LDQ39 | C (LVDS)*    |
| T5            | PL28A             | 6    | LLM0_GDLLT_FB_A/LDQ25   | T            | PL42A             | 6    | LLM0_GDLLT_FB_A/LDQ39   | T            |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |
| T7            | PL28B             | 6    | LLM0_GDLLC_FB_A/LDQ25   | C            | PL42B             | 6    | LLM0_GDLLC_FB_A/LDQ39   | C            |
| R8            | VCC               | 6    |                         |              | VCCPLL            | 6    |                         |              |
| T8            | LLM0_PLLCAP       | 6    |                         |              | LLM0_PLLCAP       | 6    |                         |              |
| U3            | PL30A             | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    | PL44A             | 6    | LLM0_GPLLT_IN_A**/LDQ48 | T (LVDS)*    |
| U4            | PL30B             | 6    | LLM0_GPLLC_IN_A**/LDQ34 | C (LVDS)*    | PL44B             | 6    | LLM0_GPLLC_IN_A**/LDQ48 | C (LVDS)*    |
| V3            | PL31A             | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            | PL45A             | 6    | LLM0_GPLLT_FB_A/LDQ48   | T            |
| U5            | PL31B             | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            | PL45B             | 6    | LLM0_GPLLC_FB_A/LDQ48   | C            |
| V4            | PL32A             | 6    | LDQ34                   | T (LVDS)*    | PL46A             | 6    | LDQ48                   | T (LVDS)*    |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |
| V5            | PL32B             | 6    | LDQ34                   | C (LVDS)*    | PL46B             | 6    | LDQ48                   | C (LVDS)*    |
| Y3            | PL33A             | 6    | LDQ34                   | T            | PL47A             | 6    | LDQ48                   | T            |
| Y4            | PL33B             | 6    | LDQ34                   | C            | PL47B             | 6    | LDQ48                   | C            |
| W3            | PL34A             | 6    | LDQS34                  | T (LVDS)*    | PL48A             | 6    | LDQS48                  | T (LVDS)*    |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |
| W4            | PL34B             | 6    | LDQ34                   | C (LVDS)*    | PL48B             | 6    | LDQ48                   | C (LVDS)*    |
| AA1           | PL35A             | 6    | LDQ34                   | T            | PL49A             | 6    | LDQ48                   | T            |
| AB1           | PL35B             | 6    | LDQ34                   | C            | PL49B             | 6    | LDQ48                   | C            |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |
| U8            | PL36A             | 6    | LDQ34                   | T (LVDS)*    | PL50A             | 6    | LDQ48                   | T (LVDS)*    |
| U7            | PL36B             | 6    | LDQ34                   | C (LVDS)*    | PL50B             | 6    | LDQ48                   | C (LVDS)*    |
| V8            | PL37A             | 6    | LDQ34                   | T            | PL51A             | 6    | LDQ48                   | T            |
| U6            | PL37B             | 6    | LDQ34                   | C            | PL51B             | 6    | LDQ48                   | C            |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |
| W6            | PL38A             | 6    | LDQ42                   | T (LVDS)*    | PL52A             | 6    | LDQ56                   | T (LVDS)*    |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| W5            | PL38B             | 6    | LDQ42         | C (LVDS)*    | PL52B             | 6    | LDQ56         | C (LVDS)*    |  |
| AC1           | PL39A             | 6    | LDQ42         | T            | PL53A             | 6    | LDQ56         | T            |  |
| AD1           | PL39B             | 6    | LDQ42         | C            | PL53B             | 6    | LDQ56         | C            |  |
| VCCIO         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| Y6            | PL40A             | 6    | LDQ42         | T (LVDS)*    | PL54A             | 6    | LDQ56         | T (LVDS)*    |  |
| Y5            | PL40B             | 6    | LDQ42         | C (LVDS)*    | PL54B             | 6    | LDQ56         | C (LVDS)*    |  |
| AE2           | PL41A             | 6    | LDQ42         | T            | PL55A             | 6    | LDQ56         | T            |  |
| AD2           | PL41B             | 6    | LDQ42         | C            | PL55B             | 6    | LDQ56         | C            |  |
| GND           | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AB3           | PL42A             | 6    | LDQS42        | T (LVDS)*    | PL56A             | 6    | LDQS56        | T (LVDS)*    |  |
| AB2           | PL42B             | 6    | LDQ42         | C (LVDS)*    | PL56B             | 6    | LDQ56         | C (LVDS)*    |  |
| W7            | PL43A             | 6    | LDQ42         | T            | PL57A             | 6    | LDQ56         | T            |  |
| VCCIO         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| W8            | PL43B             | 6    | LDQ42         | C            | PL57B             | 6    | LDQ56         | C            |  |
| Y7            | PL44A             | 6    | LDQ42         | T (LVDS)*    | PL58A             | 6    | LDQ56         | T (LVDS)*    |  |
| Y8            | PL44B             | 6    | LDQ42         | C (LVDS)*    | PL58B             | 6    | LDQ56         | C (LVDS)*    |  |
| AC2           | PL45A             | 6    | LDQ42         | T            | PL59A             | 6    | LDQ56         | T            |  |
| GND           | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AD3           | PL45B             | 6    | LDQ42         | C            | PL59B             | 6    | LDQ56         | C            |  |
| AC3           | TCK               | -    |               |              | TCK               | -    |               |              |  |
| AA8           | TDI               | -    |               |              | TDI               | -    |               |              |  |
| AB4           | TMS               | -    |               |              | TMS               | -    |               |              |  |
| AA5           | TDO               | -    |               |              | TDO               | -    |               |              |  |
| AB5           | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| AE3           | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6  | T            |  |
| AF3           | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6  | C            |  |
| AC4           | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| AD4           | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AE4           | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| AF4           | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| V9            | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| W9            | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA6           | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| AB6           | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| AC5           | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| AD5           | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| AA7           | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| AB7           | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE5           | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| AF5           | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AC7           | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| AD7           | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| W10           | PB11A             | 5    | BDQ15         | T            | PB11A             | 5    | BDQ15         | T            |  |
| Y10           | PB11B             | 5    | BDQ15         | C            | PB11B             | 5    | BDQ15         | C            |  |
| W11           | PB12A             | 5    | BDQ15         | T            | PB12A             | 5    | BDQ15         | T            |  |
| AA10          | PB12B             | 5    | BDQ15         | C            | PB12B             | 5    | BDQ15         | C            |  |
| AC8           | PB13A             | 5    | BDQ15         | T            | PB13A             | 5    | BDQ15         | T            |  |
| AD8           | PB13B             | 5    | BDQ15         | C            | PB13B             | 5    | BDQ15         | C            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AB8           | PB14A             | 5    | BDQ15         | T            | PB14A             | 5    | BDQ15         | T            |  |
| AB10          | PB14B             | 5    | BDQ15         | C            | PB14B             | 5    | BDQ15         | C            |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AE6           | PB15A             | 5    | BDQS15        | T            | PB15A             | 5    | BDQS15        | T            |  |
| AF6           | PB15B             | 5    | BDQ15         | C            | PB15B             | 5    | BDQ15         | C            |  |
| AA11          | PB16A             | 5    | BDQ15         | T            | PB16A             | 5    | BDQ15         | T            |  |
| AC9           | PB16B             | 5    | BDQ15         | C            | PB16B             | 5    | BDQ15         | C            |  |
| AB9           | PB17A             | 5    | BDQ15         | T            | PB17A             | 5    | BDQ15         | T            |  |
| AD9           | PB17B             | 5    | BDQ15         | C            | PB17B             | 5    | BDQ15         | C            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y11           | PB18A             | 5    | BDQ15         | T            | PB18A             | 5    | BDQ15         | T            |  |
| AB11          | PB18B             | 5    | BDQ15         | C            | PB18B             | 5    | BDQ15         | C            |  |
| AE7           | PB19A             | 5    | BDQ15         | T            | PB19A             | 5    | BDQ15         | T            |  |
| AF7           | PB19B             | 5    | BDQ15         | C            | PB19B             | 5    | BDQ15         | C            |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AC10          | PB20A             | 5    | BDQ24         | T            | PB20A             | 5    | BDQ24         | T            |  |
| AD10          | PB20B             | 5    | BDQ24         | C            | PB20B             | 5    | BDQ24         | C            |  |
| AA12          | PB21A             | 5    | BDQ24         | T            | PB21A             | 5    | BDQ24         | T            |  |
| W12           | PB21B             | 5    | BDQ24         | C            | PB21B             | 5    | BDQ24         | C            |  |
| AB12          | PB22A             | 5    | BDQ24         | T            | PB22A             | 5    | BDQ24         | T            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y12           | PB22B             | 5    | BDQ24         | C            | PB22B             | 5    | BDQ24         | C            |  |
| AD12          | PB23A             | 5    | BDQ24         | T            | PB23A             | 5    | BDQ24         | T            |  |
| AC12          | PB23B             | 5    | BDQ24         | C            | PB23B             | 5    | BDQ24         | C            |  |
| AC13          | PB24A             | 5    | BDQS24        | T            | PB24A             | 5    | BDQS24        | T            |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA13          | PB24B             | 5    | BDQ24         | C            | PB24B             | 5    | BDQ24         | C            |  |
| AD13          | PB25A             | 5    | BDQ24         | T            | PB25A             | 5    | BDQ24         | T            |  |
| AC14          | PB25B             | 5    | BDQ24         | C            | PB25B             | 5    | BDQ24         | C            |  |
| AE8           | PB26A             | 5    | BDQ24         | T            | PB26A             | 5    | BDQ24         | T            |  |
| VCCIO         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AF8           | PB26B             | 5    | BDQ24         | C            | PB26B             | 5    | BDQ24         | C            |  |
| AB15          | PB27A             | 5    | BDQ24         | T            | PB27A             | 5    | BDQ24         | T            |  |
| Y13           | PB27B             | 5    | BDQ24         | C            | PB27B             | 5    | BDQ24         | C            |  |
| AE9           | PB28A             | 5    | BDQ24         | T            | PB28A             | 5    | BDQ24         | T            |  |
| GND           | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AF9           | PB28B             | 5    | BDQ24         | C            | PB28B             | 5    | BDQ24         | C            |  |
| W13           | PB29A             | 5    | BDQ33         | T            | PB29A             | 5    | BDQ33         | T            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                |              | LFE2-35E/35SE     |      |                |              |  |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AA14          | PB29B             | 5    | BDQ33          | C            | PB29B             | 5    | BDQ33          | C            |  |
| AE10          | PB30A             | 5    | BDQ33          | T            | PB30A             | 5    | BDQ33          | T            |  |
| AF10          | PB30B             | 5    | BDQ33          | C            | PB30B             | 5    | BDQ33          | C            |  |
| W14           | PB31A             | 5    | BDQ33          | T            | PB31A             | 5    | BDQ33          | T            |  |
| AB13          | PB31B             | 5    | BDQ33          | C            | PB31B             | 5    | BDQ33          | C            |  |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| Y14           | PB32A             | 5    | BDQ33          | T            | PB32A             | 5    | BDQ33          | T            |  |
| AB14          | PB32B             | 5    | BDQ33          | C            | PB32B             | 5    | BDQ33          | C            |  |
| GND           | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AE11          | PB33A             | 5    | BDQS33         | T            | PB33A             | 5    | BDQS33         | T            |  |
| AF11          | PB33B             | 5    | BDQ33          | C            | PB33B             | 5    | BDQ33          | C            |  |
| AD14          | PB34A             | 5    | BDQ33          | T            | PB34A             | 5    | BDQ33          | T            |  |
| AA15          | PB34B             | 5    | BDQ33          | C            | PB34B             | 5    | BDQ33          | C            |  |
| AE12          | PB35A             | 5    | PCLKT5_0/BDQ33 | T            | PB35A             | 5    | PCLKT5_0/BDQ33 | T            |  |
| AF12          | PB35B             | 5    | PCLKC5_0/BDQ33 | C            | PB35B             | 5    | PCLKC5_0/BDQ33 | C            |  |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GND           | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AD15          | PB40A             | 4    | PCLKT4_0/BDQ42 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC15          | PB40B             | 4    | PCLKC4_0/BDQ42 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |  |
| AE13          | PB41A             | 4    | BDQ42          | T            | PB41A             | 4    | BDQ42          | T            |  |
| AF13          | PB41B             | 4    | BDQ42          | C            | PB41B             | 4    | BDQ42          | C            |  |
| AB17          | PB42A             | 4    | BDQS42         | T            | PB42A             | 4    | BDQS42         | T            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| Y15           | PB42B             | 4    | BDQ42          | C            | PB42B             | 4    | BDQ42          | C            |  |
| AE14          | PB43A             | 4    | BDQ42          | T            | PB43A             | 4    | BDQ42          | T            |  |
| AF14          | PB43B             | 4    | BDQ42          | C            | PB43B             | 4    | BDQ42          | C            |  |
| AA16          | PB44A             | 4    | BDQ42          | T            | PB44A             | 4    | BDQ42          | T            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| W15           | PB44B             | 4    | BDQ42          | C            | PB44B             | 4    | BDQ42          | C            |  |
| AC17          | PB45A             | 4    | BDQ42          | T            | PB45A             | 4    | BDQ42          | T            |  |
| AB16          | PB45B             | 4    | BDQ42          | C            | PB45B             | 4    | BDQ42          | C            |  |
| AE15          | PB46A             | 4    | BDQ42          | T            | PB46A             | 4    | BDQ42          | T            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AF15          | PB46B             | 4    | BDQ42          | C            | PB46B             | 4    | BDQ42          | C            |  |
| AE16          | PB47A             | 4    | BDQ51          | T            | PB47A             | 4    | BDQ51          | T            |  |
| AF16          | PB47B             | 4    | BDQ51          | C            | PB47B             | 4    | BDQ51          | C            |  |
| Y16           | PB48A             | 4    | BDQ51          | T            | PB48A             | 4    | BDQ51          | T            |  |
| AB18          | PB48B             | 4    | BDQ51          | C            | PB48B             | 4    | BDQ51          | C            |  |
| AD17          | PB49A             | 4    | BDQ51          | T            | PB49A             | 4    | BDQ51          | T            |  |
| AD18          | PB49B             | 4    | BDQ51          | C            | PB49B             | 4    | BDQ51          | C            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC18          | PB50A             | 4    | BDQ51          | T            | PB50A             | 4    | BDQ51          | T            |  |
| AD19          | PB50B             | 4    | BDQ51          | C            | PB50B             | 4    | BDQ51          | C            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AC19          | PB51A             | 4    | BDQS51         | T            | PB51A             | 4    | BDQS51         | T            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AE17          | PB51B             | 4    | BDQ51         | C            | PB51B             | 4    | BDQ51         | C            |  |
| AB19          | PB52A             | 4    | BDQ51         | T            | PB52A             | 4    | BDQ51         | T            |  |
| AE19          | PB52B             | 4    | BDQ51         | C            | PB52B             | 4    | BDQ51         | C            |  |
| AF17          | PB53A             | 4    | BDQ51         | T            | PB53A             | 4    | BDQ51         | T            |  |
| AE18          | PB53B             | 4    | BDQ51         | C            | PB53B             | 4    | BDQ51         | C            |  |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| W16           | PB54A             | 4    | BDQ51         | T            | PB54A             | 4    | BDQ51         | T            |  |
| AA17          | PB54B             | 4    | BDQ51         | C            | PB54B             | 4    | BDQ51         | C            |  |
| AF18          | PB55A             | 4    | BDQ51         | T            | PB55A             | 4    | BDQ51         | T            |  |
| AF19          | PB55B             | 4    | BDQ51         | C            | PB55B             | 4    | BDQ51         | C            |  |
| GND           | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AA19          | NC                | -    |               |              | PB56A             | 4    | BDQ60         | T            |  |
| W17           | NC                | -    |               |              | PB56B             | 4    | BDQ60         | C            |  |
| Y19           | NC                | -    |               |              | PB57A             | 4    | BDQ60         | T            |  |
| Y17           | NC                | -    |               |              | PB57B             | 4    | BDQ60         | C            |  |
| AF20          | NC                | -    |               |              | NC                | -    |               |              |  |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AE20          | NC                | -    |               |              | NC                | -    |               |              |  |
| AA20          | NC                | -    |               |              | NC                | -    |               |              |  |
| W18           | NC                | -    |               |              | NC                | -    |               |              |  |
| AD20          | NC                | -    |               |              | NC                | -    |               |              |  |
| GND           | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AE21          | NC                | -    |               |              | NC                | -    |               |              |  |
| AF21          | NC                | -    |               |              | NC                | -    |               |              |  |
| AF22          | NC                | -    |               |              | NC                | -    |               |              |  |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| GND           | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AE22          | PB56A             | 4    | BDQ60         | T            | PB65A             | 4    | BDQ69         | T            |  |
| AD22          | PB56B             | 4    | BDQ60         | C            | PB65B             | 4    | BDQ69         | C            |  |
| AF23          | PB57A             | 4    | BDQ60         | T            | PB66A             | 4    | BDQ69         | T            |  |
| AE23          | PB57B             | 4    | BDQ60         | C            | PB66B             | 4    | BDQ69         | C            |  |
| AD23          | PB58A             | 4    | BDQ60         | T            | PB67A             | 4    | BDQ69         | T            |  |
| AC23          | PB58B             | 4    | BDQ60         | C            | PB67B             | 4    | BDQ69         | C            |  |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AB20          | PB59A             | 4    | BDQ60         | T            | PB68A             | 4    | BDQ69         | T            |  |
| AC20          | PB59B             | 4    | BDQ60         | C            | PB68B             | 4    | BDQ69         | C            |  |
| GND           | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AB21          | PB60A             | 4    | BDQS60        | T            | PB69A             | 4    | BDQS69        | T            |  |
| AC22          | PB60B             | 4    | BDQ60         | C            | PB69B             | 4    | BDQ69         | C            |  |
| W19           | PB61A             | 4    | BDQ60         | T            | PB70A             | 4    | BDQ69         | T            |  |
| AA21          | PB61B             | 4    | BDQ60         | C            | PB70B             | 4    | BDQ69         | C            |  |
| AF24          | PB62A             | 4    | BDQ60         | T            | PB71A             | 4    | BDQ69         | T            |  |
| AE24          | PB62B             | 4    | BDQ60         | C            | PB71B             | 4    | BDQ69         | C            |  |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| Y20           | PB63A             | 4    | BDQ60         | T            | PB72A             | 4    | BDQ69         | T            |  |
| AB22          | PB63B             | 4    | BDQ60         | C            | PB72B             | 4    | BDQ69         | C            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                        |              | LFE2-35E/35SE     |      |                        |              |  |
|---------------|-------------------|------|------------------------|--------------|-------------------|------|------------------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function          | Differential | Ball/Pad Function | Bank | Dual Function          | Differential |  |
| Y21           | PB64A             | 4    | VREF2_4/BDQ60          | T            | PB73A             | 4    | VREF2_4/BDQ69          | T            |  |
| AB23          | PB64B             | 4    | VREF1_4/BDQ60          | C            | PB73B             | 4    | VREF1_4/BDQ69          | C            |  |
| GND           | GNDIO4            | -    |                        |              | GNDIO4            | -    |                        |              |  |
| AD24          | CFG2              | 8    |                        |              | CFG2              | 8    |                        |              |  |
| W20           | CFG1              | 8    |                        |              | CFG1              | 8    |                        |              |  |
| AC24          | CFG0              | 8    |                        |              | CFG0              | 8    |                        |              |  |
| V19           | PROGRAMN          | 8    |                        |              | PROGRAMN          | 8    |                        |              |  |
| AA22          | CCLK              | 8    |                        |              | CCLK              | 8    |                        |              |  |
| AB24          | INITN             | 8    |                        |              | INITN             | 8    |                        |              |  |
| AD25          | DONE              | 8    |                        |              | DONE              | 8    |                        |              |  |
| GND           | GNDIO8            | -    |                        |              | GNDIO8            | -    |                        |              |  |
| W21           | PR44B             | 8    | WRITEN                 | C            | PR58B             | 8    | WRITEN                 | C            |  |
| Y22           | PR44A             | 8    | CS1N                   | T            | PR58A             | 8    | CS1N                   | T            |  |
| AC25          | PR43B             | 8    | CSN                    | C            | PR57B             | 8    | CSN                    | C            |  |
| AB25          | PR43A             | 8    | D0/SPIFASTN            | T            | PR57A             | 8    | D0/SPIFASTN            | T            |  |
| VCCIO         | VCCIO8            | 8    |                        |              | VCCIO8            | 8    |                        |              |  |
| AD26          | PR42B             | 8    | D1                     | C            | PR56B             | 8    | D1                     | C            |  |
| AC26          | PR42A             | 8    | D2                     | T            | PR56A             | 8    | D2                     | T            |  |
| Y23           | PR41B             | 8    | D3                     | C            | PR55B             | 8    | D3                     | C            |  |
| GND           | GNDIO8            | -    |                        |              | GNDIO8            | -    |                        |              |  |
| W22           | PR41A             | 8    | D4                     | T            | PR55A             | 8    | D4                     | T            |  |
| AA25          | PR40B             | 8    | D5                     | C            | PR54B             | 8    | D5                     | C            |  |
| AB26          | PR40A             | 8    | D6                     | T            | PR54A             | 8    | D6                     | T            |  |
| W23           | PR39B             | 8    | D7/SPID0               | C            | PR53B             | 8    | D7/SPID0               | C            |  |
| VCCIO         | VCCIO8            | 8    |                        |              | VCCIO8            | 8    |                        |              |  |
| V22           | PR39A             | 8    | DI/CSSPI0N             | T            | PR53A             | 8    | DI/CSSPI0N             | T            |  |
| Y24           | PR38B             | 8    | DOUT/CSON              | C            | PR52B             | 8    | DOUT/CSON              | C            |  |
| Y25           | PR38A             | 8    | BUSY/SISPI             | T            | PR52A             | 8    | BUSY/SISPI             | T            |  |
| W24           | PR37B             | 3    | RDQ34                  | C            | PR51B             | 3    | RDQ48                  | C            |  |
| GND           | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |  |
| V23           | PR37A             | 3    | RDQ34                  | T            | PR51A             | 3    | RDQ48                  | T            |  |
| AA26          | PR36B             | 3    | RDQ34                  | C (LVDS)*    | PR50B             | 3    | RDQ48                  | C (LVDS)*    |  |
| Y26           | PR36A             | 3    | RDQ34                  | T (LVDS)*    | PR50A             | 3    | RDQ48                  | T (LVDS)*    |  |
| U21           | PR35B             | 3    | RDQ34                  | C            | PR49B             | 3    | RDQ48                  | C            |  |
| VCCIO         | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |  |
| U19           | PR35A             | 3    | RDQ34                  | T            | PR49A             | 3    | RDQ48                  | T            |  |
| W25           | PR34B             | 3    | RDQ34                  | C (LVDS)*    | PR48B             | 3    | RDQ48                  | C (LVDS)*    |  |
| W26           | PR34A             | 3    | RDQS34                 | T (LVDS)*    | PR48A             | 3    | RDQS48                 | T (LVDS)*    |  |
| GND           | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |  |
| V24           | PR33B             | 3    | RDQ34                  | C            | PR47B             | 3    | RDQ48                  | C            |  |
| V25           | PR33A             | 3    | RDQ34                  | T            | PR47A             | 3    | RDQ48                  | T            |  |
| V26           | PR32B             | 3    | RDQ34                  | C (LVDS)*    | PR46B             | 3    | RDQ48                  | C (LVDS)*    |  |
| U26           | PR32A             | 3    | RDQ34                  | T (LVDS)*    | PR46A             | 3    | RDQ48                  | T (LVDS)*    |  |
| VCCIO         | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |  |
| U22           | PR31B             | 3    | RLM0_GPLL_C_FB_A/RDQ34 | C            | PR45B             | 3    | RLM0_GPLL_C_FB_A/RDQ48 | C            |  |
| U23           | PR31A             | 3    | RLM0_GPLLT_FB_A/RDQ34  | T            | PR45A             | 3    | RLM0_GPLLT_FB_A/RDQ48  | T            |  |



## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                          |              | LFE2-35E/35SE     |      |                          |              |  |
|---------------|-------------------|------|--------------------------|--------------|-------------------|------|--------------------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function            | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |  |
| U24           | PR30B             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    | PR44B             | 3    | RLM0_GPLL_C_IN_A**/RDQ48 | C (LVDS)*    |  |
| U25           | PR30A             | 3    | RLM0_GPLL_T_IN_A**/RDQ34 | T (LVDS)*    | PR44A             | 3    | RLM0_GPLL_T_IN_A**/RDQ48 | T (LVDS)*    |  |
| R20           | RLM0_PLLCAP       | 3    |                          |              | RLM0_PLLCAP       | 3    |                          |              |  |
| P18           | VCC               | 3    |                          |              | VCCPLL            | 3    |                          |              |  |
| T19           | PR28B             | 3    | RLM0_GDLLC_FB_A/RDQ25    | C            | PR42B             | 3    | RLM0_GDLLC_FB_A/RDQ39    | C            |  |
| U20           | PR28A             | 3    | RLM0_GDLLT_FB_A/RDQ25    | T            | PR42A             | 3    | RLM0_GDLLT_FB_A/RDQ39    | T            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T25           | PR27B             | 3    | RLM0_GDLLC_IN_A**/RDQ25  | C (LVDS)*    | PR41B             | 3    | RLM0_GDLLC_IN_A**/RDQ39  | C (LVDS)*    |  |
| T26           | PR27A             | 3    | RLM0_GDLLT_IN_A**/RDQ25  | T (LVDS)*    | PR41A             | 3    | RLM0_GDLLT_IN_A**/RDQ39  | T (LVDS)*    |  |
| T20           | PR26B             | 3    | RDQ25                    | C            | PR40B             | 3    | RDQ39                    | C            |  |
| T22           | PR26A             | 3    | RDQ25                    | T            | PR40A             | 3    | RDQ39                    | T            |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R26           | PR25B             | 3    | RDQ25                    | C (LVDS)*    | PR39B             | 3    | RDQ39                    | C (LVDS)*    |  |
| R25           | PR25A             | 3    | RDQS25***                | T (LVDS)*    | PR39A             | 3    | RDQS39***                | T (LVDS)*    |  |
| R22           | NC                | -    |                          |              | PR38B             | 3    | RDQ39                    | C            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T21           | NC                | -    |                          |              | PR38A             | 3    | RDQ39                    | T            |  |
| P26           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P25           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| R24           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R23           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P20           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| R19           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P21           | NC                | -    |                          |              | PR34B             | 3    | RDQ31                    | C            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| P19           | NC                | -    |                          |              | PR34A             | 3    | RDQ31                    | T            |  |
| P23           | NC                | -    |                          |              | PR33B             | 3    | RDQ31                    | C (LVDS)*    |  |
| P22           | NC                | -    |                          |              | PR33A             | 3    | RDQ31                    | T (LVDS)*    |  |
| N22           | NC                | -    |                          |              | PR32B             | 3    | RDQ31                    | C            |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R21           | NC                | -    |                          |              | PR32A             | 3    | RDQ31                    | T            |  |
| N26           | NC                | -    |                          |              | PR31B             | 3    | RDQ31                    | C (LVDS)*    |  |
| N25           | NC                | -    |                          |              | PR31A             | 3    | RDQS31                   | T (LVDS)*    |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| N19           | PR24B             | 3    | RDQ25                    | C            | PR30B             | 3    | RDQ31                    | C            |  |
| N20           | PR24A             | 3    | RDQ25                    | T            | PR30A             | 3    | RDQ31                    | T            |  |
| M26           | PR23B             | 3    | RDQ25                    | C (LVDS)*    | PR29B             | 3    | RDQ31                    | C (LVDS)*    |  |
| M25           | PR23A             | 3    | RDQ25                    | T (LVDS)*    | PR29A             | 3    | RDQ31                    | T (LVDS)*    |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| N18           | PR22B             | 3    | VREF2_3/RDQ25            | C            | PR28B             | 3    | VREF2_3/RDQ31            | C            |  |
| N21           | PR22A             | 3    | VREF1_3/RDQ25            | T            | PR28A             | 3    | VREF1_3/RDQ31            | T            |  |
| L26           | PR21B             | 3    | PCLKC3_0/RDQ25           | C (LVDS)*    | PR27B             | 3    | PCLKC3_0/RDQ31           | C (LVDS)*    |  |
| L25           | PR21A             | 3    | PCLKT3_0/RDQ25           | T (LVDS)*    | PR27A             | 3    | PCLKT3_0/RDQ31           | T (LVDS)*    |  |
| N24           | PR19B             | 2    | PCLKC2_0/RDQ16           | C            | PR25B             | 2    | PCLKC2_0/RDQ22           | C            |  |
| M23           | PR19A             | 2    | PCLKT2_0/RDQ16           | T            | PR25A             | 2    | PCLKT2_0/RDQ22           | T            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| L21           | PR18B             | 2    | RDQ16         | C (LVDS)*    | PR24B             | 2    | RDQ22         | C (LVDS)*    |
| K22           | PR18A             | 2    | RDQ16         | T (LVDS)*    | PR24A             | 2    | RDQ22         | T (LVDS)*    |
| M24           | PR17B             | 2    | RDQ16         | C            | PR23B             | 2    | RDQ22         | C            |
| N23           | PR17A             | 2    | RDQ16         | T            | PR23A             | 2    | RDQ22         | T            |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K26           | PR16B             | 2    | RDQ16         | C (LVDS)*    | PR22B             | 2    | RDQ22         | C (LVDS)*    |
| K25           | PR16A             | 2    | RDQS16        | T (LVDS)*    | PR22A             | 2    | RDQS22        | T (LVDS)*    |
| M20           | PR15B             | 2    | RDQ16         | C            | PR21B             | 2    | RDQ22         | C            |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| M19           | PR15A             | 2    | RDQ16         | T            | PR21A             | 2    | RDQ22         | T            |
| L22           | PR14B             | 2    | RDQ16         | C (LVDS)*    | PR20B             | 2    | RDQ22         | C (LVDS)*    |
| M22           | PR14A             | 2    | RDQ16         | T (LVDS)*    | PR20A             | 2    | RDQ22         | T (LVDS)*    |
| K21           | PR13B             | 2    | RDQ16         | C            | PR19B             | 2    | RDQ22         | C            |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M21           | PR13A             | 2    | RDQ16         | T            | PR19A             | 2    | RDQ22         | T            |
| K24           | PR12B             | 2    | RDQ16         | C (LVDS)*    | PR18B             | 2    | RDQ22         | C (LVDS)*    |
| J24           | PR12A             | 2    | RDQ16         | T (LVDS)*    | PR18A             | 2    | RDQ22         | T (LVDS)*    |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| L20           | VCC               | -    |               |              | NC                | -    |               |              |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| J26           | NC                | -    |               |              | NC                | -    |               |              |
| J25           | NC                | -    |               |              | NC                | -    |               |              |
| J23           | NC                | -    |               |              | NC                | -    |               |              |
| K23           | NC                | -    |               |              | NC                | -    |               |              |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| H26           | NC                | -    |               |              | NC                | -    |               |              |
| H25           | NC                | -    |               |              | NC                | -    |               |              |
| H24           | NC                | -    |               |              | NC                | -    |               |              |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| H23           | NC                | -    |               |              | NC                | -    |               |              |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| G26           | PR11B             | 2    | RDQ8          | C            | PR17B             | 2    | RDQ14         | C            |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| G25           | PR11A             | 2    | RDQ8          | T            | PR17A             | 2    | RDQ14         | T            |
| F26           | PR10B             | 2    | RDQ8          | C (LVDS)*    | PR16B             | 2    | RDQ14         | C (LVDS)*    |
| F25           | PR10A             | 2    | RDQ8          | T (LVDS)*    | PR16A             | 2    | RDQ14         | T (LVDS)*    |
| K20           | PR9B              | 2    | RDQ8          | C            | PR15B             | 2    | RDQ14         | C            |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| L19           | PR9A              | 2    | RDQ8          | T            | PR15A             | 2    | RDQ14         | T            |
| E26           | PR8B              | 2    | RDQ8          | C (LVDS)*    | PR14B             | 2    | RDQ14         | C (LVDS)*    |
| E25           | PR8A              | 2    | RDQS8         | T (LVDS)*    | PR14A             | 2    | RDQS14        | T (LVDS)*    |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| J22           | PR7B              | 2    | RDQ8          | C            | PR13B             | 2    | RDQ14         | C            |
| H22           | PR7A              | 2    | RDQ8          | T            | PR13A             | 2    | RDQ14         | T            |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| G24           | PR6B              | 2    | RDQ8          | C (LVDS)*    | PR12B             | 2    | RDQ14         | C (LVDS)*    |  |
| G23           | PR6A              | 2    | RDQ8          | T (LVDS)*    | PR12A             | 2    | RDQ14         | T (LVDS)*    |  |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K19           | PR5B              | 2    | RDQ8          | C            | PR11B             | 2    | RDQ14         | C            |  |
| J19           | PR5A              | 2    | RDQ8          | T            | PR11A             | 2    | RDQ14         | T            |  |
| D26           | PR4B              | 2    | RDQ8          | C (LVDS)*    | PR10B             | 2    | RDQ14         | C (LVDS)*    |  |
| C26           | PR4A              | 2    | RDQ8          | T (LVDS)*    | PR10A             | 2    | RDQ14         | T (LVDS)*    |  |
| F22           | NC                | -    |               |              | PR9B              | 2    | RDQ6          | C            |  |
| E24           | NC                | -    |               |              | PR9A              | 2    | RDQ6          | T            |  |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| D25           | NC                | -    |               |              | PR8B              | 2    | RDQ6          | C (LVDS)*    |  |
| C25           | NC                | -    |               |              | PR8A              | 2    | RDQ6          | T (LVDS)*    |  |
| D24           | NC                | -    |               |              | PR7B              | 2    | RDQ6          | C            |  |
| B25           | NC                | -    |               |              | PR7A              | 2    | RDQ6          | T            |  |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H21           | NC                | -    |               |              | PR6B              | 2    | RDQ6          | C (LVDS)*    |  |
| G22           | NC                | -    |               |              | PR6A              | 2    | RDQS6         | T (LVDS)*    |  |
| B24           | NC                | -    |               |              | PR5B              | 2    | RDQ6          | C            |  |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| C24           | NC                | -    |               |              | PR5A              | 2    | RDQ6          | T            |  |
| D23           | NC                | -    |               |              | PR4B              | 2    | RDQ6          | C (LVDS)*    |  |
| C23           | NC                | -    |               |              | PR4A              | 2    | RDQ6          | T (LVDS)*    |  |
| G21           | PR3B              | 2    |               | C            | PR3B              | 2    | RDQ6          | C            |  |
| VCCIO         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H20           | PR3A              | 2    |               | T            | PR3A              | 2    | RDQ6          | T            |  |
| GND           | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| E22           | PR2B              | 2    | VREF2_2       | C (LVDS)*    | PR2B              | 2    | VREF2_2/RDQ6  | C (LVDS)*    |  |
| F21           | PR2A              | 2    | VREF1_2       | T (LVDS)*    | PR2A              | 2    | VREF1_2/RDQ6  | T (LVDS)*    |  |
| E23           | PT64B             | 1    | VREF2_1       | C            | PT73B             | 1    | VREF2_1       | C            |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| D22           | PT64A             | 1    | VREF1_1       | T            | PT73A             | 1    | VREF1_1       | T            |  |
| G20           | PT63B             | 1    |               | C            | PT72B             | 1    |               | C            |  |
| J18           | PT63A             | 1    |               | T            | PT72A             | 1    |               | T            |  |
| F20           | PT62B             | 1    |               | C            | PT71B             | 1    |               | C            |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H19           | PT62A             | 1    |               | T            | PT71A             | 1    |               | T            |  |
| A24           | PT61B             | 1    |               | C            | PT70B             | 1    |               | C            |  |
| A23           | PT61A             | 1    |               | T            | PT70A             | 1    |               | T            |  |
| E21           | PT60B             | 1    |               | C            | PT69B             | 1    |               | C            |  |
| F19           | PT60A             | 1    |               | T            | PT69A             | 1    |               | T            |  |
| C22           | PT59B             | 1    |               | C            | PT68B             | 1    |               | C            |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| E20           | PT59A             | 1    |               | T            | PT68A             | 1    |               | T            |  |
| B22           | PT58B             | 1    |               | C            | PT67B             | 1    |               | C            |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| B23           | PT58A             | 1    |               | T            | PT67A             | 1    |               | T            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C20           | PT57B             | 1    |               | C            | PT66B             | 1    |               | C            |  |
| D20           | PT57A             | 1    |               | T            | PT66A             | 1    |               | T            |  |
| A22           | PT56B             | 1    |               | C            | PT65B             | 1    |               | C            |  |
| A21           | PT56A             | 1    |               | T            | PT65A             | 1    |               | T            |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| E19           | NC                | -    |               |              | NC                | -    |               |              |  |
| C19           | NC                | -    |               |              | NC                | -    |               |              |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| B21           | NC                | -    |               |              | NC                | -    |               |              |  |
| B20           | NC                | -    |               |              | NC                | -    |               |              |  |
| D19           | NC                | -    |               |              | NC                | -    |               |              |  |
| B19           | NC                | -    |               |              | NC                | -    |               |              |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| G17           | NC                | -    |               |              | NC                | -    |               |              |  |
| E18           | NC                | -    |               |              | NC                | -    |               |              |  |
| G19           | NC                | -    |               |              | NC                | -    |               |              |  |
| F17           | NC                | -    |               |              | NC                | -    |               |              |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| A20           | NC                | -    |               |              | NC                | -    |               |              |  |
| A19           | NC                | -    |               |              | NC                | -    |               |              |  |
| E17           | NC                | -    |               |              | NC                | -    |               |              |  |
| D18           | NC                | -    |               |              | NC                | -    |               |              |  |
| B18           | PT55B             | 1    |               | C            | PT55B             | 1    |               | C            |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| A18           | PT55A             | 1    |               | T            | PT55A             | 1    |               | T            |  |
| E16           | PT54B             | 1    |               | C            | PT54B             | 1    |               | C            |  |
| G16           | PT54A             | 1    |               | T            | PT54A             | 1    |               | T            |  |
| F16           | PT53B             | 1    |               | C            | PT53B             | 1    |               | C            |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H18           | PT53A             | 1    |               | T            | PT53A             | 1    |               | T            |  |
| A17           | PT52B             | 1    |               | C            | PT52B             | 1    |               | C            |  |
| B17           | PT52A             | 1    |               | T            | PT52A             | 1    |               | T            |  |
| C18           | PT51B             | 1    |               | C            | PT51B             | 1    |               | C            |  |
| B16           | PT51A             | 1    |               | T            | PT51A             | 1    |               | T            |  |
| C17           | PT50B             | 1    |               | C            | PT50B             | 1    |               | C            |  |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| D17           | PT50A             | 1    |               | T            | PT50A             | 1    |               | T            |  |
| E15           | PT49B             | 1    |               | C            | PT49B             | 1    |               | C            |  |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G15           | PT49A             | 1    |               | T            | PT49A             | 1    |               | T            |  |
| A16           | PT48B             | 1    |               | C            | PT48B             | 1    |               | C            |  |
| B15           | PT48A             | 1    |               | T            | PT48A             | 1    |               | T            |  |
| D15           | PT47B             | 1    |               | C            | PT47B             | 1    |               | C            |  |
| F15           | PT47A             | 1    |               | T            | PT47A             | 1    |               | T            |  |
| A14           | PT46B             | 1    |               | C            | PT46B             | 1    |               | C            |  |
| B14           | PT46A             | 1    |               | T            | PT46A             | 1    |               | T            |  |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C15           | PT45B             | 1    |               | C            | PT45B             | 1    |               | C            |
| A15           | PT45A             | 1    |               | T            | PT45A             | 1    |               | T            |
| A13           | PT44B             | 1    |               | C            | PT44B             | 1    |               | C            |
| B13           | PT44A             | 1    |               | T            | PT44A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H17           | PT43B             | 1    |               | C            | PT43B             | 1    |               | C            |
| H15           | PT43A             | 1    |               | T            | PT43A             | 1    |               | T            |
| D13           | PT42B             | 1    |               | C            | PT42B             | 1    |               | C            |
| C14           | PT42A             | 1    |               | T            | PT42A             | 1    |               | T            |
| GND           | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| G14           | PT41B             | 1    |               | C            | PT41B             | 1    |               | C            |
| E14           | PT41A             | 1    |               | T            | PT41A             | 1    |               | T            |
| A12           | PT40B             | 1    |               | C            | PT40B             | 1    |               | C            |
| B12           | PT40A             | 1    |               | T            | PT40A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| F14           | PT39B             | 1    | PCLKC1_0      | C            | PT39B             | 1    | PCLKC1_0      | C            |
| D14           | PT39A             | 1    | PCLKT1_0      | T            | PT39A             | 1    | PCLKT1_0      | T            |
| H16           | XRES              | 1    |               |              | XRES              | 1    |               |              |
| H14           | PT37B             | 0    | PCLKC0_0      | C            | PT37B             | 0    | PCLKC0_0      | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| H13           | PT37A             | 0    | PCLKT0_0      | T            | PT37A             | 0    | PCLKT0_0      | T            |
| A11           | PT36B             | 0    |               | C            | PT36B             | 0    |               | C            |
| B11           | PT36A             | 0    |               | T            | PT36A             | 0    |               | T            |
| C13           | PT35B             | 0    |               | C            | PT35B             | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| E13           | PT35A             | 0    |               | T            | PT35A             | 0    |               | T            |
| D12           | PT34B             | 0    |               | C            | PT34B             | 0    |               | C            |
| F13           | PT34A             | 0    |               | T            | PT34A             | 0    |               | T            |
| A10           | PT33B             | 0    |               | C            | PT33B             | 0    |               | C            |
| B10           | PT33A             | 0    |               | T            | PT33A             | 0    |               | T            |
| C12           | PT32B             | 0    |               | C            | PT32B             | 0    |               | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C10           | PT32A             | 0    |               | T            | PT32A             | 0    |               | T            |
| G13           | PT31B             | 0    |               | C            | PT31B             | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H12           | PT31A             | 0    |               | T            | PT31A             | 0    |               | T            |
| A9            | PT30B             | 0    |               | C            | PT30B             | 0    |               | C            |
| B9            | PT30A             | 0    |               | T            | PT30A             | 0    |               | T            |
| E12           | PT29B             | 0    |               | C            | PT29B             | 0    |               | C            |
| G12           | PT29A             | 0    |               | T            | PT29A             | 0    |               | T            |
| A8            | PT28B             | 0    |               | C            | PT28B             | 0    |               | C            |
| B8            | PT28A             | 0    |               | T            | PT28A             | 0    |               | T            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E11           | PT27B             | 0    |               | C            | PT27B             | 0    |               | C            |
| C9            | PT27A             | 0    |               | T            | PT27A             | 0    |               | T            |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A7            | PT26B             | 0    |               | C            | PT26B             | 0    |               | C            |
| B7            | PT26A             | 0    |               | T            | PT26A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F12           | PT25B             | 0    |               | C            | PT25B             | 0    |               | C            |
| D10           | PT25A             | 0    |               | T            | PT25A             | 0    |               | T            |
| H11           | PT24B             | 0    |               | C            | PT24B             | 0    |               | C            |
| G11           | PT24A             | 0    |               | T            | PT24A             | 0    |               | T            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| A6            | PT23B             | 0    |               | C            | PT23B             | 0    |               | C            |
| B6            | PT23A             | 0    |               | T            | PT23A             | 0    |               | T            |
| D8            | PT22B             | 0    |               | C            | PT22B             | 0    |               | C            |
| C8            | PT22A             | 0    |               | T            | PT22A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F11           | PT21B             | 0    |               | C            | PT21B             | 0    |               | C            |
| E10           | PT21A             | 0    |               | T            | PT21A             | 0    |               | T            |
| E9            | PT20B             | 0    |               | C            | PT20B             | 0    |               | C            |
| D9            | PT20A             | 0    |               | T            | PT20A             | 0    |               | T            |
| G10           | PT19B             | 0    |               | C            | PT19B             | 0    |               | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| H10           | PT19A             | 0    |               | T            | PT19A             | 0    |               | T            |
| A5            | PT18B             | 0    |               | C            | PT18B             | 0    |               | C            |
| B5            | PT18A             | 0    |               | T            | PT18A             | 0    |               | T            |
| C7            | PT17B             | 0    |               | C            | PT17B             | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D7            | PT17A             | 0    |               | T            | PT17A             | 0    |               | T            |
| E8            | PT16B             | 0    |               | C            | PT16B             | 0    |               | C            |
| F10           | PT16A             | 0    |               | T            | PT16A             | 0    |               | T            |
| F8            | PT15B             | 0    |               | C            | PT15B             | 0    |               | C            |
| H9            | PT15A             | 0    |               | T            | PT15A             | 0    |               | T            |
| C5            | PT14B             | 0    |               | C            | PT14B             | 0    |               | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| D5            | PT14A             | 0    |               | T            | PT14A             | 0    |               | T            |
| B4            | PT13B             | 0    |               |              | PT13B             | 0    |               |              |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C4            | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C3            | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |
| A4            | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |
| A3            | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |
| B3            | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B2            | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| D4            | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |
| D3            | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |
| C2            | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |
| C1            | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |
| G8            | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |
| GND           | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| G7            | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |
| E7            | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F7            | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |
| E6            | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |
| E5            | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |
| G6            | PT2B              | 0    | VREF2_0       | C            | PT2B              | 0    | VREF2_0       | C            |
| G5            | PT2A              | 0    | VREF1_0       | T            | PT2A              | 0    | VREF1_0       | T            |
| L12           | VCC               | -    |               |              | VCC               | -    |               |              |
| L13           | VCC               | -    |               |              | VCC               | -    |               |              |
| L14           | VCC               | -    |               |              | VCC               | -    |               |              |
| L15           | VCC               | -    |               |              | VCC               | -    |               |              |
| M11           | VCC               | -    |               |              | VCC               | -    |               |              |
| M12           | VCC               | -    |               |              | VCC               | -    |               |              |
| M15           | VCC               | -    |               |              | VCC               | -    |               |              |
| M16           | VCC               | -    |               |              | VCC               | -    |               |              |
| N11           | VCC               | -    |               |              | VCC               | -    |               |              |
| N16           | VCC               | -    |               |              | VCC               | -    |               |              |
| P11           | VCC               | -    |               |              | VCC               | -    |               |              |
| P16           | VCC               | -    |               |              | VCC               | -    |               |              |
| R11           | VCC               | -    |               |              | VCC               | -    |               |              |
| R12           | VCC               | -    |               |              | VCC               | -    |               |              |
| R15           | VCC               | -    |               |              | VCC               | -    |               |              |
| R16           | VCC               | -    |               |              | VCC               | -    |               |              |
| T12           | VCC               | -    |               |              | VCC               | -    |               |              |
| T13           | VCC               | -    |               |              | VCC               | -    |               |              |
| T14           | VCC               | -    |               |              | VCC               | -    |               |              |
| T15           | VCC               | -    |               |              | VCC               | -    |               |              |
| D11           | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D6            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G9            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| K12           | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| J12           | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D16           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| D21           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G18           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| J15           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| K15           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| F23           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| J20           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| L23           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M17           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M18           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| AA23          | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| R17           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| R18           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| T23           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| V20           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AC16          | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC21          | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| U15           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| V15           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| Y18           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC11          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AC6           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| U12           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| V12           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| Y9            | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AA4           | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| R10           | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| R9            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| T4            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| V7            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| F4            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| J7            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| L4            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| M10           | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| M9            | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| AE25          | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| V18           | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| J10           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J11           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J16           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J17           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| K18           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| K9            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| L18           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| L9            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| T18           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| T9            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| U18           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| U9            | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V10           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V11           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V16           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V17           | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |



## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A2            | GND               | -    |               |              | GND               | -    |               |              |
| A25           | GND               | -    |               |              | GND               | -    |               |              |
| AA18          | GND               | -    |               |              | GND               | -    |               |              |
| AA24          | GND               | -    |               |              | GND               | -    |               |              |
| AA3           | GND               | -    |               |              | GND               | -    |               |              |
| AA9           | GND               | -    |               |              | GND               | -    |               |              |
| AD11          | GND               | -    |               |              | GND               | -    |               |              |
| AD16          | GND               | -    |               |              | GND               | -    |               |              |
| AD21          | GND               | -    |               |              | GND               | -    |               |              |
| AD6           | GND               | -    |               |              | GND               | -    |               |              |
| AE1           | GND               | -    |               |              | GND               | -    |               |              |
| AE26          | GND               | -    |               |              | GND               | -    |               |              |
| AF2           | GND               | -    |               |              | GND               | -    |               |              |
| AF25          | GND               | -    |               |              | GND               | -    |               |              |
| B1            | GND               | -    |               |              | GND               | -    |               |              |
| B26           | GND               | -    |               |              | GND               | -    |               |              |
| C11           | GND               | -    |               |              | GND               | -    |               |              |
| C16           | GND               | -    |               |              | GND               | -    |               |              |
| C21           | GND               | -    |               |              | GND               | -    |               |              |
| C6            | GND               | -    |               |              | GND               | -    |               |              |
| F18           | GND               | -    |               |              | GND               | -    |               |              |
| F24           | GND               | -    |               |              | GND               | -    |               |              |
| F3            | GND               | -    |               |              | GND               | -    |               |              |
| F9            | GND               | -    |               |              | GND               | -    |               |              |
| J13           | GND               | -    |               |              | GND               | -    |               |              |
| J14           | GND               | -    |               |              | GND               | -    |               |              |
| J21           | GND               | -    |               |              | GND               | -    |               |              |
| J6            | GND               | -    |               |              | GND               | -    |               |              |
| K10           | GND               | -    |               |              | GND               | -    |               |              |
| K11           | GND               | -    |               |              | GND               | -    |               |              |
| K13           | GND               | -    |               |              | GND               | -    |               |              |
| K14           | GND               | -    |               |              | GND               | -    |               |              |
| K16           | GND               | -    |               |              | GND               | -    |               |              |
| K17           | GND               | -    |               |              | GND               | -    |               |              |
| L10           | GND               | -    |               |              | GND               | -    |               |              |
| L11           | GND               | -    |               |              | GND               | -    |               |              |
| L16           | GND               | -    |               |              | GND               | -    |               |              |
| L17           | GND               | -    |               |              | GND               | -    |               |              |
| L24           | GND               | -    |               |              | GND               | -    |               |              |
| L3            | GND               | -    |               |              | GND               | -    |               |              |
| M13           | GND               | -    |               |              | GND               | -    |               |              |
| M14           | GND               | -    |               |              | GND               | -    |               |              |
| N10           | GND               | -    |               |              | GND               | -    |               |              |
| N12           | GND               | -    |               |              | GND               | -    |               |              |
| N13           | GND               | -    |               |              | GND               | -    |               |              |
| N14           | GND               | -    |               |              | GND               | -    |               |              |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |               |              | LFE2-35E/35SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| N15           | GND               | -    |               |              | GND               | -    |               |              |  |
| N17           | GND               | -    |               |              | GND               | -    |               |              |  |
| P10           | GND               | -    |               |              | GND               | -    |               |              |  |
| P12           | GND               | -    |               |              | GND               | -    |               |              |  |
| P13           | GND               | -    |               |              | GND               | -    |               |              |  |
| P14           | GND               | -    |               |              | GND               | -    |               |              |  |
| P15           | GND               | -    |               |              | GND               | -    |               |              |  |
| P17           | GND               | -    |               |              | GND               | -    |               |              |  |
| R13           | GND               | -    |               |              | GND               | -    |               |              |  |
| R14           | GND               | -    |               |              | GND               | -    |               |              |  |
| T10           | GND               | -    |               |              | GND               | -    |               |              |  |
| T11           | GND               | -    |               |              | GND               | -    |               |              |  |
| T16           | GND               | -    |               |              | GND               | -    |               |              |  |
| T17           | GND               | -    |               |              | GND               | -    |               |              |  |
| T24           | GND               | -    |               |              | GND               | -    |               |              |  |
| T3            | GND               | -    |               |              | GND               | -    |               |              |  |
| U10           | GND               | -    |               |              | GND               | -    |               |              |  |
| U11           | GND               | -    |               |              | GND               | -    |               |              |  |
| U13           | GND               | -    |               |              | GND               | -    |               |              |  |
| U14           | GND               | -    |               |              | GND               | -    |               |              |  |
| U16           | GND               | -    |               |              | GND               | -    |               |              |  |
| U17           | GND               | -    |               |              | GND               | -    |               |              |  |
| V13           | GND               | -    |               |              | GND               | -    |               |              |  |
| V14           | GND               | -    |               |              | GND               | -    |               |              |  |
| V21           | GND               | -    |               |              | GND               | -    |               |              |  |
| V6            | GND               | -    |               |              | GND               | -    |               |              |  |
| M3            | NC                | -    |               |              | NC                | -    |               |              |  |
| N6            | NC                | -    |               |              | NC                | -    |               |              |  |
| P24           | NC                | -    |               |              | NC                | -    |               |              |  |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| D2          | PL2A              | 7    | VREF2_7       | T (LVDS)*    | PL2A              | 7    | VREF2_7       | T (LVDS)*    |  |
| D1          | PL2B              | 7    | VREF1_7       | C (LVDS)*    | PL2B              | 7    | VREF1_7       | C (LVDS)*    |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| F6          | PL5A              | 7    | LDQ8          | T            | PL18A             | 7    | LDQ21         | T            |  |
| F5          | PL5B              | 7    | LDQ8          | C            | PL18B             | 7    | LDQ21         | C            |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| E4          | PL6A              | 7    | LDQ8          | T (LVDS)*    | PL19A             | 7    | LDQ21         | T (LVDS)*    |  |
| E3          | PL6B              | 7    | LDQ8          | C (LVDS)*    | PL19B             | 7    | LDQ21         | C (LVDS)*    |  |
| E2          | PL7A              | 7    | LDQ8          | T            | PL20A             | 7    | LDQ21         | T            |  |
| E1          | PL7B              | 7    | LDQ8          | C            | PL20B             | 7    | LDQ21         | C            |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| H6          | PL8A              | 7    | LDQS8         | T (LVDS)*    | PL21A             | 7    | LDQS21        | T (LVDS)*    |  |
| H5          | PL8B              | 7    | LDQ8          | C (LVDS)*    | PL21B             | 7    | LDQ21         | C (LVDS)*    |  |
| F2          | PL9A              | 7    | LDQ8          | T            | PL22A             | 7    | LDQ21         | T            |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| F1          | PL9B              | 7    | LDQ8          | C            | PL22B             | 7    | LDQ21         | C            |  |
| H8          | PL10A             | 7    | LDQ8          | T (LVDS)*    | PL23A             | 7    | LDQ21         | T (LVDS)*    |  |
| J9          | PL10B             | 7    | LDQ8          | C (LVDS)*    | PL23B             | 7    | LDQ21         | C (LVDS)*    |  |
| G4          | PL11A             | 7    | LDQ8          | T            | PL24A             | 7    | LDQ21         | T            |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| G3          | PL11B             | 7    | LDQ8          | C            | PL24B             | 7    | LDQ21         | C            |  |
| H7          | PL12A             | 7    | LDQ16         | T (LVDS)*    | PL25A             | 7    | LDQ29         | T (LVDS)*    |  |
| J8          | PL12B             | 7    | LDQ16         | C (LVDS)*    | PL25B             | 7    | LDQ29         | C (LVDS)*    |  |
| G2          | PL13A             | 7    | LDQ16         | T            | PL26A             | 7    | LDQ29         | T            |  |
| G1          | PL13B             | 7    | LDQ16         | C            | PL26B             | 7    | LDQ29         | C            |  |
| H3          | PL14A             | 7    | LDQ16         | T (LVDS)*    | PL27A             | 7    | LDQ29         | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| H4          | PL14B             | 7    | LDQ16         | C (LVDS)*    | PL27B             | 7    | LDQ29         | C (LVDS)*    |  |
| J5          | PL15A             | 7    | LDQ16         | T            | PL28A             | 7    | LDQ29         | T            |  |
| J4          | PL15B             | 7    | LDQ16         | C            | PL28B             | 7    | LDQ29         | C            |  |
| J3          | PL16A             | 7    | LDQS16        | T (LVDS)*    | PL29A             | 7    | LDQS29        | T (LVDS)*    |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| K4          | PL16B             | 7    | LDQ16         | C (LVDS)*    | PL29B             | 7    | LDQ29         | C (LVDS)*    |  |
| H1          | PL17A             | 7    | LDQ16         | T            | PL30A             | 7    | LDQ29         | T            |  |
| H2          | PL17B             | 7    | LDQ16         | C            | PL30B             | 7    | LDQ29         | C            |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K6          | PL18A             | 7    | LDQ16         | T (LVDS)*    | PL31A             | 7    | LDQ29         | T (LVDS)*    |  |
| K7          | PL18B             | 7    | LDQ16         | C (LVDS)*    | PL31B             | 7    | LDQ29         | C (LVDS)*    |  |
| J1          | PL19A             | 7    | LDQ16         | T            | PL32A             | 7    | LDQ29         | T            |  |
| J2          | PL19B             | 7    | LDQ16         | C            | PL32B             | 7    | LDQ29         | C            |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K3          | PL23A             | 7    | LDQ24         | T            | PL36A             | 7    | LDQ37         | T            |  |
| K2          | PL23B             | 7    | LDQ24         | C            | PL36B             | 7    | LDQ37         | C            |  |
| GND         | GNDIO7            | -    |               |              | GNDIO7            | -    |               |              |  |
| K1          | PL24A             | 7    | LDQS24***     | T (LVDS)*    | PL37A             | 7    | LDQS37***     | T (LVDS)*    |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                       |              | LFE2-70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| L2          | PL24B             | 7    | LDQ24                 | C (LVDS)*    | PL37B             | 7    | LDQ37                 | C (LVDS)*    |  |
| L1          | PL25A             | 7    | LUM0_SPLLT_IN_A/LDQ24 | T            | PL38A             | 7    | LUM0_SPLLT_IN_A/LDQ37 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| M2          | PL25B             | 7    | LUM0_SPLLC_IN_A/LDQ24 | C            | PL38B             | 7    | LUM0_SPLLC_IN_A/LDQ37 | C            |  |
| M1          | PL26A             | 7    | LUM0_SPLLT_FB_A/LDQ24 | T            | PL39A             | 7    | LUM0_SPLLT_FB_A/LDQ37 | T            |  |
| N2          | PL26B             | 7    | LUM0_SPLLC_FB_A/LDQ24 | C            | PL39B             | 7    | LUM0_SPLLC_FB_A/LDQ37 | C            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M8          | VCCPLL            | 7    |                       |              | NC                | -    |                       |              |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| N1          | PL37A             | 7    | LDQ41                 |              | PL50A             | 7    | LDQ54                 |              |  |
| L8          | PL38A             | 7    | LDQ41                 | T            | PL51A             | 7    | LDQ54                 | T            |  |
| K8          | PL38B             | 7    | LDQ41                 | C            | PL51B             | 7    | LDQ54                 | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| L6          | PL39A             | 7    | LDQ41                 | T (LVDS)*    | PL52A             | 7    | LDQ54                 | T (LVDS)*    |  |
| K5          | PL39B             | 7    | LDQ41                 | C (LVDS)*    | PL52B             | 7    | LDQ54                 | C (LVDS)*    |  |
| L7          | PL40A             | 7    | LDQ41                 | T            | PL53A             | 7    | LDQ54                 | T            |  |
| L5          | PL40B             | 7    | LDQ41                 | C            | PL53B             | 7    | LDQ54                 | C            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| P1          | PL41A             | 7    | LDQS41                | T (LVDS)*    | PL54A             | 7    | LDQS54                | T (LVDS)*    |  |
| P2          | PL41B             | 7    | LDQ41                 | C (LVDS)*    | PL54B             | 7    | LDQ54                 | C (LVDS)*    |  |
| M6          | PL42A             | 7    | LDQ41                 | T            | PL55A             | 7    | LDQ54                 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| N8          | PL42B             | 7    | LDQ41                 | C            | PL55B             | 7    | LDQ54                 | C            |  |
| R1          | PL43A             | 7    | LDQ41                 | T (LVDS)*    | PL56A             | 7    | LDQ54                 | T (LVDS)*    |  |
| R2          | PL43B             | 7    | LDQ41                 | C (LVDS)*    | PL56B             | 7    | LDQ54                 | C (LVDS)*    |  |
| M7          | PL44A             | 7    | PCLKT7_0/LDQ41        | T            | PL57A             | 7    | PCLKT7_0/LDQ54        | T            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| N9          | PL44B             | 7    | PCLKC7_0/LDQ41        | C            | PL57B             | 7    | PCLKC7_0/LDQ54        | C            |  |
| M4          | PL46A             | 6    | PCLKT6_0/LDQ50        | T (LVDS)*    | PL59A             | 6    | PCLKT6_0/LDQ63        | T (LVDS)*    |  |
| M5          | PL46B             | 6    | PCLKC6_0/LDQ50        | C (LVDS)*    | PL59B             | 6    | PCLKC6_0/LDQ63        | C (LVDS)*    |  |
| N7          | PL47A             | 6    | VREF2_6/LDQ50         | T            | PL60A             | 6    | VREF2_6/LDQ63         | T            |  |
| P9          | PL47B             | 6    | VREF1_6/LDQ50         | C            | PL60B             | 6    | VREF1_6/LDQ63         | C            |  |
| N3          | PL48A             | 6    | LDQ50                 | T (LVDS)*    | PL61A             | 6    | LDQ63                 | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| N4          | PL48B             | 6    | LDQ50                 | C (LVDS)*    | PL61B             | 6    | LDQ63                 | C (LVDS)*    |  |
| N5          | PL49A             | 6    | LDQ50                 | T            | PL62A             | 6    | LDQ63                 | T            |  |
| P7          | PL49B             | 6    | LDQ50                 | C            | PL62B             | 6    | LDQ63                 | C            |  |
| T1          | PL50A             | 6    | LDQS50                | T (LVDS)*    | PL63A             | 6    | LDQS63                | T (LVDS)*    |  |
| GND         | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |  |
| T2          | PL50B             | 6    | LDQ50                 | C (LVDS)*    | PL63B             | 6    | LDQ63                 | C (LVDS)*    |  |
| P8          | PL51A             | 6    | LDQ50                 | T            | PL64A             | 6    | LDQ63                 | T            |  |
| P6          | PL51B             | 6    | LDQ50                 | C            | PL64B             | 6    | LDQ63                 | C            |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| P5          | PL52A             | 6    | LDQ50                 | T (LVDS)*    | PL65A             | 6    | LDQ63                 | T (LVDS)*    |  |
| P4          | PL52B             | 6    | LDQ50                 | C (LVDS)*    | PL65B             | 6    | LDQ63                 | C (LVDS)*    |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                         |              | LFE2-70E/SE       |      |                         |              |  |
|-------------|-------------------|------|-------------------------|--------------|-------------------|------|-------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential | Ball/Pad Function | Bank | Dual Function           | Differential |  |
| U1          | PL53A             | 6    | LDQ50                   | T            | PL66A             | 6    | LDQ63                   | T            |  |
| V1          | PL53B             | 6    | LDQ50                   | C            | PL66B             | 6    | LDQ63                   | C            |  |
| GND         | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| P3          | PL54A             | 6    | LDQ58                   | T (LVDS)*    | PL67A             | 6    | LDQ71                   | T (LVDS)*    |  |
| R3          | PL54B             | 6    | LDQ58                   | C (LVDS)*    | PL67B             | 6    | LDQ71                   | C (LVDS)*    |  |
| R4          | PL55A             | 6    | LDQ58                   | T            | PL68A             | 6    | LDQ71                   | T            |  |
| U2          | PL55B             | 6    | LDQ58                   | C            | PL68B             | 6    | LDQ71                   | C            |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| V2          | PL56A             | 6    | LDQ58                   | T (LVDS)*    | PL69A             | 6    | LDQ71                   | T (LVDS)*    |  |
| W2          | PL56B             | 6    | LDQ58                   | C (LVDS)*    | PL69B             | 6    | LDQ71                   | C (LVDS)*    |  |
| T6          | PL57A             | 6    | LDQ58                   | T            | PL70A             | 6    | LDQ71                   | T            |  |
| R5          | PL57B             | 6    | LDQ58                   | C            | PL70B             | 6    | LDQ71                   | C            |  |
| GND         | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| R6          | PL58A             | 6    | LDQS58                  | T (LVDS)*    | PL71A             | 6    | LDQS71                  | T (LVDS)*    |  |
| R7          | PL58B             | 6    | LDQ58                   | C (LVDS)*    | PL71B             | 6    | LDQ71                   | C (LVDS)*    |  |
| W1          | PL59A             | 6    | LDQ58                   | T            | PL72A             | 6    | LDQ71                   | T            |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| Y2          | PL59B             | 6    | LDQ58                   | C            | PL72B             | 6    | LDQ71                   | C            |  |
| Y1          | PL60A             | 6    | LLM0_GDLLT_IN_A**/LDQ58 | T (LVDS)*    | PL73A             | 6    | LLM0_GDLLT_IN_A**/LDQ71 | T (LVDS)*    |  |
| AA2         | PL60B             | 6    | LLM0_GDLLC_IN_A**/LDQ58 | C (LVDS)*    | PL73B             | 6    | LLM0_GDLLC_IN_A**/LDQ71 | C (LVDS)*    |  |
| T5          | PL61A             | 6    | LLM0_GDLLT_FB_A/LDQ58   | T            | PL74A             | 6    | LLM0_GDLLT_FB_A/LDQ71   | T            |  |
| GND         | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| T7          | PL61B             | 6    | LLM0_GDLLC_FB_D/LDQ58   | C            | PL74B             | 6    | LLM0_GDLLC_FB_D/LDQ71   | C            |  |
| R8          | VCCPLL            | 6    |                         |              | VCCPLL            | -    |                         |              |  |
| T8          | LLM0_PLLCAP       | 6    |                         |              | LLM0_PLLCAP       | 6    |                         |              |  |
| U3          | PL63A             | 6    | LLM0_GPLLT_IN_A**/LDQ67 | T (LVDS)*    | PL76A             | 6    | LLM0_GPLLT_IN_A**/LDQ80 | T (LVDS)*    |  |
| U4          | PL63B             | 6    | LLM0_GPLLC_IN_A**/LDQ67 | C (LVDS)*    | PL76B             | 6    | LLM0_GPLLC_IN_A**/LDQ80 | C (LVDS)*    |  |
| V3          | PL64A             | 6    | LLM0_GPLLT_FB_A/LDQ67   | T            | PL77A             | 6    | LLM0_GPLLT_FB_A/LDQ80   | T            |  |
| U5          | PL64B             | 6    | LLM0_GPLLC_FB_A/LDQ67   | C            | PL77B             | 6    | LLM0_GPLLC_FB_A/LDQ80   | C            |  |
| V4          | PL65A             | 6    | LDQ67                   | T (LVDS)*    | PL78A             | 6    | LDQ80                   | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| V5          | PL65B             | 6    | LDQ67                   | C (LVDS)*    | PL78B             | 6    | LDQ80                   | C (LVDS)*    |  |
| Y3          | PL66A             | 6    | LDQ67                   | T            | PL79A             | 6    | LDQ80                   | T            |  |
| Y4          | PL66B             | 6    | LDQ67                   | C            | PL79B             | 6    | LDQ80                   | C            |  |
| W3          | PL67A             | 6    | LDQS67                  | T (LVDS)*    | PL80A             | 6    | LDQS80                  | T (LVDS)*    |  |
| GND         | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| W4          | PL67B             | 6    | LDQ67                   | C (LVDS)*    | PL80B             | 6    | LDQ80                   | C (LVDS)*    |  |
| AA1         | PL68A             | 6    | LDQ67                   | T            | PL81A             | 6    | LDQ80                   | T            |  |
| AB1         | PL68B             | 6    | LDQ67                   | C            | PL81B             | 6    | LDQ80                   | C            |  |
| VCCIO       | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| U8          | PL69A             | 6    | LDQ67                   | T (LVDS)*    | PL82A             | 6    | LDQ80                   | T (LVDS)*    |  |
| U7          | PL69B             | 6    | LDQ67                   | C (LVDS)*    | PL82B             | 6    | LDQ80                   | C (LVDS)*    |  |
| V8          | PL70A             | 6    | LDQ67                   | T            | PL83A             | 6    | LDQ80                   | T            |  |
| U6          | PL70B             | 6    | LDQ67                   | C            | PL83B             | 6    | LDQ80                   | C            |  |
| GND         | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| W6          | PL71A             | 6    | LDQ75                   | T (LVDS)*    | PL84A             | 6    | LDQ88                   | T (LVDS)*    |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| W5          | PL71B             | 6    | LDQ75         | C (LVDS)*    | PL84B             | 6    | LDQ88         | C (LVDS)*    |  |
| AC1         | PL72A             | 6    | LDQ75         | T            | PL85A             | 6    | LDQ88         | T            |  |
| AD1         | PL72B             | 6    | LDQ75         | C            | PL85B             | 6    | LDQ88         | C            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| Y6          | PL73A             | 6    | LDQ75         | T (LVDS)*    | PL86A             | 6    | LDQ88         | T (LVDS)*    |  |
| Y5          | PL73B             | 6    | LDQ75         | C (LVDS)*    | PL86B             | 6    | LDQ88         | C (LVDS)*    |  |
| AE2         | PL74A             | 6    | LDQ75         | T            | PL87A             | 6    | LDQ88         | T            |  |
| AD2         | PL74B             | 6    | LDQ75         | C            | PL87B             | 6    | LDQ88         | C            |  |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AB3         | PL75A             | 6    | LDQS75        | T (LVDS)*    | PL88A             | 6    | LDQS88        | T (LVDS)*    |  |
| AB2         | PL75B             | 6    | LDQ75         | C (LVDS)*    | PL88B             | 6    | LDQ88         | C (LVDS)*    |  |
| W7          | PL76A             | 6    | LDQ75         | T            | PL89A             | 6    | LDQ88         | T            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| W8          | PL76B             | 6    | LDQ75         | C            | PL89B             | 6    | LDQ88         | C            |  |
| Y7          | PL77A             | 6    | LDQ75         | T (LVDS)*    | PL90A             | 6    | LDQ88         | T (LVDS)*    |  |
| Y8          | PL77B             | 6    | LDQ75         | C (LVDS)*    | PL90B             | 6    | LDQ88         | C (LVDS)*    |  |
| AC2         | PL78A             | 6    | LDQ75         | T            | PL91A             | 6    | LDQ88         | T            |  |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AD3         | PL78B             | 6    | LDQ75         | C            | PL91B             | 6    | LDQ88         | C            |  |
| AC3         | TCK               | -    |               |              | TCK               | -    |               |              |  |
| AA8         | TDI               | -    |               |              | TDI               | -    |               |              |  |
| AB4         | TMS               | -    |               |              | TMS               | -    |               |              |  |
| AA5         | TDO               | -    |               |              | TDO               | -    |               |              |  |
| AB5         | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| AE3         | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6  | T            |  |
| AF3         | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6  | C            |  |
| AC4         | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| AD4         | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AE4         | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| AF4         | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| V9          | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| W9          | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA6         | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| AB6         | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| AC5         | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| AD5         | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| AA7         | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| AB7         | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE5         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| AF5         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AC7         | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| AD7         | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| W10         | PB20A             | 5    | BDQ24         | T            | PB29A             | 5    | BDQ33         | T            |  |
| Y10         | PB20B             | 5    | BDQ24         | C            | PB29B             | 5    | BDQ33         | C            |  |
| W11         | PB21A             | 5    | BDQ24         | T            | PB30A             | 5    | BDQ33         | T            |  |
| AA10        | PB21B             | 5    | BDQ24         | C            | PB30B             | 5    | BDQ33         | C            |  |
| AC8         | PB22A             | 5    | BDQ24         | T            | PB31A             | 5    | BDQ33         | T            |  |
| AD8         | PB22B             | 5    | BDQ24         | C            | PB31B             | 5    | BDQ33         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AB8         | PB23A             | 5    | BDQ24         | T            | PB32A             | 5    | BDQ33         | T            |  |
| AB10        | PB23B             | 5    | BDQ24         | C            | PB32B             | 5    | BDQ33         | C            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AE6         | PB24A             | 5    | BDQS24        | T            | PB33A             | 5    | BDQS33        | T            |  |
| AF6         | PB24B             | 5    | BDQ24         | C            | PB33B             | 5    | BDQ33         | C            |  |
| AA11        | PB25A             | 5    | BDQ24         | T            | PB34A             | 5    | BDQ33         | T            |  |
| AC9         | PB25B             | 5    | BDQ24         | C            | PB34B             | 5    | BDQ33         | C            |  |
| AB9         | PB26A             | 5    | BDQ24         | T            | PB35A             | 5    | BDQ33         | T            |  |
| AD9         | PB26B             | 5    | BDQ24         | C            | PB35B             | 5    | BDQ33         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y11         | PB27A             | 5    | BDQ24         | T            | PB36A             | 5    | BDQ33         | T            |  |
| AB11        | PB27B             | 5    | BDQ24         | C            | PB36B             | 5    | BDQ33         | C            |  |
| AE7         | PB28A             | 5    | BDQ24         | T            | PB37A             | 5    | BDQ33         | T            |  |
| AF7         | PB28B             | 5    | BDQ24         | C            | PB37B             | 5    | BDQ33         | C            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AC10        | PB29A             | 5    | BDQ33         | T            | PB38A             | 5    | BDQ42         | T            |  |
| AD10        | PB29B             | 5    | BDQ33         | C            | PB38B             | 5    | BDQ42         | C            |  |
| AA12        | PB30A             | 5    | BDQ33         | T            | PB39A             | 5    | BDQ42         | T            |  |
| W12         | PB30B             | 5    | BDQ33         | C            | PB39B             | 5    | BDQ42         | C            |  |
| AB12        | PB31A             | 5    | BDQ33         | T            | PB40A             | 5    | BDQ42         | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y12         | PB31B             | 5    | BDQ33         | C            | PB40B             | 5    | BDQ42         | C            |  |
| AD12        | PB32A             | 5    | BDQ33         | T            | PB41A             | 5    | BDQ42         | T            |  |
| AC12        | PB32B             | 5    | BDQ33         | C            | PB41B             | 5    | BDQ42         | C            |  |
| AC13        | PB33A             | 5    | BDQS33        | T            | PB42A             | 5    | BDQS42        | T            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA13        | PB33B             | 5    | BDQ33         | C            | PB42B             | 5    | BDQ42         | C            |  |
| AD13        | PB34A             | 5    | BDQ33         | T            | PB43A             | 5    | BDQ42         | T            |  |
| AC14        | PB34B             | 5    | BDQ33         | C            | PB43B             | 5    | BDQ42         | C            |  |
| AE8         | PB35A             | 5    | BDQ33         | T            | PB44A             | 5    | BDQ42         | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AF8         | PB35B             | 5    | BDQ33         | C            | PB44B             | 5    | BDQ42         | C            |  |
| AB15        | PB36A             | 5    | BDQ33         | T            | PB45A             | 5    | BDQ42         | T            |  |
| Y13         | PB36B             | 5    | BDQ33         | C            | PB45B             | 5    | BDQ42         | C            |  |
| AE9         | PB37A             | 5    | BDQ33         | T            | PB46A             | 5    | BDQ42         | T            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AF9         | PB37B             | 5    | BDQ33         | C            | PB46B             | 5    | BDQ42         | C            |  |
| W13         | PB38A             | 5    | BDQ42         | T            | PB47A             | 5    | BDQ51         | T            |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                |              | LFE2-70E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AA14        | PB38B             | 5    | BDQ42          | C            | PB47B             | 5    | BDQ51          | C            |  |
| AE10        | PB39A             | 5    | BDQ42          | T            | PB48A             | 5    | BDQ51          | T            |  |
| AF10        | PB39B             | 5    | BDQ42          | C            | PB48B             | 5    | BDQ51          | C            |  |
| W14         | PB40A             | 5    | BDQ42          | T            | PB49A             | 5    | BDQ51          | T            |  |
| AB13        | PB40B             | 5    | BDQ42          | C            | PB49B             | 5    | BDQ51          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| Y14         | PB41A             | 5    | BDQ42          | T            | PB50A             | 5    | BDQ51          | T            |  |
| AB14        | PB41B             | 5    | BDQ42          | C            | PB50B             | 5    | BDQ51          | C            |  |
| GND         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AE11        | PB42A             | 5    | BDQS42         | T            | PB51A             | 5    | BDQS51         | T            |  |
| AF11        | PB42B             | 5    | BDQ42          | C            | PB51B             | 5    | BDQ51          | C            |  |
| AD14        | PB43A             | 5    | BDQ42          | T            | PB52A             | 5    | BDQ51          | T            |  |
| AA15        | PB43B             | 5    | BDQ42          | C            | PB52B             | 5    | BDQ51          | C            |  |
| AE12        | PB44A             | 5    | PCLKT5_0/BDQ42 | T            | PB53A             | 5    | PCLKT5_0/BDQ51 | T            |  |
| AF12        | PB44B             | 5    | PCLKC5_0/BDQ42 | C            | PB53B             | 5    | PCLKC5_0/BDQ51 | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GND         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AD15        | PB49A             | 4    | PCLKT4_0/BDQ51 | T            | PB58A             | 4    | PCLKT4_0/BDQ60 | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC15        | PB49B             | 4    | PCLKC4_0/BDQ51 | C            | PB58B             | 4    | PCLKC4_0/BDQ60 | C            |  |
| AE13        | PB50A             | 4    | BDQ51          | T            | PB59A             | 4    | BDQ60          | T            |  |
| AF13        | PB50B             | 4    | BDQ51          | C            | PB59B             | 4    | BDQ60          | C            |  |
| AB17        | PB51A             | 4    | BDQS51         | T            | PB60A             | 4    | BDQS60         | T            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| Y15         | PB51B             | 4    | BDQ51          | C            | PB60B             | 4    | BDQ60          | C            |  |
| AE14        | PB52A             | 4    | BDQ51          | T            | PB61A             | 4    | BDQ60          | T            |  |
| AF14        | PB52B             | 4    | BDQ51          | C            | PB61B             | 4    | BDQ60          | C            |  |
| AA16        | PB53A             | 4    | BDQ51          | T            | PB62A             | 4    | BDQ60          | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| W15         | PB53B             | 4    | BDQ51          | C            | PB62B             | 4    | BDQ60          | C            |  |
| AC17        | PB54A             | 4    | BDQ51          | T            | PB63A             | 4    | BDQ60          | T            |  |
| AB16        | PB54B             | 4    | BDQ51          | C            | PB63B             | 4    | BDQ60          | C            |  |
| AE15        | PB55A             | 4    | BDQ51          | T            | PB64A             | 4    | BDQ60          | T            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AF15        | PB55B             | 4    | BDQ51          | C            | PB64B             | 4    | BDQ60          | C            |  |
| AE16        | PB56A             | 4    | BDQ60          | T            | PB65A             | 4    | BDQ69          | T            |  |
| AF16        | PB56B             | 4    | BDQ60          | C            | PB65B             | 4    | BDQ69          | C            |  |
| Y16         | PB57A             | 4    | BDQ60          | T            | PB66A             | 4    | BDQ69          | T            |  |
| AB18        | PB57B             | 4    | BDQ60          | C            | PB66B             | 4    | BDQ69          | C            |  |
| AD17        | PB58A             | 4    | BDQ60          | T            | PB67A             | 4    | BDQ69          | T            |  |
| AD18        | PB58B             | 4    | BDQ60          | C            | PB67B             | 4    | BDQ69          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC18        | PB59A             | 4    | BDQ60          | T            | PB68A             | 4    | BDQ69          | T            |  |
| AD19        | PB59B             | 4    | BDQ60          | C            | PB68B             | 4    | BDQ69          | C            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AC19        | PB60A             | 4    | BDQS60         | T            | PB69A             | 4    | BDQS69         | T            |  |



## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AE17        | PB60B             | 4    | BDQ60         | C            | PB69B             | 4    | BDQ69         | C            |  |
| AB19        | PB61A             | 4    | BDQ60         | T            | PB70A             | 4    | BDQ69         | T            |  |
| AE19        | PB61B             | 4    | BDQ60         | C            | PB70B             | 4    | BDQ69         | C            |  |
| AF17        | PB62A             | 4    | BDQ60         | T            | PB71A             | 4    | BDQ69         | T            |  |
| AE18        | PB62B             | 4    | BDQ60         | C            | PB71B             | 4    | BDQ69         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| W16         | PB63A             | 4    | BDQ60         | T            | PB72A             | 4    | BDQ69         | T            |  |
| AA17        | PB63B             | 4    | BDQ60         | C            | PB72B             | 4    | BDQ69         | C            |  |
| AF18        | PB64A             | 4    | BDQ60         | T            | PB73A             | 4    | BDQ69         | T            |  |
| AF19        | PB64B             | 4    | BDQ60         | C            | PB73B             | 4    | BDQ69         | C            |  |
| GND         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AA19        | PB65A             | 4    | BDQ69         | T            | PB74A             | 4    | BDQ78         | T            |  |
| W17         | PB65B             | 4    | BDQ69         | C            | PB74B             | 4    | BDQ78         | C            |  |
| Y19         | PB66A             | 4    | BDQ69         | T            | PB75A             | 4    | BDQ78         | T            |  |
| Y17         | PB66B             | 4    | BDQ69         | C            | PB75B             | 4    | BDQ78         | C            |  |
| AF20        | PB67A             | 4    | BDQ69         | T            | PB76A             | 4    | BDQ78         | T            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AE20        | PB67B             | 4    | BDQ69         | C            | PB76B             | 4    | BDQ78         | C            |  |
| AA20        | PB68A             | 4    | BDQ69         | T            | PB77A             | 4    | BDQ78         | T            |  |
| W18         | PB68B             | 4    | BDQ69         | C            | PB77B             | 4    | BDQ78         | C            |  |
| AD20        | PB69A             | 4    | BDQS69        | T            | PB78A             | 4    | BDQS78        | T            |  |
| GND         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AE21        | PB69B             | 4    | BDQ69         | C            | PB78B             | 4    | BDQ78         | C            |  |
| AF21        | PB70A             | 4    | BDQ69         | T            | PB79A             | 4    | BDQ78         | T            |  |
| AF22        | PB70B             | 4    | BDQ69         | C            | PB79B             | 4    | BDQ78         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| GND         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AE22        | PB74A             | 4    | BDQ78         | T            | PB92A             | 4    | BDQ96         | T            |  |
| AD22        | PB74B             | 4    | BDQ78         | C            | PB92B             | 4    | BDQ96         | C            |  |
| AF23        | PB75A             | 4    | BDQ78         | T            | PB93A             | 4    | BDQ96         | T            |  |
| AE23        | PB75B             | 4    | BDQ78         | C            | PB93B             | 4    | BDQ96         | C            |  |
| AD23        | PB76A             | 4    | BDQ78         | T            | PB94A             | 4    | BDQ96         | T            |  |
| AC23        | PB76B             | 4    | BDQ78         | C            | PB94B             | 4    | BDQ96         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AB20        | PB77A             | 4    | BDQ78         | T            | PB95A             | 4    | BDQ96         | T            |  |
| AC20        | PB77B             | 4    | BDQ78         | C            | PB95B             | 4    | BDQ96         | C            |  |
| GND         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AB21        | PB78A             | 4    | BDQS78        | T            | PB96A             | 4    | BDQS96        | T            |  |
| AC22        | PB78B             | 4    | BDQ78         | C            | PB96B             | 4    | BDQ96         | C            |  |
| W19         | PB79A             | 4    | BDQ78         | T            | PB97A             | 4    | BDQ96         | T            |  |
| AA21        | PB79B             | 4    | BDQ78         | C            | PB97B             | 4    | BDQ96         | C            |  |
| AF24        | PB80A             | 4    | BDQ78         | T            | PB98A             | 4    | BDQ96         | T            |  |
| AE24        | PB80B             | 4    | BDQ78         | C            | PB98B             | 4    | BDQ96         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| Y20         | PB81A             | 4    | BDQ78         | T            | PB99A             | 4    | BDQ96         | T            |  |
| AB22        | PB81B             | 4    | BDQ78         | C            | PB99B             | 4    | BDQ96         | C            |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                        |              | LFE2-70E/SE       |      |                        |              |  |
|-------------|-------------------|------|------------------------|--------------|-------------------|------|------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function          | Differential | Ball/Pad Function | Bank | Dual Function          | Differential |  |
| Y21         | PB82A             | 4    | VREF2_4/BDQ78          | T            | PB100A            | 4    | VREF2_4/BDQ96          | T            |  |
| AB23        | PB82B             | 4    | VREF1_4/BDQ78          | C            | PB100B            | 4    | VREF1_4/BDQ96          | C            |  |
| GND         | GNDIO4            | -    |                        |              | GNDIO4            | -    |                        |              |  |
| AD24        | CFG2              | 8    |                        |              | CFG2              | 8    |                        |              |  |
| W20         | CFG1              | 8    |                        |              | CFG1              | 8    |                        |              |  |
| AC24        | CFG0              | 8    |                        |              | CFG0              | 8    |                        |              |  |
| V19         | PROGRAMN          | 8    |                        |              | PROGRAMN          | 8    |                        |              |  |
| AA22        | CCLK              | 8    |                        |              | CCLK              | 8    |                        |              |  |
| AB24        | INITN             | 8    |                        |              | INITN             | 8    |                        |              |  |
| AD25        | DONE              | 8    |                        |              | DONE              | 8    |                        |              |  |
| GND         | GNDIO8            | -    |                        |              | GNDIO8            | -    |                        |              |  |
| W21         | PR77B             | 8    | WRITEN                 | C            | PR90B             | 8    | WRITEN                 | C            |  |
| Y22         | PR77A             | 8    | CS1N                   | T            | PR90A             | 8    | CS1N                   | T            |  |
| AC25        | PR76B             | 8    | CSN                    | C            | PR89B             | 8    | CSN                    | C            |  |
| AB25        | PR76A             | 8    | D0/SPIFASTN            | T            | PR89A             | 8    | D0/SPIFASTN            | T            |  |
| VCCIO       | VCCIO8            | 8    |                        |              | VCCIO8            | 8    |                        |              |  |
| AD26        | PR75B             | 8    | D1                     | C            | PR88B             | 8    | D1                     | C            |  |
| AC26        | PR75A             | 8    | D2                     | T            | PR88A             | 8    | D2                     | T            |  |
| Y23         | PR74B             | 8    | D3                     | C            | PR87B             | 8    | D3                     | C            |  |
| GND         | GNDIO8            | -    |                        |              | GNDIO8            | -    |                        |              |  |
| W22         | PR74A             | 8    | D4                     | T            | PR87A             | 8    | D4                     | T            |  |
| AA25        | PR73B             | 8    | D5                     | C            | PR86B             | 8    | D5                     | C            |  |
| AB26        | PR73A             | 8    | D6                     | T            | PR86A             | 8    | D6                     | T            |  |
| W23         | PR72B             | 8    | D7/SPID0               | C            | PR85B             | 8    | D7/SPID0               | C            |  |
| VCCIO       | VCCIO8            | 8    |                        |              | VCCIO8            | 8    |                        |              |  |
| V22         | PR72A             | 8    | DI/CSSPI0N             | T            | PR85A             | 8    | DI/CSSPI0N             | T            |  |
| Y24         | PR71B             | 8    | DOUT/CSON              | C            | PR84B             | 8    | DOUT/CSON              | C            |  |
| Y25         | PR71A             | 8    | BUSY/SISPI             | T            | PR84A             | 8    | BUSY/SISPI             | T            |  |
| W24         | PR70B             | 3    | RDQ67                  | C            | PR83B             | 3    | RDQ80                  | C            |  |
| GND         | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |  |
| V23         | PR70A             | 3    | RDQ67                  | T            | PR83A             | 3    | RDQ80                  | T            |  |
| AA26        | PR69B             | 3    | RDQ67                  | C (LVDS)*    | PR82B             | 3    | RDQ80                  | C (LVDS)*    |  |
| Y26         | PR69A             | 3    | RDQ67                  | T (LVDS)*    | PR82A             | 3    | RDQ80                  | T (LVDS)*    |  |
| U21         | PR68B             | 3    | RDQ67                  | C            | PR81B             | 3    | RDQ80                  | C            |  |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |  |
| U19         | PR68A             | 3    | RDQ67                  | T            | PR81A             | 3    | RDQ80                  | T            |  |
| W25         | PR67B             | 3    | RDQ67                  | C (LVDS)*    | PR80B             | 3    | RDQ80                  | C (LVDS)*    |  |
| W26         | PR67A             | 3    | RDQS67                 | T (LVDS)*    | PR80A             | 3    | RDQS80                 | T (LVDS)*    |  |
| GND         | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |  |
| V24         | PR66B             | 3    | RDQ67                  | C            | PR79B             | 3    | RDQ80                  | C            |  |
| V25         | PR66A             | 3    | RDQ67                  | T            | PR79A             | 3    | RDQ80                  | T            |  |
| V26         | PR65B             | 3    | RDQ67                  | C (LVDS)*    | PR78B             | 3    | RDQ80                  | C (LVDS)*    |  |
| U26         | PR65A             | 3    | RDQ67                  | T (LVDS)*    | PR78A             | 3    | RDQ80                  | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |  |
| U22         | PR64B             | 3    | RLM0_GPLL_C_FB_A/RDQ67 | C            | PR77B             | 3    | RLM0_GPLL_C_FB_A/RDQ80 | C            |  |
| U23         | PR64A             | 3    | RLM0_GPLL_T_FB_A/RDQ67 | T            | PR77A             | 3    | RLM0_GPLL_T_FB_A/RDQ80 | T            |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                          |              | LFE2-70E/SE       |      |                          |              |  |
|-------------|-------------------|------|--------------------------|--------------|-------------------|------|--------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |  |
| U24         | PR63B             | 3    | RLM0_GPLL_C_IN_A**/RDQ67 | C (LVDS)*    | PR76B             | 3    | RLM0_GPLL_C_IN_A**/RDQ80 | C (LVDS)*    |  |
| U25         | PR63A             | 3    | RLM0_GPLL_T_IN_A**/RDQ67 | T (LVDS)*    | PR76A             | 3    | RLM0_GPLL_T_IN_A**/RDQ80 | T (LVDS)*    |  |
| R20         | RLM0_PLLCAP       | 3    |                          |              | RLM0_PLLCAP       | 3    |                          |              |  |
| P18         | VCCPLL            | 3    |                          |              | VCCPLL            | -    |                          |              |  |
| T19         | PR61B             | 3    | RLM0_GDLLC_FB_A/RDQ58    | C            | PR74B             | 3    | RLM0_GDLLC_FB_A/RDQ71    | C            |  |
| U20         | PR61A             | 3    | RLM0_GDLLT_FB_A/RDQ58    | T            | PR74A             | 3    | RLM0_GDLLT_FB_A/RDQ71    | T            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T25         | PR60B             | 3    | RLM0_GDLLC_IN_A**/RDQ58  | C (LVDS)*    | PR73B             | 3    | RLM0_GDLLC_IN_A**/RDQ71  | C (LVDS)*    |  |
| T26         | PR60A             | 3    | RLM0_GDLLT_IN_A**/RDQ58  | T (LVDS)*    | PR73A             | 3    | RLM0_GDLLT_IN_A**/RDQ71  | T (LVDS)*    |  |
| T20         | PR59B             | 3    | RDQ58                    | C            | PR72B             | 3    | RDQ71                    | C            |  |
| T22         | PR59A             | 3    | RDQ58                    | T            | PR72A             | 3    | RDQ71                    | T            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R26         | PR58B             | 3    | RDQ58                    | C (LVDS)*    | PR71B             | 3    | RDQ71                    | C (LVDS)*    |  |
| R25         | PR58A             | 3    | RDQS58                   | T (LVDS)*    | PR71A             | 3    | RDQS71                   | T (LVDS)*    |  |
| R22         | PR57B             | 3    | RDQ58                    | C            | PR70B             | 3    | RDQ71                    | C            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T21         | PR57A             | 3    | RDQ58                    | T            | PR70A             | 3    | RDQ71                    | T            |  |
| P26         | PR56B             | 3    | RDQ58                    | C (LVDS)*    | PR69B             | 3    | RDQ71                    | C (LVDS)*    |  |
| P25         | PR56A             | 3    | RDQ58                    | T (LVDS)*    | PR69A             | 3    | RDQ71                    | T (LVDS)*    |  |
| R24         | PR55B             | 3    | RDQ58                    | C            | PR68B             | 3    | RDQ71                    | C            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R23         | PR55A             | 3    | RDQ58                    | T            | PR68A             | 3    | RDQ71                    | T            |  |
| P20         | PR54B             | 3    | RDQ58                    | C (LVDS)*    | PR67B             | 3    | RDQ71                    | C (LVDS)*    |  |
| R19         | PR54A             | 3    | RDQ58                    | T (LVDS)*    | PR67A             | 3    | RDQ71                    | T (LVDS)*    |  |
| P21         | PR53B             | 3    | RDQ50                    | C            | PR66B             | 3    | RDQ63                    | C            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| P19         | PR53A             | 3    | RDQ50                    | T            | PR66A             | 3    | RDQ63                    | T            |  |
| P23         | PR52B             | 3    | RDQ50                    | C (LVDS)*    | PR65B             | 3    | RDQ63                    | C (LVDS)*    |  |
| P22         | PR52A             | 3    | RDQ50                    | T (LVDS)*    | PR65A             | 3    | RDQ63                    | T (LVDS)*    |  |
| N22         | PR51B             | 3    | RDQ50                    | C            | PR64B             | 3    | RDQ63                    | C            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R21         | PR51A             | 3    | RDQ50                    | T            | PR64A             | 3    | RDQ63                    | T            |  |
| N26         | PR50B             | 3    | RDQ50                    | C (LVDS)*    | PR63B             | 3    | RDQ63                    | C (LVDS)*    |  |
| N25         | PR50A             | 3    | RDQS50                   | T (LVDS)*    | PR63A             | 3    | RDQS63                   | T (LVDS)*    |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| N19         | PR49B             | 3    | RDQ50                    | C            | PR62B             | 3    | RDQ63                    | C            |  |
| N20         | PR49A             | 3    | RDQ50                    | T            | PR62A             | 3    | RDQ63                    | T            |  |
| M26         | PR48B             | 3    | RDQ50                    | C (LVDS)*    | PR61B             | 3    | RDQ63                    | C (LVDS)*    |  |
| M25         | PR48A             | 3    | RDQ50                    | T (LVDS)*    | PR61A             | 3    | RDQ63                    | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| N18         | PR47B             | 3    | VREF2_3/RDQ50            | C            | PR60B             | 3    | VREF2_3/RDQ63            | C            |  |
| N21         | PR47A             | 3    | VREF1_3/RDQ50            | T            | PR60A             | 3    | VREF1_3/RDQ63            | T            |  |
| L26         | PR46B             | 3    | PCLKC3_0/RDQ50           | C (LVDS)*    | PR59B             | 3    | PCLKC3_0/RDQ63           | C (LVDS)*    |  |
| L25         | PR46A             | 3    | PCLKT3_0/RDQ50           | T (LVDS)*    | PR59A             | 3    | PCLKT3_0/RDQ63           | T (LVDS)*    |  |
| N24         | PR44B             | 2    | PCLKC2_0/RDQ41           | C            | PR57B             | 2    | PCLKC2_0/RDQ54           | C            |  |
| M23         | PR44A             | 2    | PCLKT2_0/RDQ41           | T            | PR57A             | 2    | PCLKT2_0/RDQ54           | T            |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                       |              | LFE2-70E/SE       |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| L21         | PR43B             | 2    | RDQ41                 | C (LVDS)*    | PR56B             | 2    | RDQ54                 | C (LVDS)*    |
| K22         | PR43A             | 2    | RDQ41                 | T (LVDS)*    | PR56A             | 2    | RDQ54                 | T (LVDS)*    |
| M24         | PR42B             | 2    | RDQ41                 | C            | PR55B             | 2    | RDQ54                 | C            |
| N23         | PR42A             | 2    | RDQ41                 | T            | PR55A             | 2    | RDQ54                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| K26         | PR41B             | 2    | RDQ41                 | C (LVDS)*    | PR54B             | 2    | RDQ54                 | C (LVDS)*    |
| K25         | PR41A             | 2    | RDQS41                | T (LVDS)*    | PR54A             | 2    | RDQS54                | T (LVDS)*    |
| M20         | PR40B             | 2    | RDQ41                 | C            | PR53B             | 2    | RDQ54                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| M19         | PR40A             | 2    | RDQ41                 | T            | PR53A             | 2    | RDQ54                 | T            |
| L22         | PR39B             | 2    | RDQ41                 | C (LVDS)*    | PR52B             | 2    | RDQ54                 | C (LVDS)*    |
| M22         | PR39A             | 2    | RDQ41                 | T (LVDS)*    | PR52A             | 2    | RDQ54                 | T (LVDS)*    |
| K21         | PR38B             | 2    | RDQ41                 | C            | PR51B             | 2    | RDQ54                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| M21         | PR38A             | 2    | RDQ41                 | T            | PR51A             | 2    | RDQ54                 | T            |
| K24         | PR37B             | 2    | RDQ41                 | C (LVDS)*    | PR50B             | 2    | RDQ54                 | C (LVDS)*    |
| J24         | PR37A             | 2    | RDQ41                 | T (LVDS)*    | PR50A             | 2    | RDQ54                 | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| L20         | VCCPLL            | 2    |                       |              | NC                | -    |                       |              |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| J26         | PR26B             | 2    | RUM0_SPLLC_FB_A/RDQ24 | C            | PR39B             | 2    | RUM0_SPLLC_FB_A/RDQ37 | C            |
| J25         | PR26A             | 2    | RUM0_SPLLT_FB_A/RDQ24 | T            | PR39A             | 2    | RUM0_SPLLT_FB_A/RDQ37 | T            |
| J23         | PR25B             | 2    | RUM0_SPLLC_IN_A/RDQ24 | C            | PR38B             | 2    | RUM0_SPLLC_IN_A/RDQ37 | C            |
| K23         | PR25A             | 2    | RUM0_SPLLT_IN_A/RDQ24 | T            | PR38A             | 2    | RUM0_SPLLT_IN_A/RDQ37 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| H26         | PR24B             | 2    | RDQ24                 | C (LVDS)*    | PR37B             | 2    | RDQ37                 | C (LVDS)*    |
| H25         | PR24A             | 2    | RDQS24***             | T (LVDS)*    | PR37A             | 2    | RDQS37***             | T (LVDS)*    |
| H24         | PR23B             | 2    | RDQ24                 | C            | PR36B             | 2    | RDQ37                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| H23         | PR23A             | 2    | RDQ24                 | T            | PR36A             | 2    | RDQ37                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| G26         | PR19B             | 2    | RDQ16                 | C            | PR32B             | 2    | RDQ29                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| G25         | PR19A             | 2    | RDQ16                 | T            | PR32A             | 2    | RDQ29                 | T            |
| F26         | PR18B             | 2    | RDQ16                 | C (LVDS)*    | PR31B             | 2    | RDQ29                 | C (LVDS)*    |
| F25         | PR18A             | 2    | RDQ16                 | T (LVDS)*    | PR31A             | 2    | RDQ29                 | T (LVDS)*    |
| K20         | PR17B             | 2    | RDQ16                 | C            | PR30B             | 2    | RDQ29                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| L19         | PR17A             | 2    | RDQ16                 | T            | PR30A             | 2    | RDQ29                 | T            |
| E26         | PR16B             | 2    | RDQ16                 | C (LVDS)*    | PR29B             | 2    | RDQ29                 | C (LVDS)*    |
| E25         | PR16A             | 2    | RDQS16                | T (LVDS)*    | PR29A             | 2    | RDQS29                | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| J22         | PR15B             | 2    | RDQ16                 | C            | PR28B             | 2    | RDQ29                 | C            |
| H22         | PR15A             | 2    | RDQ16                 | T            | PR28A             | 2    | RDQ29                 | T            |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| G24         | PR14B             | 2    | RDQ16         | C (LVDS)*    | PR27B             | 2    | RDQ29         | C (LVDS)*    |  |
| G23         | PR14A             | 2    | RDQ16         | T (LVDS)*    | PR27A             | 2    | RDQ29         | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K19         | PR13B             | 2    | RDQ16         | C            | PR26B             | 2    | RDQ29         | C            |  |
| J19         | PR13A             | 2    | RDQ16         | T            | PR26A             | 2    | RDQ29         | T            |  |
| D26         | PR12B             | 2    | RDQ16         | C (LVDS)*    | PR25B             | 2    | RDQ29         | C (LVDS)*    |  |
| C26         | PR12A             | 2    | RDQ16         | T (LVDS)*    | PR25A             | 2    | RDQ29         | T (LVDS)*    |  |
| F22         | PR11B             | 2    | RDQ8          | C            | PR24B             | 2    | RDQ21         | C            |  |
| E24         | PR11A             | 2    | RDQ8          | T            | PR24A             | 2    | RDQ21         | T            |  |
| GND         | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| D25         | PR10B             | 2    | RDQ8          | C (LVDS)*    | PR23B             | 2    | RDQ21         | C (LVDS)*    |  |
| C25         | PR10A             | 2    | RDQ8          | T (LVDS)*    | PR23A             | 2    | RDQ21         | T (LVDS)*    |  |
| D24         | PR9B              | 2    | RDQ8          | C            | PR22B             | 2    | RDQ21         | C            |  |
| B25         | PR9A              | 2    | RDQ8          | T            | PR22A             | 2    | RDQ21         | T            |  |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H21         | PR8B              | 2    | RDQ8          | C (LVDS)*    | PR21B             | 2    | RDQ21         | C (LVDS)*    |  |
| G22         | PR8A              | 2    | RDQS8         | T (LVDS)*    | PR21A             | 2    | RDQS21        | T (LVDS)*    |  |
| B24         | PR7B              | 2    | RDQ8          | C            | PR20B             | 2    | RDQ21         | C            |  |
| GND         | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| C24         | PR7A              | 2    | RDQ8          | T            | PR20A             | 2    | RDQ21         | T            |  |
| D23         | PR6B              | 2    | RDQ8          | C (LVDS)*    | PR19B             | 2    | RDQ21         | C (LVDS)*    |  |
| C23         | PR6A              | 2    | RDQ8          | T (LVDS)*    | PR19A             | 2    | RDQ21         | T (LVDS)*    |  |
| G21         | PR5B              | 2    | RDQ8          | C            | PR18B             | 2    | RDQ21         | C            |  |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H20         | PR5A              | 2    | RDQ8          | T            | PR18A             | 2    | RDQ21         | T            |  |
| GND         | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| E22         | PR2B              | 2    | VREF2_2       | C (LVDS)*    | PR2B              | 2    | VREF2_2       | C (LVDS)*    |  |
| F21         | PR2A              | 2    | VREF1_2       | T (LVDS)*    | PR2A              | 2    | VREF1_2       | T (LVDS)*    |  |
| E23         | PT82B             | 1    | VREF2_1       | C            | PT100B            | 1    | VREF2_1       | C            |  |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| D22         | PT82A             | 1    | VREF1_1       | T            | PT100A            | 1    | VREF1_1       | T            |  |
| G20         | PT81B             | 1    |               | C            | PT99B             | 1    |               | C            |  |
| J18         | PT81A             | 1    |               | T            | PT99A             | 1    |               | T            |  |
| F20         | PT80B             | 1    |               | C            | PT98B             | 1    |               | C            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H19         | PT80A             | 1    |               | T            | PT98A             | 1    |               | T            |  |
| A24         | PT79B             | 1    |               | C            | PT97B             | 1    |               | C            |  |
| A23         | PT79A             | 1    |               | T            | PT97A             | 1    |               | T            |  |
| E21         | PT78B             | 1    |               | C            | PT96B             | 1    |               | C            |  |
| F19         | PT78A             | 1    |               | T            | PT96A             | 1    |               | T            |  |
| C22         | PT77B             | 1    |               | C            | PT95B             | 1    |               | C            |  |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| E20         | PT77A             | 1    |               | T            | PT95A             | 1    |               | T            |  |
| B22         | PT76B             | 1    |               | C            | PT94B             | 1    |               | C            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| B23         | PT76A             | 1    |               | T            | PT94A             | 1    |               | T            |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| C20         | PT75B             | 1    |               | C            | PT93B             | 1    |               | C            |
| D20         | PT75A             | 1    |               | T            | PT93A             | 1    |               | T            |
| A22         | PT74B             | 1    |               | C            | PT92B             | 1    |               | C            |
| A21         | PT74A             | 1    |               | T            | PT92A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| E19         | PT71B             | 1    |               | C            | PT85B             | 1    |               | C            |
| C19         | PT71A             | 1    |               | T            | PT85A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| B21         | PT70B             | 1    |               | C            | PT79B             | 1    |               | C            |
| B20         | PT70A             | 1    |               | T            | PT79A             | 1    |               | T            |
| D19         | PT69B             | 1    |               | C            | PT78B             | 1    |               | C            |
| B19         | PT69A             | 1    |               | T            | PT78A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| G17         | PT68B             | 1    |               | C            | PT77B             | 1    |               | C            |
| E18         | PT68A             | 1    |               | T            | PT77A             | 1    |               | T            |
| G19         | PT67B             | 1    |               | C            | PT76B             | 1    |               | C            |
| F17         | PT67A             | 1    |               | T            | PT76A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A20         | PT66B             | 1    |               | C            | PT75B             | 1    |               | C            |
| A19         | PT66A             | 1    |               | T            | PT75A             | 1    |               | T            |
| E17         | PT65B             | 1    |               | C            | PT74B             | 1    |               | C            |
| D18         | PT65A             | 1    |               | T            | PT74A             | 1    |               | T            |
| B18         | PT64B             | 1    |               | C            | PT73B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A18         | PT64A             | 1    |               | T            | PT73A             | 1    |               | T            |
| E16         | PT63B             | 1    |               | C            | PT72B             | 1    |               | C            |
| G16         | PT63A             | 1    |               | T            | PT72A             | 1    |               | T            |
| F16         | PT62B             | 1    |               | C            | PT71B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H18         | PT62A             | 1    |               | T            | PT71A             | 1    |               | T            |
| A17         | PT61B             | 1    |               | C            | PT70B             | 1    |               | C            |
| B17         | PT61A             | 1    |               | T            | PT70A             | 1    |               | T            |
| C18         | PT60B             | 1    |               | C            | PT69B             | 1    |               | C            |
| B16         | PT60A             | 1    |               | T            | PT69A             | 1    |               | T            |
| C17         | PT59B             | 1    |               | C            | PT68B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| D17         | PT59A             | 1    |               | T            | PT68A             | 1    |               | T            |
| E15         | PT58B             | 1    |               | C            | PT67B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G15         | PT58A             | 1    |               | T            | PT67A             | 1    |               | T            |
| A16         | PT57B             | 1    |               | C            | PT66B             | 1    |               | C            |
| B15         | PT57A             | 1    |               | T            | PT66A             | 1    |               | T            |
| D15         | PT56B             | 1    |               | C            | PT65B             | 1    |               | C            |
| F15         | PT56A             | 1    |               | T            | PT65A             | 1    |               | T            |
| A14         | PT55B             | 1    |               | C            | PT64B             | 1    |               | C            |
| B14         | PT55A             | 1    |               | T            | PT64A             | 1    |               | T            |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C15         | PT54B             | 1    |               | C            | PT63B             | 1    |               | C            |
| A15         | PT54A             | 1    |               | T            | PT63A             | 1    |               | T            |
| A13         | PT53B             | 1    |               | C            | PT62B             | 1    |               | C            |
| B13         | PT53A             | 1    |               | T            | PT62A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H17         | PT52B             | 1    |               | C            | PT61B             | 1    |               | C            |
| H15         | PT52A             | 1    |               | T            | PT61A             | 1    |               | T            |
| D13         | PT51B             | 1    |               | C            | PT60B             | 1    |               | C            |
| C14         | PT51A             | 1    |               | T            | PT60A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| G14         | PT50B             | 1    |               | C            | PT59B             | 1    |               | C            |
| E14         | PT50A             | 1    |               | T            | PT59A             | 1    |               | T            |
| A12         | PT49B             | 1    |               | C            | PT58B             | 1    |               | C            |
| B12         | PT49A             | 1    |               | T            | PT58A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| F14         | PT48B             | 1    | PCLKC1_0      | C            | PT57B             | 1    | PCLKC1_0      | C            |
| D14         | PT48A             | 1    | PCLKT1_0      | T            | PT57A             | 1    | PCLKT1_0      | T            |
| H16         | XRES              | 1    |               |              | XRES              | 1    |               |              |
| H14         | PT46B             | 0    | PCLKC0_0      | C            | PT55B             | 0    | PCLKC0_0      | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| H13         | PT46A             | 0    | PCLKT0_0      | T            | PT55A             | 0    | PCLKT0_0      | T            |
| A11         | PT45B             | 0    |               | C            | PT54B             | 0    |               | C            |
| B11         | PT45A             | 0    |               | T            | PT54A             | 0    |               | T            |
| C13         | PT44B             | 0    |               | C            | PT53B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| E13         | PT44A             | 0    |               | T            | PT53A             | 0    |               | T            |
| D12         | PT43B             | 0    |               | C            | PT52B             | 0    |               | C            |
| F13         | PT43A             | 0    |               | T            | PT52A             | 0    |               | T            |
| A10         | PT42B             | 0    |               | C            | PT51B             | 0    |               | C            |
| B10         | PT42A             | 0    |               | T            | PT51A             | 0    |               | T            |
| C12         | PT41B             | 0    |               | C            | PT50B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C10         | PT41A             | 0    |               | T            | PT50A             | 0    |               | T            |
| G13         | PT40B             | 0    |               | C            | PT49B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H12         | PT40A             | 0    |               | T            | PT49A             | 0    |               | T            |
| A9          | PT39B             | 0    |               | C            | PT48B             | 0    |               | C            |
| B9          | PT39A             | 0    |               | T            | PT48A             | 0    |               | T            |
| E12         | PT38B             | 0    |               | C            | PT47B             | 0    |               | C            |
| G12         | PT38A             | 0    |               | T            | PT47A             | 0    |               | T            |
| A8          | PT37B             | 0    |               | C            | PT46B             | 0    |               | C            |
| B8          | PT37A             | 0    |               | T            | PT46A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E11         | PT36B             | 0    |               | C            | PT45B             | 0    |               | C            |
| C9          | PT36A             | 0    |               | T            | PT45A             | 0    |               | T            |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A7          | PT35B             | 0    |               | C            | PT44B             | 0    |               | C            |
| B7          | PT35A             | 0    |               | T            | PT44A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F12         | PT34B             | 0    |               | C            | PT43B             | 0    |               | C            |
| D10         | PT34A             | 0    |               | T            | PT43A             | 0    |               | T            |
| H11         | PT33B             | 0    |               | C            | PT42B             | 0    |               | C            |
| G11         | PT33A             | 0    |               | T            | PT42A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| A6          | PT32B             | 0    |               | C            | PT41B             | 0    |               | C            |
| B6          | PT32A             | 0    |               | T            | PT41A             | 0    |               | T            |
| D8          | PT31B             | 0    |               | C            | PT40B             | 0    |               | C            |
| C8          | PT31A             | 0    |               | T            | PT40A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F11         | PT30B             | 0    |               | C            | PT39B             | 0    |               | C            |
| E10         | PT30A             | 0    |               | T            | PT39A             | 0    |               | T            |
| E9          | PT29B             | 0    |               | C            | PT38B             | 0    |               | C            |
| D9          | PT29A             | 0    |               | T            | PT38A             | 0    |               | T            |
| G10         | PT28B             | 0    |               | C            | PT37B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| H10         | PT28A             | 0    |               | T            | PT37A             | 0    |               | T            |
| A5          | PT27B             | 0    |               | C            | PT36B             | 0    |               | C            |
| B5          | PT27A             | 0    |               | T            | PT36A             | 0    |               | T            |
| C7          | PT26B             | 0    |               | C            | PT35B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D7          | PT26A             | 0    |               | T            | PT35A             | 0    |               | T            |
| E8          | PT25B             | 0    |               | C            | PT34B             | 0    |               | C            |
| F10         | PT25A             | 0    |               | T            | PT34A             | 0    |               | T            |
| F8          | PT24B             | 0    |               | C            | PT33B             | 0    |               | C            |
| H9          | PT24A             | 0    |               | T            | PT33A             | 0    |               | T            |
| C5          | PT23B             | 0    |               | C            | PT32B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| D5          | PT23A             | 0    |               | T            | PT32A             | 0    |               | T            |
| B4          | PT22B             | 0    |               |              | PT31B             | 0    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C4          | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C3          | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |
| A4          | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |
| A3          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |
| B3          | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B2          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |



## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| D4          | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |  |
| D3          | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |  |
| C2          | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |  |
| C1          | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |  |
| G8          | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |  |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| G7          | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |  |
| E7          | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F7          | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |  |
| E6          | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |  |
| E5          | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| G6          | PT2B              | 0    | VREF2_0       | C            | PT2B              | 0    | VREF2_0       | C            |  |
| G5          | PT2A              | 0    | VREF1_0       | T            | PT2A              | 0    | VREF1_0       | T            |  |
| L12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| D11         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D6          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| K12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| J12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D16         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| D21         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G18         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| J15         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| K15         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F23         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| J20         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| L23         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M17         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M18         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| AA23        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| R17         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| R18         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| T23         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| V20         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AC16        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC21        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| U15         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| V15         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| Y18         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC11        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AC6         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| U12         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| V12         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| Y9          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AA4         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| R10         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| R9          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| T4          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| V7          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| F4          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| J7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| L4          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| M10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| M9          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| AE25        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| V18         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| J10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J16         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| J17         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| K18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| K9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| L18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| L9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| T18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| T9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| U18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| U9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V16         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| V17         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A2          | GND               | -    |               |              | GND               | -    |               |              |
| A25         | GND               | -    |               |              | GND               | -    |               |              |
| AA18        | GND               | -    |               |              | GND               | -    |               |              |
| AA24        | GND               | -    |               |              | GND               | -    |               |              |
| AA3         | GND               | -    |               |              | GND               | -    |               |              |
| AA9         | GND               | -    |               |              | GND               | -    |               |              |
| AD11        | GND               | -    |               |              | GND               | -    |               |              |
| AD16        | GND               | -    |               |              | GND               | -    |               |              |
| AD21        | GND               | -    |               |              | GND               | -    |               |              |
| AD6         | GND               | -    |               |              | GND               | -    |               |              |
| AE1         | GND               | -    |               |              | GND               | -    |               |              |
| AE26        | GND               | -    |               |              | GND               | -    |               |              |
| AF2         | GND               | -    |               |              | GND               | -    |               |              |
| AF25        | GND               | -    |               |              | GND               | -    |               |              |
| B1          | GND               | -    |               |              | GND               | -    |               |              |
| B26         | GND               | -    |               |              | GND               | -    |               |              |
| C11         | GND               | -    |               |              | GND               | -    |               |              |
| C16         | GND               | -    |               |              | GND               | -    |               |              |
| C21         | GND               | -    |               |              | GND               | -    |               |              |
| C6          | GND               | -    |               |              | GND               | -    |               |              |
| F18         | GND               | -    |               |              | GND               | -    |               |              |
| F24         | GND               | -    |               |              | GND               | -    |               |              |
| F3          | GND               | -    |               |              | GND               | -    |               |              |
| F9          | GND               | -    |               |              | GND               | -    |               |              |
| J13         | GND               | -    |               |              | GND               | -    |               |              |
| J14         | GND               | -    |               |              | GND               | -    |               |              |
| J21         | GND               | -    |               |              | GND               | -    |               |              |
| J6          | GND               | -    |               |              | GND               | -    |               |              |
| K10         | GND               | -    |               |              | GND               | -    |               |              |
| K11         | GND               | -    |               |              | GND               | -    |               |              |
| K13         | GND               | -    |               |              | GND               | -    |               |              |
| K14         | GND               | -    |               |              | GND               | -    |               |              |
| K16         | GND               | -    |               |              | GND               | -    |               |              |
| K17         | GND               | -    |               |              | GND               | -    |               |              |
| L10         | GND               | -    |               |              | GND               | -    |               |              |
| L11         | GND               | -    |               |              | GND               | -    |               |              |
| L16         | GND               | -    |               |              | GND               | -    |               |              |
| L17         | GND               | -    |               |              | GND               | -    |               |              |
| L24         | GND               | -    |               |              | GND               | -    |               |              |
| L3          | GND               | -    |               |              | GND               | -    |               |              |
| M13         | GND               | -    |               |              | GND               | -    |               |              |
| M14         | GND               | -    |               |              | GND               | -    |               |              |
| N10         | GND               | -    |               |              | GND               | -    |               |              |
| N12         | GND               | -    |               |              | GND               | -    |               |              |
| N13         | GND               | -    |               |              | GND               | -    |               |              |
| N14         | GND               | -    |               |              | GND               | -    |               |              |

## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| N15         | GND               | -    |               |              | GND               | -    |               |              |
| N17         | GND               | -    |               |              | GND               | -    |               |              |
| P10         | GND               | -    |               |              | GND               | -    |               |              |
| P12         | GND               | -    |               |              | GND               | -    |               |              |
| P13         | GND               | -    |               |              | GND               | -    |               |              |
| P14         | GND               | -    |               |              | GND               | -    |               |              |
| P15         | GND               | -    |               |              | GND               | -    |               |              |
| P17         | GND               | -    |               |              | GND               | -    |               |              |
| R13         | GND               | -    |               |              | GND               | -    |               |              |
| R14         | GND               | -    |               |              | GND               | -    |               |              |
| T10         | GND               | -    |               |              | GND               | -    |               |              |
| T11         | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |
| T17         | GND               | -    |               |              | GND               | -    |               |              |
| T24         | GND               | -    |               |              | GND               | -    |               |              |
| T3          | GND               | -    |               |              | GND               | -    |               |              |
| U10         | GND               | -    |               |              | GND               | -    |               |              |
| U11         | GND               | -    |               |              | GND               | -    |               |              |
| U13         | GND               | -    |               |              | GND               | -    |               |              |
| U14         | GND               | -    |               |              | GND               | -    |               |              |
| U16         | GND               | -    |               |              | GND               | -    |               |              |
| U17         | GND               | -    |               |              | GND               | -    |               |              |
| V13         | GND               | -    |               |              | GND               | -    |               |              |
| V14         | GND               | -    |               |              | GND               | -    |               |              |
| V21         | GND               | -    |               |              | GND               | -    |               |              |
| V6          | GND               | -    |               |              | GND               | -    |               |              |
| M3          | NC                | -    |               |              | NC                | -    |               |              |
| N6          | NC                | -    |               |              | NC                | -    |               |              |
| P24         | NC                | -    |               |              | NC                | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| VCCIO       | VCCIO7            | 7    |                       |              |
| F4          | PL2A              | 7    | VREF2_7               | T (LVDS)*    |
| F3          | PL2B              | 7    | VREF1_7               | C (LVDS)*    |
| H4          | PL3A              | 7    |                       | T            |
| G5          | PL3B              | 7    |                       | C            |
| GND         | GNDIO7            | -    |                       |              |
| D2          | PL4A              | 7    |                       | T (LVDS)*    |
| D1          | PL4B              | 7    |                       | C (LVDS)*    |
| E2          | PL5A              | 7    |                       | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| E1          | PL5B              | 7    |                       | C            |
| GND         | GNDIO7            | -    |                       |              |
| VCCIO       | VCCIO7            | 7    |                       |              |
| F1          | PL14A             | 7    | LUM1_SPLLT_IN_A/LDQ12 | T (LVDS)*    |
| F2          | PL14B             | 7    | LUM1_SPLLC_IN_A/LDQ12 | C (LVDS)*    |
| G1          | PL15A             | 7    | LUM1_SPLLT_FB_A/LDQ12 | T            |
| G2          | PL15B             | 7    | LUM1_SPLLC_FB_A/LDQ12 | C            |
| GND         | GNDIO7            | -    |                       |              |
| H8          | PL18A             | 7    | LDQ21                 | T            |
| H6          | PL18B             | 7    | LDQ21                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| G4          | PL19A             | 7    | LDQ21                 | T (LVDS)*    |
| G3          | PL19B             | 7    | LDQ21                 | C (LVDS)*    |
| H7          | PL20A             | 7    | LDQ21                 | T            |
| H5          | PL20B             | 7    | LDQ21                 | C            |
| GND         | GNDIO7            | -    |                       |              |
| H2          | PL21A             | 7    | LDQS21                | T (LVDS)*    |
| H1          | PL21B             | 7    | LDQ21                 | C (LVDS)*    |
| J6          | PL22A             | 7    | LDQ21                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| J8          | PL22B             | 7    | LDQ21                 | C            |
| J2          | PL23A             | 7    | LDQ21                 | T (LVDS)*    |
| J1          | PL23B             | 7    | LDQ21                 | C (LVDS)*    |
| J5          | PL24A             | 7    | LDQ21                 | T            |
| GND         | GNDIO7            | -    |                       |              |
| J7          | PL24B             | 7    | LDQ21                 | C            |
| J4          | PL25A             | 7    | LDQ29                 | T (LVDS)*    |
| J3          | PL25B             | 7    | LDQ29                 | C (LVDS)*    |
| K6          | PL26A             | 7    | LDQ29                 | T            |
| K8          | PL26B             | 7    | LDQ29                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| K2          | PL27A             | 7    | LDQ29                 | T (LVDS)*    |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| K1          | PL27B             | 7    | LDQ29                 | C (LVDS)*    |
| K5          | PL28A             | 7    | LDQ29                 | T            |
| K7          | PL28B             | 7    | LDQ29                 | C            |
| GND         | GNDIO7            | -    |                       |              |
| K4          | PL29A             | 7    | LDQS29                | T (LVDS)*    |
| K3          | PL29B             | 7    | LDQ29                 | C (LVDS)*    |
| L8          | PL30A             | 7    | LDQ29                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| L6          | PL30B             | 7    | LDQ29                 | C            |
| L2          | PL31A             | 7    | LDQ29                 | T (LVDS)*    |
| L1          | PL31B             | 7    | LDQ29                 | C (LVDS)*    |
| L7          | PL32A             | 7    | LDQ29                 | T            |
| GND         | GNDIO7            | -    |                       |              |
| L5          | PL32B             | 7    | LDQ29                 | C            |
| L4          | PL33A             | 7    | LDQ37                 | T (LVDS)*    |
| L3          | PL33B             | 7    | LDQ37                 | C (LVDS)*    |
| M8          | PL34A             | 7    | LDQ37                 | T            |
| M6          | PL34B             | 7    | LDQ37                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| M2          | PL35A             | 7    | LDQ37                 | T (LVDS)*    |
| M1          | PL35B             | 7    | LDQ37                 | C (LVDS)*    |
| M7          | PL36A             | 7    | LDQ37                 | T            |
| M5          | PL36B             | 7    | LDQ37                 | C            |
| GND         | GNDIO7            | -    |                       |              |
| M4          | PL37A             | 7    | LDQS37                | T (LVDS)*    |
| M3          | PL37B             | 7    | LDQ37                 | C (LVDS)*    |
| N6          | PL38A             | 7    | LUM0_SPLLT_IN_A/LDQ37 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| N8          | PL38B             | 7    | LUM0_SPLLC_IN_A/LDQ37 | C            |
| N5          | PL39A             | 7    | LUM0_SPLLT_FB_A/LDQ37 | T            |
| N7          | PL39B             | 7    | LUM0_SPLLC_FB_A/LDQ37 | C            |
| GND         | GNDIO7            | -    |                       |              |
| VCCIO       | VCCIO7            | 7    |                       |              |
| T9          | PL50A             | 7    | LDQ54                 |              |
| R9          | PL51A             | 7    | LDQ54                 | T            |
| P7          | PL51B             | 7    | LDQ54                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| N2          | PL52A             | 7    | LDQ54                 | T (LVDS)*    |
| N1          | PL52B             | 7    | LDQ54                 | C (LVDS)*    |
| P6          | PL53A             | 7    | LDQ54                 | T            |
| P5          | PL53B             | 7    | LDQ54                 | C            |
| GND         | GNDIO7            | -    |                       |              |
| P4          | PL54A             | 7    | LDQS54                | T (LVDS)*    |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| P3          | PL54B             | 7    | LDQ54          | C (LVDS)*    |
| R6          | PL55A             | 7    | LDQ54          | T            |
| VCCIO       | VCCIO7            | 7    |                |              |
| R8          | PL55B             | 7    | LDQ54          | C            |
| P2          | PL56A             | 7    | LDQ54          | T (LVDS)*    |
| P1          | PL56B             | 7    | LDQ54          | C (LVDS)*    |
| R5          | PL57A             | 7    | PCLKT7_0/LDQ54 | T            |
| GND         | GNDIO7            | -    |                |              |
| R7          | PL57B             | 7    | PCLKC7_0/LDQ54 | C            |
| R4          | PL59A             | 6    | PCLKT6_0/LDQ63 | T (LVDS)*    |
| R3          | PL59B             | 6    | PCLKC6_0/LDQ63 | C (LVDS)*    |
| T5          | PL60A             | 6    | VREF2_6/LDQ63  | T            |
| T7          | PL60B             | 6    | VREF1_6/LDQ63  | C            |
| T3          | PL61A             | 6    | LDQ63          | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                |              |
| T4          | PL61B             | 6    | LDQ63          | C (LVDS)*    |
| T6          | PL62A             | 6    | LDQ63          | T            |
| T8          | PL62B             | 6    | LDQ63          | C            |
| T2          | PL63A             | 6    | LDQS63         | T (LVDS)*    |
| GND         | GNDIO6            | -    |                |              |
| T1          | PL63B             | 6    | LDQ63          | C (LVDS)*    |
| U7          | PL64A             | 6    | LDQ63          | T            |
| U5          | PL64B             | 6    | LDQ63          | C            |
| VCCIO       | VCCIO6            | 6    |                |              |
| U4          | PL65A             | 6    | LDQ63          | T (LVDS)*    |
| U3          | PL65B             | 6    | LDQ63          | C (LVDS)*    |
| U8          | PL66A             | 6    | LDQ63          | T            |
| U6          | PL66B             | 6    | LDQ63          | C            |
| GND         | GNDIO6            | -    |                |              |
| U2          | PL67A             | 6    | LDQ71          | T (LVDS)*    |
| U1          | PL67B             | 6    | LDQ71          | C (LVDS)*    |
| V7          | PL68A             | 6    | LDQ71          | T            |
| V5          | PL68B             | 6    | LDQ71          | C            |
| VCCIO       | VCCIO6            | 6    |                |              |
| V2          | PL69A             | 6    | LDQ71          | T (LVDS)*    |
| V1          | PL69B             | 6    | LDQ71          | C (LVDS)*    |
| V8          | PL70A             | 6    | LDQ71          | T            |
| V6          | PL70B             | 6    | LDQ71          | C            |
| GND         | GNDIO6            | -    |                |              |
| W1          | PL71A             | 6    | LDQS71         | T (LVDS)*    |
| W2          | PL71B             | 6    | LDQ71          | C (LVDS)*    |
| W5          | PL72A             | 6    | LDQ71          | T            |
| VCCIO       | VCCIO6            | 6    |                |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                         |              |
|-------------|-------------------|------|-------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential |
| W7          | PL72B             | 6    | LDQ71                   | C            |
| W4          | PL73A             | 6    | LLM0_GDLLT_IN_A**/LDQ71 | T (LVDS)*    |
| W3          | PL73B             | 6    | LLM0_GDLLC_IN_A**/LDQ71 | C (LVDS)*    |
| W6          | PL74A             | 6    | LLM0_GDLLT_FB_A/LDQ71   | T            |
| GND         | GNDIO6            | -    |                         |              |
| W8          | PL74B             | 6    | LLM0_GDLLC_FB_D/LDQ71   | C            |
| Y8          | LLM0_PLLCAP       | 6    |                         |              |
| Y1          | PL76A             | 6    | LLM0_GPLLT_IN_A**/LDQ80 | T (LVDS)*    |
| Y2          | PL76B             | 6    | LLM0_GPLLC_IN_A**/LDQ80 | C (LVDS)*    |
| Y5          | PL77A             | 6    | LLM0_GPLLT_FB_A/LDQ80   | T            |
| Y6          | PL77B             | 6    | LLM0_GPLLC_FB_A/LDQ80   | C            |
| Y4          | PL78A             | 6    | LDQ80                   | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                         |              |
| Y3          | PL78B             | 6    | LDQ80                   | C (LVDS)*    |
| AA6         | PL79A             | 6    | LDQ80                   | T            |
| AA8         | PL79B             | 6    | LDQ80                   | C            |
| AA2         | PL80A             | 6    | LDQS80                  | T (LVDS)*    |
| GND         | GNDIO6            | -    |                         |              |
| AA1         | PL80B             | 6    | LDQ80                   | C (LVDS)*    |
| AA7         | PL81A             | 6    | LDQ80                   | T            |
| AA5         | PL81B             | 6    | LDQ80                   | C            |
| VCCIO       | VCCIO6            | 6    |                         |              |
| AA4         | PL82A             | 6    | LDQ80                   | T (LVDS)*    |
| AA3         | PL82B             | 6    | LDQ80                   | C (LVDS)*    |
| AB7         | PL83A             | 6    | LDQ80                   | T            |
| AB5         | PL83B             | 6    | LDQ80                   | C            |
| GND         | GNDIO6            | -    |                         |              |
| AB2         | PL84A             | 6    | LDQ88                   | T (LVDS)*    |
| AB1         | PL84B             | 6    | LDQ88                   | C (LVDS)*    |
| AB8         | PL85A             | 6    | LDQ88                   | T            |
| AB6         | PL85B             | 6    | LDQ88                   | C            |
| VCCIO       | VCCIO6            | 6    |                         |              |
| AB4         | PL86A             | 6    | LDQ88                   | T (LVDS)*    |
| AB3         | PL86B             | 6    | LDQ88                   | C (LVDS)*    |
| AC7         | PL87A             | 6    | LDQ88                   | T            |
| AC5         | PL87B             | 6    | LDQ88                   | C            |
| GND         | GNDIO6            | -    |                         |              |
| AC2         | PL88A             | 6    | LDQS88                  | T (LVDS)*    |
| AC1         | PL88B             | 6    | LDQ88                   | C (LVDS)*    |
| AC6         | PL89A             | 6    | LDQ88                   | T            |
| VCCIO       | VCCIO6            | 6    |                         |              |
| AD6         | PL89B             | 6    | LDQ88                   | C            |
| AD1         | PL90A             | 6    | LDQ88                   | T (LVDS)*    |



**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AD2         | PL90B             | 6    | LDQ88         | C (LVDS)*    |
| AD7         | PL91A             | 6    | LDQ88         | T            |
| GND         | GNDIO6            | -    |               |              |
| AB9         | PL91B             | 6    | LDQ88         | C            |
| AD5         | TCK               | -    |               |              |
| AE7         | TDI               | -    |               |              |
| AD4         | TMS               | -    |               |              |
| AA9         | TDO               | -    |               |              |
| AD3         | VCCJ              | -    |               |              |
| AC8         | PB2A              | 5    | VREF2_5/BDQ6  | T            |
| AE8         | PB2B              | 5    | VREF1_5/BDQ6  | C            |
| AD8         | PB3A              | 5    | BDQ6          | T            |
| AF8         | PB3B              | 5    | BDQ6          | C            |
| AG7         | PB4A              | 5    | BDQ6          | T            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AH7         | PB4B              | 5    | BDQ6          | C            |
| AC9         | PB5A              | 5    | BDQ6          | T            |
| AE9         | PB5B              | 5    | BDQ6          | C            |
| AD9         | PB6A              | 5    | BDQS6         | T            |
| GND         | GNDIO5            | -    |               |              |
| AF9         | PB6B              | 5    | BDQ6          | C            |
| AB10        | PB7A              | 5    | BDQ6          | T            |
| AA10        | PB7B              | 5    | BDQ6          | C            |
| AJ7         | PB8A              | 5    | BDQ6          | T            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AK7         | PB8B              | 5    | BDQ6          | C            |
| AC10        | PB9A              | 5    | BDQ6          | T            |
| AE10        | PB9B              | 5    | BDQ6          | C            |
| AJ8         | PB10A             | 5    | BDQ6          | T            |
| GND         | GNDIO5            | -    |               |              |
| AK8         | PB10B             | 5    | BDQ6          | C            |
| AF6         | PB11A             | 5    | BDQ15         | T            |
| AF7         | PB11B             | 5    | BDQ15         | C            |
| AG5         | PB12A             | 5    | BDQ15         | T            |
| AH5         | PB12B             | 5    | BDQ15         | C            |
| AG6         | PB13A             | 5    | BDQ15         | T            |
| AH6         | PB13B             | 5    | BDQ15         | C            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AJ4         | PB14A             | 5    | BDQ15         | T            |
| AK4         | PB14B             | 5    | BDQ15         | C            |
| GND         | GNDIO5            | -    |               |              |
| AJ5         | PB15A             | 5    | BDQS15        | T            |
| AK5         | PB15B             | 5    | BDQ15         | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AJ6         | PB16A             | 5    | BDQ15         | T            |
| AK6         | PB16B             | 5    | BDQ15         | C            |
| VCCIO       | VCCIO5            | 5    |               |              |
| GND         | GNDIO5            | -    |               |              |
| AD10        | PB29A             | 5    | BDQ33         | T            |
| AF10        | PB29B             | 5    | BDQ33         | C            |
| AC11        | PB30A             | 5    | BDQ33         | T            |
| AD11        | PB30B             | 5    | BDQ33         | C            |
| AG9         | PB31A             | 5    | BDQ33         | T            |
| AH9         | PB31B             | 5    | BDQ33         | C            |
| VCCIO       | VCCIO5            | 99   |               |              |
| AE11        | PB32A             | 5    | BDQ33         | T            |
| AG10        | PB32B             | 5    | BDQ33         | C            |
| GND         | GNDIO5            | -    |               |              |
| AJ9         | PB33A             | 5    | BDQS33        | T            |
| AK9         | PB33B             | 5    | BDQ33         | C            |
| AF11        | PB34A             | 5    | BDQ33         | T            |
| AH10        | PB34B             | 5    | BDQ33         | C            |
| AC12        | PB35A             | 5    | BDQ33         | T            |
| AE12        | PB35B             | 5    | BDQ33         | C            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AD12        | PB36A             | 5    | BDQ33         | T            |
| AF12        | PB36B             | 5    | BDQ33         | C            |
| AJ10        | PB37A             | 5    | BDQ33         | T            |
| AK10        | PB37B             | 5    | BDQ33         | C            |
| GND         | GNDIO5            | -    |               |              |
| AG11        | PB38A             | 5    | BDQ42         | T            |
| AH11        | PB38B             | 5    | BDQ42         | C            |
| AE13        | PB39A             | 5    | BDQ42         | T            |
| AC13        | PB39B             | 5    | BDQ42         | C            |
| AF13        | PB40A             | 5    | BDQ42         | T            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AD13        | PB40B             | 5    | BDQ42         | C            |
| AJ11        | PB41A             | 5    | BDQ42         | T            |
| AK11        | PB41B             | 5    | BDQ42         | C            |
| AD14        | PB42A             | 5    | BDQS42        | T            |
| GND         | GNDIO5            | -    |               |              |
| AC14        | PB42B             | 5    | BDQ42         | C            |
| AG12        | PB43A             | 5    | BDQ42         | T            |
| AE14        | PB43B             | 5    | BDQ42         | C            |
| AJ12        | PB44A             | 5    | BDQ42         | T            |
| VCCIO       | VCCIO5            | 5    |               |              |
| AK12        | PB44B             | 5    | BDQ42         | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| AH12        | PB45A             | 5    | BDQ42          | T            |
| AF14        | PB45B             | 5    | BDQ42          | C            |
| AJ13        | PB46A             | 5    | BDQ42          | T            |
| GND         | GNDIO5            | -    |                |              |
| AK13        | PB46B             | 5    | BDQ42          | C            |
| AB15        | PB47A             | 5    | BDQ51          | T            |
| AD15        | PB47B             | 5    | BDQ51          | C            |
| AE15        | PB48A             | 5    | BDQ51          | T            |
| AF15        | PB48B             | 5    | BDQ51          | C            |
| AG15        | PB49A             | 5    | BDQ51          | T            |
| AG14        | PB49B             | 5    | BDQ51          | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| AH15        | PB50A             | 5    | BDQ51          | T            |
| AH14        | PB50B             | 5    | BDQ51          | C            |
| GND         | GNDIO5            | -    |                |              |
| AJ14        | PB51A             | 5    | BDQS51         | T            |
| AK14        | PB51B             | 5    | BDQ51          | C            |
| AD16        | PB52A             | 5    | BDQ51          | T            |
| AF16        | PB52B             | 5    | BDQ51          | C            |
| AJ15        | PB53A             | 5    | PCLKT5_0/BDQ51 | T            |
| AK15        | PB53B             | 5    | PCLKC5_0/BDQ51 | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| GND         | GNDIO5            | -    |                |              |
| AE16        | PB58A             | 4    | PCLKT4_0/BDQ60 | T            |
| VCCIO       | VCCIO4            | 4    |                |              |
| AC15        | PB58B             | 4    | PCLKC4_0/BDQ60 | C            |
| AJ16        | PB59A             | 4    | BDQ60          | T            |
| AK16        | PB59B             | 4    | BDQ60          | C            |
| AC16        | PB60A             | 4    | BDQS60         | T            |
| GND         | GNDIO4            | -    |                |              |
| AB16        | PB60B             | 4    | BDQ60          | C            |
| AH17        | PB61A             | 4    | BDQ60          | T            |
| AG17        | PB61B             | 4    | BDQ60          | C            |
| AF17        | PB62A             | 4    | BDQ60          | T            |
| VCCIO       | VCCIO4            | 4    |                |              |
| AD17        | PB62B             | 4    | BDQ60          | C            |
| AE17        | PB63A             | 4    | BDQ60          | T            |
| AC17        | PB63B             | 4    | BDQ60          | C            |
| AJ17        | PB64A             | 4    | BDQ60          | T            |
| GND         | GNDIO4            | -    |                |              |
| AK17        | PB64B             | 4    | BDQ60          | C            |
| AK18        | PB65A             | 4    | BDQ69          | T            |
| AJ18        | PB65B             | 4    | BDQ69          | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AD18        | PB66A             | 4    | BDQ69         | T            |
| AF18        | PB66B             | 4    | BDQ69         | C            |
| AC18        | PB67A             | 4    | BDQ69         | T            |
| AE18        | PB67B             | 4    | BDQ69         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AG19        | PB68A             | 4    | BDQ69         | T            |
| AH19        | PB68B             | 4    | BDQ69         | C            |
| GND         | GNDIO4            | -    |               |              |
| AE19        | PB69A             | 4    | BDQS69        | T            |
| AF19        | PB69B             | 4    | BDQ69         | C            |
| AC19        | PB70A             | 4    | BDQ69         | T            |
| AD19        | PB70B             | 4    | BDQ69         | C            |
| AJ19        | PB71A             | 4    | BDQ69         | T            |
| AK19        | PB71B             | 4    | BDQ69         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AF20        | PB72A             | 4    | BDQ69         | T            |
| AH20        | PB72B             | 4    | BDQ69         | C            |
| AE20        | PB73A             | 4    | BDQ69         | T            |
| AG20        | PB73B             | 4    | BDQ69         | C            |
| GND         | GNDIO4            | -    |               |              |
| AD20        | PB74A             | 4    | BDQ78         | T            |
| AC20        | PB74B             | 4    | BDQ78         | C            |
| AH21        | PB75A             | 4    | BDQ78         | T            |
| AF21        | PB75B             | 4    | BDQ78         | C            |
| AJ20        | PB76A             | 4    | BDQ78         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AK20        | PB76B             | 4    | BDQ78         | C            |
| AG21        | PB77A             | 4    | BDQ78         | T            |
| AE21        | PB77B             | 4    | BDQ78         | C            |
| AD21        | PB78A             | 4    | BDQS78        | T            |
| GND         | GNDIO4            | -    |               |              |
| AC21        | PB78B             | 4    | BDQ78         | C            |
| AD22        | PB79A             | 4    | BDQ78         | T            |
| AB21        | PB79B             | 4    | BDQ78         | C            |
| AJ21        | PB80A             | 4    | BDQ78         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AK21        | PB80B             | 4    | BDQ78         | C            |
| GND         | GNDIO4            | -    |               |              |
| VCCIO       | VCCIO4            | 4    |               |              |
| AJ25        | PB87A             | 4    | BDQS87***     | T            |
| AK24        | PB87B             | 4    | BDQ87         | C            |
| AJ24        | PB88A             | 4    | BDQ87         | T            |
| AK25        | PB88B             | 4    | BDQ87         | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AH24        | PB89A             | 4    | BDQ87         | T            |
| AH25        | PB89B             | 4    | BDQ87         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AJ26        | PB90A             | 4    | BDQ87         | T            |
| AK26        | PB90B             | 4    | BDQ87         | C            |
| AF25        | PB91A             | 4    | BDQ87         | T            |
| AG25        | PB91B             | 4    | BDQ87         | C            |
| GND         | GNDIO4            | -    |               |              |
| AK22        | PB92A             | 4    | BDQ96         | T            |
| AJ22        | PB92B             | 4    | BDQ96         | C            |
| AE22        | PB93A             | 4    | BDQ96         | T            |
| AF22        | PB93B             | 4    | BDQ96         | C            |
| AG22        | PB94A             | 4    | BDQ96         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AH22        | PB94B             | 4    | BDQ96         | C            |
| AG24        | PB95A             | 4    | BDQ96         | T            |
| AG23        | PB95B             | 4    | BDQ96         | C            |
| AE23        | PB96A             | 4    | BDQS96        |              |
| GND         | GNDIO4            | -    |               |              |
| AC22        | PB97A             | 4    | BDQ96         |              |
| AJ23        | PB98A             | 4    | BDQ96         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AK23        | PB98B             | 4    | BDQ96         | C            |
| AD24        | PB99A             | 4    | BDQ96         | T            |
| AF24        | PB99B             | 4    | BDQ96         | C            |
| AC23        | PB100A            | 4    | VREF2_4/BDQ96 | T            |
| GND         | GNDIO4            | -    |               |              |
| AE24        | PB100B            | 4    | VREF1_4/BDQ96 | C            |
| AE25        | CFG2              | 8    |               |              |
| AB22        | CFG1              | 8    |               |              |
| AE26        | CFG0              | 8    |               |              |
| AA22        | PROGRAMN          | 8    |               |              |
| AD25        | CCLK              | 8    |               |              |
| AD26        | INITN             | 8    |               |              |
| AC24        | DONE              | 8    |               |              |
| GND         | GNDIO4            | -    |               |              |
| AC25        | PR90B             | 8    | WRITEN        | C            |
| AE27        | PR90A             | 8    | CS1N          | T            |
| AC26        | PR89B             | 8    | CSN           | C            |
| AE28        | PR89A             | 8    | D0/SPIFASTN   | T            |
| VCCIO       | VCCIO8            | 8    |               |              |
| AD27        | PR88B             | 8    | D1            | C            |
| AD28        | PR88A             | 8    | D2            | T            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                          |              |
|-------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential |
| AB24        | PR87B             | 8    | D3                       | C            |
| GND         | GNDIO4            | -    |                          |              |
| AB23        | PR87A             | 8    | D4                       | T            |
| AB25        | PR86B             | 8    | D5                       | C            |
| AB26        | PR86A             | 8    | D6                       | T            |
| AC27        | PR85B             | 8    | D7/SPID0                 | C            |
| VCCIO       | VCCIO8            | 8    |                          |              |
| AB27        | PR85A             | 8    | DI/CSSPION               | T            |
| AD29        | PR84B             | 8    | DOUT/CSON                | C            |
| AD30        | PR84A             | 8    | BUSY/SISPI               | T            |
| AA25        | PR83B             | 3    | RDQ80                    | C            |
| GND         | GNDIO3            | -    |                          |              |
| AA23        | PR83A             | 3    | RDQ80                    | T            |
| AC29        | PR82B             | 3    | RDQ80                    | C (LVDS)*    |
| AC30        | PR82A             | 3    | RDQ80                    | T (LVDS)*    |
| AA26        | PR81B             | 3    | RDQ80                    | C            |
| VCCIO       | VCCIO3            | 3    |                          |              |
| AA24        | PR81A             | 3    | RDQ80                    | T            |
| AB29        | PR80B             | 3    | RDQ80                    | C (LVDS)*    |
| AB30        | PR80A             | 3    | RDQS80                   | T (LVDS)*    |
| GND         | GNDIO3            | -    |                          |              |
| Y23         | PR79B             | 3    | RDQ80                    | C            |
| Y25         | PR79A             | 3    | RDQ80                    | T            |
| AA27        | PR78B             | 3    | RDQ80                    | C (LVDS)*    |
| AA28        | PR78A             | 3    | RDQ80                    | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                          |              |
| Y24         | PR77B             | 3    | RLM0_GPLL_C_FB_A/RDQ80   | C            |
| Y26         | PR77A             | 3    | RLM0_GPLLT_FB_A/RDQ80    | T            |
| AA29        | PR76B             | 3    | RLM0_GPLL_C_IN_A**/RDQ80 | C (LVDS)*    |
| AA30        | PR76A             | 3    | RLM0_GPLLT_IN_A**/RDQ80  | T (LVDS)*    |
| R22         | RLM0_PLLCAP       | 3    |                          |              |
| W23         | PR74B             | 3    | RLM0_GDLL_C_FB_A/RDQ71   | C            |
| W25         | PR74A             | 3    | RLM0_GDLLT_FB_A/RDQ71    | T            |
| GND         | GNDIO3            | -    |                          |              |
| Y27         | PR73B             | 3    | RLM0_GDLL_C_IN_A**/RDQ71 | C (LVDS)*    |
| Y28         | PR73A             | 3    | RLM0_GDLLT_IN_A**/RDQ71  | T (LVDS)*    |
| W24         | PR72B             | 3    | RDQ71                    | C            |
| W26         | PR72A             | 3    | RDQ71                    | T            |
| VCCIO       | VCCIO3            | 3    |                          |              |
| Y29         | PR71B             | 3    | RDQ71                    | C (LVDS)*    |
| Y30         | PR71A             | 3    | RDQS71                   | T (LVDS)*    |
| V25         | PR70B             | 3    | RDQ71                    | C            |
| GND         | GNDIO3            | -    |                          |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| V23         | PR70A             | 3    | RDQ71          | T            |
| W27         | PR69B             | 3    | RDQ71          | C (LVDS)*    |
| W28         | PR69A             | 3    | RDQ71          | T (LVDS)*    |
| V26         | PR68B             | 3    | RDQ71          | C            |
| VCCIO       | VCCIO3            | 3    |                |              |
| V24         | PR68A             | 3    | RDQ71          | T            |
| W29         | PR67B             | 3    | RDQ71          | C (LVDS)*    |
| W30         | PR67A             | 3    | RDQ71          | T (LVDS)*    |
| U25         | PR66B             | 3    | RDQ63          | C            |
| GND         | GNDIO3            | -    |                |              |
| U23         | PR66A             | 3    | RDQ63          | T            |
| V29         | PR65B             | 3    | RDQ63          | C (LVDS)*    |
| V30         | PR65A             | 3    | RDQ63          | T (LVDS)*    |
| U26         | PR64B             | 3    | RDQ63          | C            |
| VCCIO       | VCCIO3            | 3    |                |              |
| U24         | PR64A             | 3    | RDQ63          | T            |
| U27         | PR63B             | 3    | RDQ63          | C (LVDS)*    |
| U28         | PR63A             | 3    | RDQS63         | T (LVDS)*    |
| GND         | GNDIO3            | -    |                |              |
| T23         | PR62B             | 3    | RDQ63          | C            |
| T25         | PR62A             | 3    | RDQ63          | T            |
| U29         | PR61B             | 3    | RDQ63          | C (LVDS)*    |
| U30         | PR61A             | 3    | RDQ63          | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                |              |
| T24         | PR60B             | 3    | VREF2_3/RDQ63  | C            |
| T26         | PR60A             | 3    | VREF1_3/RDQ63  | T            |
| T27         | PR59B             | 3    | PCLKC3_0/RDQ63 | C (LVDS)*    |
| T28         | PR59A             | 3    | PCLKT3_0/RDQ63 | T (LVDS)*    |
| R24         | PR57B             | 2    | PCLKC2_0/RDQ54 | C            |
| R26         | PR57A             | 2    | PCLKT2_0/RDQ54 | T            |
| GND         | GNDIO2            | -    |                |              |
| T29         | PR56B             | 2    | RDQ54          | C (LVDS)*    |
| T30         | PR56A             | 2    | RDQ54          | T (LVDS)*    |
| R23         | PR55B             | 2    | RDQ54          | C            |
| R25         | PR55A             | 2    | RDQ54          | T            |
| VCCIO       | VCCIO2            | 2    |                |              |
| R27         | PR54B             | 2    | RDQ54          | C (LVDS)*    |
| R28         | PR54A             | 2    | RDQS54         | T (LVDS)*    |
| P26         | PR53B             | 2    | RDQ54          | C            |
| GND         | GNDIO2            | -    |                |              |
| P24         | PR53A             | 2    | RDQ54          | T            |
| R29         | PR52B             | 2    | RDQ54          | C (LVDS)*    |
| R30         | PR52A             | 2    | RDQ54          | T (LVDS)*    |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| P25         | PR51B             | 2    | RDQ54                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| P23         | PR51A             | 2    | RDQ54                 | T            |
| P27         | PR50B             | 2    | RDQ54                 | C (LVDS)*    |
| P28         | PR50A             | 2    | RDQ54                 | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              |
| VCCIO       | VCCIO2            | 2    |                       |              |
| N24         | PR39B             | 2    | RUM0_SPLLC_FB_A/RDQ37 | C            |
| N26         | PR39A             | 2    | RUM0_SPLLT_FB_A/RDQ37 | T            |
| N23         | PR38B             | 2    | RUM0_SPLLC_IN_A/RDQ37 | C            |
| N25         | PR38A             | 2    | RUM0_SPLLT_IN_A/RDQ37 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| P29         | PR37B             | 2    | RDQ37                 | C (LVDS)*    |
| P30         | PR37A             | 2    | RDQS37                | T (LVDS)*    |
| M26         | PR36B             | 2    | RDQ37                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| M24         | PR36A             | 2    | RDQ37                 | T            |
| N29         | PR35B             | 2    | RDQ37                 | C (LVDS)*    |
| N30         | PR35A             | 2    | RDQ37                 | T (LVDS)*    |
| M25         | PR34B             | 2    | RDQ37                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| M23         | PR34A             | 2    | RDQ37                 | T            |
| M27         | PR33B             | 2    | RDQ37                 | C (LVDS)*    |
| M28         | PR33A             | 2    | RDQ37                 | T (LVDS)*    |
| L26         | PR32B             | 2    | RDQ29                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| L24         | PR32A             | 2    | RDQ29                 | T            |
| M29         | PR31B             | 2    | RDQ29                 | C (LVDS)*    |
| M30         | PR31A             | 2    | RDQ29                 | T (LVDS)*    |
| L25         | PR30B             | 2    | RDQ29                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| L23         | PR30A             | 2    | RDQ29                 | T            |
| L27         | PR29B             | 2    | RDQ29                 | C (LVDS)*    |
| L28         | PR29A             | 2    | RDQS29                | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              |
| K24         | PR28B             | 2    | RDQ29                 | C            |
| K26         | PR28A             | 2    | RDQ29                 | T            |
| L29         | PR27B             | 2    | RDQ29                 | C (LVDS)*    |
| L30         | PR27A             | 2    | RDQ29                 | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| K23         | PR26B             | 2    | RDQ29                 | C            |
| K25         | PR26A             | 2    | RDQ29                 | T            |
| K27         | PR25B             | 2    | RDQ29                 | C (LVDS)*    |



**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| K28         | PR25A             | 2    | RDQ29                 | T (LVDS)*    |
| J24         | PR24B             | 2    | RDQ21                 | C            |
| J26         | PR24A             | 2    | RDQ21                 | T            |
| GND         | GNDIO2            | -    |                       |              |
| K29         | PR23B             | 2    | RDQ21                 | C (LVDS)*    |
| K30         | PR23A             | 2    | RDQ21                 | T (LVDS)*    |
| J23         | PR22B             | 2    | RDQ21                 | C            |
| J25         | PR22A             | 2    | RDQ21                 | T            |
| VCCIO       | VCCIO2            | 99   |                       |              |
| J27         | PR21B             | 2    | RDQ21                 | C (LVDS)*    |
| J28         | PR21A             | 2    | RDQS21                | T (LVDS)*    |
| H26         | PR20B             | 2    | RDQ21                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| H24         | PR20A             | 2    | RDQ21                 | T            |
| J29         | PR19B             | 2    | RDQ21                 | C (LVDS)*    |
| J30         | PR19A             | 2    | RDQ21                 | T (LVDS)*    |
| H25         | PR18B             | 2    | RDQ21                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H23         | PR18A             | 2    | RDQ21                 | T            |
| G27         | PR15B             | 2    | RUM1_SPLLC_FB_A/RDQ12 | C            |
| GND         | GNDIO2            | -    |                       |              |
| H27         | PR15A             | 2    | RUM1_SPLLT_FB_A/RDQ12 | T            |
| G29         | PR14B             | 2    | RUM1_SPLLC_IN_A/RDQ12 | C (LVDS)*    |
| G28         | PR14A             | 2    | RUM1_SPLLT_IN_A/RDQ12 | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| GND         | GNDIO2            | -    |                       |              |
| G26         | PR6B              | 2    |                       | C (LVDS)*    |
| G25         | PR6A              | 2    |                       | T (LVDS)*    |
| G30         | PR5B              | 2    |                       | C            |
| F30         | PR5A              | 2    |                       | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| F26         | PR4B              | 2    |                       | C (LVDS)*    |
| F27         | PR4A              | 2    |                       | T (LVDS)*    |
| F29         | PR3B              | 2    |                       | C            |
| GND         | GNDIO2            | -    |                       |              |
| F28         | PR3A              | 2    |                       | T            |
| H29         | PR2B              | 2    | VREF2_2               | C (LVDS)*    |
| H30         | PR2A              | 2    | VREF1_2               | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| B26         | PT100B            | 1    | VREF2_1               | C            |
| A26         | PT100A            | 1    | VREF1_1               | T            |
| GND         | GNDIO1            | -    |                       |              |
| C25         | PT99B             | 1    |                       | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| D25         | PT99A             | 1    |               | T            |
| J22         | PT98B             | 1    |               | C            |
| J21         | PT98A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B25         | PT97B             | 1    |               | C            |
| A25         | PT97A             | 1    |               | T            |
| E24         | PT96B             | 1    |               | C            |
| F24         | PT96A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| F23         | PT95B             | 1    |               | C            |
| H22         | PT95A             | 1    |               | T            |
| D24         | PT94B             | 1    |               | C            |
| C24         | PT94A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| E23         | PT93B             | 1    |               | C            |
| G23         | PT93A             | 1    |               | T            |
| B24         | PT92B             | 1    |               | C            |
| A24         | PT92A             | 1    |               | T            |
| C27         | PT91B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              |
| D27         | PT91A             | 1    |               | T            |
| C26         | PT90B             | 1    |               | C            |
| D26         | PT90A             | 1    |               | T            |
| A27         | PT89B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B27         | PT89A             | 1    |               | T            |
| A28         | PT88B             | 1    |               | C            |
| B28         | PT88A             | 1    |               | T            |
| A29         | PT87B             | 1    |               | C            |
| B29         | PT87A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| VCCIO       | VCCIO1            | 1    |               |              |
| H21         | PT80B             | 1    |               | C            |
| F22         | PT80A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B23         | PT79B             | 1    |               | C            |
| A23         | PT79A             | 1    |               | T            |
| G24         | PT78B             | 1    |               | C            |
| E22         | PT78A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| D22         | PT77B             | 1    |               | C            |
| C22         | PT77A             | 1    |               | T            |
| G22         | PT76B             | 1    |               | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| E21         | PT76A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B22         | PT75B             | 1    |               | C            |
| A22         | PT75A             | 1    |               | T            |
| H20         | PT74B             | 1    |               | C            |
| F21         | PT74A             | 1    |               | T            |
| F20         | PT73B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              |
| H19         | PT73A             | 1    |               | T            |
| D21         | PT72B             | 1    |               | C            |
| C21         | PT72A             | 1    |               | T            |
| E20         | PT71B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              |
| G21         | PT71A             | 1    |               | T            |
| B21         | PT70B             | 1    |               | C            |
| A21         | PT70A             | 1    |               | T            |
| F19         | PT69B             | 1    |               | C            |
| G20         | PT69A             | 1    |               | T            |
| E19         | PT68B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              |
| G19         | PT68A             | 1    |               | T            |
| D20         | PT67B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              |
| C20         | PT67A             | 1    |               | T            |
| B20         | PT66B             | 1    |               | C            |
| A20         | PT66A             | 1    |               | T            |
| F18         | PT65B             | 1    |               | C            |
| H18         | PT65A             | 1    |               | T            |
| D19         | PT64B             | 1    |               | C            |
| C19         | PT64A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| G18         | PT63B             | 1    |               | C            |
| E18         | PT63A             | 1    |               | T            |
| H17         | PT62B             | 1    |               | C            |
| F17         | PT62A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| G17         | PT61B             | 1    |               | C            |
| E17         | PT61A             | 1    |               | T            |
| B19         | PT60B             | 1    |               | C            |
| A19         | PT60A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| D17         | PT59B             | 1    |               | C            |
| B18         | PT59A             | 1    |               | T            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C17         | PT58B             | 1    |               | C            |
| A18         | PT58A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| H16         | PT57B             | 1    | PCLKC1_0      | C            |
| F16         | PT57A             | 1    | PCLKT1_0      | T            |
| K16         | XRES              | 1    |               |              |
| E16         | PT55B             | 0    | PCLKC0_0      | C            |
| GND         | GNDIO0            | -    |               |              |
| G16         | PT55A             | 0    | PCLKT0_0      | T            |
| B17         | PT54B             | 0    |               | C            |
| A17         | PT54A             | 0    |               | T            |
| J15         | PT53B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| J16         | PT53A             | 0    |               | T            |
| C16         | PT52B             | 0    |               | C            |
| D16         | PT52A             | 0    |               | T            |
| F15         | PT51B             | 0    |               | C            |
| H15         | PT51A             | 0    |               | T            |
| E15         | PT50B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              |
| G15         | PT50A             | 0    |               | T            |
| C15         | PT49B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| D15         | PT49A             | 0    |               | T            |
| B16         | PT48B             | 0    |               | C            |
| A16         | PT48A             | 0    |               | T            |
| E14         | PT47B             | 0    |               | C            |
| G14         | PT47A             | 0    |               | T            |
| B15         | PT46B             | 0    |               | C            |
| A15         | PT46A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| H14         | PT45B             | 0    |               | C            |
| F14         | PT45A             | 0    |               | T            |
| D14         | PT44B             | 0    |               | C            |
| C14         | PT44A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              |
| G13         | PT43B             | 0    |               | C            |
| E13         | PT43A             | 0    |               | T            |
| B14         | PT42B             | 0    |               | C            |
| A14         | PT42A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| H13         | PT41B             | 0    |               | C            |
| F13         | PT41A             | 0    |               | T            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| G12         | PT40B             | 0    |               | C            |
| E12         | PT40A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              |
| B13         | PT39B             | 0    |               | C            |
| A13         | PT39A             | 0    |               | T            |
| H12         | PT38B             | 0    |               | C            |
| F12         | PT38A             | 0    |               | T            |
| C12         | PT37B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              |
| D12         | PT37A             | 0    |               | T            |
| B12         | PT36B             | 0    |               | C            |
| A12         | PT36A             | 0    |               | T            |
| E11         | PT35B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| G11         | PT35A             | 0    |               | T            |
| F11         | PT34B             | 0    |               | C            |
| H11         | PT34A             | 0    |               | T            |
| C11         | PT33B             | 0    |               | C            |
| D11         | PT33A             | 0    |               | T            |
| B11         | PT32B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              |
| A11         | PT32A             | 0    |               | T            |
| E10         | PT31B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| G10         | PT31A             | 0    |               | T            |
| F10         | PT30B             | 0    |               | C            |
| H10         | PT30A             | 0    |               | T            |
| D10         | PT29B             | 0    |               | C            |
| C10         | PT29A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              |
| A7          | PT16B             | 0    |               | C            |
| B7          | PT16A             | 0    |               | T            |
| A6          | PT15B             | 0    |               | C            |
| B6          | PT15A             | 0    |               | T            |
| C7          | PT14B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              |
| D7          | PT14A             | 0    |               | T            |
| D8          | PT13B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| E7          | PT13A             | 0    |               | T            |
| C6          | PT12B             | 0    |               | C            |
| D6          | PT12A             | 0    |               | T            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C5          | PT11B             | 0    |               | C            |
| D5          | PT11A             | 0    |               | T            |
| E9          | PT10B             | 0    |               | C            |
| G9          | PT10A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| B10         | PT9B              | 0    |               | C            |
| A10         | PT9A              | 0    |               | T            |
| D9          | PT8B              | 0    |               | C            |
| C9          | PT8A              | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              |
| F9          | PT7B              | 0    |               | C            |
| H9          | PT7A              | 0    |               | T            |
| B9          | PT6B              | 0    |               | C            |
| A9          | PT6A              | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| E8          | PT5B              | 0    |               | C            |
| G8          | PT5A              | 0    |               | T            |
| A8          | PT4B              | 0    |               | C            |
| B8          | PT4A              | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              |
| F8          | PT3B              | 0    |               | C            |
| F7          | PT3A              | 0    |               | T            |
| J10         | PT2B              | 0    | VREF2_0       | C            |
| J9          | PT2A              | 0    | VREF1_0       | T            |
| AA11        | VCC               | -    |               |              |
| AA20        | VCC               | -    |               |              |
| K11         | VCC               | -    |               |              |
| K21         | VCC               | -    |               |              |
| K22         | VCC               | -    |               |              |
| L11         | VCC               | -    |               |              |
| L12         | VCC               | -    |               |              |
| L13         | VCC               | -    |               |              |
| L18         | VCC               | -    |               |              |
| L19         | VCC               | -    |               |              |
| L20         | VCC               | -    |               |              |
| M11         | VCC               | -    |               |              |
| M20         | VCC               | -    |               |              |
| N11         | VCC               | -    |               |              |
| N20         | VCC               | -    |               |              |
| V11         | VCC               | -    |               |              |
| V20         | VCC               | -    |               |              |
| W11         | VCC               | -    |               |              |
| W20         | VCC               | -    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| Y10         | VCC               | -    |               |              |
| Y11         | VCC               | -    |               |              |
| Y12         | VCC               | -    |               |              |
| Y13         | VCC               | -    |               |              |
| Y18         | VCC               | -    |               |              |
| Y19         | VCC               | -    |               |              |
| Y20         | VCC               | -    |               |              |
| J13         | VCCIO0            | 0    |               |              |
| J14         | VCCIO0            | 0    |               |              |
| K12         | VCCIO0            | 0    |               |              |
| K13         | VCCIO0            | 0    |               |              |
| K14         | VCCIO0            | 0    |               |              |
| K15         | VCCIO0            | 0    |               |              |
| J17         | VCCIO1            | 1    |               |              |
| J18         | VCCIO1            | 1    |               |              |
| J20         | VCCIO1            | 1    |               |              |
| K17         | VCCIO1            | 1    |               |              |
| K18         | VCCIO1            | 1    |               |              |
| K20         | VCCIO1            | 1    |               |              |
| L21         | VCCIO2            | 2    |               |              |
| M21         | VCCIO2            | 2    |               |              |
| M22         | VCCIO2            | 2    |               |              |
| N21         | VCCIO2            | 2    |               |              |
| N22         | VCCIO2            | 2    |               |              |
| R21         | VCCIO2            | 2    |               |              |
| U21         | VCCIO3            | 3    |               |              |
| U22         | VCCIO3            | 3    |               |              |
| V21         | VCCIO3            | 3    |               |              |
| V22         | VCCIO3            | 3    |               |              |
| W21         | VCCIO3            | 3    |               |              |
| Y22         | VCCIO3            | 3    |               |              |
| AA16        | VCCIO4            | 4    |               |              |
| AA17        | VCCIO4            | 4    |               |              |
| AA18        | VCCIO4            | 4    |               |              |
| AA19        | VCCIO4            | 4    |               |              |
| AB17        | VCCIO4            | 4    |               |              |
| AB18        | VCCIO4            | 4    |               |              |
| AA12        | VCCIO5            | 5    |               |              |
| AA13        | VCCIO5            | 5    |               |              |
| AA14        | VCCIO5            | 5    |               |              |
| AB12        | VCCIO5            | 5    |               |              |
| AB13        | VCCIO5            | 5    |               |              |
| AB14        | VCCIO5            | 5    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| U10         | VCCIO6            | 6    |               |              |
| U9          | VCCIO6            | 6    |               |              |
| V10         | VCCIO6            | 6    |               |              |
| W10         | VCCIO6            | 6    |               |              |
| W9          | VCCIO6            | 6    |               |              |
| Y9          | VCCIO6            | 6    |               |              |
| L10         | VCCIO7            | 7    |               |              |
| L9          | VCCIO7            | 7    |               |              |
| M10         | VCCIO7            | 7    |               |              |
| N10         | VCCIO7            | 7    |               |              |
| P10         | VCCIO7            | 7    |               |              |
| R10         | VCCIO7            | 7    |               |              |
| AA21        | VCCIO8            | 8    |               |              |
| Y21         | VCCIO8            | 8    |               |              |
| AA15        | VCCAUX            | -    |               |              |
| AB11        | VCCAUX            | -    |               |              |
| AB19        | VCCAUX            | -    |               |              |
| AB20        | VCCAUX            | -    |               |              |
| J11         | VCCAUX            | -    |               |              |
| J12         | VCCAUX            | -    |               |              |
| J19         | VCCAUX            | -    |               |              |
| K19         | VCCAUX            | -    |               |              |
| L22         | VCCAUX            | -    |               |              |
| M9          | VCCAUX            | -    |               |              |
| N9          | VCCAUX            | -    |               |              |
| P21         | VCCAUX            | -    |               |              |
| P9          | VCCAUX            | -    |               |              |
| T10         | VCCAUX            | -    |               |              |
| T21         | VCCAUX            | -    |               |              |
| V9          | VCCAUX            | -    |               |              |
| W22         | VCCAUX            | -    |               |              |
| A1          | GND               | -    |               |              |
| A30         | GND               | -    |               |              |
| AC28        | GND               | -    |               |              |
| AC3         | GND               | -    |               |              |
| AH13        | GND               | -    |               |              |
| AH18        | GND               | -    |               |              |
| AH23        | GND               | -    |               |              |
| AH28        | GND               | -    |               |              |
| AH3         | GND               | -    |               |              |
| AH8         | GND               | -    |               |              |
| AK1         | GND               | -    |               |              |
| AK30        | GND               | -    |               |              |



**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C13         | GND               | -    |               |              |
| C18         | GND               | -    |               |              |
| C23         | GND               | -    |               |              |
| C28         | GND               | -    |               |              |
| C3          | GND               | -    |               |              |
| C8          | GND               | -    |               |              |
| H28         | GND               | -    |               |              |
| H3          | GND               | -    |               |              |
| L14         | GND               | -    |               |              |
| L15         | GND               | -    |               |              |
| L16         | GND               | -    |               |              |
| L17         | GND               | -    |               |              |
| M12         | GND               | -    |               |              |
| M13         | GND               | -    |               |              |
| M14         | GND               | -    |               |              |
| M15         | GND               | -    |               |              |
| M16         | GND               | -    |               |              |
| M17         | GND               | -    |               |              |
| M18         | GND               | -    |               |              |
| M19         | GND               | -    |               |              |
| N12         | GND               | -    |               |              |
| N13         | GND               | -    |               |              |
| N14         | GND               | -    |               |              |
| N15         | GND               | -    |               |              |
| N16         | GND               | -    |               |              |
| N17         | GND               | -    |               |              |
| N18         | GND               | -    |               |              |
| N19         | GND               | -    |               |              |
| N28         | GND               | -    |               |              |
| N3          | GND               | -    |               |              |
| P11         | GND               | -    |               |              |
| P12         | GND               | -    |               |              |
| P13         | GND               | -    |               |              |
| P14         | GND               | -    |               |              |
| P15         | GND               | -    |               |              |
| P16         | GND               | -    |               |              |
| P17         | GND               | -    |               |              |
| P18         | GND               | -    |               |              |
| P19         | GND               | -    |               |              |
| P20         | GND               | -    |               |              |
| R11         | GND               | -    |               |              |
| R12         | GND               | -    |               |              |
| R13         | GND               | -    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| R14         | GND               | -    |               |              |
| R15         | GND               | -    |               |              |
| R16         | GND               | -    |               |              |
| R17         | GND               | -    |               |              |
| R18         | GND               | -    |               |              |
| R19         | GND               | -    |               |              |
| R20         | GND               | -    |               |              |
| T11         | GND               | -    |               |              |
| T12         | GND               | -    |               |              |
| T13         | GND               | -    |               |              |
| T14         | GND               | -    |               |              |
| T15         | GND               | -    |               |              |
| T16         | GND               | -    |               |              |
| T17         | GND               | -    |               |              |
| T18         | GND               | -    |               |              |
| T19         | GND               | -    |               |              |
| T20         | GND               | -    |               |              |
| U11         | GND               | -    |               |              |
| U12         | GND               | -    |               |              |
| U13         | GND               | -    |               |              |
| U14         | GND               | -    |               |              |
| U15         | GND               | -    |               |              |
| U16         | GND               | -    |               |              |
| U17         | GND               | -    |               |              |
| U18         | GND               | -    |               |              |
| U19         | GND               | -    |               |              |
| U20         | GND               | -    |               |              |
| V12         | GND               | -    |               |              |
| V13         | GND               | -    |               |              |
| V14         | GND               | -    |               |              |
| V15         | GND               | -    |               |              |
| V16         | GND               | -    |               |              |
| V17         | GND               | -    |               |              |
| V18         | GND               | -    |               |              |
| V19         | GND               | -    |               |              |
| V28         | GND               | -    |               |              |
| V3          | GND               | -    |               |              |
| W12         | GND               | -    |               |              |
| W13         | GND               | -    |               |              |
| W14         | GND               | -    |               |              |
| W15         | GND               | -    |               |              |
| W16         | GND               | -    |               |              |
| W17         | GND               | -    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| W18         | GND               | -    |               |              |
| W19         | GND               | -    |               |              |
| Y14         | GND               | -    |               |              |
| Y15         | GND               | -    |               |              |
| Y16         | GND               | -    |               |              |
| Y17         | GND               | -    |               |              |
| A2          | NC                | -    |               |              |
| A3          | NC                | -    |               |              |
| A4          | NC                | -    |               |              |
| A5          | NC                | -    |               |              |
| AB28        | NC                | -    |               |              |
| AC4         | NC                | -    |               |              |
| AD23        | NC                | -    |               |              |
| AE1         | NC                | -    |               |              |
| AE2         | NC                | -    |               |              |
| AE29        | NC                | -    |               |              |
| AE3         | NC                | -    |               |              |
| AE30        | NC                | -    |               |              |
| AE4         | NC                | -    |               |              |
| AE5         | NC                | -    |               |              |
| AE6         | NC                | -    |               |              |
| AF1         | NC                | -    |               |              |
| AF2         | NC                | -    |               |              |
| AF23        | NC                | -    |               |              |
| AF26        | NC                | -    |               |              |
| AF27        | NC                | -    |               |              |
| AF28        | NC                | -    |               |              |
| AF29        | NC                | -    |               |              |
| AF3         | NC                | -    |               |              |
| AF30        | NC                | -    |               |              |
| AF4         | NC                | -    |               |              |
| AF5         | NC                | -    |               |              |
| AG1         | NC                | -    |               |              |
| AG13        | NC                | -    |               |              |
| AG16        | NC                | -    |               |              |
| AG18        | NC                | -    |               |              |
| AG2         | NC                | -    |               |              |
| AG26        | NC                | -    |               |              |
| AG27        | NC                | -    |               |              |
| AG28        | NC                | -    |               |              |
| AG29        | NC                | -    |               |              |
| AG3         | NC                | -    |               |              |
| AG30        | NC                | -    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AG4         | NC                | -    |               |              |
| AG8         | NC                | -    |               |              |
| AH1         | NC                | -    |               |              |
| AH16        | NC                | -    |               |              |
| AH2         | NC                | -    |               |              |
| AH26        | NC                | -    |               |              |
| AH27        | NC                | -    |               |              |
| AH29        | NC                | -    |               |              |
| AH30        | NC                | -    |               |              |
| AH4         | NC                | -    |               |              |
| AJ1         | NC                | -    |               |              |
| AJ2         | NC                | -    |               |              |
| AJ27        | NC                | -    |               |              |
| AJ28        | NC                | -    |               |              |
| AJ29        | NC                | -    |               |              |
| AJ3         | NC                | -    |               |              |
| AJ30        | NC                | -    |               |              |
| AK2         | NC                | -    |               |              |
| AK27        | NC                | -    |               |              |
| AK28        | NC                | -    |               |              |
| AK29        | NC                | -    |               |              |
| AK3         | NC                | -    |               |              |
| B1          | NC                | -    |               |              |
| B2          | NC                | -    |               |              |
| B3          | NC                | -    |               |              |
| B30         | NC                | -    |               |              |
| B4          | NC                | -    |               |              |
| B5          | NC                | -    |               |              |
| C1          | NC                | -    |               |              |
| C2          | NC                | -    |               |              |
| C29         | NC                | -    |               |              |
| C30         | NC                | -    |               |              |
| C4          | NC                | -    |               |              |
| D13         | NC                | -    |               |              |
| D18         | NC                | -    |               |              |
| D23         | NC                | -    |               |              |
| D28         | NC                | -    |               |              |
| D29         | NC                | -    |               |              |
| D3          | NC                | -    |               |              |
| D30         | NC                | -    |               |              |
| D4          | NC                | -    |               |              |
| E25         | NC                | -    |               |              |
| E26         | NC                | -    |               |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| E27         | NC                | -    |               |              |
| E28         | NC                | -    |               |              |
| E29         | NC                | -    |               |              |
| E3          | NC                | -    |               |              |
| E30         | NC                | -    |               |              |
| E4          | NC                | -    |               |              |
| E5          | NC                | -    |               |              |
| E6          | NC                | -    |               |              |
| F25         | NC                | -    |               |              |
| F5          | NC                | -    |               |              |
| F6          | NC                | -    |               |              |
| G6          | NC                | -    |               |              |
| G7          | NC                | -    |               |              |
| K10         | NC                | -    |               |              |
| K9          | NC                | -    |               |              |
| N27         | NC                | -    |               |              |
| N4          | NC                | -    |               |              |
| R1          | NC                | -    |               |              |
| R2          | NC                | -    |               |              |
| V27         | NC                | -    |               |              |
| V4          | NC                | -    |               |              |
| P22         | VCCPLL            | -    |               |              |
| P8          | VCCPLL            | -    |               |              |
| T22         | VCCPLL            | -    |               |              |
| Y7          | VCCPLL            | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA

| LFE2M20E/SE |                   |      |                 |              | LFE2M35E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| A2          | PL2A              | 7    | LDQ6            | T (LVDS)*    | PL2A              | 7    | LDQ6                  | T (LVDS)*    |  |
| B2          | PL2B              | 7    | LDQ6            | C (LVDS)*    | PL2B              | 7    | LDQ6                  | C (LVDS)*    |  |
| D3          | PL3A              | 7    | LDQ6            | T            | PL3A              | 7    | LDQ6                  | T            |  |
| C2          | PL3B              | 7    | LDQ6            | C            | PL3B              | 7    | LDQ6                  | C            |  |
| E4          | PL4A              | 7    | LDQ6            | T (LVDS)*    | PL4A              | 7    | LDQ6                  | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                 |              | VCCIO7            | 7    |                       |              |  |
| E5          | PL4B              | 7    | LDQ6            | C (LVDS)*    | PL4B              | 7    | LDQ6                  | C (LVDS)*    |  |
| B1          | PL5A              | 7    | LDQ6            | T            | PL5A              | 7    | LDQ6                  | T            |  |
| C1          | PL5B              | 7    | LDQ6            | C            | PL5B              | 7    | LDQ6                  | C            |  |
| D2          | PL6A              | 7    | LDQS6           | T (LVDS)*    | PL6A              | 7    | LDQS6                 | T (LVDS)*    |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| D1          | PL6B              | 7    | LDQ6            | C (LVDS)*    | PL6B              | 7    | LDQ6                  | C (LVDS)*    |  |
| E1          | PL7A              | 7    | LDQ6            | T            | PL7A              | 7    | LDQ6                  | T            |  |
| F1          | PL7B              | 7    | LDQ6            | C            | PL7B              | 7    | LDQ6                  | C            |  |
| VCCIO       | VCCIO7            | 7    |                 |              | VCCIO7            | 7    |                       |              |  |
| F3          | PL8A              | 7    | LDQ6            | T (LVDS)*    | PL8A              | 7    | LDQ6                  | T (LVDS)*    |  |
| F2          | PL8B              | 7    | LDQ6            | C (LVDS)*    | PL8B              | 7    | LDQ6                  | C (LVDS)*    |  |
| F6          | PL9A              | 7    | VREF2_7/LDQ6    | T            | PL9A              | 7    | VREF2_7/LDQ6          | T            |  |
| F5          | PL9B              | 7    | VREF1_7/LDQ6    | C            | PL9B              | 7    | VREF1_7/LDQ6          | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G4          | PL11A             | 7    | LUM0_SPLLT_IN_A | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |  |
| G3          | PL11B             | 7    | LUM0_SPLLC_IN_A | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |  |
| G1          | PL12A             | 7    | LUM0_SPLLT_FB_A | T            | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |  |
| G2          | PL12B             | 7    | LUM0_SPLLC_FB_A | C            | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |  |
| H1          | PL13A             | 7    |                 | T (LVDS)*    | PL13A             | 7    | LDQ15                 | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                 |              | VCCIO7            | 7    |                       |              |  |
| J1          | PL13B             | 7    |                 | C (LVDS)*    | PL13B             | 7    | LDQ15                 | C (LVDS)*    |  |
| H2          | PL14A             | 7    |                 | T            | PL14A             | 7    | LDQ15                 | T            |  |
| H3          | PL14B             | 7    |                 | C            | PL14B             | 7    | LDQ15                 | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| VCCIO       | VCCIO7            | 7    |                 |              | VCCIO7            | 7    |                       |              |  |
| G6          | PL24A             | 7    | LDQ22           | T (LVDS)*    | PL34A             | 7    | LDQ32                 | T (LVDS)*    |  |
| H6          | PL24B             | 7    | LDQ22           | C (LVDS)*    | PL34B             | 7    | LDQ32                 | C (LVDS)*    |  |
| J2          | PL25A             | 7    | PCLKT7_0/LDQ22  | T            | PL35A             | 7    | PCLKT7_0/LDQ32        | T            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| K1          | PL25B             | 7    | PCLKC7_0/LDQ22  | C            | PL35B             | 7    | PCLKC7_0/LDQ32        | C            |  |
| H4          | PL27A             | 6    | PCLKT6_0        | T (LVDS)*    | PL37A             | 6    | PCLKT6_0              | T (LVDS)*    |  |
| H5          | PL27B             | 6    | PCLKC6_0        | C (LVDS)*    | PL37B             | 6    | PCLKC6_0              | C (LVDS)*    |  |
| J4          | PL28A             | 6    | VREF2_6         | T            | PL38A             | 6    | VREF2_6               | T            |  |
| K4          | PL28B             | 6    | VREF1_6         | C            | PL38B             | 6    | VREF1_6               | C            |  |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                       |              |  |
| J6          | PL31A             | 6    | LLM1_SPLLT_IN_A | T (LVDS)*    | PL41A             | 6    | LLM2_SPLLT_IN_A       | T (LVDS)*    |  |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                       |              |  |
| J5          | PL31B             | 6    | LLM1_SPLLC_IN_A | C (LVDS)*    | PL41B             | 6    | LLM2_SPLLC_IN_A       | C (LVDS)*    |  |
| K3          | PL32A             | 6    | LLM1_SPLLT_FB_A | T            | PL42A             | 6    | LLM2_SPLLT_FB_A       | T            |  |
| K2          | PL32B             | 6    | LLM1_SPLLC_FB_A | C            | PL42B             | 6    | LLM2_SPLLC_FB_A       | C            |  |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                       |              |  |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                 |              | LFE2M35E/SE       |      |                             |              |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function               | Differential |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                             |              |
| L1          | PL42A             | 6    | LLM0_GPLLT_IN_A | T (LVDS)*    | PL57A             | 6    | LLM0_GPLLT_IN_A**/LDQS57*** | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                             |              |
| L2          | PL42B             | 6    | LLM0_GPLLC_IN_A | C (LVDS)*    | PL57B             | 6    | LLM0_GPLLC_IN_A**/LDQ57     | C (LVDS)*    |
| L3          | PL43A             | 6    | LLM0_GPLLT_FB_A | T            | PL58A             | 6    | LLM0_GPLLT_FB_A/LDQ57       | T            |
| L4          | PL43B             | 6    | LLM0_GPLLC_FB_A | C            | PL58B             | 6    | LLM0_GPLLC_FB_A/LDQ57       | C            |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                             |              |
| M1          | PL44A             | 6    | LLM0_GDLLT_IN_A | T (LVDS)*    | PL59A             | 6    | LLM0_GDLLT_IN_A**/LDQ57     | T (LVDS)*    |
| N1          | PL44B             | 6    | LLM0_GDLLC_IN_A | C (LVDS)*    | PL59B             | 6    | LLM0_GDLLC_IN_A**/LDQ57     | C (LVDS)*    |
| N2          | PL45A             | 6    | LLM0_GDLLT_FB_A | T            | PL60A             | 6    | LLM0_GDLLT_FB_A/LDQ57       | T            |
| N3          | PL45B             | 6    | LLM0_GDLLC_FB_A | C            | PL60B             | 6    | LLM0_GDLLC_FB_A/LDQ57       | C            |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                             |              |
| M4          | LLM0_PLLCAP       | 6    |                 |              | LLM0_PLLCAP       | 6    |                             |              |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                             |              |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                             |              |
| K6          | TCK               | -    |                 |              | TCK               | -    |                             |              |
| L5          | TDI               | -    |                 |              | TDI               | -    |                             |              |
| N4          | TMS               | -    |                 |              | TMS               | -    |                             |              |
| N6          | TDO               | -    |                 |              | TDO               | -    |                             |              |
| K7          | VCCJ              | -    |                 |              | VCCJ              | -    |                             |              |
| M5          | PB2A              | 5    | BDQ6            | T            | PB2A              | 5    | BDQ6                        | T            |
| N5          | PB2B              | 5    | BDQ6            | C            | PB2B              | 5    | BDQ6                        | C            |
| L6          | PB3A              | 5    | BDQ6            | T            | PB3A              | 5    | BDQ6                        | T            |
| M6          | PB3B              | 5    | BDQ6            | C            | PB3B              | 5    | BDQ6                        | C            |
| P3          | PB4A              | 5    | BDQ6            | T            | PB4A              | 5    | BDQ6                        | T            |
| VCCIO       | VCCIO5            | 5    |                 |              | VCCIO5            | 5    |                             |              |
| P4          | PB4B              | 5    | BDQ6            | C            | PB4B              | 5    | BDQ6                        | C            |
| P2          | PB5A              | 5    | BDQ6            | T            | PB5A              | 5    | BDQ6                        | T            |
| P1          | PB5B              | 5    | BDQ6            | C            | PB5B              | 5    | BDQ6                        | C            |
| R1          | PB6A              | 5    | BDQS6           | T            | PB6A              | 5    | BDQS6                       | T            |
| GNDIO       | GNDIO5            | -    |                 |              | GNDIO5            | -    |                             |              |
| R2          | PB6B              | 5    | BDQ6            | C            | PB6B              | 5    | BDQ6                        | C            |
| R3          | PB7A              | 5    | BDQ6            | T            | PB7A              | 5    | BDQ6                        | T            |
| T2          | PB7B              | 5    | BDQ6            | C            | PB7B              | 5    | BDQ6                        | C            |
| R4          | PB8A              | 5    | BDQ6            | T            | PB8A              | 5    | BDQ6                        | T            |
| VCCIO       | VCCIO5            | 5    |                 |              | VCCIO5            | 5    |                             |              |
| T3          | PB8B              | 5    | BDQ6            | C            | PB8B              | 5    | BDQ6                        | C            |
| T4          | PB10A             | 5    | BDQ6            | T            | PB10A             | 5    | BDQ6                        | T            |
| GNDIO       | GNDIO5            | -    |                 |              | GNDIO5            | -    |                             |              |
| T5          | PB10B             | 5    | BDQ6            | C            | PB10B             | 5    | BDQ6                        | C            |
| VCCIO       | VCCIO5            | 5    |                 |              | VCCIO5            | 5    |                             |              |
| GNDIO       | GNDIO5            | -    |                 |              | GNDIO5            | -    |                             |              |
| T6          | PB16A             | 5    | VREF2_5/BDQ15   | T            | PB34A             | 5    | VREF2_5/BDQ33               | T            |
| R6          | PB16B             | 5    | VREF1_5/BDQ15   | C            | PB34B             | 5    | VREF1_5/BDQ33               | C            |
| P6          | PB17A             | 5    | PCLKT5_0/BDQ15  | T            | PB35A             | 5    | PCLKT5_0/BDQ33              | T            |
| P7          | PB17B             | 5    | PCLKC5_0/BDQ15  | C            | PB35B             | 5    | PCLKC5_0/BDQ33              | C            |
| VCCIO       | VCCIO5            | 5    |                 |              | VCCIO5            | 5    |                             |              |
| GNDIO       | GNDIO5            | -    |                 |              | GNDIO5            | -    |                             |              |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                |              | LFE2M35E/SE       |      |                |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| T7          | PB22A             | 4    | PCLKT4_0/BDQ24 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T8          | PB22B             | 4    | PCLKC4_0/BDQ24 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |
| L7          | PB23A             | 4    | VREF2_4/BDQ24  | T            | PB41A             | 4    | VREF2_4/BDQ42  | T            |
| L8          | PB23B             | 4    | VREF1_4/BDQ24  | C            | PB41B             | 4    | VREF1_4/BDQ42  | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| P8          | PB29A             | 4    | BDQ33          | T            | PB47A             | 4    | BDQ51          | T            |
| N8          | PB29B             | 4    | BDQ33          | C            | PB47B             | 4    | BDQ51          | C            |
| R7          | PB30A             | 4    | BDQ33          | T            | PB48A             | 4    | BDQ51          | T            |
| R8          | PB30B             | 4    | BDQ33          | C            | PB48B             | 4    | BDQ51          | C            |
| N7          | PB31A             | 4    | BDQ33          | T            | PB49A             | 4    | BDQ51          | T            |
| M8          | PB31B             | 4    | BDQ33          | C            | PB49B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| R9          | PB32A             | 4    | BDQ33          | T            | PB50A             | 4    | BDQ51          | T            |
| T9          | PB32B             | 4    | BDQ33          | C            | PB50B             | 4    | BDQ51          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| T10         | PB33A             | 4    | BDQS33         | T            | PB51A             | 4    | BDQS51         | T            |
| R10         | PB33B             | 4    | BDQ33          | C            | PB51B             | 4    | BDQ51          | C            |
| N9          | PB34A             | 4    | BDQ33          | T            | PB52A             | 4    | BDQ51          | T            |
| P10         | PB34B             | 4    | BDQ33          | C            | PB52B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| L9          | PB47A             | 4    | BDQ51          | T            | PB65A             | 4    | BDQ69          | T            |
| M9          | PB47B             | 4    | BDQ51          | C            | PB65B             | 4    | BDQ69          | C            |
| T11         | PB49A             | 4    | BDQ51          | T            | PB67A             | 4    | BDQ69          | T            |
| R11         | PB49B             | 4    | BDQ51          | C            | PB67B             | 4    | BDQ69          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T12         | PB50A             | 4    | BDQ51          | T            | PB68A             | 4    | BDQ69          | T            |
| T13         | PB50B             | 4    | BDQ51          | C            | PB68B             | 4    | BDQ69          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| P11         | PB51A             | 4    | BDQS51         | T            | PB69A             | 4    | BDQS69         | T            |
| N10         | PB51B             | 4    | BDQ51          | C            | PB69B             | 4    | BDQ69          | C            |
| T14         | PB52A             | 4    | BDQ51          | T            | PB70A             | 4    | BDQ69          | T            |
| R13         | PB52B             | 4    | BDQ51          | C            | PB70B             | 4    | BDQ69          | C            |
| R15         | PB53A             | 4    | BDQ51          | T            | PB71A             | 4    | BDQ69          | T            |
| R16         | PB53B             | 4    | BDQ51          | C            | PB71B             | 4    | BDQ69          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| R14         | PB54A             | 4    | BDQ51          | T            | PB72A             | 4    | BDQ69          | T            |
| P15         | PB54B             | 4    | BDQ51          | C            | PB72B             | 4    | BDQ69          | C            |
| P16         | PB55A             | 4    | BDQ51          | T            | PB73A             | 4    | BDQ69          | T            |
| P14         | PB55B             | 4    | BDQ51          | C            | PB73B             | 4    | BDQ69          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| L11         | CFG2              | 8    |                |              | CFG2              | 8    |                |              |
| L10         | CFG1              | 8    |                |              | CFG1              | 8    |                |              |
| P13         | CFG0              | 8    |                |              | CFG0              | 8    |                |              |
| N12         | PROGRAMN          | 8    |                |              | PROGRAMN          | 8    |                |              |



## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                  |              | LFE2M35E/SE       |      |                           |              |
|-------------|-------------------|------|------------------|--------------|-------------------|------|---------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function    | Differential | Ball/Pad Function | Bank | Dual Function             | Differential |
| N11         | CCLK              | 8    |                  |              | CCLK              | 8    |                           |              |
| M11         | INITN             | 8    |                  |              | INITN             | 8    |                           |              |
| N13         | DONE              | 8    |                  |              | DONE              | 8    |                           |              |
| GNDIO       | GNDIO8            | -    |                  |              | GNDIO8            | -    |                           |              |
| M12         | PR53B             | 8    | WRITEN           | C            | PR68B             | 8    | WRITEN                    | C            |
| M13         | PR53A             | 8    | CS1N             | T            | PR68A             | 8    | CS1N                      | T            |
| N14         | PR52B             | 8    | CSN              | C            | PR67B             | 8    | CSN                       | C            |
| N15         | PR52A             | 8    | D0/SPIFASTN      | T            | PR67A             | 8    | D0/SPIFASTN               | T            |
| VCCIO       | VCCIO8            | 8    |                  |              | VCCIO8            | 8    |                           |              |
| N16         | PR51B             | 8    | D1               | C            | PR66B             | 8    | D1                        | C            |
| M16         | PR51A             | 8    | D2               | T            | PR66A             | 8    | D2                        | T            |
| L12         | PR50B             | 8    | D3               | C            | PR65B             | 8    | D3                        | C            |
| GNDIO       | GNDIO8            | -    |                  |              | GNDIO8            | -    |                           |              |
| L13         | PR50A             | 8    | D4               | T            | PR65A             | 8    | D4                        | T            |
| L16         | PR49B             | 8    | D5               | C            | PR64B             | 8    | D5                        | C            |
| K16         | PR49A             | 8    | D6               | T            | PR64A             | 8    | D6                        | T            |
| L14         | PR48B             | 8    | D7/SPID0***      | C            | PR63B             | 8    | D7/SPID0***               | C            |
| VCCIO       | VCCIO8            | 8    |                  |              | VCCIO8            | 8    |                           |              |
| L15         | PR48A             | 8    | DI/CSSPI0N       | T            | PR63A             | 8    | DI/CSSPI0N                | T            |
| K13         | PR47B             | 8    | DOUT/CSN/CSSPI1N | C            | PR62B             | 8    | DOUT/CSN/CSSPI1N          | C            |
| K14         | PR47A             | 8    | BUSY/SISPI       | T            | PR62A             | 8    | BUSY/SISPI                | T            |
| K11         | RLM0_PLLCAP       | 3    |                  |              | RLM0_PLLCAP       | 3    |                           |              |
| K15         | PR45B             | 3    | RLM0_GDLLC_FB_A  | C            | PR60B             | 3    | RLM0_GDLLC_FB_A/RDQ57     | C            |
| GNDIO       | GNDIO3            | -    |                  |              | GNDIO3            | -    |                           |              |
| J16         | PR45A             | 3    | RLM0_GDLLT_FB_A  | T            | PR60A             | 3    | RLM0_GDLLT_FB_A/RDQ57     | T            |
| H16         | PR44B             | 3    | RLM0_GDLLC_IN_A  | C (LVDS)*    | PR59B             | 3    | RLM0_GDLLC_IN_A**/RDQ57   | C (LVDS)*    |
| J15         | PR44A             | 3    | RLM0_GDLLT_IN_A  | T (LVDS)*    | PR59A             | 3    | RLM0_GDLLT_IN_A**/RDQ57   | T (LVDS)*    |
| J14         | PR43B             | 3    | RLM0_GPLLC_IN_A  | C            | PR58B             | 3    | RLM0_GPLLC_IN_A**/RDQ57   | C            |
| VCCIO       | VCCIO3            | 3    |                  |              | VCCIO3            | 3    |                           |              |
| J13         | PR43A             | 3    | RLM0_GPLLT_IN_A  | T            | PR58A             | 3    | RLM0_GPLLT_IN_A**/RDQ57   | T            |
| H13         | PR42B             | 3    | RLM0_GPLLC_FB_A  | C (LVDS)*    | PR57B             | 3    | RLM0_GPLLC_FB_A/RDQ57     | C (LVDS)*    |
| H12         | PR42A             | 3    | RLM0_GPLLT_FB_A  | T (LVDS)*    | PR57A             | 3    | RLM0_GPLLT_FB_A/RDQS57*** | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                  |              | GNDIO3            | -    |                           |              |
| VCCIO       | VCCIO3            | 3    |                  |              | VCCIO3            | 3    |                           |              |
| G16         | PR32B             | 3    | RLM1_SPLLC_FB_A  | C            | PR42B             | 3    | RLM2_SPLLC_FB_A           | C            |
| VCCIO       | VCCIO3            | 3    |                  |              | VCCIO3            | 3    |                           |              |
| H15         | PR32A             | 3    | RLM1_SPLLT_FB_A  | T            | PR42A             | 3    | RLM2_SPLLT_FB_A           | T            |
| E16         | PR31B             | 3    | RLM1_SPLLC_IN_A  | C (LVDS)*    | PR41B             | 3    | RLM2_SPLLC_IN_A           | C (LVDS)*    |
| F15         | PR31A             | 3    | RLM1_SPLLT_IN_A  | T (LVDS)*    | PR41A             | 3    | RLM2_SPLLT_IN_A           | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                  |              | GNDIO3            | -    |                           |              |
| VCCIO       | VCCIO3            | 3    |                  |              | VCCIO3            | 3    |                           |              |
| F16         | PR28B             | 3    | VREF2_3          | C            | PR38B             | 3    | VREF2_3                   | C            |
| G15         | PR28A             | 3    | VREF1_3          | T            | PR38A             | 3    | VREF1_3                   | T            |
| J11         | PR27B             | 3    | PCLKC3_0         | C (LVDS)*    | PR37B             | 3    | PCLKC3_0                  | C (LVDS)*    |
| J12         | PR27A             | 3    | PCLKT3_0         | T (LVDS)*    | PR37A             | 3    | PCLKT3_0                  | T (LVDS)*    |
| G14         | PR25B             | 2    | PCLKC2_0/RDQ22   | C            | PR35B             | 2    | PCLKC2_0/RDQ32            | C            |
| G13         | PR25A             | 2    | PCLKT2_0/RDQ22   | T            | PR35A             | 2    | PCLKT2_0/RDQ32            | T            |
| GNDIO       | GNDIO2            | -    |                  |              | GNDIO2            | -    |                           |              |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                 |              | LFE2M35E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| F14         | PR24B             | 2    | RDQ22           | C (LVDS)*    | PR34B             | 2    | RDQ32                 | C(LVDS)*     |  |
| F13         | PR24A             | 2    | RDQ22           | T (LVDS)*    | PR34A             | 2    | RDQ32                 | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| GNDIO       | GNDIO2            | -    |                 |              | GNDIO2            | -    |                       |              |  |
| H11         | PR14B             | 2    |                 | C            | PR14B             | 2    | RDQ15                 | C            |  |
| G11         | PR14A             | 2    |                 | T            | PR14A             | 2    | RDQ15                 | T            |  |
| E13         | PR13B             | 2    |                 | C (LVDS)*    | PR13B             | 2    | RDQ15                 | C(LVDS)*     |  |
| F12         | PR13A             | 2    |                 | T (LVDS)*    | PR13A             | 2    | RDQ15                 | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| F11         | PR12B             | 2    | RUM0_SPLLC_FB_A | C            | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |  |
| E12         | PR12A             | 2    | RUM0_SPLLT_FB_A | T            | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |  |
| D16         | PR11B             | 2    | RUM0_SPLLC_IN_A | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C(LVDS)*     |  |
| D15         | PR11A             | 2    | RUM0_SPLLT_IN_A | T (LVDS)*    | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |  |
| C16         | PR9B              | 2    | VREF2_2         | C            | PR9B              | 2    | VREF2_2               | C            |  |
| GNDIO       | GNDIO2            | -    |                 |              | GNDIO2            | -    |                       |              |  |
| B16         | PR9A              | 2    | VREF1_2         | T            | PR9A              | 2    | VREF1_2               | T            |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| F4          | XRES              | -    |                 |              | XRES              | -    |                       |              |  |
| C15         | URC_SQ_VCCRX0     | 12   |                 |              | URC_SQ_VCCRX0     | 12   |                       |              |  |
| A14         | URC_SQ_HDINP0     | 12   |                 | T            | URC_SQ_HDINP0     | 12   |                       | T            |  |
| B15         | URC_SQ_VCCIB0     | 12   |                 |              | URC_SQ_VCCIB0     | 12   |                       |              |  |
| B14         | URC_SQ_HDINN0     | 12   |                 | C            | URC_SQ_HDINN0     | 12   |                       | C            |  |
| C12         | URC_SQ_VCCTX0     | 12   |                 |              | URC_SQ_VCCTX0     | 12   |                       |              |  |
| A11         | URC_SQ_HDOUTP0    | 12   |                 | T            | URC_SQ_HDOUTP0    | 12   |                       | T            |  |
| A12         | URC_SQ_VCCOB0     | 12   |                 |              | URC_SQ_VCCOB0     | 12   |                       |              |  |
| B11         | URC_SQ_HDOUTN0    | 12   |                 | C            | URC_SQ_HDOUTN0    | 12   |                       | C            |  |
| C11         | URC_SQ_VCCTX1     | 12   |                 |              | URC_SQ_VCCTX1     | 12   |                       |              |  |
| B10         | URC_SQ_HDOUTN1    | 12   |                 | C            | URC_SQ_HDOUTN1    | 12   |                       | C            |  |
| C10         | URC_SQ_VCCOB1     | 12   |                 |              | URC_SQ_VCCOB1     | 12   |                       |              |  |
| A10         | URC_SQ_HDOUTP1    | 12   |                 | T            | URC_SQ_HDOUTP1    | 12   |                       | T            |  |
| C14         | URC_SQ_VCCRX1     | 12   |                 |              | URC_SQ_VCCRX1     | 12   |                       |              |  |
| B13         | URC_SQ_HDINN1     | 12   |                 | C            | URC_SQ_HDINN1     | 12   |                       | C            |  |
| C13         | URC_SQ_VCCIB1     | 12   |                 |              | URC_SQ_VCCIB1     | 12   |                       |              |  |
| A13         | URC_SQ_HDINP1     | 12   |                 | T            | URC_SQ_HDINP1     | 12   |                       | T            |  |
| B9          | URC_SQ_VCCAUX33   | 12   |                 |              | URC_SQ_VCCAUX33   | 12   |                       |              |  |
| D8          | URC_SQ_REFCLKN    | 12   |                 | C            | URC_SQ_REFCLKN    | 12   |                       | C            |  |
| D9          | URC_SQ_REFCLKP    | 12   |                 | T            | URC_SQ_REFCLKP    | 12   |                       | T            |  |
| C9          | URC_SQ_VCCP       | 12   |                 |              | URC_SQ_VCCP       | 12   |                       |              |  |
| A5          | URC_SQ_HDINP2     | 12   |                 | T            | URC_SQ_HDINP2     | 12   |                       | T            |  |
| C5          | URC_SQ_VCCIB2     | 12   |                 |              | URC_SQ_VCCIB2     | 12   |                       |              |  |
| B5          | URC_SQ_HDINN2     | 12   |                 | C            | URC_SQ_HDINN2     | 12   |                       | C            |  |
| C4          | URC_SQ_VCCRX2     | 12   |                 |              | URC_SQ_VCCRX2     | 12   |                       |              |  |
| A8          | URC_SQ_HDOUTP2    | 12   |                 | T            | URC_SQ_HDOUTP2    | 12   |                       | T            |  |
| C8          | URC_SQ_VCCOB2     | 12   |                 |              | URC_SQ_VCCOB2     | 12   |                       |              |  |
| B8          | URC_SQ_HDOUTN2    | 12   |                 | C            | URC_SQ_HDOUTN2    | 12   |                       | C            |  |
| C7          | URC_SQ_VCCTX2     | 12   |                 |              | URC_SQ_VCCTX2     | 12   |                       |              |  |
| B7          | URC_SQ_HDOUTN3    | 12   |                 | C            | URC_SQ_HDOUTN3    | 12   |                       | C            |  |
| A6          | URC_SQ_VCCOB3     | 12   |                 |              | URC_SQ_VCCOB3     | 12   |                       |              |  |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| A7          | URC_SQ_HDOUTP3    | 12   |               | T            | URC_SQ_HDOUTP3    | 12   |               | T            |  |
| C6          | URC_SQ_VCCTX3     | 12   |               |              | URC_SQ_VCCTX3     | 12   |               |              |  |
| B4          | URC_SQ_HDINN3     | 12   |               | C            | URC_SQ_HDINN3     | 12   |               | C            |  |
| B3          | URC_SQ_VCCIB3     | 12   |               |              | URC_SQ_VCCIB3     | 12   |               |              |  |
| A4          | URC_SQ_HDINP3     | 12   |               | T            | URC_SQ_HDINP3     | 12   |               | T            |  |
| C3          | URC_SQ_VCCRX3     | 12   |               |              | URC_SQ_VCCRX3     | 12   |               |              |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G10         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| G7          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| G9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| H7          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K8          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| E7          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E10         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E14         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| G12         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K12         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| M14         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| VCCIO       | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| M10         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| P12         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| M7          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| P5          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| K5          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| M3          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| E3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| G5          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| VCCIO       | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| T15         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| VCCIO       | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| G8          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| H10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| J7          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A1          | GND               | -    |               |              | GND               | -    |               |              |  |
| A15         | GND               | -    |               |              | GND               | -    |               |              |  |
| A16         | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| A3          | GND               | -    |               |              | GND               | -    |               |              |
| A9          | GND               | -    |               |              | GND               | -    |               |              |
| B12         | GND               | -    |               |              | GND               | -    |               |              |
| B6          | GND               | -    |               |              | GND               | -    |               |              |
| E15         | GND               | -    |               |              | GND               | -    |               |              |
| E2          | GND               | -    |               |              | GND               | -    |               |              |
| H14         | GND               | -    |               |              | GND               | -    |               |              |
| H8          | GND               | -    |               |              | GND               | -    |               |              |
| H9          | GND               | -    |               |              | GND               | -    |               |              |
| J3          | GND               | -    |               |              | GND               | -    |               |              |
| J8          | GND               | -    |               |              | GND               | -    |               |              |
| J9          | GND               | -    |               |              | GND               | -    |               |              |
| M15         | GND               | -    |               |              | GND               | -    |               |              |
| M2          | GND               | -    |               |              | GND               | -    |               |              |
| P9          | GND               | -    |               |              | GND               | -    |               |              |
| R12         | GND               | -    |               |              | GND               | -    |               |              |
| R5          | GND               | -    |               |              | GND               | -    |               |              |
| T1          | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |
| D10         | NC                | -    |               |              | NC                | -    |               |              |
| D11         | NC                | -    |               |              | NC                | -    |               |              |
| D12         | NC                | -    |               |              | NC                | -    |               |              |
| D13         | NC                | -    |               |              | NC                | -    |               |              |
| D14         | NC                | -    |               |              | NC                | -    |               |              |
| D4          | NC                | -    |               |              | NC                | -    |               |              |
| D5          | NC                | -    |               |              | NC                | -    |               |              |
| D6          | NC                | -    |               |              | NC                | -    |               |              |
| D7          | NC                | -    |               |              | NC                | -    |               |              |
| E11         | NC                | -    |               |              | NC                | -    |               |              |
| E6          | NC                | -    |               |              | NC                | -    |               |              |
| E8          | NC                | -    |               |              | NC                | -    |               |              |
| E9          | NC                | -    |               |              | NC                | -    |               |              |
| F10         | NC                | -    |               |              | NC                | -    |               |              |
| F7          | NC                | -    |               |              | NC                | -    |               |              |
| F8          | NC                | -    |               |              | NC                | -    |               |              |
| F9          | NC                | -    |               |              | NC                | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPPLLs or GDLLs within the respective quadrant.

\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA

| LFE2M20E/SE |                   |      |                       |              | LFE2M35E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| D1          | PL2A              | 7    | LDQ6                  | T (LVDS)*    | PL2A              | 7    | LDQ6                  | T (LVDS)*    |  |
| E1          | PL2B              | 7    | LDQ6                  | C (LVDS)*    | PL2B              | 7    | LDQ6                  | C (LVDS)*    |  |
| F1          | PL3A              | 7    | LDQ6                  | T            | PL3A              | 7    | LDQ6                  | T            |  |
| F2          | PL3B              | 7    | LDQ6                  | C            | PL3B              | 7    | LDQ6                  | C            |  |
| F5          | PL4A              | 7    | LDQ6                  | T (LVDS)*    | PL4A              | 7    | LDQ6                  | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| G6          | PL4B              | 7    | LDQ6                  | C (LVDS)*    | PL4B              | 7    | LDQ6                  | C (LVDS)*    |  |
| F4          | PL5A              | 7    | LDQ6                  | T            | PL5A              | 7    | LDQ6                  | T            |  |
| F3          | PL5B              | 7    | LDQ6                  | C            | PL5B              | 7    | LDQ6                  | C            |  |
| G1          | PL6A              | 7    | LDQS6                 | T (LVDS)*    | PL6A              | 7    | LDQS6                 | T (LVDS)*    |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| G2          | PL6B              | 7    | LDQ6                  | C (LVDS)*    | PL6B              | 7    | LDQ6                  | C (LVDS)*    |  |
| H1          | PL7A              | 7    | LDQ6                  | T            | PL7A              | 7    | LDQ6                  | T            |  |
| H2          | PL7B              | 7    | LDQ6                  | C            | PL7B              | 7    | LDQ6                  | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| H7          | PL8A              | 7    | LDQ6                  | T (LVDS)*    | PL8A              | 7    | LDQ6                  | T (LVDS)*    |  |
| H6          | PL8B              | 7    | LDQ6                  | C (LVDS)*    | PL8B              | 7    | LDQ6                  | C (LVDS)*    |  |
| G3          | PL9A              | 7    | VREF2_7/LDQ6          | T            | PL9A              | 7    | VREF2_7/LDQ6          | T            |  |
| H3          | PL9B              | 7    | VREF1_7/LDQ6          | C            | PL9B              | 7    | VREF1_7/LDQ6          | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| H5          | PL11A             | 7    | LUM0_SPLLT_IN_A       | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |  |
| H4          | PL11B             | 7    | LUM0_SPLLC_IN_A       | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |  |
| J1          | PL12A             | 7    | LUM0_SPLLT_FB_A       | T            | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |  |
| J2          | PL12B             | 7    | LUM0_SPLLC_FB_A       | C            | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |  |
| J3          | PL13A             | 7    |                       | T (LVDS)*    | PL13A             | 7    | LDQ15                 | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| J4          | PL13B             | 7    |                       | C (LVDS)*    | PL13B             | 7    | LDQ15                 | C (LVDS)*    |  |
| J7          | PL14A             | 7    |                       | T            | PL14A             | 7    | LDQ15                 | T            |  |
| J6          | PL14B             | 7    |                       | C            | PL14B             | 7    | LDQ15                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| K1          | PL18A             | 7    | LUM1_SPLLT_IN_A/LDQ22 | T (LVDS)*    | PL28A             | 7    | LUM1_SPLLT_IN_A/LDQ32 | T (LVDS)*    |  |
| K2          | PL18B             | 7    | LUM1_SPLLC_IN_A/LDQ22 | C (LVDS)*    | PL28B             | 7    | LUM1_SPLLC_IN_A/LDQ32 | C (LVDS)*    |  |
| J5          | PL19A             | 7    | LUM1_SPLLT_FB_A/LDQ22 | T            | PL29A             | 7    | LUM1_SPLLT_FB_A/LDQ32 | T            |  |
| K5          | PL19B             | 7    | LUM1_SPLLC_FB_A/LDQ22 | C            | PL29B             | 7    | LUM1_SPLLC_FB_A/LDQ32 | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| K7          | PL20A             | 7    | LDQ22                 | T (LVDS)*    | PL30A             | 7    | LDQ32                 | T (LVDS)*    |  |
| K6          | PL20B             | 7    | LDQ22                 | C (LVDS)*    | PL30B             | 7    | LDQ32                 | C (LVDS)*    |  |
| L6          | PL21A             | 7    | LDQ22                 | T            | PL31A             | 7    | LDQ32                 | T            |  |
| L7          | PL21B             | 7    | LDQ22                 | C            | PL31B             | 7    | LDQ32                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| L1          | PL22A             | 7    | LDQS22                | T (LVDS)*    | PL32A             | 7    | LDQS32                | T (LVDS)*    |  |
| L2          | PL22B             | 7    | LDQ22                 | C (LVDS)*    | PL32B             | 7    | LDQ32                 | C (LVDS)*    |  |
| M7          | PL23A             | 7    | LDQ22                 | T            | PL33A             | 7    | LDQ32                 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| L5          | PL23B             | 7    | LDQ22                 | C            | PL33B             | 7    | LDQ32                 | C            |  |
| L3          | PL24A             | 7    | LDQ22                 | T (LVDS)*    | PL34A             | 7    | LDQ32                 | T (LVDS)*    |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                   |              | LFE2M35E/SE       |      |                              |              |  |
|-------------|-------------------|------|-------------------|--------------|-------------------|------|------------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function                | Differential |  |
| L4          | PL24B             | 7    | LDQ22             | C (LVDS)*    | PL34B             | 7    | LDQ32                        | C (LVDS)*    |  |
| M1          | PL25A             | 7    | PCLKT7_0/LDQ22    | T            | PL35A             | 7    | PCLKT7_0/LDQ32               | T            |  |
| GNDIO       | GNDIO7            | -    |                   |              | GNDIO7            | -    |                              |              |  |
| M2          | PL25B             | 7    | PCLKC7_0/LDQ22    | C            | PL35B             | 7    | PCLKC7_0/LDQ32               | C            |  |
| M6          | PL27A             | 6    | PCLKT6_0          | T (LVDS)*    | PL37A             | 6    | PCLKT6_0                     | T (LVDS)*    |  |
| M5          | PL27B             | 6    | PCLKC6_0          | C (LVDS)*    | PL37B             | 6    | PCLKC6_0                     | C (LVDS)*    |  |
| M3          | PL28A             | 6    | VREF2_6           | T            | PL38A             | 6    | VREF2_6                      | T            |  |
| M4          | PL28B             | 6    | VREF1_6           | C            | PL38B             | 6    | VREF1_6                      | C            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                              |              |  |
| N7          | PL31A             | 6    | LLM1_SPLLT_IN_A   | T (LVDS)*    | PL41A             | 6    | LLM2_SPLLT_IN_A              | T (LVDS)*    |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |
| N6          | PL31B             | 6    | LLM1_SPLLC_IN_A   | C (LVDS)*    | PL41B             | 6    | LLM2_SPLLC_IN_A              | C (LVDS)*    |  |
| N1          | PL32A             | 6    | LLM1_SPLLT_FB_A   | T            | PL42A             | 6    | LLM2_SPLLT_FB_A              | T            |  |
| N2          | PL32B             | 6    | LLM1_SPLLC_FB_A   | C            | PL42B             | 6    | LLM2_SPLLC_FB_A              | C            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                              |              |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |
| P6          | PL38A             | 6    | LDQS38****        | T (LVDS)*    | PL48A             | 6    | LDQS48****                   | T (LVDS)*    |  |
| N5          | PL38B             | 6    | LDQ38             | C (LVDS)*    | PL48B             | 6    | LDQ48                        | C (LVDS)*    |  |
| P1          | PL39A             | 6    | LDQ38             | T            | PL49A             | 6    | LDQ48                        | T            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                              |              |  |
| P2          | PL39B             | 6    | LDQ38             | C            | PL49B             | 6    | LDQ48                        | C            |  |
| P3          | PL40A             | 6    | LDQ38             | T (LVDS)*    | PL50A             | 6    | LDQ48                        | T (LVDS)*    |  |
| P4          | PL40B             | 6    | LDQ38             | C (LVDS)*    | PL50B             | 6    | LDQ48                        | C (LVDS)*    |  |
| P5          | PL41A             | 6    | LDQ38             | T            | PL51A             | 6    | LDQ48                        | T            |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |
| P7          | PL41B             | 6    | LDQ38             | C            | PL51B             | 6    | LDQ48                        | C            |  |
| R1          | PL42A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL57A             | 6    | LLM0_GPLLT_IN_A**/LDQS57**** | T (LVDS)*    |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |
| R2          | PL42B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL57B             | 6    | LLM0_GPLLC_IN_A**/LDQ57      | C (LVDS)*    |  |
| R3          | PL43A             | 6    | LLM0_GPLLT_FB_A   | T            | PL58A             | 6    | LLM0_GPLLT_FB_A/LDQ57        | T            |  |
| R4          | PL43B             | 6    | LLM0_GPLLC_FB_A   | C            | PL58B             | 6    | LLM0_GPLLC_FB_A/LDQ57        | C            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                              |              |  |
| R6          | PL44A             | 6    | LLM0_GDLT_IN_A**  | T (LVDS)*    | PL59A             | 6    | LLM0_GDLT_IN_A**/LDQ57       | T (LVDS)*    |  |
| R5          | PL44B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL59B             | 6    | LLM0_GDLLC_IN_A**/LDQ57      | C (LVDS)*    |  |
| T1          | PL45A             | 6    | LLM0_GDLT_FB_A    | T            | PL60A             | 6    | LLM0_GDLT_FB_A/LDQ57         | T            |  |
| T2          | PL45B             | 6    | LLM0_GDLLC_FB_A   | C            | PL60B             | 6    | LLM0_GDLLC_FB_A/LDQ57        | C            |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |
| R7          | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                              |              |  |
| T6          | PL47A             | 6    | LDQ51             | T (LVDS)*    | PL62A             | 6    | LDQ66                        | T (LVDS)*    |  |
| T7          | PL47B             | 6    | LDQ51             | C (LVDS)*    | PL62B             | 6    | LDQ66                        | C (LVDS)*    |  |
| U1          | PL48A             | 6    | LDQ51             | T            | PL63A             | 6    | LDQ66                        | T            |  |
| U2          | PL48B             | 6    | LDQ51             | C            | PL63B             | 6    | LDQ66                        | C            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                              |              |  |
| T3          | PL49A             | 6    | LDQ51             | T (LVDS)*    | PL64A             | 6    | LDQ66                        | T (LVDS)*    |  |
| U3          | PL49B             | 6    | LDQ51             | C (LVDS)*    | PL64B             | 6    | LDQ66                        | C (LVDS)*    |  |
| U6          | PL50A             | 6    | LDQ51             | T            | NC                | -    |                              |              |  |
| U5          | PL50B             | 6    | LDQ51             | C            | PL65B             | 6    | LDQ66                        | C            |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                              |              |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| V5          | PL51A             | 6    | LDQS51        | T (LVDS)*    | PL66A             | 6    | LDQS66        | T (LVDS)*    |  |
| U4          | PL51B             | 6    | LDQ51         | C (LVDS)*    | PL66B             | 6    | LDQ66         | C (LVDS)*    |  |
| V1          | PL52A             | 6    | LDQ51         | T            | PL67A             | 6    | LDQ66         | T            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| V3          | PL52B             | 6    | LDQ51         | C            | PL67B             | 6    | LDQ66         | C            |  |
| W1          | PL53A             | 6    | LDQ51         | T (LVDS)*    | PL68A             | 6    | LDQ66         | T (LVDS)*    |  |
| Y1          | PL53B             | 6    | LDQ51         | C (LVDS)*    | PL68B             | 6    | LDQ66         | C (LVDS)*    |  |
| AA1         | PL54A             | 6    | LDQ51         | T            | PL69A             | 6    | LDQ66         | T            |  |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AA2         | PL54B             | 6    | LDQ51         | C            | PL69B             | 6    | LDQ66         | C            |  |
| V4          | TCK               | -    |               |              | TCK               | -    |               |              |  |
| Y2          | TDI               | -    |               |              | TDI               | -    |               |              |  |
| Y3          | TMS               | -    |               |              | TMS               | -    |               |              |  |
| W3          | TDO               | -    |               |              | TDO               | -    |               |              |  |
| W4          | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| W5          | PB2A              | 5    | BDQ6          | T            | PB2A              | 5    | BDQ6          | T            |  |
| Y4          | PB2B              | 5    | BDQ6          | C            | PB2B              | 5    | BDQ6          | C            |  |
| W6          | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| V6          | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AA3         | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AB2         | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| T8          | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| U7          | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| U8          | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| T9          | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| V8          | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| W8          | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| Y6          | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y5          | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| AB3         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| AB4         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AB5         | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA6         | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| V9          | PB13A             | 5    | BDQ15         | T            | PB31A             | 5    | BDQ33         | T            |  |
| U9          | PB13B             | 5    | BDQ15         | C            | PB31B             | 5    | BDQ33         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| -           | -                 | -    |               |              | GNDIO5            | -    |               |              |  |
| U10         | PB14A             | 5    | BDQ15         | T            | PB32A             | 5    | BDQ33         | T            |  |
| T10         | PB14B             | 5    | BDQ15         | C            | PB32B             | 5    | BDQ33         | C            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| W9          | PB15A             | 5    | BDQS15****    | T            | PB33A             | 5    | BDQS33****    | T            |  |
| Y8          | PB15B             | 5    | BDQ15         | C            | PB33B             | 5    | BDQ33         | C            |  |
| AA7         | PB16A             | 5    | VREF2_5/BDQ15 | T            | PB34A             | 5    | VREF2_5/BDQ33 | T            |  |
| Y7          | PB16B             | 5    | VREF1_5/BDQ15 | C            | PB34B             | 5    | VREF1_5/BDQ33 | C            |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                |              | LFE2M35E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AB6         | PB17A             | 5    | PCLKT5_0/BDQ15 | T            | PB35A             | 5    | PCLKT5_0/BDQ33 | T            |  |
| AB7         | PB17B             | 5    | PCLKC5_0/BDQ15 | C            | PB35B             | 5    | PCLKC5_0/BDQ33 | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AA8         | PB22A             | 4    | PCLKT4_0/BDQ24 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AB8         | PB22B             | 4    | PCLKC4_0/BDQ24 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |  |
| AA9         | PB23A             | 4    | VREF2_4/BDQ24  | T            | PB41A             | 4    | VREF2_4/BDQ42  | T            |  |
| Y9          | PB23B             | 4    | VREF1_4/BDQ24  | C            | PB41B             | 4    | VREF1_4/BDQ42  | C            |  |
| AB9         | PB24A             | 4    | BDQS24****     | T            | PB42A             | 4    | BDQS42****     | T            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AB10        | PB24B             | 4    | BDQ24          | C            | PB42B             | 4    | BDQ42          | C            |  |
| AA10        | PB25A             | 4    | BDQ24          | T            | PB43A             | 4    | BDQ42          | T            |  |
| Y11         | PB25B             | 4    | BDQ24          | C            | PB43B             | 4    | BDQ42          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| V10         | PB29A             | 4    | BDQ33          | T            | PB47A             | 4    | BDQ51          | T            |  |
| U11         | PB29B             | 4    | BDQ33          | C            | PB47B             | 4    | BDQ51          | C            |  |
| V11         | PB30A             | 4    | BDQ33          | T            | PB48A             | 4    | BDQ51          | T            |  |
| W11         | PB30B             | 4    | BDQ33          | C            | PB48B             | 4    | BDQ51          | C            |  |
| AA11        | PB31A             | 4    | BDQ33          | T            | PB49A             | 4    | BDQ51          | T            |  |
| AB11        | PB31B             | 4    | BDQ33          | C            | PB49B             | 4    | BDQ51          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| T11         | PB32A             | 4    | BDQ33          | T            | PB50A             | 4    | BDQ51          | T            |  |
| U12         | PB32B             | 4    | BDQ33          | C            | PB50B             | 4    | BDQ51          | C            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AA12        | PB33A             | 4    | BDQS33         | T            | PB51A             | 4    | BDQS51         | T            |  |
| Y12         | PB33B             | 4    | BDQ33          | C            | PB51B             | 4    | BDQ51          | C            |  |
| V12         | PB34A             | 4    | BDQ33          | T            | PB52A             | 4    | BDQ51          | T            |  |
| W12         | PB34B             | 4    | BDQ33          | C            | PB52B             | 4    | BDQ51          | C            |  |
| AB12        | PB35A             | 4    | BDQ33          | T            | PB53A             | 4    | BDQ51          | T            |  |
| AA13        | PB35B             | 4    | BDQ33          | C            | PB53B             | 4    | BDQ51          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| T12         | PB36A             | 4    | BDQ33          | T            | PB54A             | 4    | BDQ51          | T            |  |
| U13         | PB36B             | 4    | BDQ33          | C            | PB54B             | 4    | BDQ51          | C            |  |
| V13         | PB37A             | 4    | BDQ33          | T            | PB55A             | 4    | BDQ51          | T            |  |
| T13         | PB37B             | 4    | BDQ33          | C            | PB55B             | 4    | BDQ51          | C            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AB13        | PB38A             | 4    | BDQ42          | T            | PB56A             | 4    | BDQ60          | T            |  |
| AB14        | PB38B             | 4    | BDQ42          | C            | PB56B             | 4    | BDQ60          | C            |  |
| U14         | PB39A             | 4    | BDQ42          | T            | PB57A             | 4    | BDQ60          | T            |  |
| T14         | PB39B             | 4    | BDQ42          | C            | PB57B             | 4    | BDQ60          | C            |  |
| AA14        | PB40A             | 4    | BDQ42          | T            | PB58A             | 4    | BDQ60          | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| Y14         | PB40B             | 4    | BDQ42          | C            | PB58B             | 4    | BDQ60          | C            |  |
| W14         | PB41A             | 4    | BDQ42          | T            | PB59A             | 4    | BDQ60          | T            |  |
| V14         | PB41B             | 4    | BDQ42          | C            | PB59B             | 4    | BDQ60          | C            |  |
| AB15        | PB42A             | 4    | BDQS42         | T            | PB60A             | 4    | BDQS60         | T            |  |



## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                |              | LFE2M35E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AA15        | PB42B             | 4    | BDQ42          | C            | PB60B             | 4    | BDQ60          | C            |  |
| V15         | PB43A             | 4    | BDQ42          | T            | PB61A             | 4    | BDQ60          | T            |  |
| U15         | PB43B             | 4    | BDQ42          | C            | PB61B             | 4    | BDQ60          | C            |  |
| AB16        | PB44A             | 4    | BDQ42          | T            | PB62A             | 4    | BDQ60          | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AA16        | PB44B             | 4    | BDQ42          | C            | PB62B             | 4    | BDQ60          | C            |  |
| AB17        | PB45A             | 4    | BDQ42          | T            | PB63A             | 4    | BDQ60          | T            |  |
| AA17        | PB45B             | 4    | BDQ42          | C            | PB63B             | 4    | BDQ60          | C            |  |
| Y15         | PB46A             | 4    | BDQ42          | T            | PB64A             | 4    | BDQ60          | T            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| W15         | PB46B             | 4    | BDQ42          | C            | PB64B             | 4    | BDQ60          | C            |  |
| AB20        | PB47A             | 4    | BDQ51          | T            | PB65A             | 4    | BDQ69          | T            |  |
| AB21        | PB47B             | 4    | BDQ51          | C            | PB65B             | 4    | BDQ69          | C            |  |
| AA21        | PB48A             | 4    | BDQ51          | T            | PB66A             | 4    | BDQ69          | T            |  |
| AA20        | PB48B             | 4    | BDQ51          | C            | PB66B             | 4    | BDQ69          | C            |  |
| AB19        | PB49A             | 4    | BDQ51          | T            | PB67A             | 4    | BDQ69          | T            |  |
| AB18        | PB49B             | 4    | BDQ51          | C            | PB67B             | 4    | BDQ69          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| Y22         | PB50A             | 4    | BDQ51          | T            | PB68A             | 4    | BDQ69          | T            |  |
| Y21         | PB50B             | 4    | BDQ51          | C            | PB68B             | 4    | BDQ69          | C            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| Y17         | PB51A             | 4    | BDQS51         | T            | PB69A             | 4    | BDQS69         | T            |  |
| Y18         | PB51B             | 4    | BDQ51          | C            | PB69B             | 4    | BDQ69          | C            |  |
| Y16         | PB52A             | 4    | BDQ51          | T            | PB70A             | 4    | BDQ69          | T            |  |
| W17         | PB52B             | 4    | BDQ51          | C            | PB70B             | 4    | BDQ69          | C            |  |
| Y19         | PB53A             | 4    | BDQ51          | T            | PB71A             | 4    | BDQ69          | T            |  |
| Y20         | PB53B             | 4    | BDQ51          | C            | PB71B             | 4    | BDQ69          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| W19         | PB54A             | 4    | BDQ51          | T            | PB72A             | 4    | BDQ69          | T            |  |
| W18         | PB54B             | 4    | BDQ51          | C            | PB72B             | 4    | BDQ69          | C            |  |
| V17         | PB55A             | 4    | BDQ51          | T            | PB73A             | 4    | BDQ69          | T            |  |
| V18         | PB55B             | 4    | BDQ51          | C            | PB73B             | 4    | BDQ69          | C            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| W20         | CFG2              | 8    |                |              | CFG2              | 8    |                |              |  |
| V20         | CFG1              | 8    |                |              | CFG1              | 8    |                |              |  |
| V19         | CFG0              | 8    |                |              | CFG0              | 8    |                |              |  |
| V22         | PROGRAMN          | 8    |                |              | PROGRAMN          | 8    |                |              |  |
| W22         | CCLK              | 8    |                |              | CCLK              | 8    |                |              |  |
| U18         | INITN             | 8    |                |              | INITN             | 8    |                |              |  |
| U22         | DONE              | 8    |                |              | DONE              | 8    |                |              |  |
| GNDIO       | GNDIO8            | -    |                |              | GNDIO8            | -    |                |              |  |
| U20         | PR53B             | 8    | WRITEN***      | C            | PR68B             | 8    | WRITEN***      | C            |  |
| U21         | PR53A             | 8    | CS1N***        | T            | PR68A             | 8    | CS1N***        | T            |  |
| U17         | PR52B             | 8    | CSN***         | C            | PR67B             | 8    | CSN***         | C            |  |
| U16         | PR52A             | 8    | D0/SPIFASTN*** | T            | PR67A             | 8    | D0/SPIFASTN*** | T            |  |
| VCCIO       | VCCIO8            | 8    |                |              | VCCIO8            | 8    |                |              |  |
| T16         | PR51B             | 8    | D1***          | C            | PR66B             | 8    | D1***          | C            |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                     |              | LFE2M35E/SE       |      |                            |              |  |
|-------------|-------------------|------|---------------------|--------------|-------------------|------|----------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function       | Differential | Ball/Pad Function | Bank | Dual Function              | Differential |  |
| T17         | PR51A             | 8    | D2***               | T            | PR66A             | 8    | D2***                      | T            |  |
| T22         | PR50B             | 8    | D3***               | C            | PR65B             | 8    | D3***                      | C            |  |
| GNDIO       | GNDIO8            | -    |                     |              | GNDIO8            | -    |                            |              |  |
| R22         | PR50A             | 8    | D4***               | T            | PR65A             | 8    | D4***                      | T            |  |
| T15         | PR49B             | 8    | D5***               | C            | PR64B             | 8    | D5***                      | C            |  |
| R17         | PR49A             | 8    | D6***               | T            | PR64A             | 8    | D6***                      | T            |  |
| T20         | PR48B             | 8    | D7/SPID0***         | C            | PR63B             | 8    | D7/SPID0***                | C            |  |
| VCCIO       | VCCIO8            | 8    |                     |              | VCCIO8            | 8    |                            |              |  |
| T21         | PR48A             | 8    | DI/CSSPI0N***       | T            | PR63A             | 8    | DI/CSSPI0N***              | T            |  |
| R21         | PR47B             | 8    | DOU/CSON/CSSPI1N*** | C            | PR62B             | 8    | DOU/CSON/CSSPI1N***        | C            |  |
| R20         | PR47A             | 8    | BUSY/SISPI***       | T            | PR62A             | 8    | BUSY/SISPI***              | T            |  |
| R16         | RLM0_PLLCAP       | 3    |                     |              | RLM0_PLLCAP       | 3    |                            |              |  |
| R18         | PR45B             | 3    | RLM0_GDLLC_FB_A     | C            | PR60B             | 3    | RLM0_GDLLC_FB_A/RDQ57      | C            |  |
| GNDIO       | GNDIO3            | -    |                     |              | GNDIO3            | -    |                            |              |  |
| R19         | PR45A             | 3    | RLM0_GDLLT_FB_A     | T            | PR60A             | 3    | RLM0_GDLLT_FB_A/RDQ57      | T            |  |
| P22         | PR44B             | 3    | RLM0_GDLLC_IN_A**   | C (LVDS)*    | PR59B             | 3    | RLM0_GDLLC_IN_A**/RDQ57    | C (LVDS)*    |  |
| P21         | PR44A             | 3    | RLM0_GDLLT_IN_A**   | T (LVDS)*    | PR59A             | 3    | RLM0_GDLLT_IN_A**/RDQ57    | T (LVDS)*    |  |
| P16         | PR43B             | 3    | RLM0_GPLLC_IN_A**   | C            | PR58B             | 3    | RLM0_GPLLC_IN_A**/RDQ57    | C            |  |
| VCCIO       | VCCIO3            | 3    |                     |              | VCCIO3            | 3    |                            |              |  |
| P17         | PR43A             | 3    | RLM0_GPLLT_IN_A**   | T            | PR58A             | 3    | RLM0_GPLLT_IN_A**/RDQ57    | T            |  |
| P20         | PR42B             | 3    | RLM0_GPLLC_FB_A     | C (LVDS)*    | PR57B             | 3    | RLM0_GPLLC_FB_A/RDQ57      | C (LVDS)*    |  |
| P19         | PR42A             | 3    | RLM0_GPLLT_FB_A     | T (LVDS)*    | PR57A             | 3    | RLM0_GPLLT_FB_A/RDQS57**** | T (LVDS)*    |  |
| GNDIO       | GNDIO3            | -    |                     |              | GNDIO3            | -    |                            |              |  |
| -           | -                 | -    |                     |              | VCCIO3            | 3    |                            |              |  |
| P18         | PR41B             | 3    | RDQ38               | C            | PR51B             | 3    | RDQ48                      | C            |  |
| N16         | PR41A             | 3    | RDQ38               | T            | PR51A             | 3    | RDQ48                      | T            |  |
| GNDIO       | GNDIO3            | -    |                     |              | GNDIO3            | -    |                            |              |  |
| N22         | PR40B             | 3    | RDQ38               | C (LVDS)*    | PR50B             | 3    | RDQ48                      | C (LVDS)*    |  |
| N21         | PR40A             | 3    | RDQ38               | T (LVDS)*    | PR50A             | 3    | RDQ48                      | T (LVDS)*    |  |
| N17         | PR39B             | 3    | RDQ38               | C            | PR49B             | 3    | RDQ48                      | C            |  |
| N18         | PR39A             | 3    | RDQ38               | T            | PR49A             | 3    | RDQ48                      | T            |  |
| VCCIO       | VCCIO3            | 3    |                     |              | VCCIO3            | 3    |                            |              |  |
| M22         | PR38B             | 3    | RDQ38               | C (LVDS)*    | PR48B             | 3    | RDQ48                      | C (LVDS)*    |  |
| M21         | PR38A             | 3    | RDQS38              | T (LVDS)*    | PR48A             | 3    | RDQS48                     | T (LVDS)*    |  |
| M16         | PR37B             | 3    | RDQ38               | C            | PR47B             | 3    | RDQ48                      | C            |  |
| GNDIO       | GNDIO3            | -    |                     |              | GNDIO3            | -    |                            |              |  |
| M17         | PR37A             | 3    | RDQ38               | T            | PR47A             | 3    | RDQ48                      | T            |  |
| M20         | PR36B             | 3    | RDQ38               | C (LVDS)*    | PR46B             | 3    | RDQ48                      | C (LVDS)*    |  |
| M19         | PR36A             | 3    | RDQ38               | T (LVDS)*    | PR46A             | 3    | RDQ48                      | T (LVDS)*    |  |
| M18         | PR35B             | 3    | RDQ38               | C            | PR45B             | 3    | RDQ48                      | C            |  |
| VCCIO       | VCCIO3            | 3    |                     |              | VCCIO3            | 3    |                            |              |  |
| L16         | PR35A             | 3    | RDQ38               | T            | PR45A             | 3    | RDQ48                      | T            |  |
| L22         | PR34B             | 3    | RDQ38               | C (LVDS)*    | PR44B             | 3    | RDQ48                      | C (LVDS)*    |  |
| L21         | PR34A             | 3    | RDQ38               | T (LVDS)*    | PR44A             | 3    | RDQ48                      | T (LVDS)*    |  |
| K22         | PR32B             | 3    | RLM1_SPLLC_FB_A     | C            | PR42B             | 3    | RLM2_SPLLC_FB_A            | C            |  |
| VCCIO       | VCCIO3            | 3    |                     |              | VCCIO3            | 3    |                            |              |  |
| K21         | PR32A             | 3    | RLM1_SPLLT_FB_A     | T            | PR42A             | 3    | RLM2_SPLLT_FB_A            | T            |  |
| L17         | PR31B             | 3    | RLM1_SPLLC_IN_A     | C (LVDS)*    | PR41B             | 3    | RLM2_SPLLC_IN_A            | C (LVDS)*    |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                       |              | LFE2M35E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| L18         | PR31A             | 3    | RLM1_SPLLT_IN_A       | T (LVDS)*    | PR41A             | 3    | RLM2_SPLLT_IN_A       | T (LVDS)*    |  |
| GNDIO       | GNDIO3            | -    |                       |              | GNDIO3            | -    |                       |              |  |
| L20         | PR30B             | 3    |                       | C            | PR40B             | 3    |                       | C            |  |
| L19         | PR30A             | 3    |                       | T            | PR40A             | 3    |                       | T            |  |
| K16         | PR29B             | 3    |                       | C (LVDS)*    | PR39B             | 3    |                       | C (LVDS)*    |  |
| K17         | PR29A             | 3    |                       | T (LVDS)*    | PR39A             | 3    |                       | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |                       |              | VCCIO3            | 3    |                       |              |  |
| J16         | PR28B             | 3    | VREF2_3               | C            | PR38B             | 3    | VREF2_3               | C            |  |
| K18         | PR28A             | 3    | VREF1_3               | T            | PR38A             | 3    | VREF1_3               | T            |  |
| J22         | PR27B             | 3    | PCLKC3_0              | C (LVDS)*    | PR37B             | 3    | PCLKC3_0              | C (LVDS)*    |  |
| J21         | PR27A             | 3    | PCLKT3_0              | T (LVDS)*    | PR37A             | 3    | PCLKT3_0              | T (LVDS)*    |  |
| H22         | PR25B             | 2    | PCLKC2_0/RDQ22        | C            | PR35B             | 2    | PCLKC2_0/RDQ32        | C            |  |
| H21         | PR25A             | 2    | PCLKT2_0/RDQ22        | T            | PR35A             | 2    | PCLKT2_0/RDQ32        | T            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| J17         | PR24B             | 2    | RDQ22                 | C (LVDS)*    | PR34B             | 2    | RDQ32                 | C (LVDS)*    |  |
| J18         | PR24A             | 2    | RDQ22                 | T (LVDS)*    | PR34A             | 2    | RDQ32                 | T (LVDS)*    |  |
| J20         | PR23B             | 2    | RDQ22                 | C            | PR33B             | 2    | RDQ32                 | C            |  |
| J19         | PR23A             | 2    | RDQ22                 | T            | PR33A             | 2    | RDQ32                 | T            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| H16         | PR22B             | 2    | RDQ22                 | C (LVDS)*    | PR32B             | 2    | RDQ32                 | C (LVDS)*    |  |
| H17         | PR22A             | 2    | RDQS22                | T (LVDS)*    | PR32A             | 2    | RDQS32                | T (LVDS)*    |  |
| G22         | PR21B             | 2    | RDQ22                 | C            | PR31B             | 2    | RDQ32                 | C            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| G21         | PR21A             | 2    | RDQ22                 | T            | PR31A             | 2    | RDQ32                 | T            |  |
| H20         | PR20B             | 2    | RDQ22                 | C (LVDS)*    | PR30B             | 2    | RDQ32                 | C (LVDS)*    |  |
| H19         | PR20A             | 2    | RDQ22                 | T (LVDS)*    | PR30A             | 2    | RDQ32                 | T (LVDS)*    |  |
| G16         | PR19B             | 2    | RUM1_SPLLC_FB_A/RDQ22 | C            | PR29B             | 2    | RUM1_SPLLC_FB_A/RDQ32 | C            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| H18         | PR19A             | 2    | RUM1_SPLLT_FB_A/RDQ22 | T            | PR29A             | 2    | RUM1_SPLLT_FB_A/RDQ32 | T            |  |
| F22         | PR18B             | 2    | RUM1_SPLLC_IN_A/RDQ22 | C (LVDS)*    | PR28B             | 2    | RUM1_SPLLC_IN_A/RDQ32 | C (LVDS)*    |  |
| F21         | PR18A             | 2    | RUM1_SPLLT_IN_A/RDQ22 | T (LVDS)*    | PR28A             | 2    | RUM1_SPLLT_IN_A/RDQ32 | T (LVDS)*    |  |
| GNDIO       | GNDIO2            | -    |                       |              | -                 | -    |                       |              |  |
| G20         | PR16B             | 2    |                       | C            | PR26B             | 2    | RDQ23                 | C            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | -                 | -    |                       |              |  |
| F20         | PR16A             | 2    |                       | T            | PR26A             | 2    | RDQ23                 | T            |  |
| -           | -                 | -    |                       |              | GNDIO2            | -    |                       |              |  |
| G17         | PR15B             | 2    |                       | C (LVDS)*    | PR25B             | 2    | RDQ23                 | C (LVDS)*    |  |
| F17         | PR15A             | 2    |                       | T (LVDS)*    | PR25A             | 2    | RDQ23                 | T (LVDS)*    |  |
| -           | -                 | -    |                       |              | VCCIO2            | 2    |                       |              |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| E22         | PR14B             | 2    |                       | C            | PR14B             | 2    | RDQ15                 | C            |  |
| D22         | PR14A             | 2    |                       | T            | PR14A             | 2    | RDQ15                 | T            |  |
| E20         | PR13B             | 2    |                       | C (LVDS)*    | PR13B             | 2    | RDQ15                 | C (LVDS)*    |  |
| D20         | PR13A             | 2    |                       | T (LVDS)*    | PR13A             | 2    | RDQ15                 | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| D19         | PR12B             | 2    | RUM0_SPLLC_FB_A       | C            | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |  |
| E19         | PR12A             | 2    | RUM0_SPLLT_FB_A       | T            | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |  |
| F18         | PR11B             | 2    | RUM0_SPLLC_IN_A       | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                             |      |                 |              | LFE2M35E/SE                 |      |                       |              |  |
|-------------|-----------------------------|------|-----------------|--------------|-----------------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function           | Bank | Dual Function   | Differential | Ball/Pad Function           | Bank | Dual Function         | Differential |  |
| F19         | PR11A                       | 2    | RUM0_SPLLT_IN_A | T (LVDS)*    | PR11A                       | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |  |
| E18         | PR9B                        | 2    | VREF2_2         | C            | PR9B                        | 2    | VREF2_2               | C            |  |
| GNDIO       | GNDIO2                      | -    |                 |              | GNDIO2                      | -    |                       |              |  |
| D18         | PR9A                        | 2    | VREF1_2         | T            | PR9A                        | 2    | VREF1_2               | T            |  |
| VCCIO       | VCCIO2                      | 2    |                 |              | -                           | -    |                       |              |  |
| F16         | XRES                        | -    |                 |              | XRES                        | -    |                       |              |  |
| C22         | URC_SQ_VCCRX0               | 12   |                 |              | URC_SQ_VCCRX0               | 12   |                       |              |  |
| A21         | URC_SQ_HDINP0               | 12   |                 | T            | URC_SQ_HDINP0               | 12   |                       | T            |  |
| B22         | URC_SQ_VCCIB0               | 12   |                 |              | URC_SQ_VCCIB0               | 12   |                       |              |  |
| B21         | URC_SQ_HDINN0               | 12   |                 | C            | URC_SQ_HDINN0               | 12   |                       | C            |  |
| C19         | URC_SQ_VCCTX0               | 12   |                 |              | URC_SQ_VCCTX0               | 12   |                       |              |  |
| A18         | URC_SQ_HDOUTP <sub>0</sub>  | 12   |                 | T            | URC_SQ_HDOUTP <sub>0</sub>  | 12   |                       | T            |  |
| A19         | URC_SQ_VCCOB0               | 12   |                 |              | URC_SQ_VCCOB0               | 12   |                       |              |  |
| B18         | URC_SQ_HDOUTN <sub>0</sub>  | 12   |                 | C            | URC_SQ_HDOUTN <sub>0</sub>  | 12   |                       | C            |  |
| C18         | URC_SQ_VCCTX1               | 12   |                 |              | URC_SQ_VCCTX1               | 12   |                       |              |  |
| B17         | URC_SQ_HDOUTN <sub>1</sub>  | 12   |                 | C            | URC_SQ_HDOUTN <sub>1</sub>  | 12   |                       | C            |  |
| C17         | URC_SQ_VCCOB1               | 12   |                 |              | URC_SQ_VCCOB1               | 12   |                       |              |  |
| A17         | URC_SQ_HDOUTP <sub>1</sub>  | 12   |                 | T            | URC_SQ_HDOUTP <sub>1</sub>  | 12   |                       | T            |  |
| C21         | URC_SQ_VCCRX1               | 12   |                 |              | URC_SQ_VCCRX1               | 12   |                       |              |  |
| B20         | URC_SQ_HDINN1               | 12   |                 | C            | URC_SQ_HDINN1               | 12   |                       | C            |  |
| C20         | URC_SQ_VCCIB1               | 12   |                 |              | URC_SQ_VCCIB1               | 12   |                       |              |  |
| A20         | URC_SQ_HDINP1               | 12   |                 | T            | URC_SQ_HDINP1               | 12   |                       | T            |  |
| B16         | URC_SQ_VCCAUX <sub>33</sub> | 12   |                 |              | URC_SQ_VCCAUX <sub>33</sub> | 12   |                       |              |  |
| E17         | URC_SQ_REFCLK <sub>N</sub>  | 12   |                 | C            | URC_SQ_REFCLK <sub>N</sub>  | 12   |                       | C            |  |
| D17         | URC_SQ_REFCLK <sub>P</sub>  | 12   |                 | T            | URC_SQ_REFCLK <sub>P</sub>  | 12   |                       | T            |  |
| C16         | URC_SQ_VCCP                 | 12   |                 |              | URC_SQ_VCCP                 | 12   |                       |              |  |
| A12         | URC_SQ_HDINP2               | 12   |                 | T            | URC_SQ_HDINP2               | 12   |                       | T            |  |
| C12         | URC_SQ_VCCIB2               | 12   |                 |              | URC_SQ_VCCIB2               | 12   |                       |              |  |
| B12         | URC_SQ_HDINN2               | 12   |                 | C            | URC_SQ_HDINN2               | 12   |                       | C            |  |
| C11         | URC_SQ_VCCRX2               | 12   |                 |              | URC_SQ_VCCRX2               | 12   |                       |              |  |
| A15         | URC_SQ_HDOUTP <sub>2</sub>  | 12   |                 | T            | URC_SQ_HDOUTP <sub>2</sub>  | 12   |                       | T            |  |
| C15         | URC_SQ_VCCOB2               | 12   |                 |              | URC_SQ_VCCOB2               | 12   |                       |              |  |
| B15         | URC_SQ_HDOUTN <sub>2</sub>  | 12   |                 | C            | URC_SQ_HDOUTN <sub>2</sub>  | 12   |                       | C            |  |
| C14         | URC_SQ_VCCTX2               | 12   |                 |              | URC_SQ_VCCTX2               | 12   |                       |              |  |
| B14         | URC_SQ_HDOUTN <sub>3</sub>  | 12   |                 | C            | URC_SQ_HDOUTN <sub>3</sub>  | 12   |                       | C            |  |
| A13         | URC_SQ_VCCOB3               | 12   |                 |              | URC_SQ_VCCOB3               | 12   |                       |              |  |
| A14         | URC_SQ_HDOUTP <sub>3</sub>  | 12   |                 | T            | URC_SQ_HDOUTP <sub>3</sub>  | 12   |                       | T            |  |
| C13         | URC_SQ_VCCTX3               | 12   |                 |              | URC_SQ_VCCTX3               | 12   |                       |              |  |
| B11         | URC_SQ_HDINN3               | 12   |                 | C            | URC_SQ_HDINN3               | 12   |                       | C            |  |
| B10         | URC_SQ_VCCIB3               | 12   |                 |              | URC_SQ_VCCIB3               | 12   |                       |              |  |
| A11         | URC_SQ_HDINP3               | 12   |                 | T            | URC_SQ_HDINP3               | 12   |                       | T            |  |
| C10         | URC_SQ_VCCRX3               | 12   |                 |              | URC_SQ_VCCRX3               | 12   |                       |              |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| E13         | PT28B             | 1    |               | C            | PT46B             | 1    |               | C            |  |
| D12         | PT28A             | 1    |               | T            | PT46A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| A9          | PT27B             | 1    |               | C            | PT45B             | 1    |               | C            |  |
| A8          | PT27A             | 1    |               | T            | PT45A             | 1    |               | T            |  |
| A7          | PT26B             | 1    |               | C            | PT44B             | 1    |               | C            |  |
| A6          | PT26A             | 1    |               | T            | PT44A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E12         | PT25B             | 1    |               | C            | PT43B             | 1    |               | C            |  |
| F12         | PT25A             | 1    |               | T            | PT43A             | 1    |               | T            |  |
| A5          | PT24B             | 1    |               | C            | PT42B             | 1    |               | C            |  |
| A4          | PT24A             | 1    |               | T            | PT42A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| B7          | PT23B             | 1    |               | C            | PT41B             | 1    |               | C            |  |
| B8          | PT23A             | 1    |               | T            | PT41A             | 1    |               | T            |  |
| G11         | PT22B             | 1    |               | C            | PT40B             | 1    |               | C            |  |
| E11         | PT22A             | 1    |               | T            | PT40A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| D11         | PT21B             | 1    | VREF2_1       | C            | PT39B             | 1    | VREF2_1       | C            |  |
| D10         | PT21A             | 1    | VREF1_1       | T            | PT39A             | 1    | VREF1_1       | T            |  |
| F11         | PT20A             | 1    | PCLKT1_0      | T            | PT38A             | 1    | PCLKT1_0      | T            |  |
| G10         | PT20B             | 1    | PCLKC1_0      | C            | PT38B             | 1    | PCLKC1_0      | C            |  |
| G9          | PT19B             | 0    | PCLKC0_0      | C            | PT37B             | 0    | PCLKC0_0      | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| F9          | PT19A             | 0    | PCLKT0_0      | T            | PT37A             | 0    | PCLKT0_0      | T            |  |
| C9          | PT18B             | 0    | VREF2_0       | C            | PT36B             | 0    | VREF2_0       | C            |  |
| D9          | PT18A             | 0    | VREF1_0       | T            | PT36A             | 0    | VREF1_0       | T            |  |
| A2          | PT17B             | 0    |               | C            | PT35B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| A3          | PT17A             | 0    |               | T            | PT35A             | 0    |               | T            |  |
| B3          | PT16B             | 0    |               | C            | PT34B             | 0    |               | C            |  |
| C4          | PT16A             | 0    |               | T            | PT34A             | 0    |               | T            |  |
| E10         | PT15B             | 0    |               | C            | PT33B             | 0    |               | C            |  |
| F10         | PT15A             | 0    |               | T            | PT33A             | 0    |               | T            |  |
| C7          | PT14B             | 0    |               | C            | PT32B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| B6          | PT14A             | 0    |               | T            | PT32A             | 0    |               | T            |  |
| C6          | PT13B             | 0    |               | C            | PT31B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| C5          | PT13A             | 0    |               | T            | PT31A             | 0    |               | T            |  |
| C8          | PT12B             | 0    |               | C            | PT30B             | 0    |               | C            |  |
| D8          | PT12A             | 0    |               | T            | PT30A             | 0    |               | T            |  |
| E8          | PT11B             | 0    |               | C            | PT29B             | 0    |               | C            |  |
| E9          | PT11A             | 0    |               | T            | PT29A             | 0    |               | T            |  |
| -           | -                 | -    |               |              | GNDIO0            | -    |               |              |  |
| -           | -                 | -    |               |              | VCCIO0            | 0    |               |              |  |
| F8          | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |  |
| G8          | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| F7          | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |  |
| G7          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |  |
| C3          | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |  |
| D4          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F6          | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |  |
| E6          | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |  |
| E5          | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |  |
| D6          | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| D3          | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |  |
| E3          | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |  |
| D5          | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |  |
| E4          | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| C2          | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |  |
| B2          | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| B1          | PT2B              | 0    |               | C            | PT2B              | 0    |               | C            |  |
| C1          | PT2A              | 0    |               | T            | PT2A              | 0    |               | T            |  |
| R8          | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| H15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| H8          | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| R15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| B5          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| B9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E7          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D13         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E16         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H14         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| G18         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| J15         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K19         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| N19         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| P15         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| T18         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| V21         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| AA18        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| R14         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| V16         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| W13         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA5         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| R9          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| V7          | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| W10         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| N4          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| P8          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| T5          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| V2          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| E2          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| G5          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| J8          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| K4          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| AA22        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| U19         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| H11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| H12         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L15         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L8          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| M15         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| M8          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| R11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| R12         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A1          | GND               | -    |               |              | GND               | -    |               |              |  |
| A10         | GND               | -    |               |              | GND               | -    |               |              |  |
| A16         | GND               | -    |               |              | GND               | -    |               |              |  |
| A22         | GND               | -    |               |              | GND               | -    |               |              |  |
| AA19        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB1         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB22        | GND               | -    |               |              | GND               | -    |               |              |  |
| B13         | GND               | -    |               |              | GND               | -    |               |              |  |
| B19         | GND               | -    |               |              | GND               | -    |               |              |  |
| B4          | GND               | -    |               |              | GND               | -    |               |              |  |
| D16         | GND               | -    |               |              | GND               | -    |               |              |  |
| D2          | GND               | -    |               |              | GND               | -    |               |              |  |
| D21         | GND               | -    |               |              | GND               | -    |               |              |  |
| D7          | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| G19         | GND               | -    |               |              | GND               | -    |               |              |  |
| G4          | GND               | -    |               |              | GND               | -    |               |              |  |
| H10         | GND               | -    |               |              | GND               | -    |               |              |  |
| H13         | GND               | -    |               |              | GND               | -    |               |              |  |
| J14         | GND               | -    |               |              | GND               | -    |               |              |  |
| J9          | GND               | -    |               |              | GND               | -    |               |              |  |
| K10         | GND               | -    |               |              | GND               | -    |               |              |  |
| K11         | GND               | -    |               |              | GND               | -    |               |              |  |
| K12         | GND               | -    |               |              | GND               | -    |               |              |  |
| K13         | GND               | -    |               |              | GND               | -    |               |              |  |
| K15         | GND               | -    |               |              | GND               | -    |               |              |  |
| K20         | GND               | -    |               |              | GND               | -    |               |              |  |
| K3          | GND               | -    |               |              | GND               | -    |               |              |  |
| K8          | GND               | -    |               |              | GND               | -    |               |              |  |
| L10         | GND               | -    |               |              | GND               | -    |               |              |  |
| L11         | GND               | -    |               |              | GND               | -    |               |              |  |
| L12         | GND               | -    |               |              | GND               | -    |               |              |  |
| L13         | GND               | -    |               |              | GND               | -    |               |              |  |
| M10         | GND               | -    |               |              | GND               | -    |               |              |  |
| M11         | GND               | -    |               |              | GND               | -    |               |              |  |
| M12         | GND               | -    |               |              | GND               | -    |               |              |  |
| M13         | GND               | -    |               |              | GND               | -    |               |              |  |
| N10         | GND               | -    |               |              | GND               | -    |               |              |  |
| N11         | GND               | -    |               |              | GND               | -    |               |              |  |
| N12         | GND               | -    |               |              | GND               | -    |               |              |  |
| N13         | GND               | -    |               |              | GND               | -    |               |              |  |
| N15         | GND               | -    |               |              | GND               | -    |               |              |  |
| N20         | GND               | -    |               |              | GND               | -    |               |              |  |
| N3          | GND               | -    |               |              | GND               | -    |               |              |  |
| N8          | GND               | -    |               |              | GND               | -    |               |              |  |
| P14         | GND               | -    |               |              | GND               | -    |               |              |  |
| P9          | GND               | -    |               |              | GND               | -    |               |              |  |
| R10         | GND               | -    |               |              | GND               | -    |               |              |  |
| R13         | GND               | -    |               |              | GND               | -    |               |              |  |
| T19         | GND               | -    |               |              | GND               | -    |               |              |  |
| T4          | GND               | -    |               |              | GND               | -    |               |              |  |
| W16         | GND               | -    |               |              | GND               | -    |               |              |  |
| W2          | GND               | -    |               |              | GND               | -    |               |              |  |
| W21         | GND               | -    |               |              | GND               | -    |               |              |  |
| W7          | GND               | -    |               |              | GND               | -    |               |              |  |
| Y10         | GND               | -    |               |              | GND               | -    |               |              |  |
| Y13         | GND               | -    |               |              | GND               | -    |               |              |  |
| D15         | NC                | -    |               |              | NC                | -    |               |              |  |
| G14         | NC                | -    |               |              | NC                | -    |               |              |  |
| G15         | NC                | -    |               |              | NC                | -    |               |              |  |
| D14         | NC                | -    |               |              | NC                | -    |               |              |  |
| E15         | NC                | -    |               |              | NC                | -    |               |              |  |
| E14         | NC                | -    |               |              | NC                | -    |               |              |  |



## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| F15         | NC                | -    |               |              | NC                | -    |               |              |
| F14         | NC                | -    |               |              | NC                | -    |               |              |
| F13         | NC                | -    |               |              | NC                | -    |               |              |
| G12         | NC                | -    |               |              | NC                | -    |               |              |
| G13         | NC                | -    |               |              | NC                | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPPLLs or GDLLs within the respective quadrant.

\*\*\*For density migration, board design must take into account that these sysCONFIG pins are dual function for the lower density devices (ECP2M20 and ECP2M35). They can be either sysCONFIG pins or general purpose I/Os. These pins are dedicated sysCONFIG pins for the higher density devices (ECP2M50, ECP2M70 and ECP2M100).

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA**

| LFE2M50E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| D1          | PL2A              | 7    | LDQ6                  | T (LVDS)*    |
| E1          | PL2B              | 7    | LDQ6                  | C (LVDS)*    |
| F1          | PL3A              | 7    | LDQ6                  | T            |
| F2          | PL3B              | 7    | LDQ6                  | C            |
| F5          | PL4A              | 7    | LDQ6                  | T (LVDS)*    |
| VCCIO       | VCCIO7            | 7    |                       |              |
| G6          | PL4B              | 7    | LDQ6                  | C (LVDS)*    |
| F4          | PL5A              | 7    | LDQ6                  | T            |
| F3          | PL5B              | 7    | LDQ6                  | C            |
| G1          | PL6A              | 7    | LDQS6                 | T (LVDS)*    |
| GNDIO       | GNDIO7            | -    |                       |              |
| G2          | PL6B              | 7    | LDQ6                  | C (LVDS)*    |
| H1          | PL7A              | 7    | LDQ6                  | T            |
| H2          | PL7B              | 7    | LDQ6                  | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| H7          | PL8A              | 7    | LDQ6                  | T (LVDS)*    |
| H6          | PL8B              | 7    | LDQ6                  | C (LVDS)*    |
| G3          | PL9A              | 7    | VREF2_7/LDQ6          | T            |
| H3          | PL9B              | 7    | VREF1_7/LDQ6          | C            |
| GNDIO       | GNDIO7            | -    |                       |              |
| VCCIO       | VCCIO7            | 7    |                       |              |
| H5          | PL11A             | 7    | LUM0_SPLLT_IN_A       | T (LVDS)*    |
| H4          | PL11B             | 7    | LUM0_SPLLC_IN_A       | C (LVDS)*    |
| J1          | PL12A             | 7    | LUM0_SPLLT_FB_A       | T            |
| J2          | PL12B             | 7    | LUM0_SPLLC_FB_A       | C            |
| GNDIO       | GNDIO7            | -    |                       |              |
| J3          | PL13A             | 7    |                       | T (LVDS)*    |
| J4          | PL13B             | 7    |                       | C (LVDS)*    |
| J7          | PL14A             | 7    |                       | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| J6          | PL14B             | 7    |                       | C            |
| GNDIO       | GNDIO7            | -    |                       |              |
| VCCIO       | VCCIO7            | 7    |                       |              |
| K1          | PL32A             | 7    | LUM3_SPLLT_IN_A/LDQ36 | T (LVDS)*    |
| K2          | PL32B             | 7    | LUM3_SPLLC_IN_A/LDQ36 | C (LVDS)*    |
| J5          | PL33A             | 7    | LUM3_SPLLT_FB_A/LDQ36 | T            |
| K5          | PL33B             | 7    | LUM3_SPLLC_FB_A/LDQ36 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| K7          | PL34A             | 7    | LDQ36                 | T (LVDS)*    |
| K6          | PL34B             | 7    | LDQ36                 | C (LVDS)*    |
| L6          | PL35A             | 7    | LDQ36                 | T            |
| L7          | PL35B             | 7    | LDQ36                 | C            |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |                   |              |
|-------------|-------------------|------|-------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function     | Differential |
| GNDIO       | GNDIO7            | -    |                   |              |
| L1          | PL36A             | 7    | LDQS36            | T (LVDS)*    |
| L2          | PL36B             | 7    | LDQ36             | C (LVDS)*    |
| M7          | PL37A             | 7    | LDQ36             | T            |
| VCCIO       | VCCIO7            | 7    |                   |              |
| L5          | PL37B             | 7    | LDQ36             | C            |
| L3          | PL38A             | 7    | LDQ36             | T (LVDS)*    |
| L4          | PL38B             | 7    | LDQ36             | C (LVDS)*    |
| M1          | PL39A             | 7    | PCLKT7_0/LDQ36    | T            |
| GNDIO       | GNDIO7            | -    |                   |              |
| M2          | PL39B             | 7    | PCLKC7_0/LDQ36    | C            |
| M6          | PL41A             | 6    | PCLKT6_0          | T (LVDS)*    |
| M5          | PL41B             | 6    | PCLKC6_0          | C (LVDS)*    |
| M3          | PL42A             | 6    | VREF2_6           | T            |
| M4          | PL42B             | 6    | VREF1_6           | C            |
| VCCIO       | VCCIO6            | 6    |                   |              |
| N7          | PL45A             | 6    | LLM3_SPLLT_IN_A   | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                   |              |
| N6          | PL45B             | 6    | LLM3_SPLLC_IN_A   | C (LVDS)*    |
| N1          | PL46A             | 6    | LLM3_SPLLT_FB_A   | T            |
| N2          | PL46B             | 6    | LLM3_SPLLC_FB_A   | C            |
| VCCIO       | VCCIO6            | 6    |                   |              |
| GNDIO       | GNDIO6            | -    |                   |              |
| P6          | PL52A             | 6    | LDQS52****        | T (LVDS)*    |
| N5          | PL52B             | 6    | LDQ52             | C (LVDS)*    |
| P1          | PL53A             | 6    | LDQ52             | T            |
| VCCIO       | VCCIO6            | 6    |                   |              |
| P2          | PL53B             | 6    | LDQ52             | C            |
| P3          | PL54A             | 6    | LDQ52             | T (LVDS)*    |
| P4          | PL54B             | 6    | LDQ52             | C (LVDS)*    |
| P5          | PL55A             | 6    | LDQ52             | T            |
| GNDIO       | GNDIO6            | -    |                   |              |
| P7          | PL55B             | 6    | LDQ52             | C            |
| VCCIO       | VCCIO6            | 6    |                   |              |
| GNDIO       | GNDIO6            | -    |                   |              |
| R1          | PL62A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                   |              |
| R2          | PL62B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    |
| R3          | PL63A             | 6    | LLM0_GPLLT_FB_A   | T            |
| R4          | PL63B             | 6    | LLM0_GPLLC_FB_A   | C            |
| VCCIO       | VCCIO6            | 6    |                   |              |
| R6          | PL64A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    |
| R5          | PL64B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |                 |              |
|-------------|-------------------|------|-----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential |
| T1          | PL65A             | 6    | LLM0_GDLLT_FB_A | T            |
| T2          | PL65B             | 6    | LLM0_GDLLC_FB_A | C            |
| GNDIO       | GNDIO6            | -    |                 |              |
| R7          | LLM0_PLLCAP       | 6    |                 |              |
| T6          | PL67A             | 6    | LDQ71           | T (LVDS)*    |
| T7          | PL67B             | 6    | LDQ71           | C (LVDS)*    |
| U1          | PL68A             | 6    | LDQ71           | T            |
| U2          | PL68B             | 6    | LDQ71           | C            |
| VCCIO       | VCCIO6            | 6    |                 |              |
| T3          | PL69A             | 6    | LDQ71           | T (LVDS)*    |
| U3          | PL69B             | 6    | LDQ71           | C (LVDS)*    |
| U6          | PL70A             | 6    | LDQ71           | T            |
| U5          | PL70B             | 6    | LDQ71           | C            |
| GNDIO       | GNDIO6            | -    |                 |              |
| V5          | PL71A             | 6    | LDQS71          | T (LVDS)*    |
| U4          | PL71B             | 6    | LDQ71           | C (LVDS)*    |
| V1          | PL72A             | 6    | LDQ71           | T            |
| VCCIO       | VCCIO6            | 6    |                 |              |
| V3          | PL72B             | 6    | LDQ71           | C            |
| W1          | PL73A             | 6    | LDQ71           | T (LVDS)*    |
| Y1          | PL73B             | 6    | LDQ71           | C (LVDS)*    |
| AA1         | PL74A             | 6    | LDQ71           | T            |
| GNDIO       | GNDIO6            | -    |                 |              |
| AA2         | PL74B             | 6    | LDQ71           | C            |
| V4          | TCK               | -    |                 |              |
| Y2          | TDI               | -    |                 |              |
| Y3          | TMS               | -    |                 |              |
| W3          | TDO               | -    |                 |              |
| W4          | VCCJ              | -    |                 |              |
| W5          | PB2A              | 5    | BDQ6            | T            |
| Y4          | PB2B              | 5    | BDQ6            | C            |
| W6          | PB3A              | 5    | BDQ6            | T            |
| V6          | PB3B              | 5    | BDQ6            | C            |
| AA3         | PB4A              | 5    | BDQ6            | T            |
| AB2         | PB4B              | 5    | BDQ6            | C            |
| VCCIO       | VCCIO5            | 5    |                 |              |
| T8          | PB5A              | 5    | BDQ6            | T            |
| U7          | PB5B              | 5    | BDQ6            | C            |
| GNDIO       | GNDIO5            | -    |                 |              |
| U8          | PB6A              | 5    | BDQS6           | T            |
| T9          | PB6B              | 5    | BDQ6            | C            |
| V8          | PB7A              | 5    | BDQ6            | T            |
| W8          | PB7B              | 5    | BDQ6            | C            |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| Y6          | PB8A              | 5    | BDQ6           | T            |
| Y5          | PB8B              | 5    | BDQ6           | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| AB3         | PB9A              | 5    | BDQ6           | T            |
| AB4         | PB9B              | 5    | BDQ6           | C            |
| AB5         | PB10A             | 5    | BDQ6           | T            |
| AA6         | PB10B             | 5    | BDQ6           | C            |
| GNDIO       | GNDIO5            | -    |                |              |
| VCCIO       | VCCIO5            | 5    |                |              |
| V9          | PB40A             | 5    | BDQ42          | T            |
| U9          | PB40B             | 5    | BDQ42          | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| U10         | PB41A             | 5    | BDQ42          | T            |
| T10         | PB41B             | 5    | BDQ42          | C            |
| GNDIO       | GNDIO5            | -    |                |              |
| W9          | PB42A             | 5    | BDQS42****     | T            |
| Y8          | PB42B             | 5    | BDQ42          | C            |
| AA7         | PB43A             | 5    | VREF2_5/BDQ42  | T            |
| Y7          | PB43B             | 5    | VREF1_5/BDQ42  | C            |
| AB6         | PB44A             | 5    | PCLKT5_0/BDQ42 | T            |
| AB7         | PB44B             | 5    | PCLKC5_0/BDQ42 | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| GNDIO       | GNDIO5            | -    |                |              |
| AA8         | PB49A             | 4    | PCLKT4_0/BDQ51 | T            |
| VCCIO       | VCCIO4            | 4    |                |              |
| AB8         | PB49B             | 4    | PCLKC4_0/BDQ51 | C            |
| AA9         | PB50A             | 4    | VREF2_4/BDQ51  | T            |
| Y9          | PB50B             | 4    | VREF1_4/BDQ51  | C            |
| AB9         | PB51A             | 4    | BDQS51****     | T            |
| GNDIO       | GNDIO4            | -    |                |              |
| AB10        | PB51B             | 4    | BDQ51          | C            |
| AA10        | PB52A             | 4    | BDQ51          | T            |
| Y11         | PB52B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              |
| V10         | PB56A             | 4    | BDQ60          | T            |
| U11         | PB56B             | 4    | BDQ60          | C            |
| V11         | PB57A             | 4    | BDQ60          | T            |
| W11         | PB57B             | 4    | BDQ60          | C            |
| AA11        | PB58A             | 4    | BDQ60          | T            |
| AB11        | PB58B             | 4    | BDQ60          | C            |
| VCCIO       | VCCIO4            | 4    |                |              |
| T11         | PB59A             | 4    | BDQ60          | T            |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| U12         | PB59B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| AA12        | PB60A             | 4    | BDQS60        | T            |
| Y12         | PB60B             | 4    | BDQ60         | C            |
| V12         | PB61A             | 4    | BDQ60         | T            |
| W12         | PB61B             | 4    | BDQ60         | C            |
| AB12        | PB62A             | 4    | BDQ60         | T            |
| AA13        | PB62B             | 4    | BDQ60         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| T12         | PB63A             | 4    | BDQ60         | T            |
| U13         | PB63B             | 4    | BDQ60         | C            |
| V13         | PB64A             | 4    | BDQ60         | T            |
| T13         | PB64B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| AB13        | PB65A             | 4    | BDQ69         | T            |
| AB14        | PB65B             | 4    | BDQ69         | C            |
| U14         | PB66A             | 4    | BDQ69         | T            |
| T14         | PB66B             | 4    | BDQ69         | C            |
| AA14        | PB67A             | 4    | BDQ69         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| Y14         | PB67B             | 4    | BDQ69         | C            |
| W14         | PB68A             | 4    | BDQ69         | T            |
| V14         | PB68B             | 4    | BDQ69         | C            |
| AB15        | PB69A             | 4    | BDQS69        | T            |
| GNDIO       | GNDIO4            | -    |               |              |
| AA15        | PB69B             | 4    | BDQ69         | C            |
| V15         | PB70A             | 4    | BDQ69         | T            |
| U15         | PB70B             | 4    | BDQ69         | C            |
| AB16        | PB71A             | 4    | BDQ69         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AA16        | PB71B             | 4    | BDQ69         | C            |
| AB17        | PB72A             | 4    | BDQ69         | T            |
| AA17        | PB72B             | 4    | BDQ69         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| W20         | CFG2              | 8    |               |              |
| V20         | CFG1              | 8    |               |              |
| V19         | CFG0              | 8    |               |              |
| V22         | PROGRAMN          | 8    |               |              |
| W22         | CCLK              | 8    |               |              |
| U18         | INITN             | 8    |               |              |
| U22         | DONE              | 8    |               |              |
| GNDIO       | GNDIO8            | -    |               |              |
| U20         | WRITEN***         | 8    |               |              |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                      |      |                    |              |
|-------------|----------------------|------|--------------------|--------------|
| Ball Number | Ball/Pad Function    | Bank | Dual Function      | Differential |
| U21         | CS1N***              | 8    |                    |              |
| U17         | CSN***               | 8    |                    |              |
| U16         | D0/SPIFASTN***       | 8    |                    |              |
| VCCIO       | VCCIO8               | 8    |                    |              |
| T16         | D1***                | 8    |                    |              |
| T17         | D2***                | 8    |                    |              |
| T22         | D3***                | 8    |                    |              |
| GNDIO       | GNDIO8               | -    |                    |              |
| R22         | D4***                | 8    |                    |              |
| T15         | D5***                | 8    |                    |              |
| R17         | D6***                | 8    |                    |              |
| T20         | D7/SPID0***          | 8    |                    |              |
| VCCIO       | VCCIO8               | 8    |                    |              |
| T21         | DI/CSSPI0N***        | 8    |                    |              |
| R21         | DOUT/CSON/CSSPI1N*** | 8    |                    |              |
| R20         | BUSY/SISPI***        | 8    |                    |              |
| R16         | RLM0_PLLCAP          | 3    |                    |              |
| R18         | PR65B                | 3    | RLM0_GDLLC_FB_A    | C            |
| GNDIO       | GNDIO3               | -    |                    |              |
| R19         | PR65A                | 3    | RLM0_GDLLT_FB_A    | T            |
| P22         | PR64B                | 3    | RLM0_GDLLC_IN_A**  | C (LVDS)*    |
| P21         | PR64A                | 3    | RLM0_GDLLT_IN_A**  | T (LVDS)*    |
| P16         | PR63B                | 3    | RLM0_GPLL_C_IN_A** | C            |
| VCCIO       | VCCIO3               | 3    |                    |              |
| P17         | PR63A                | 3    | RLM0_GPLLT_IN_A**  | T            |
| P20         | PR62B                | 3    | RLM0_GPLL_C_FB_A   | C (LVDS)*    |
| P19         | PR62A                | 3    | RLM0_GPLLT_FB_A    | T (LVDS)*    |
| GNDIO       | GNDIO3               | -    |                    |              |
| VCCIO       | VCCIO3               | 3    |                    |              |
| P18         | PR55B                | 3    | RDQ52              | C            |
| N16         | PR55A                | 3    | RDQ52              | T            |
| GNDIO       | GNDIO3               | -    |                    |              |
| N22         | PR54B                | 3    | RDQ52              | C (LVDS)*    |
| N21         | PR54A                | 3    | RDQ52              | T (LVDS)*    |
| N17         | PR53B                | 3    | RDQ52              | C            |
| N18         | PR53A                | 3    | RDQ52              | T            |
| VCCIO       | VCCIO3               | 3    |                    |              |
| M22         | PR52B                | 3    | RDQ52              | C (LVDS)*    |
| M21         | PR52A                | 3    | RDQS52             | T (LVDS)*    |
| M16         | PR51B                | 3    | RDQ52              | C            |
| GNDIO       | GNDIO3               | -    |                    |              |
| M17         | PR51A                | 3    | RDQ52              | T            |
| M20         | PR50B                | 3    | RDQ52              | C (LVDS)*    |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| M19         | PR50A             | 3    | RDQ52                 | T (LVDS)*    |
| M18         | PR49B             | 3    | RDQ52                 | C            |
| VCCIO       | VCCIO3            | 3    |                       |              |
| L16         | PR49A             | 3    | RDQ52                 | T            |
| L22         | PR48B             | 3    | RDQ52                 | C (LVDS)*    |
| L21         | PR48A             | 3    | RDQ52                 | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                       |              |
| K22         | PR46B             | 3    | RLM3_SPLLC_FB_A       | C            |
| VCCIO       | VCCIO3            | 3    |                       |              |
| K21         | PR46A             | 3    | RLM3_SPLLT_FB_A       | T            |
| L17         | PR45B             | 3    | RLM3_SPLLC_IN_A       | C (LVDS)*    |
| L18         | PR45A             | 3    | RLM3_SPLLT_IN_A       | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                       |              |
| L20         | PR44B             | 3    |                       | C            |
| L19         | PR44A             | 3    |                       | T            |
| K16         | PR43B             | 3    |                       | C (LVDS)*    |
| K17         | PR43A             | 3    |                       | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                       |              |
| J16         | PR42B             | 3    | VREF2_3               | C            |
| K18         | PR42A             | 3    | VREF1_3               | T            |
| J22         | PR41B             | 3    | PCLKC3_0              | C (LVDS)*    |
| J21         | PR41A             | 3    | PCLKT3_0              | T (LVDS)*    |
| H22         | PR39B             | 2    | PCLKC2_0/RDQ36        | C            |
| H21         | PR39A             | 2    | PCLKT2_0/RDQ36        | T            |
| GNDIO       | GNDIO2            | -    |                       |              |
| J17         | PR38B             | 2    | RDQ36                 | C (LVDS)*    |
| J18         | PR38A             | 2    | RDQ36                 | T (LVDS)*    |
| J20         | PR37B             | 2    | RDQ36                 | C            |
| J19         | PR37A             | 2    | RDQ36                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H16         | PR36B             | 2    | RDQ36                 | C (LVDS)*    |
| H17         | PR36A             | 2    | RDQS36                | T (LVDS)*    |
| G22         | PR35B             | 2    | RDQ36                 | C            |
| GNDIO       | GNDIO2            | -    |                       |              |
| G21         | PR35A             | 2    | RDQ36                 | T            |
| H20         | PR34B             | 2    | RDQ36                 | C (LVDS)*    |
| H19         | PR34A             | 2    | RDQ36                 | T (LVDS)*    |
| G16         | PR33B             | 2    | RUM3_SPLLC_FB_A/RDQ36 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H18         | PR33A             | 2    | RUM3_SPLLT_FB_A/RDQ36 | T            |
| F22         | PR32B             | 2    | RUM3_SPLLC_IN_A/RDQ36 | C (LVDS)*    |
| F21         | PR32A             | 2    | RUM3_SPLLT_IN_A/RDQ36 | T (LVDS)*    |
| G20         | PR30B             | 2    | RDQ27                 | C            |



**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |                 |              |
|-------------|-------------------|------|-----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential |
| F20         | PR30A             | 2    | RDQ27           | T            |
| GNDIO       | GNDIO2            | -    |                 |              |
| G17         | PR29B             | 2    | RDQ27           | C (LVDS)*    |
| F17         | PR29A             | 2    | RDQ27           | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                 |              |
| GNDIO       | GNDIO2            | -    |                 |              |
| E22         | PR14B             | 2    |                 | C            |
| D22         | PR14A             | 2    |                 | T            |
| VCCIO       | VCCIO2            | -    |                 |              |
| E20         | PR13B             | 2    |                 | C (LVDS)*    |
| D20         | PR13A             | 2    |                 | T (LVDS)*    |
| D19         | PR12B             | 2    | RUM0_SPLLC_FB_A | C            |
| GNDIO       | GNDIO2            | -    |                 |              |
| E19         | PR12A             | 2    | RUM0_SPLLT_FB_A | T            |
| F18         | PR11B             | 2    | RUM0_SPLLC_IN_A | C (LVDS)*    |
| F19         | PR11A             | 2    | RUM0_SPLLT_IN_A | T (LVDS)*    |
| VCCIO       | VCCIO2            | -    |                 |              |
| E18         | PR9B              | 2    | VREF2_2         | C            |
| GNDIO       | GNDIO2            | -    |                 |              |
| D18         | PR9A              | 2    | VREF1_2         | T            |
| VCCIO       | VCCIO2            | 2    |                 |              |
| F16         | XRES              | -    |                 |              |
| C22         | URC_SQ_VCCR0      | 12   |                 |              |
| A21         | URC_SQ_HDINP0     | 12   |                 | T            |
| B22         | URC_SQ_VCCIB0     | 12   |                 |              |
| B21         | URC_SQ_HDINN0     | 12   |                 | C            |
| C19         | URC_SQ_VCCTX0     | 12   |                 |              |
| A18         | URC_SQ_HDOUTP0    | 12   |                 | T            |
| A19         | URC_SQ_VCCOB0     | 12   |                 |              |
| B18         | URC_SQ_HDOUTN0    | 12   |                 | C            |
| C18         | URC_SQ_VCCTX1     | 12   |                 |              |
| B17         | URC_SQ_HDOUTN1    | 12   |                 | C            |
| C17         | URC_SQ_VCCOB1     | 12   |                 |              |
| A17         | URC_SQ_HDOUTP1    | 12   |                 | T            |
| C21         | URC_SQ_VCCR1      | 12   |                 |              |
| B20         | URC_SQ_HDINN1     | 12   |                 | C            |
| C20         | URC_SQ_VCCIB1     | 12   |                 |              |
| A20         | URC_SQ_HDINP1     | 12   |                 | T            |
| B16         | URC_SQ_VCCAUX33   | 12   |                 |              |
| E17         | URC_SQ_REFCLKN    | 12   |                 | C            |
| D17         | URC_SQ_REFCLKP    | 12   |                 | T            |
| C16         | URC_SQ_VCCP       | 12   |                 |              |
| A12         | URC_SQ_HDINP2     | 12   |                 | T            |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C12         | URC_SQ_VCCIB2     | 12   |               |              |
| B12         | URC_SQ_HDINN2     | 12   |               | C            |
| C11         | URC_SQ_VCCR2      | 12   |               |              |
| A15         | URC_SQ_HDOUTP2    | 12   |               | T            |
| C15         | URC_SQ_VCCOB2     | 12   |               |              |
| B15         | URC_SQ_HDOUTN2    | 12   |               | C            |
| C14         | URC_SQ_VCCTX2     | 12   |               |              |
| B14         | URC_SQ_HDOUTN3    | 12   |               | C            |
| A13         | URC_SQ_VCCOB3     | 12   |               |              |
| A14         | URC_SQ_HDOUTP3    | 12   |               | T            |
| C13         | URC_SQ_VCCTX3     | 12   |               |              |
| B11         | URC_SQ_HDINN3     | 12   |               | C            |
| B10         | URC_SQ_VCCIB3     | 12   |               |              |
| A11         | URC_SQ_HDINP3     | 12   |               | T            |
| C10         | URC_SQ_VCCR3      | 12   |               |              |
| GNDIO       | GNDIO1            | -    |               |              |
| VCCIO       | VCCIO1            | 1    |               |              |
| E13         | PT55B             | 1    |               | C            |
| D12         | PT55A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              |
| A9          | PT54B             | 1    |               | C            |
| A8          | PT54A             | 1    |               | T            |
| A7          | PT53B             | 1    |               | C            |
| A6          | PT53A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| E12         | PT52B             | 1    |               | C            |
| F12         | PT52A             | 1    |               | T            |
| A5          | PT51B             | 1    |               | C            |
| A4          | PT51A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              |
| B7          | PT50B             | 1    |               | C            |
| B8          | PT50A             | 1    |               | T            |
| G11         | PT49B             | 1    |               | C            |
| E11         | PT49A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| D11         | PT48B             | 1    | VREF2_1       | C            |
| D10         | PT48A             | 1    | VREF1_1       | T            |
| G10         | PT47B             | 1    | PCLKC1_0      | C            |
| F11         | PT47A             | 1    | PCLKT1_0      | T            |
| G9          | PT46B             | 0    | PCLKC0_0      | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| F9          | PT46A             | 0    | PCLKT0_0      | T            |
| C9          | PT45B             | 0    | VREF2_0       | C            |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| D9          | PT45A             | 0    | VREF1_0       | T            |
| A2          | PT44B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| A3          | PT44A             | 0    |               | T            |
| B3          | PT43B             | 0    |               | C            |
| C4          | PT43A             | 0    |               | T            |
| E10         | PT42B             | 0    |               | C            |
| F10         | PT42A             | 0    |               | T            |
| C7          | PT41B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| B6          | PT41A             | 0    |               | T            |
| C6          | PT40B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| C5          | PT40A             | 0    |               | T            |
| C8          | PT39B             | 0    |               | C            |
| D8          | PT39A             | 0    |               | T            |
| E8          | PT38B             | 0    |               | C            |
| E9          | PT38A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              |
| F8          | PT10B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| G8          | PT10A             | 0    |               | T            |
| F7          | PT9B              | 0    |               | C            |
| G7          | PT9A              | 0    |               | T            |
| C3          | PT8B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| D4          | PT8A              | 0    |               | T            |
| F6          | PT7B              | 0    |               | C            |
| E6          | PT7A              | 0    |               | T            |
| E5          | PT6B              | 0    |               | C            |
| D6          | PT6A              | 0    |               | T            |
| D3          | PT5B              | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| E3          | PT5A              | 0    |               | T            |
| D5          | PT4B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| E4          | PT4A              | 0    |               | T            |
| C2          | PT3B              | 0    |               | C            |
| B2          | PT3A              | 0    |               | T            |
| B1          | PT2B              | 0    |               | C            |
| C1          | PT2A              | 0    |               | T            |
| J10         | VCC               | -    |               |              |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| J11         | VCC               | -    |               |              |
| J12         | VCC               | -    |               |              |
| J13         | VCC               | -    |               |              |
| K14         | VCC               | -    |               |              |
| K9          | VCC               | -    |               |              |
| L14         | VCC               | -    |               |              |
| L9          | VCC               | -    |               |              |
| M14         | VCC               | -    |               |              |
| M9          | VCC               | -    |               |              |
| N14         | VCC               | -    |               |              |
| N9          | VCC               | -    |               |              |
| P10         | VCC               | -    |               |              |
| P11         | VCC               | -    |               |              |
| P12         | VCC               | -    |               |              |
| P13         | VCC               | -    |               |              |
| B5          | VCCIO0            | 0    |               |              |
| B9          | VCCIO0            | 0    |               |              |
| E7          | VCCIO0            | 0    |               |              |
| H9          | VCCIO0            | 0    |               |              |
| D13         | VCCIO1            | 1    |               |              |
| E16         | VCCIO1            | 1    |               |              |
| H14         | VCCIO1            | 1    |               |              |
| E21         | VCCIO2            | 2    |               |              |
| G18         | VCCIO2            | 2    |               |              |
| J15         | VCCIO2            | 2    |               |              |
| K19         | VCCIO2            | 2    |               |              |
| N19         | VCCIO3            | 3    |               |              |
| P15         | VCCIO3            | 3    |               |              |
| T18         | VCCIO3            | 3    |               |              |
| V21         | VCCIO3            | 3    |               |              |
| AA18        | VCCIO4            | 4    |               |              |
| R14         | VCCIO4            | 4    |               |              |
| V16         | VCCIO4            | 4    |               |              |
| W13         | VCCIO4            | 4    |               |              |
| AA5         | VCCIO5            | 5    |               |              |
| R9          | VCCIO5            | 5    |               |              |
| V7          | VCCIO5            | 5    |               |              |
| W10         | VCCIO5            | 5    |               |              |
| N4          | VCCIO6            | 6    |               |              |
| P8          | VCCIO6            | 6    |               |              |
| T5          | VCCIO6            | 6    |               |              |
| V2          | VCCIO6            | 6    |               |              |
| E2          | VCCIO7            | 7    |               |              |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| G5          | VCCIO7            | 7    |               |              |
| J8          | VCCIO7            | 7    |               |              |
| K4          | VCCIO7            | 7    |               |              |
| AA22        | VCCIO8            | 8    |               |              |
| U19         | VCCIO8            | 8    |               |              |
| H11         | VCCAUX            | -    |               |              |
| H12         | VCCAUX            | -    |               |              |
| L15         | VCCAUX            | -    |               |              |
| L8          | VCCAUX            | -    |               |              |
| M15         | VCCAUX            | -    |               |              |
| M8          | VCCAUX            | -    |               |              |
| R11         | VCCAUX            | -    |               |              |
| R12         | VCCAUX            | -    |               |              |
| A1          | GND               | -    |               |              |
| A10         | GND               | -    |               |              |
| A16         | GND               | -    |               |              |
| A22         | GND               | -    |               |              |
| AA19        | GND               | -    |               |              |
| AA4         | GND               | -    |               |              |
| AB1         | GND               | -    |               |              |
| AB22        | GND               | -    |               |              |
| B13         | GND               | -    |               |              |
| B19         | GND               | -    |               |              |
| B4          | GND               | -    |               |              |
| D16         | GND               | -    |               |              |
| D2          | GND               | -    |               |              |
| D21         | GND               | -    |               |              |
| D7          | GND               | -    |               |              |
| G19         | GND               | -    |               |              |
| G4          | GND               | -    |               |              |
| H10         | GND               | -    |               |              |
| H13         | GND               | -    |               |              |
| J14         | GND               | -    |               |              |
| J9          | GND               | -    |               |              |
| K10         | GND               | -    |               |              |
| K11         | GND               | -    |               |              |
| K12         | GND               | -    |               |              |
| K13         | GND               | -    |               |              |
| K15         | GND               | -    |               |              |
| K20         | GND               | -    |               |              |
| K3          | GND               | -    |               |              |
| K8          | GND               | -    |               |              |
| L10         | GND               | -    |               |              |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| L11         | GND               | -    |               |              |
| L12         | GND               | -    |               |              |
| L13         | GND               | -    |               |              |
| M10         | GND               | -    |               |              |
| M11         | GND               | -    |               |              |
| M12         | GND               | -    |               |              |
| M13         | GND               | -    |               |              |
| N10         | GND               | -    |               |              |
| N11         | GND               | -    |               |              |
| N12         | GND               | -    |               |              |
| N13         | GND               | -    |               |              |
| N15         | GND               | -    |               |              |
| N20         | GND               | -    |               |              |
| N3          | GND               | -    |               |              |
| N8          | GND               | -    |               |              |
| P14         | GND               | -    |               |              |
| P9          | GND               | -    |               |              |
| R10         | GND               | -    |               |              |
| R13         | GND               | -    |               |              |
| T19         | GND               | -    |               |              |
| T4          | GND               | -    |               |              |
| W16         | GND               | -    |               |              |
| W2          | GND               | -    |               |              |
| W21         | GND               | -    |               |              |
| W7          | GND               | -    |               |              |
| Y10         | GND               | -    |               |              |
| Y13         | GND               | -    |               |              |
| Y15         | NC                | -    |               |              |
| W15         | NC                | -    |               |              |
| AB20        | NC                | -    |               |              |
| AB21        | NC                | -    |               |              |
| AA21        | NC                | -    |               |              |
| AA20        | NC                | -    |               |              |
| AB19        | NC                | -    |               |              |
| AB18        | NC                | -    |               |              |
| Y22         | NC                | -    |               |              |
| Y21         | NC                | -    |               |              |
| Y17         | NC                | -    |               |              |
| Y18         | NC                | -    |               |              |
| Y16         | NC                | -    |               |              |
| W17         | NC                | -    |               |              |
| Y19         | NC                | -    |               |              |
| Y20         | NC                | -    |               |              |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| W19         | NC                | -    |               |              |
| W18         | NC                | -    |               |              |
| V17         | NC                | -    |               |              |
| V18         | NC                | -    |               |              |
| D15         | NC                | -    |               |              |
| G14         | NC                | -    |               |              |
| G15         | NC                | -    |               |              |
| D14         | NC                | -    |               |              |
| E15         | NC                | -    |               |              |
| E14         | NC                | -    |               |              |
| F15         | NC                | -    |               |              |
| F14         | NC                | -    |               |              |
| F13         | NC                | -    |               |              |
| G12         | NC                | -    |               |              |
| G13         | NC                | -    |               |              |
| H8          | VCCPLL            | -    |               |              |
| H15         | VCCPLL            | -    |               |              |
| R8          | VCCPLL            | -    |               |              |
| R15         | VCCPLL            | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\*For density migration, board design must take into account that these sysCONFIG pins are dual function for the lower density devices (ECP2M20 and ECP2M35). They can be either sysCONFIG pins or general purpose I/Os. These pins are dedicated pins for the higher density devices (ECP2M50, ECP2M70 and ECP2M100).

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA

| LFE2M35E/SE |                   |      |                       |              | LFE2M50E/SE       |      |                 |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function   | Differential |  |
| C2          | PL2A              | 7    | LDQ6                  | T (LVDS)*    | PL2A              | 7    | LDQ6            | T*           |  |
| C1          | PL2B              | 7    | LDQ6                  | C (LVDS)*    | PL2B              | 7    | LDQ6            | C*           |  |
| F6          | PL3A              | 7    | LDQ6                  | T            | PL3A              | 7    | LDQ6            | T            |  |
| H9          | PL3B              | 7    | LDQ6                  | C            | PL3B              | 7    | LDQ6            | C            |  |
| D3          | PL4A              | 7    | LDQ6                  | T (LVDS)*    | PL4A              | 7    | LDQ6            | T*           |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                 |              |  |
| D2          | PL4B              | 7    | LDQ6                  | C (LVDS)*    | PL4B              | 7    | LDQ6            | C*           |  |
| F5          | PL5A              | 7    | LDQ6                  | T            | PL5A              | 7    | LDQ6            | T            |  |
| H8          | PL5B              | 7    | LDQ6                  | C            | PL5B              | 7    | LDQ6            | C            |  |
| E3          | PL6A              | 7    | LDQS6                 | T (LVDS)*    | PL6A              | 7    | LDQS6           | T*           |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                 |              |  |
| E2          | PL6B              | 7    | LDQ6                  | C (LVDS)*    | PL6B              | 7    | LDQ6            | C*           |  |
| J9          | PL7A              | 7    | LDQ6                  | T            | PL7A              | 7    | LDQ6            | T            |  |
| E4          | PL7B              | 7    | LDQ6                  | C            | PL7B              | 7    | LDQ6            | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                 |              |  |
| E1          | PL8A              | 7    | LDQ6                  | T (LVDS)*    | PL8A              | 7    | LDQ6            | T*           |  |
| D1          | PL8B              | 7    | LDQ6                  | C (LVDS)*    | PL8B              | 7    | LDQ6            | C*           |  |
| J8          | PL9A              | 7    | VREF2_7/LDQ6          | T            | PL9A              | 7    | VREF2_7/LDQ6    | T            |  |
| F4          | PL9B              | 7    | VREF1_7/LDQ6          | C            | PL9B              | 7    | VREF1_7/LDQ6    | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                 |              |  |
| -           | -                 | -    |                       |              | VCCIO7            | 7    |                 |              |  |
| F3          | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A | T*           |  |
| F1          | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A | C*           |  |
| G6          | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            | PL12A             | 7    | LUM0_SPLLT_FB_A | T            |  |
| K9          | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            | PL12B             | 7    | LUM0_SPLLC_FB_A | C            |  |
| -           | -                 | -    |                       |              | GNDIO7            | -    |                 |              |  |
| G5          | PL13A             | 7    | LDQ15                 | T (LVDS)*    | PL13A             | 7    |                 | T*           |  |
| VCCIO       | VCCIO7            | 7    |                       |              | -                 | -    |                 |              |  |
| G4          | PL13B             | 7    | LDQ15                 | C (LVDS)*    | PL13B             | 7    |                 | C*           |  |
| H5          | PL14A             | 7    | LDQ15                 | T            | PL14A             | 7    |                 | T            |  |
| -           | -                 | -    |                       |              | VCCIO7            | 7    |                 |              |  |
| H6          | PL14B             | 7    | LDQ15                 | C            | PL14B             | 7    |                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                 |              |  |
| J7          | PL16A             | 7    | LDQ15                 | T            | PL19A             | 7    |                 | T            |  |
| H4          | PL16B             | 7    | LDQ15                 | C            | PL19B             | 7    |                 | C            |  |
| H3          | PL17A             | 7    | LDQ15                 | T (LVDS)*    | PL20A             | 7    |                 | T*           |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                 |              |  |
| G3          | PL17B             | 7    | LDQ15                 | C (LVDS)*    | PL20B             | 7    |                 | C*           |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                 |              |  |
| G1          | PL19A             | 7    | LDQ23                 | T (LVDS)*    | PL23A             | 7    | LDQ27           | T*           |  |
| H1          | PL19B             | 7    | LDQ23                 | C (LVDS)*    | PL23B             | 7    | LDQ27           | C*           |  |
| J3          | PL20A             | 7    | LDQ23                 | T            | PL24A             | 7    | LDQ27           | T            |  |
| J4          | PL20B             | 7    | LDQ23                 | C            | PL24B             | 7    | LDQ27           | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                 |              |  |
| H2          | PL21A             | 7    | LDQ23                 | T (LVDS)*    | PL25A             | 7    | LDQ27           | T*           |  |
| J2          | PL21B             | 7    | LDQ23                 | C (LVDS)*    | PL25B             | 7    | LDQ27           | C*           |  |
| K7          | PL22A             | 7    | LDQ23                 | T            | PL26A             | 7    | LDQ27           | T            |  |
| J6          | PL22B             | 7    | LDQ23                 | C            | PL26B             | 7    | LDQ27           | C            |  |



## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                       |              | LFE2M50E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| K5          | PL23A             | 7    | LDQS23                | T (LVDS)*    | PL27A             | 7    | LDQS27                | T*           |  |
| L5          | PL23B             | 7    | LDQ23                 | C (LVDS)*    | PL27B             | 7    | LDQ27                 | C*           |  |
| K4          | PL24A             | 7    | LDQ23                 | T            | PL28A             | 7    | LDQ27                 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| L4          | PL24B             | 7    | LDQ23                 | C            | PL28B             | 7    | LDQ27                 | C            |  |
| K3          | PL25A             | 7    | LDQ23                 | T (LVDS)*    | PL29A             | 7    | LDQ27                 | T*           |  |
| L3          | PL25B             | 7    | LDQ23                 | C (LVDS)*    | PL29B             | 7    | LDQ27                 | C*           |  |
| J1          | PL26A             | 7    | LDQ23                 | T            | PL30A             | 7    | LDQ27                 | T            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| K2          | PL26B             | 7    | LDQ23                 | C            | PL30B             | 7    | LDQ27                 | C            |  |
| K1          | PL28A             | 7    | LUM1_SPLLT_IN_A/LDQ32 | T (LVDS)*    | PL32A             | 7    | LUM3_SPLLT_IN_A/LDQ36 | T*           |  |
| L1          | PL28B             | 7    | LUM1_SPLLC_IN_A/LDQ32 | C (LVDS)*    | PL32B             | 7    | LUM3_SPLLC_IN_A/LDQ36 | C*           |  |
| K8          | PL29A             | 7    | LUM1_SPLLT_FB_A/LDQ32 | T            | PL33A             | 7    | LUM3_SPLLT_FB_A/LDQ36 | T            |  |
| M5          | PL29B             | 7    | LUM1_SPLLC_FB_A/LDQ32 | C            | PL33B             | 7    | LUM3_SPLLC_FB_A/LDQ36 | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| M4          | PL30A             | 7    | LDQ32                 | T (LVDS)*    | PL34A             | 7    | LDQ36                 | T*           |  |
| M3          | PL30B             | 7    | LDQ32                 | C (LVDS)*    | PL34B             | 7    | LDQ36                 | C*           |  |
| L8          | PL31A             | 7    | LDQ32                 | T            | PL35A             | 7    | LDQ36                 | T            |  |
| M6          | PL31B             | 7    | LDQ32                 | C            | PL35B             | 7    | LDQ36                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M1          | PL32A             | 7    | LDQS32                | T (LVDS)*    | PL36A             | 7    | LDQS36                | T*           |  |
| N1          | PL32B             | 7    | LDQ32                 | C (LVDS)*    | PL36B             | 7    | LDQ36                 | C*           |  |
| N3          | PL33A             | 7    | LDQ32                 | T            | PL37A             | 7    | LDQ36                 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| N2          | PL33B             | 7    | LDQ32                 | C            | PL37B             | 7    | LDQ36                 | C            |  |
| N5          | PL34A             | 7    | LDQ32                 | T (LVDS)*    | PL38A             | 7    | LDQ36                 | T*           |  |
| N4          | PL34B             | 7    | LDQ32                 | C (LVDS)*    | PL38B             | 7    | LDQ36                 | C*           |  |
| M7          | PL35A             | 7    | PCLKT7_0/LDQ32        | T            | PL39A             | 7    | PCLKT7_0/LDQ36        | T            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M8          | PL35B             | 7    | PCLKC7_0/LDQ32        | C            | PL39B             | 7    | PCLKC7_0/LDQ36        | C            |  |
| P3          | PL37A             | 6    | PCLKT6_0              | T (LVDS)*    | PL41A             | 6    | PCLKT6_0              | T*           |  |
| P2          | PL37B             | 6    | PCLKC6_0              | C (LVDS)*    | PL41B             | 6    | PCLKC6_0              | C*           |  |
| P5          | PL38A             | 6    | VREF2_6               | T            | PL42A             | 6    | VREF2_6               | T            |  |
| N6          | PL38B             | 6    | VREF1_6               | C            | PL42B             | 6    | VREF1_6               | C            |  |
| P4          | PL39A             | 6    |                       | T (LVDS)*    | PL43A             | 6    |                       | T*           |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| R3          | PL39B             | 6    |                       | C (LVDS)*    | PL43B             | 6    |                       | C*           |  |
| P6          | PL40A             | 6    |                       | T            | PL44A             | 6    |                       | T            |  |
| N7          | NC                | -    |                       |              | PL44B             | 6    |                       | C            |  |
| P1          | PL41A             | 6    | LLM2_SPLLT_IN_A       | T (LVDS)*    | PL45A             | 6    | LLM3_SPLLT_IN_A       | T*           |  |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |  |
| R1          | PL41B             | 6    | LLM2_SPLLC_IN_A       | C (LVDS)*    | PL45B             | 6    | LLM3_SPLLC_IN_A       | C*           |  |
| N8          | PL42A             | 6    | LLM2_SPLLT_FB_A       | T            | PL46A             | 6    | LLM3_SPLLT_FB_A       | T            |  |
| R5          | PL42B             | 6    | LLM2_SPLLC_FB_A       | C            | PL46B             | 6    | LLM3_SPLLC_FB_A       | C            |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| T3          | PL44A             | 6    | LDQ48                 | T (LVDS)*    | PL48A             | 6    | LDQ52                 | T*           |  |
| T4          | PL44B             | 6    | LDQ48                 | C (LVDS)*    | PL48B             | 6    | LDQ52                 | C*           |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                              |              | LFE2M50E/SE       |      |                 |              |  |
|-------------|-------------------|------|------------------------------|--------------|-------------------|------|-----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function                | Differential | Ball/Pad Function | Bank | Dual Function   | Differential |  |
| P8          | PL45A             | 6    | LDQ48                        | T            | PL49A             | 6    | LDQ52           | T            |  |
| R6          | PL45B             | 6    | LDQ48                        | C            | PL49B             | 6    | LDQ52           | C            |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |
| T1          | PL46A             | 6    | LDQ48                        | T (LVDS)*    | PL50A             | 6    | LDQ52           | T*           |  |
| U1          | PL46B             | 6    | LDQ48                        | C (LVDS)*    | PL50B             | 6    | LDQ52           | C*           |  |
| R7          | PL47A             | 6    | LDQ48                        | T            | PL51A             | 6    | LDQ52           | T            |  |
| T5          | PL47B             | 6    | LDQ48                        | C            | PL51B             | 6    | LDQ52           | C            |  |
| GNDIO       | GNDIO6            | -    |                              |              | GNDIO6            | -    |                 |              |  |
| U3          | PL48A             | 6    | LDQS48                       | T (LVDS)*    | PL52A             | 6    | LDQS52          | T*           |  |
| U4          | PL48B             | 6    | LDQ48                        | C (LVDS)*    | PL52B             | 6    | LDQ52           | C*           |  |
| U5          | PL49A             | 6    | LDQ48                        | T            | PL53A             | 6    | LDQ52           | T            |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |
| U6          | PL49B             | 6    | LDQ48                        | C            | PL53B             | 6    | LDQ52           | C            |  |
| U2          | PL50A             | 6    | LDQ48                        | T (LVDS)*    | PL54A             | 6    | LDQ52           | T*           |  |
| V1          | PL50B             | 6    | LDQ48                        | C (LVDS)*    | PL54B             | 6    | LDQ52           | C*           |  |
| W2          | PL51A             | 6    | LDQ48                        | T            | PL55A             | 6    | LDQ52           | T            |  |
| GNDIO       | GNDIO6            | -    |                              |              | GNDIO6            | -    |                 |              |  |
| V2          | PL51B             | 6    | LDQ48                        | C            | PL55B             | 6    | LDQ52           | C            |  |
| V4          | PL55A             | 6    | LDQ57                        | T (LVDS)*    | PL59A             | 6    |                 | T*           |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |
| V3          | PL55B             | 6    | LDQ57                        | C (LVDS)*    | PL59B             | 6    |                 | C*           |  |
| -           | -                 | -    |                              |              | GNDIO6            | -    |                 |              |  |
| W4          | PL57A             | 6    | LLM0_GPLLT_IN_A**/LDQS57**** | T (LVDS)*    | PL62A             | 6    | LLM0_GPLLT_IN_A | T*           |  |
| GNDIO       | GNDIO6            | -    |                              |              | GNDIO6            | -    |                 |              |  |
| W3          | PL57B             | 6    | LLM0_GPLLC_IN_A**/LDQ57      | C (LVDS)*    | PL62B             | 6    | LLM0_GPLLC_IN_A | C*           |  |
| W1          | PL58A             | 6    | LLM0_GPLLT_FB_A/LDQ57        | T            | PL63A             | 6    | LLM0_GPLLT_FB_A | T            |  |
| Y1          | PL58B             | 6    | LLM0_GPLLC_FB_A/LDQ57        | C            | PL63B             | 6    | LLM0_GPLLC_FB_A | C            |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |
| AA1         | PL59A             | 6    | LLM0_GDLLT_IN_A**/LDQ57      | T (LVDS)*    | PL64A             | 6    | LLM0_GDLLT_IN_A | T*           |  |
| AB1         | PL59B             | 6    | LLM0_GDLLC_IN_A**/LDQ57      | C (LVDS)*    | PL64B             | 6    | LLM0_GDLLC_IN_A | C*           |  |
| U7          | PL60A             | 6    | LLM0_GDLLT_FB_A/LDQ57        | T            | PL65A             | 6    | LLM0_GDLLT_FB_A | T            |  |
| V6          | PL60B             | 6    | LLM0_GDLLC_FB_A/LDQ57        | C            | PL65B             | 6    | LLM0_GDLLC_FB_A | C            |  |
| GNDIO       | GNDIO6            | -    |                              |              | GNDIO6            | -    |                 |              |  |
| T8          | LLM0_PLLCAP       | 6    |                              |              | LLM0_PLLCAP       | 6    |                 |              |  |
| W5          | PL62A             | 6    | LDQ66                        | T (LVDS)*    | PL67A             | 6    | LDQ71           | T*           |  |
| Y4          | PL62B             | 6    | LDQ66                        | C (LVDS)*    | PL67B             | 6    | LDQ71           | C*           |  |
| U8          | PL63A             | 6    | LDQ66                        | T            | PL68A             | 6    | LDQ71           | T            |  |
| W6          | PL63B             | 6    | LDQ66                        | C            | PL68B             | 6    | LDQ71           | C            |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |
| Y3          | PL64A             | 6    | LDQ66                        | T (LVDS)*    | PL69A             | 6    | LDQ71           | T*           |  |
| AA3         | PL64B             | 6    | LDQ66                        | C (LVDS)*    | PL69B             | 6    | LDQ71           | C*           |  |
| V7          | NC                | -    |                              |              | PL70A             | 6    | LDQ71           | T            |  |
| Y5          | PL65B             | 6    | LDQ66                        | C            | PL70B             | 6    | LDQ71           | C            |  |
| GNDIO       | GNDIO6            | -    |                              |              | GNDIO6            | -    |                 |              |  |
| AB2         | PL66A             | 6    | LDQS66                       | T (LVDS)*    | PL71A             | 6    | LDQS71          | T*           |  |
| AA4         | PL66B             | 6    | LDQ66                        | C (LVDS)*    | PL71B             | 6    | LDQ71           | C*           |  |
| Y6          | PL67A             | 6    | LDQ66                        | T            | PL72A             | 6    | LDQ71           | T            |  |
| VCCIO       | VCCIO6            | 6    |                              |              | VCCIO6            | 6    |                 |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| U9          | PL67B             | 6    | LDQ66         | C            | PL72B             | 6    | LDQ71         | C            |  |
| AA5         | PL68A             | 6    | LDQ66         | T (LVDS)*    | PL73A             | 6    | LDQ71         | T*           |  |
| AA6         | PL68B             | 6    | LDQ66         | C (LVDS)*    | PL73B             | 6    | LDQ71         | C*           |  |
| Y7          | PL69A             | 6    | LDQ66         | T            | PL74A             | 6    | LDQ71         | T            |  |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| V9          | PL69B             | 6    | LDQ66         | C            | PL74B             | 6    | LDQ71         | C            |  |
| AC3         | TCK               | -    |               |              | TCK               | -    |               |              |  |
| W8          | TDI               | -    |               |              | TDI               | -    |               |              |  |
| AC4         | TMS               | -    |               |              | TMS               | -    |               |              |  |
| V8          | TDO               | -    |               |              | TDO               | -    |               |              |  |
| AA7         | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| AB6         | PB2A              | 5    | BDQ6          | T            | PB2A              | 5    | BDQ6          | T            |  |
| Y8          | PB2B              | 5    | BDQ6          | C            | PB2B              | 5    | BDQ6          | C            |  |
| AD1         | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| AD2         | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AC5         | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| AA8         | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AC6         | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| W9          | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| AB7         | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| Y9          | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| AD3         | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| AD4         | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| AA9         | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| W10         | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AC7         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| Y10         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AE2         | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| AD5         | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AE4         | PB11A             | 5    | BDQ15         | T            | PB11A             | 5    | BDQ15         | T            |  |
| AE3         | PB11B             | 5    | BDQ15         | C            | PB11B             | 5    | BDQ15         | C            |  |
| W11         | PB12A             | 5    | BDQ15         | T            | PB12A             | 5    | BDQ15         | T            |  |
| AB8         | PB12B             | 5    | BDQ15         | C            | PB12B             | 5    | BDQ15         | C            |  |
| AE5         | PB13A             | 5    | BDQ15         | T            | PB13A             | 5    | BDQ15         | T            |  |
| AD6         | PB13B             | 5    | BDQ15         | C            | PB13B             | 5    | BDQ15         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AA10        | PB14A             | 5    | BDQ15         | T            | PB14A             | 5    | BDQ15         | T            |  |
| AC8         | PB14B             | 5    | BDQ15         | C            | PB14B             | 5    | BDQ15         | C            |  |
| W12         | PB15A             | 5    | BDQS15        | T            | PB15A             | 5    | BDQS15        | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AC9         | PB15B             | 5    | BDQ15         | C            | PB15B             | 5    | BDQ15         | C            |  |
| W13         | PB16A             | 5    | BDQ15         | T            | PB16A             | 5    | BDQ15         | T            |  |
| AB10        | PB16B             | 5    | BDQ15         | C            | PB16B             | 5    | BDQ15         | C            |  |
| AF3         | PB17A             | 5    | BDQ15         | T            | PB17A             | 5    | BDQ15         | T            |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                |              | LFE2M50E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AF4         | PB17B             | 5    | BDQ15          | C            | PB17B             | 5    | BDQ15          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| AF5         | PB18A             | 5    | BDQ15          | T            | PB18A             | 5    | BDQ15          | T            |  |
| AF6         | PB18B             | 5    | BDQ15          | C            | PB18B             | 5    | BDQ15          | C            |  |
| Y12         | PB19A             | 5    | BDQ15          | T            | PB19A             | 5    | BDQ15          | T            |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AB11        | PB19B             | 5    | BDQ15          | C            | PB19B             | 5    | BDQ15          | C            |  |
| -           | -                 | -    |                |              | VCCIO5            | 5    |                |              |  |
| -           | -                 | -    |                |              | GNDIO5            | -    |                |              |  |
| AD7         | PB20A             | 5    | BDQ24          | T            | PB29A             | 5    | BDQ33          | T            |  |
| AF7         | PB20B             | 5    | BDQ24          | C            | PB29B             | 5    | BDQ33          | C            |  |
| AD8         | PB21A             | 5    | BDQ24          | T            | PB30A             | 5    | BDQ33          | T            |  |
| AA12        | PB21B             | 5    | BDQ24          | C            | PB30B             | 5    | BDQ33          | C            |  |
| AE8         | PB22A             | 5    | BDQ24          | T            | PB31A             | 5    | BDQ33          | T            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| AF8         | PB22B             | 5    | BDQ24          | C            | PB31B             | 5    | BDQ33          | C            |  |
| AD9         | PB23A             | 5    | BDQ24          | T            | PB32A             | 5    | BDQ33          | T            |  |
| AC10        | PB23B             | 5    | BDQ24          | C            | PB32B             | 5    | BDQ33          | C            |  |
| AC11        | PB24A             | 5    | BDQS24         | T            | PB33A             | 5    | BDQS33         | T            |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AB12        | PB24B             | 5    | BDQ24          | C            | PB33B             | 5    | BDQ33          | C            |  |
| AD10        | PB25A             | 5    | BDQ24          | T            | PB34A             | 5    | BDQ33          | T            |  |
| Y13         | PB25B             | 5    | BDQ24          | C            | PB34B             | 5    | BDQ33          | C            |  |
| AF9         | PB26A             | 5    | BDQ24          | T            | PB35A             | 5    | BDQ33          | T            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| AE9         | PB26B             | 5    | BDQ24          | C            | PB35B             | 5    | BDQ33          | C            |  |
| AF10        | PB27A             | 5    | BDQ24          | T            | PB36A             | 5    | BDQ33          | T            |  |
| AE10        | PB27B             | 5    | BDQ24          | C            | PB36B             | 5    | BDQ33          | C            |  |
| AD11        | PB28A             | 5    | BDQ24          | T            | PB37A             | 5    | BDQ33          | T            |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AF11        | PB28B             | 5    | BDQ24          | C            | PB37B             | 5    | BDQ33          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AA13        | PB33A             | 5    | BDQS33****     | T            | PB42A             | 5    | BDQS42****     | T            |  |
| AB13        | PB33B             | 5    | BDQ33          | C            | PB42B             | 5    | BDQ42          | C            |  |
| W14         | PB34A             | 5    | VREF2_5/BDQ33  | T            | PB43A             | 5    | VREF2_5/BDQ42  | T            |  |
| AC12        | PB34B             | 5    | VREF1_5/BDQ33  | C            | PB43B             | 5    | VREF1_5/BDQ42  | C            |  |
| AF12        | PB35A             | 5    | PCLKT5_0/BDQ33 | T            | PB44A             | 5    | PCLKT5_0/BDQ42 | T            |  |
| AD12        | PB35B             | 5    | PCLKC5_0/BDQ33 | C            | PB44B             | 5    | PCLKC5_0/BDQ42 | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AC13        | PB40A             | 4    | PCLKT4_0/BDQ42 | T            | PB49A             | 4    | PCLKT4_0/BDQ51 | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| Y14         | PB40B             | 4    | PCLKC4_0/BDQ42 | C            | PB49B             | 4    | PCLKC4_0/BDQ51 | C            |  |
| AB20        | PB57A             | 4    | BDQ60          | T            | PB50A             | 4    | VREF2_4/BDQ51  | T            |  |
| AC14        | PB41B             | 4    | VREF1_4/BDQ42  | C            | PB50B             | 4    | VREF1_4/BDQ51  | C            |  |
| AB14        | PB42A             | 4    | BDQS42****     | T            | PB51A             | 4    | BDQS51****     | T            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AA14        | PB42B             | 4    | BDQ42         | C            | PB51B             | 4    | BDQ51         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| W17         | PB65A             | 4    | BDQ69         | T            | PB56A             | 4    | BDQ60         | T            |  |
| AA19        | PB65B             | 4    | BDQ69         | C            | PB56B             | 4    | BDQ60         | C            |  |
| AC15        | PB48A             | 4    | BDQ51         | T            | PB57A             | 4    | BDQ60         | T            |  |
| Y18         | PB68B             | 4    | BDQ69         | C            | PB57B             | 4    | BDQ60         | C            |  |
| AB15        | PB49A             | 4    | BDQ51         | T            | PB58A             | 4    | BDQ60         | T            |  |
| AC16        | PB49B             | 4    | BDQ51         | C            | PB58B             | 4    | BDQ60         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA17        | PB60A             | 4    | BDQS60****    | T            | PB59A             | 4    | BDQ60         | T            |  |
| AB16        | PB50B             | 4    | BDQ51         | C            | PB59B             | 4    | BDQ60         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AA15        | PB51A             | 4    | BDQS51****    | T            | PB60A             | 4    | BDQS60        | T            |  |
| W16         | PB59B             | 4    | BDQ60         | C            | PB60B             | 4    | BDQ60         | C            |  |
| Y15         | PB52A             | 4    | BDQ51         | T            | PB61A             | 4    | BDQ60         | T            |  |
| AC17        | PB52B             | 4    | BDQ51         | C            | PB61B             | 4    | BDQ60         | C            |  |
| AA18        | PB61A             | 4    | BDQ60         | T            | PB62A             | 4    | BDQ60         | T            |  |
| Y17         | PB61B             | 4    | BDQ60         | C            | PB62B             | 4    | BDQ60         | C            |  |
| -           | -                 | -    |               |              | VCCIO4            | 4    |               |              |  |
| GNDIO       | GNDIO4            | -    |               |              | -                 | -    |               |              |  |
| W15         | PB54A             | 4    | BDQ51         | T            | PB63A             | 4    | BDQ60         | T            |  |
| AB17        | PB54B             | 4    | BDQ51         | C            | PB63B             | 4    | BDQ60         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| V17         | PB73A             | 4    | BDQ69         | T            | PB72A             | 4    | BDQ69         | T            |  |
| AA20        | PB73B             | 4    | BDQ69         | C            | PB72B             | 4    | BDQ69         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AD13        | VCC               | -    |               |              | LRC_SQ_VCCR3      | 13   |               |              |  |
| AF14        | PB47A             | 4    | BDQ51         | T            | LRC_SQ_HDINP3     | 13   |               | T            |  |
| AE13        | NC                | -    |               |              | LRC_SQ_VCCIB3     | 13   |               |              |  |
| AE14        | PB41A             | 4    | VREF2_4/BDQ42 | T            | LRC_SQ_HDINN3     | 13   |               | C            |  |
| AD16        | VCC               | -    |               |              | LRC_SQ_VCCTX3     | 13   |               |              |  |
| AF17        | PB51B             | 4    | BDQ51         | C            | LRC_SQ_HDOUPT3    | 13   |               | T            |  |
| AF16        | NC                | -    |               |              | LRC_SQ_VCCOB3     | 13   |               |              |  |
| AE17        | PB50A             | 4    | BDQ51         | T            | LRC_SQ_HDOUPTN3   | 13   |               | C            |  |
| AD17        | VCC               | -    |               |              | LRC_SQ_VCCTX2     | 13   |               |              |  |
| AE18        | PB53B             | 4    | BDQ51         | C            | LRC_SQ_HDOUPTN2   | 13   |               | C            |  |
| AD18        | NC                | -    |               |              | LRC_SQ_VCCOB2     | 13   |               |              |  |
| AF18        | PB53A             | 4    | BDQ51         | T            | LRC_SQ_HDOUPT2    | 13   |               | T            |  |
| AD14        | VCC               | -    |               |              | LRC_SQ_VCCR2      | 13   |               |              |  |
| AE15        | PB48B             | 4    | BDQ51         | C            | LRC_SQ_HDINN2     | 13   |               | C            |  |
| AD15        | NC                | -    |               |              | LRC_SQ_VCCIB2     | 13   |               |              |  |
| AF15        | PB47B             | 4    | BDQ51         | C            | LRC_SQ_HDINP2     | 13   |               | T            |  |
| AD19        | VCC               | -    |               |              | LRC_SQ_VCCP       | 13   |               |              |  |
| AC19        | PB57B             | 4    | BDQ60         | C            | LRC_SQ_REFCLKP    | 13   |               | T            |  |
| AB19        | PB59A             | 4    | BDQ60         | T            | LRC_SQ_REFCLKN    | 13   |               | C            |  |
| AE19        | VCCAUX            | -    |               |              | LRC_SQ_VCCAUX33   | 13   |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                         |              | LFE2M50E/SE              |      |                 |              |  |
|-------------|-------------------|------|-------------------------|--------------|--------------------------|------|-----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential | Ball/Pad Function        | Bank | Dual Function   | Differential |  |
| AF23        | PB64A             | 4    | BDQ60                   | T            | LRC_SQ_HDINP1            | 13   |                 | T            |  |
| AD23        | NC                | -    |                         |              | LRC_SQ_VCCIB1            | 13   |                 |              |  |
| AE23        | PB66B             | 4    | BDQ69                   | C            | LRC_SQ_HDINN1            | 13   |                 | C            |  |
| AD24        | VCC               | -    |                         |              | LRC_SQ_VCCRX1            | 13   |                 |              |  |
| AF20        | PB55A             | 4    | BDQ51                   | T            | LRC_SQ_HDOUTP1           | 13   |                 | T            |  |
| AD20        | NC                | -    |                         |              | LRC_SQ_VCCOB1            | 13   |                 |              |  |
| AE20        | PB55B             | 4    | BDQ51                   | C            | LRC_SQ_HDOUTN1           | 13   |                 | C            |  |
| AD21        | VCC               | -    |                         |              | LRC_SQ_VCCTX1            | 13   |                 |              |  |
| AE21        | PB63B             | 4    | BDQ60                   | C            | LRC_SQ_HDOUTN0           | 13   |                 | C            |  |
| AF22        | NC                | -    |                         |              | LRC_SQ_VCCOB0            | 13   |                 |              |  |
| AF21        | PB62A             | 4    | BDQ60                   | T            | LRC_SQ_HDOUTP0           | 13   |                 | T            |  |
| AD22        | VCC               | -    |                         |              | LRC_SQ_VCCTX0            | 13   |                 |              |  |
| AE24        | PB67B             | 4    | BDQ69                   | C            | LRC_SQ_HDINN0            | 13   |                 | C            |  |
| AE25        | NC                | -    |                         |              | LRC_SQ_VCCIB0            | 13   |                 |              |  |
| AF24        | PB67A             | 4    | BDQ69                   | T            | LRC_SQ_HDINP0            | 13   |                 | T            |  |
| AD25        | VCC               | -    |                         |              | LRC_SQ_VCCRX0            | 13   |                 |              |  |
| AA21        | CFG2              | 8    |                         |              | CFG2                     | 8    |                 |              |  |
| AA22        | CFG1              | 8    |                         |              | CFG1                     | 8    |                 |              |  |
| AB23        | CFG0              | 8    |                         |              | CFG0                     | 8    |                 |              |  |
| AC26        | PROGRAMN          | 8    |                         |              | PROGRAMN                 | 8    |                 |              |  |
| AB24        | CCLK              | 8    |                         |              | CCLK                     | 8    |                 |              |  |
| AA23        | INITN             | 8    |                         |              | INITN                    | 8    |                 |              |  |
| AB25        | DONE              | 8    |                         |              | DONE                     | 8    |                 |              |  |
| GNDIO       | GNDIO8            | -    |                         |              | GNDIO8                   | -    |                 |              |  |
| Y19         | PR68B             | 8    | WRITEN***               | C            | WRITEN***                | 8    |                 |              |  |
| Y21         | PR68A             | 8    | CS1N***                 | T            | CS1N***                  | 8    |                 |              |  |
| AB26        | PR67B             | 8    | CSN***                  | C            | CSN***                   | 8    |                 |              |  |
| Y22         | PR67A             | 8    | D0/SPIFASTN***          | T            | D0/SPIFASTN***           | 8    |                 |              |  |
| VCCIO       | VCCIO8            | 8    |                         |              |                          | 8    |                 |              |  |
| W19         | PR66B             | 8    | D1***                   | C            | D1***                    | 8    |                 |              |  |
| Y20         | PR66A             | 8    | D2***                   | T            | D2***                    | 8    |                 |              |  |
| W22         | PR65B             | 8    | D3***                   | C            | D3***                    | 8    |                 |              |  |
| GNDIO       | GNDIO8            | -    |                         |              |                          | -    |                 |              |  |
| W18         | PR65A             | 8    | D4***                   | T            | D4***                    | 8    |                 |              |  |
| Y23         | PR64B             | 8    | D5***                   | C            | D5***                    | 8    |                 |              |  |
| AA24        | PR64A             | 8    | D6***                   | T            | D6***                    | 8    |                 |              |  |
| W21         | PR63B             | 8    | D7/SPID0***             | C            | D7/SPID0***              | 8    |                 |              |  |
| VCCIO       | VCCIO8            | 8    |                         |              | VCCIO8                   | 8    |                 |              |  |
| V20         | PR63A             | 8    | DI/CSSPI0N***           | T            | DI/CSSPI0N***            | 8    |                 |              |  |
| W23         | PR62B             | 8    | DOUT/CSON/CSSPI1N***    | C            | DOUT/CSON/<br>CSSPI1N*** | 8    |                 |              |  |
| Y24         | PR62A             | 8    | BUSY/SISPI***           | T            | BUSY/SISPI***            | 8    |                 |              |  |
| V19         | RLM0_PLLCAP       | 3    |                         |              | RLM0_PLLCAP              | 3    |                 |              |  |
| V21         | PR60B             | 3    | RLM0_GDLLC_FB_A         | C            | PR65B                    | 3    | RLM0_GDLLC_FB_A | C            |  |
| GNDIO       | GNDIO3            | -    |                         |              | GNDIO3                   | -    |                 |              |  |
| U19         | PR60A             | 3    | RLM0_GDLLT_FB_A/RDQ57   | T            | PR65A                    | 3    | RLM0_GDLLT_FB_A | T            |  |
| AA26        | PR59B             | 3    | RLM0_GDLLC_IN_A**/RDQ57 | C (LVDS)*    | PR64B                    | 3    | RLM0_GDLLC_IN_A | C*           |  |
| Y26         | PR59A             | 3    | RLM0_GDLLT_IN_A**/RDQ57 | T (LVDS)*    | PR64A                    | 3    | RLM0_GDLLT_IN_A | T*           |  |
| V23         | PR58B             | 3    | RLM0_GPLLC_IN_A**/RDQ57 | C            | PR63B                    | 3    | RLM0_GPLLC_IN_A | C            |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                         |              | LFE2M50E/SE       |      |                 |              |  |
|-------------|-------------------|------|-------------------------|--------------|-------------------|------|-----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function           | Differential | Ball/Pad Function | Bank | Dual Function   | Differential |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| U20         | PR58A             | 3    | RLM0_GPLLT_IN_A**/RDQ57 | T            | PR63A             | 3    | RLM0_GPLLT_IN_A | T            |  |
| W24         | PR57B             | 3    | RLM0_GPLLC_FB_A/RDQ57   | C (LVDS)*    | PR62B             | 3    | RLM0_GPLLC_FB_A | C*           |  |
| V24         | PR57A             | 3    | RLM0_GPLLT_FB_A/RDQS57  | T (LVDS)*    | PR62A             | 3    | RLM0_GPLLT_FB_A | T*           |  |
| GNDIO       | GNDIO3            | -    |                         |              | GNDIO3            | -    |                 |              |  |
| U21         | PR56A             | 3    | RDQ57                   | T            | PR60A             | 3    |                 | T            |  |
| W25         | PR55B             | 3    | RDQ57                   | C (LVDS)*    | PR59B             | 3    |                 | C*           |  |
| W26         | PR55A             | 3    | RDQ57                   | T (LVDS)*    | PR59A             | 3    |                 | T*           |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| U18         | PR54B             | 3    | RDQ57                   | C            | PR58B             | 3    |                 | C            |  |
| U22         | PR54A             | 3    | RDQ57                   | T            | PR58A             | 3    |                 | T            |  |
| V25         | PR53B             | 3    | RDQ57                   | C (LVDS)*    | PR57B             | 3    |                 | C*           |  |
| V26         | PR53A             | 3    | RDQ57                   | T (LVDS)*    | PR57A             | 3    |                 | T*           |  |
| U24         | PR51B             | 3    | RDQ48                   | C            | PR55B             | 3    | RDQ52           | C            |  |
| T24         | PR51A             | 3    | RDQ48                   | T            | PR55A             | 3    | RDQ52           | T            |  |
| GNDIO       | GNDIO3            | -    |                         |              | GNDIO3            | -    |                 |              |  |
| T22         | PR50B             | 3    | RDQ48                   | C (LVDS)*    | PR54B             | 3    | RDQ52           | C*           |  |
| T23         | PR50A             | 3    | RDQ48                   | T (LVDS)*    | PR54A             | 3    | RDQ52           | T*           |  |
| U25         | PR49B             | 3    | RDQ48                   | C            | PR53B             | 3    | RDQ52           | C            |  |
| U26         | PR49A             | 3    | RDQ48                   | T            | PR53A             | 3    | RDQ52           | T            |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| T19         | PR48B             | 3    | RDQ48                   | C (LVDS)*    | PR52B             | 3    | RDQ52           | C*           |  |
| R19         | PR48A             | 3    | RDQS48                  | T (LVDS)*    | PR52A             | 3    | RDQS52          | T*           |  |
| R21         | PR47B             | 3    | RDQ48                   | C            | PR51B             | 3    | RDQ52           | C            |  |
| GNDIO       | GNDIO3            | -    |                         |              | GNDIO3            | -    |                 |              |  |
| R20         | PR47A             | 3    | RDQ48                   | T            | PR51A             | 3    | RDQ52           | T            |  |
| T26         | PR46B             | 3    | RDQ48                   | C (LVDS)*    | PR50B             | 3    | RDQ52           | C*           |  |
| R26         | PR46A             | 3    | RDQ48                   | T (LVDS)*    | PR50A             | 3    | RDQ52           | T*           |  |
| P21         | PR45B             | 3    | RDQ48                   | C            | PR49B             | 3    | RDQ52           | C            |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| P19         | PR45A             | 3    | RDQ48                   | T            | PR49A             | 3    | RDQ52           | T            |  |
| R23         | PR44B             | 3    | RDQ48                   | C (LVDS)*    | PR48B             | 3    | RDQ52           | C*           |  |
| R24         | PR44A             | 3    | RDQ48                   | T (LVDS)*    | PR48A             | 3    | RDQ52           | T*           |  |
| -           | -                 | -    |                         |              | GNDIO3            | -    |                 |              |  |
| R22         | PR42B             | 3    | RLM2_SPLLC_FB_A         | C            | PR46B             | 3    | RLM3_SPLLC_FB_A | C            |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| N19         | PR42A             | 3    | RLM2_SPLLT_FB_A         | T            | PR46A             | 3    | RLM3_SPLLT_FB_A | T            |  |
| P23         | PR41B             | 3    | RLM2_SPLLC_IN_A         | C (LVDS)*    | PR45B             | 3    | RLM3_SPLLC_IN_A | C*           |  |
| P24         | PR41A             | 3    | RLM2_SPLLT_IN_A         | T (LVDS)*    | PR45A             | 3    | RLM3_SPLLT_IN_A | T*           |  |
| GNDIO       | GNDIO3            | -    |                         |              | GNDIO3            | -    |                 |              |  |
| N21         | PR40B             | 3    |                         | C            | PR44B             | 3    |                 | C            |  |
| P22         | PR40A             | 3    |                         | T            | PR44A             | 3    |                 | T            |  |
| N20         | PR39B             | 3    |                         | C (LVDS)*    | PR43B             | 3    |                 | C*           |  |
| N22         | PR39A             | 3    |                         | T (LVDS)*    | PR43A             | 3    |                 | T*           |  |
| VCCIO       | VCCIO3            | 3    |                         |              | VCCIO3            | 3    |                 |              |  |
| P25         | PR38B             | 3    | VREF2_3                 | C            | PR42B             | 3    | VREF2_3         | C            |  |
| P26         | PR38A             | 3    | VREF1_3                 | T            | PR42A             | 3    | VREF1_3         | T            |  |
| M21         | PR37B             | 3    | PCLKC3_0                | C (LVDS)*    | PR41B             | 3    | PCLKC3_0        | C*           |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                       |              | LFE2M50E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| N23         | PR37A             | 3    | PCLKT3_0              | T (LVDS)*    | PR41A             | 3    | PCLKT3_0              | T*           |  |
| N24         | PR35B             | 2    | PCLKC2_0/RDQ32        | C            | PR39B             | 2    | PCLKC2_0/RDQ36        | C            |  |
| N25         | PR35A             | 2    | PCLKT2_0/RDQ32        | T            | PR39A             | 2    | PCLKT2_0/RDQ36        | T            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| M22         | PR34B             | 2    | RDQ32                 | C (LVDS)*    | PR38B             | 2    | RDQ36                 | C*           |  |
| M24         | PR34A             | 2    | RDQ32                 | T (LVDS)*    | PR38A             | 2    | RDQ36                 | T*           |  |
| M23         | PR33B             | 2    | RDQ32                 | C            | PR37B             | 2    | RDQ36                 | C            |  |
| N26         | PR33A             | 2    | RDQ32                 | T            | PR37A             | 2    | RDQ36                 | T            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| L22         | PR32B             | 2    | RDQ32                 | C (LVDS)*    | PR36B             | 2    | RDQ36                 | C*           |  |
| L24         | PR32A             | 2    | RDQS32                | T (LVDS)*    | PR36A             | 2    | RDQS36                | T*           |  |
| L23         | PR31B             | 2    | RDQ32                 | C            | PR35B             | 2    | RDQ36                 | C            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| M20         | PR31A             | 2    | RDQ32                 | T            | PR35A             | 2    | RDQ36                 | T            |  |
| M26         | PR30B             | 2    | RDQ32                 | C (LVDS)*    | PR34B             | 2    | RDQ36                 | C*           |  |
| L26         | PR30A             | 2    | RDQ32                 | T (LVDS)*    | PR34A             | 2    | RDQ36                 | T*           |  |
| K22         | PR29B             | 2    | RUM1_SPLLC_FB_A/RDQ32 | C            | PR33B             | 2    | RUM3_SPLLC_FB_A/RDQ36 | C            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| M19         | PR29A             | 2    | RUM1_SPLLT_FB_A/RDQ32 | T            | PR33A             | 2    | RUM3_SPLLT_FB_A/RDQ36 | T            |  |
| K25         | PR28B             | 2    | RUM1_SPLLC_IN_A/RDQ32 | C (LVDS)*    | PR32B             | 2    | RUM3_SPLLC_IN_A/RDQ36 | C*           |  |
| K26         | PR28A             | 2    | RUM1_SPLLT_IN_A/RDQ32 | T (LVDS)*    | PR32A             | 2    | RUM3_SPLLT_IN_A/RDQ36 | T*           |  |
| K24         | PR26B             | 2    | RDQ23                 | C            | PR30B             | 2    | RDQ27                 | C            |  |
| K23         | PR26A             | 2    | RDQ23                 | T            | PR30A             | 2    | RDQ27                 | T            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| L19         | PR25B             | 2    | RDQ23                 | C (LVDS)*    | PR29B             | 2    | RDQ27                 | C*           |  |
| K21         | PR25A             | 2    | RDQ23                 | T (LVDS)*    | PR29A             | 2    | RDQ27                 | T*           |  |
| J23         | PR24B             | 2    | RDQ23                 | C            | PR28B             | 2    | RDQ27                 | C            |  |
| J24         | PR24A             | 2    | RDQ23                 | T            | PR28A             | 2    | RDQ27                 | T            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| K20         | PR23B             | 2    | RDQ23                 | C (LVDS)*    | PR27B             | 2    | RDQ27                 | C*           |  |
| J21         | PR23A             | 2    | RDQS23                | T (LVDS)*    | PR27A             | 2    | RDQS27                | T*           |  |
| H21         | PR22B             | 2    | RDQ23                 | C            | PR26B             | 2    | RDQ27                 | C            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| K18         | PR22A             | 2    | RDQ23                 | T            | PR26A             | 2    | RDQ27                 | T            |  |
| H22         | PR21B             | 2    | RDQ23                 | C (LVDS)*    | PR25B             | 2    | RDQ27                 | C*           |  |
| J20         | PR21A             | 2    | RDQ23                 | T (LVDS)*    | PR25A             | 2    | RDQ27                 | T*           |  |
| J25         | PR20B             | 2    | RDQ23                 | C            | PR24B             | 2    | RDQ27                 | C            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| J26         | PR20A             | 2    | RDQ23                 | T            | PR24A             | 2    | RDQ27                 | T            |  |
| G21         | PR19B             | 2    | RDQ23                 | C (LVDS)*    | PR23B             | 2    | RDQ27                 | C*           |  |
| J19         | PR19A             | 2    | RDQ23                 | T (LVDS)*    | PR23A             | 2    | RDQ27                 | T*           |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| H23         | PR18B             | 2    | RDQ15                 | C            | PR21B             | 2    |                       | C            |  |
| H24         | PR18A             | 2    | RDQ15                 | T            | PR21A             | 2    |                       | T            |  |
| H25         | PR17B             | 2    | RDQ15                 | C (LVDS)*    | PR20B             | 2    |                       | C*           |  |
| H26         | PR17A             | 2    | RDQ15                 | T (LVDS)*    | PR20A             | 2    |                       | T*           |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| G22         | PR16B             | 2    | RDQ15                 | C            | PR19B             | 2    |                       | C            |  |



## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |                       |              | LFE2M50E/SE       |      |                 |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function   | Differential |  |
| K19         | PR16A             | 2    | RDQ15                 | T            | PR19A             | 2    |                 | T            |  |
| G24         | PR15B             | 2    | RDQ15                 | C (LVDS)*    | PR18B             | 2    |                 | C*           |  |
| G23         | PR15A             | 2    | RDQS15                | T (LVDS)*    | PR18A             | 2    |                 | T*           |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                 |              |  |
| J18         | PR14B             | 2    | RDQ15                 | C            | PR14B             | 2    |                 | C            |  |
| F22         | PR14A             | 2    | RDQ15                 | T            | PR14A             | 2    |                 | T            |  |
| -           | -                 | -    |                       |              | VCCIO2            | 2    |                 |              |  |
| F23         | PR13B             | 2    | RDQ15                 | C (LVDS)*    | PR13B             | 2    |                 | C*           |  |
| F24         | PR13A             | 2    | RDQ15                 | T (LVDS)*    | PR13A             | 2    |                 | T*           |  |
| VCCIO       | VCCIO2            | 2    |                       |              | -                 | -    |                 |              |  |
| H20         | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            | PR12B             | 2    | RUM0_SPLLC_FB_A | C            |  |
| -           | -                 | -    |                       |              | GNDIO2            | -    |                 |              |  |
| F21         | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            | PR12A             | 2    | RUM0_SPLLT_FB_A | T            |  |
| G26         | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A | C*           |  |
| F26         | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    | PR11A             | 2    | RUM0_SPLLT_IN_A | T*           |  |
| -           | -                 | -    |                       |              | VCCIO2            | 2    |                 |              |  |
| E24         | PR9B              | 2    | VREF2_2               | C            | PR9B              | 2    | VREF2_2         | C            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                 |              |  |
| E23         | PR9A              | 2    | VREF1_2               | T            | PR9A              | 2    | VREF1_2         | T            |  |
| VCCIO       | VCCIO4            | 4    |                       |              | VCCIO2            | 2    |                 |              |  |
| H19         | XRES              | -    |                       |              | XRES              | -    |                 |              |  |
| C25         | URC_SQ_VCCRX0     | 12   |                       |              | URC_SQ_VCCRX0     | 12   |                 |              |  |
| A24         | URC_SQ_HDINP0     | 12   |                       | T            | URC_SQ_HDINP0     | 12   |                 | T            |  |
| B25         | URC_SQ_VCCIB0     | 12   |                       |              | URC_SQ_VCCIB0     | 12   |                 |              |  |
| B24         | URC_SQ_HDINN0     | 12   |                       | C            | URC_SQ_HDINN0     | 12   |                 | C            |  |
| C22         | URC_SQ_VCCTX0     | 12   |                       |              | URC_SQ_VCCTX0     | 12   |                 |              |  |
| A21         | URC_SQ_HDOUTP0    | 12   |                       | T            | URC_SQ_HDOUTP0    | 12   |                 | T            |  |
| A22         | URC_SQ_VCCOB0     | 12   |                       |              | URC_SQ_VCCOB0     | 12   |                 |              |  |
| B21         | URC_SQ_HDOUTN0    | 12   |                       | C            | URC_SQ_HDOUTN0    | 12   |                 | C            |  |
| C21         | URC_SQ_VCCTX1     | 12   |                       |              | URC_SQ_VCCTX1     | 12   |                 |              |  |
| B20         | URC_SQ_HDOUTN1    | 12   |                       | C            | URC_SQ_HDOUTN1    | 12   |                 | C            |  |
| C20         | URC_SQ_VCCOB1     | 12   |                       |              | URC_SQ_VCCOB1     | 12   |                 |              |  |
| A20         | URC_SQ_HDOUTP1    | 12   |                       | T            | URC_SQ_HDOUTP1    | 12   |                 | T            |  |
| C24         | URC_SQ_VCCRX1     | 12   |                       |              | URC_SQ_VCCRX1     | 12   |                 |              |  |
| B23         | URC_SQ_HDINN1     | 12   |                       | C            | URC_SQ_HDINN1     | 12   |                 | C            |  |
| C23         | URC_SQ_VCCIB1     | 12   |                       |              | URC_SQ_VCCIB1     | 12   |                 |              |  |
| A23         | URC_SQ_HDINP1     | 12   |                       | T            | URC_SQ_HDINP1     | 12   |                 | T            |  |
| B19         | URC_SQ_VCCAUX33   | 12   |                       |              | URC_SQ_VCCAUX33   | 12   |                 |              |  |
| E19         | URC_SQ_REFCLKN    | 12   |                       | C            | URC_SQ_REFCLKN    | 12   |                 | C            |  |
| D19         | URC_SQ_REFCLKP    | 12   |                       | T            | URC_SQ_REFCLKP    | 12   |                 | T            |  |
| C19         | URC_SQ_VCCP       | 12   |                       |              | URC_SQ_VCCP       | 12   |                 |              |  |
| A15         | URC_SQ_HDINP2     | 12   |                       | T            | URC_SQ_HDINP2     | 12   |                 | T            |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C15         | URC_SQ_VCCIB2     | 12   |               |              | URC_SQ_VCCIB2     | 12   |               |              |  |
| B15         | URC_SQ_HDINN2     | 12   |               | C            | URC_SQ_HDINN2     | 12   |               | C            |  |
| C14         | URC_SQ_VCCRX2     | 12   |               |              | URC_SQ_VCCRX2     | 12   |               |              |  |
| A18         | URC_SQ_HDOUTP2    | 12   |               | T            | URC_SQ_HDOUTP2    | 12   |               | T            |  |
| C18         | URC_SQ_VCCOB2     | 12   |               |              | URC_SQ_VCCOB2     | 12   |               |              |  |
| B18         | URC_SQ_HDOUTN2    | 12   |               | C            | URC_SQ_HDOUTN2    | 12   |               | C            |  |
| C17         | URC_SQ_VCCTX2     | 12   |               |              | URC_SQ_VCCTX2     | 12   |               |              |  |
| B17         | URC_SQ_HDOUTN3    | 12   |               | C            | URC_SQ_HDOUTN3    | 12   |               | C            |  |
| A16         | URC_SQ_VCCOB3     | 12   |               |              | URC_SQ_VCCOB3     | 12   |               |              |  |
| A17         | URC_SQ_HDOUTP3    | 12   |               | T            | URC_SQ_HDOUTP3    | 12   |               | T            |  |
| C16         | URC_SQ_VCCTX3     | 12   |               |              | URC_SQ_VCCTX3     | 12   |               |              |  |
| B14         | URC_SQ_HDINN3     | 12   |               | C            | URC_SQ_HDINN3     | 12   |               | C            |  |
| B13         | URC_SQ_VCCIB3     | 12   |               |              | URC_SQ_VCCIB3     | 12   |               |              |  |
| A14         | URC_SQ_HDINP3     | 12   |               | T            | URC_SQ_HDINP3     | 12   |               | T            |  |
| C13         | URC_SQ_VCCRX3     | 12   |               |              | URC_SQ_VCCRX3     | 12   |               |              |  |
| -           | -                 | -    |               |              | GNDIO1            | -    |               |              |  |
| -           | -                 | -    |               |              | VCCIO1            | 1    |               |              |  |
| E17         | PT46B             | 1    |               | C            | PT55B             | 1    |               | C            |  |
| D17         | PT46A             | 1    |               | T            | PT55A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| F17         | PT45B             | 1    |               | C            | PT54B             | 1    |               | C            |  |
| D16         | PT45A             | 1    |               | T            | PT54A             | 1    |               | T            |  |
| F19         | PT44B             | 1    |               | C            | PT53B             | 1    |               | C            |  |
| F18         | PT44A             | 1    |               | T            | PT53A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E16         | PT43B             | 1    |               | C            | PT52B             | 1    |               | C            |  |
| D15         | PT43A             | 1    |               | T            | PT52A             | 1    |               | T            |  |
| G18         | PT42B             | 1    |               | C            | PT51B             | 1    |               | C            |  |
| E15         | PT42A             | 1    |               | T            | PT51A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| G17         | PT41B             | 1    |               | C            | PT50B             | 1    |               | C            |  |
| E14         | PT41A             | 1    |               | T            | PT50A             | 1    |               | T            |  |
| D14         | PT40B             | 1    |               | C            | PT49B             | 1    |               | C            |  |
| D13         | PT40A             | 1    |               | T            | PT49A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F15         | PT39B             | 1    | VREF2_1       | C            | PT48B             | 1    | VREF2_1       | C            |  |
| E12         | PT39A             | 1    | VREF1_1       | T            | PT48A             | 1    | VREF1_1       | T            |  |
| H17         | PT38B             | 1    | PCLKC1_0      | C            | PT47B             | 1    | PCLKC1_0      | C            |  |
| E13         | PT38A             | 1    | PCLKT1_0      | T            | PT47A             | 1    | PCLKT1_0      | T            |  |
| C12         | PT37B             | 0    | PCLKC0_0      | C            | PT46B             | 0    | PCLKC0_0      | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| G15         | PT37A             | 0    | PCLKT0_0      | T            | PT46A             | 0    | PCLKT0_0      | T            |  |
| C11         | PT36B             | 0    | VREF2_0       | C            | PT45B             | 0    | VREF2_0       | C            |  |
| F14         | PT36A             | 0    | VREF1_0       | T            | PT45A             | 0    | VREF1_0       | T            |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| A12         | PT35B             | 0    |               | C            | PT44B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| A11         | PT35A             | 0    |               | T            | PT44A             | 0    |               | T            |  |
| D12         | PT34B             | 0    |               | C            | PT43B             | 0    |               | C            |  |
| H16         | PT34A             | 0    |               | T            | PT43A             | 0    |               | T            |  |
| H18         | PT33B             | 0    |               | C            | PT42B             | 0    |               | C            |  |
| H15         | PT33A             | 0    |               | T            | PT42A             | 0    |               | T            |  |
| A10         | PT32B             | 0    |               | C            | PT41B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| B10         | PT32A             | 0    |               | T            | PT41A             | 0    |               | T            |  |
| D11         | PT31B             | 0    |               | C            | PT40B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G14         | PT31A             | 0    |               | T            | PT40A             | 0    |               | T            |  |
| E11         | PT30B             | 0    |               | C            | PT39B             | 0    |               | C            |  |
| F13         | PT30A             | 0    |               | T            | PT39A             | 0    |               | T            |  |
| D10         | PT29B             | 0    |               | C            | PT38B             | 0    |               | C            |  |
| H14         | PT29A             | 0    |               | T            | PT38A             | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| A9          | PT24B             | 0    |               | C            | PT24B             | 0    |               | C            |  |
| C10         | PT23B             | 0    |               | C            | PT23B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| E8          | PT23A             | 0    |               | T            | PT23A             | 0    |               | T            |  |
| B9          | PT22B             | 0    |               | C            | PT22B             | 0    |               | C            |  |
| A8          | PT22A             | 0    |               | T            | PT22A             | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F12         | PT21B             | 0    |               | C            | PT21B             | 0    |               | C            |  |
| E10         | PT21A             | 0    |               | T            | PT21A             | 0    |               | T            |  |
| G13         | PT20B             | 0    |               | C            | PT20B             | 0    |               | C            |  |
| C9          | PT20A             | 0    |               | T            | PT20A             | 0    |               | T            |  |
| B8          | PT19B             | 0    |               | C            | PT19B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| A7          | PT19A             | 0    |               | T            | PT19A             | 0    |               | T            |  |
| D9          | PT18B             | 0    |               | C            | PT18B             | 0    |               | C            |  |
| H13         | PT18A             | 0    |               | T            | PT18A             | 0    |               | T            |  |
| D6          | PT17B             | 0    |               | C            | PT17B             | 0    |               | C            |  |
| C7          | PT17A             | 0    |               | T            | PT17A             | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| C8          | PT16B             | 0    |               | C            | PT16B             | 0    |               | C            |  |
| G12         | PT16A             | 0    |               | T            | PT16A             | 0    |               | T            |  |
| D8          | PT15B             | 0    |               | C            | PT15B             | 0    |               | C            |  |
| H12         | PT15A             | 0    |               | T            | PT15A             | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| A6          | PT14B             | 0    |               | C            | PT14B             | 0    |               | C            |  |
| A5          | PT14A             | 0    |               | T            | PT14A             | 0    |               | T            |  |
| A4          | PT13B             | 0    |               | C            | PT13B             | 0    |               | C            |  |
| A3          | PT13A             | 0    |               | T            | PT13A             | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C6          | PT12B             | 0    |               | C            | PT12B             | 0    |               | C            |  |
| F10         | PT12A             | 0    |               | T            | PT12A             | 0    |               | T            |  |
| D7          | PT11B             | 0    |               | C            | PT11B             | 0    |               | C            |  |
| H11         | PT11A             | 0    |               | T            | PT11A             | 0    |               | T            |  |
| D5          | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| E6          | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |  |
| G10         | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |  |
| F9          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |  |
| H10         | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E7          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |  |
| B3          | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |  |
| C5          | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |  |
| B2          | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |  |
| C4          | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |  |
| G9          | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| F7          | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |  |
| C3          | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D4          | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |  |
| J10         | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |  |
| F8          | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| G8          | PT2B              | 0    |               | C            | PT2B              | 0    |               | C            |  |
| G7          | PT2A              | 0    |               | T            | PT2A              | 0    |               | T            |  |
| L12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| B12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| B7          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| F11         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| J13         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| K12         | VCCIO0            | 0    |               |              | VCCIO0            | 1    |               |              |  |
| D18         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F16         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| J14         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| K15         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G25         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| L21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| M17         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| M25         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| N18         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| P18         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| R17         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| R25         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| T21         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| Y25         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| AA16        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AC18        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| U15         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| V14         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA11        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| V13         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE12        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE7         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| U12         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| P9          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| R10         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| R2          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| T6          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| Y2          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| G2          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| L6          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M2          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| N9          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| AC24        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| U17         | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| J11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| J12         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| J15         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| J16         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| M18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| M9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| R18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| R9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| T18         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| T9          | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V12         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V15         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| V16         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A13         | GND               | -    |               |              | GND               | -    |               |              |  |
| A19         | GND               | -    |               |              | GND               | -    |               |              |  |
| A2          | GND               | -    |               |              | GND               | -    |               |              |  |
| A25         | GND               | -    |               |              | GND               | -    |               |              |  |
| AA2         | GND               | -    |               |              | GND               | -    |               |              |  |
| AA25        | GND               | -    |               |              | GND               | -    |               |              |  |
| AB18        | GND               | -    |               |              | GND               | -    |               |              |  |
| AB22        | GND               | -    |               |              | GND               | -    |               |              |  |
| AB5         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB9         | GND               | -    |               |              | GND               | -    |               |              |  |
| AE1         | GND               | -    |               |              | GND               | -    |               |              |  |
| AE11        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE16        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE22        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE26        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE6         | GND               | -    |               |              | GND               | -    |               |              |  |
| AF13        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF19        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF2         | GND               | -    |               |              | GND               | -    |               |              |  |
| AF25        | GND               | -    |               |              | GND               | -    |               |              |  |
| B1          | GND               | -    |               |              | GND               | -    |               |              |  |
| B11         | GND               | -    |               |              | GND               | -    |               |              |  |
| B16         | GND               | -    |               |              | GND               | -    |               |              |  |
| B22         | GND               | -    |               |              | GND               | -    |               |              |  |
| B26         | GND               | -    |               |              | GND               | -    |               |              |  |
| B6          | GND               | -    |               |              | GND               | -    |               |              |  |
| E18         | GND               | -    |               |              | GND               | -    |               |              |  |
| E22         | GND               | -    |               |              | GND               | -    |               |              |  |
| E5          | GND               | -    |               |              | GND               | -    |               |              |  |
| E9          | GND               | -    |               |              | GND               | -    |               |              |  |
| F2          | GND               | -    |               |              | GND               | -    |               |              |  |
| F25         | GND               | -    |               |              | GND               | -    |               |              |  |
| G11         | GND               | -    |               |              | GND               | -    |               |              |  |
| G16         | GND               | -    |               |              | GND               | -    |               |              |  |
| J22         | GND               | -    |               |              | GND               | -    |               |              |  |
| J5          | GND               | -    |               |              | GND               | -    |               |              |  |
| K11         | GND               | -    |               |              | GND               | -    |               |              |  |
| K13         | GND               | -    |               |              | GND               | -    |               |              |  |
| K14         | GND               | -    |               |              | GND               | -    |               |              |  |
| K16         | GND               | -    |               |              | GND               | -    |               |              |  |
| L10         | GND               | -    |               |              | GND               | -    |               |              |  |
| L11         | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| L16         | GND               | -    |               |              | GND               | -    |               |              |  |
| L17         | GND               | -    |               |              | GND               | -    |               |              |  |
| L2          | GND               | -    |               |              | GND               | -    |               |              |  |
| L20         | GND               | -    |               |              | GND               | -    |               |              |  |
| L25         | GND               | -    |               |              | GND               | -    |               |              |  |
| L7          | GND               | -    |               |              | GND               | -    |               |              |  |
| M13         | GND               | -    |               |              | GND               | -    |               |              |  |
| M14         | GND               | -    |               |              | GND               | -    |               |              |  |
| N10         | GND               | -    |               |              | GND               | -    |               |              |  |
| N12         | GND               | -    |               |              | GND               | -    |               |              |  |
| N13         | GND               | -    |               |              | GND               | -    |               |              |  |
| N14         | GND               | -    |               |              | GND               | -    |               |              |  |
| N15         | GND               | -    |               |              | GND               | -    |               |              |  |
| N17         | GND               | -    |               |              | GND               | -    |               |              |  |
| P10         | GND               | -    |               |              | GND               | -    |               |              |  |
| P12         | GND               | -    |               |              | GND               | -    |               |              |  |
| P13         | GND               | -    |               |              | GND               | -    |               |              |  |
| P14         | GND               | -    |               |              | GND               | -    |               |              |  |
| P15         | GND               | -    |               |              | GND               | -    |               |              |  |
| P17         | GND               | -    |               |              | GND               | -    |               |              |  |
| R13         | GND               | -    |               |              | GND               | -    |               |              |  |
| R14         | GND               | -    |               |              | GND               | -    |               |              |  |
| T10         | GND               | -    |               |              | GND               | -    |               |              |  |
| T11         | GND               | -    |               |              | GND               | -    |               |              |  |
| T16         | GND               | -    |               |              | GND               | -    |               |              |  |
| T17         | GND               | -    |               |              | GND               | -    |               |              |  |
| T2          | GND               | -    |               |              | GND               | -    |               |              |  |
| T20         | GND               | -    |               |              | GND               | -    |               |              |  |
| T25         | GND               | -    |               |              | GND               | -    |               |              |  |
| T7          | GND               | -    |               |              | GND               | -    |               |              |  |
| U11         | GND               | -    |               |              | GND               | -    |               |              |  |
| U13         | GND               | -    |               |              | GND               | -    |               |              |  |
| U14         | GND               | -    |               |              | GND               | -    |               |              |  |
| U16         | GND               | -    |               |              | GND               | -    |               |              |  |
| V22         | GND               | -    |               |              | GND               | -    |               |              |  |
| V5          | GND               | -    |               |              | GND               | -    |               |              |  |
| Y11         | GND               | -    |               |              | GND               | -    |               |              |  |
| Y16         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB3         | NC                | -    |               |              | NC                | -    |               |              |  |
| AB4         | NC                | -    |               |              | NC                | -    |               |              |  |
| AC1         | NC                | -    |               |              | NC                | -    |               |              |  |
| AC2         | NC                | -    |               |              | NC                | -    |               |              |  |
| B4          | NC                | -    |               |              | NC                | -    |               |              |  |
| B5          | NC                | -    |               |              | NC                | -    |               |              |  |
| C26         | NC                | -    |               |              | NC                | -    |               |              |  |
| D20         | NC                | -    |               |              | NC                | -    |               |              |  |
| D21         | NC                | -    |               |              | NC                | -    |               |              |  |
| D22         | NC                | -    |               |              | NC                | -    |               |              |  |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| D23         | NC                | -    |               |              | NC                | -    |               |              |  |
| D24         | NC                | -    |               |              | NC                | -    |               |              |  |
| D25         | NC                | -    |               |              | NC                | -    |               |              |  |
| D26         | NC                | -    |               |              | NC                | -    |               |              |  |
| E20         | NC                | -    |               |              | NC                | -    |               |              |  |
| E21         | NC                | -    |               |              | NC                | -    |               |              |  |
| E25         | NC                | -    |               |              | NC                | -    |               |              |  |
| E26         | NC                | -    |               |              | NC                | -    |               |              |  |
| F20         | NC                | -    |               |              | NC                | -    |               |              |  |
| G20         | NC                | -    |               |              | NC                | -    |               |              |  |
| K10         | NC                | -    |               |              | NC                | -    |               |              |  |
| K17         | NC                | -    |               |              | NC                | -    |               |              |  |
| R4          | NC                | -    |               |              | NC                | -    |               |              |  |
| U10         | NC                | -    |               |              | NC                | -    |               |              |  |
| U23         | NC                | -    |               |              | NC                | -    |               |              |  |
| V10         | NC                | -    |               |              | NC                | -    |               |              |  |
| W7          | NC                | -    |               |              | NC                | -    |               |              |  |
| AB21        | PB69B             | 4    | BDQ69         | C            | NC                | -    |               |              |  |
| AC20        | PB58A             | 4    | BDQ60         | T            | NC                | -    |               |              |  |
| AC21        | PB63A             | 4    | BDQ60         | T            | NC                | -    |               |              |  |
| AC22        | PB69A             | 4    | BDQS69****    | T            | NC                | -    |               |              |  |
| AC23        | PB71A             | 4    | BDQ69         | T            | NC                | -    |               |              |  |
| AC25        | PB71B             | 4    | BDQ69         | C            | NC                | -    |               |              |  |
| AD26        | PB70B             | 4    | BDQ69         | C            | NC                | -    |               |              |  |
| W20         | PB72B             | 4    | BDQ69         | C            | NC                | -    |               |              |  |
| H7          | L_VCCPLL          | -    |               |              | L_VCCPLL          | -    |               |              |  |
| K6          | L_VCCPLL          | -    |               |              | L_VCCPLL          | -    |               |              |  |
| P7          | L_VCCPLL          | -    |               |              | L_VCCPLL          | -    |               |              |  |
| R8          | L_VCCPLL          | -    |               |              | L_VCCPLL          | -    |               |              |  |
| V18         | R_VCCPLL          | -    |               |              | R_VCCPLL          | -    |               |              |  |
| P20         | R_VCCPLL          | -    |               |              | R_VCCPLL          | -    |               |              |  |
| J17         | R_VCCPLL          | -    |               |              | R_VCCPLL          | -    |               |              |  |
| G19         | R_VCCPLL          | -    |               |              | R_VCCPLL          | -    |               |              |  |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\* For density migration, board design must take into account that these sysCONFIG pins are dual function for the lower density devices (ECP2M20 and ECP2M35). They can be either sysCONFIG pins or general purpose I/Os. These pins are dedicated pins for the higher density devices (ECP2M50, ECP2M70 and ECP2M100).

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.



**LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA**

| LFE2M50E/SE |                   |      |                 |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| D2          | PL9A              | 7    | VREF2_7/LDQ6    | T            | PL9A              | 7    | VREF2_7               | T            |  |
| D3          | PL9B              | 7    | VREF1_7/LDQ6    | C            | PL9B              | 7    | VREF1_7               | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| J8          | PL11A             | 7    | LUM0_SPLLT_IN_A | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |  |
| H7          | PL11B             | 7    | LUM0_SPLLC_IN_A | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |  |
| E3          | PL12A             | 7    | LUM0_SPLLT_FB_A | T            | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |  |
| E4          | PL12B             | 7    | LUM0_SPLLC_FB_A | C            | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | -                 | -    |                       |              |  |
| G6          | PL13A             | 7    |                 | T (LVDS)*    | PL13A             | 7    | LDQ15                 | T (LVDS)*    |  |
| F5          | PL13B             | 7    |                 | C (LVDS)*    | PL13B             | 7    | LDQ15                 | C (LVDS)*    |  |
| E2          | PL14A             | 7    |                 | T            | PL14A             | 7    | LDQ15                 | T            |  |
| D1          | PL14B             | 7    |                 | C            | PL14B             | 7    | LDQ15                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G5          | NC                | -    |                 |              | PL15A             | 7    | LDQS15                | T (LVDS)*    |  |
| G4          | NC                | -    |                 |              | PL15B             | 7    | LDQ15                 | C (LVDS)*    |  |
| K7          | NC                | -    |                 |              | PL16A             | 7    | LDQ15                 | T            |  |
| K8          | NC                | -    |                 |              | PL16B             | 7    | LDQ15                 | C            |  |
| E1          | NC                | -    |                 |              | PL17A             | 7    | LDQ15                 | T (LVDS)*    |  |
| F2          | NC                | -    |                 |              | PL17B             | 7    | LDQ15                 | C (LVDS)*    |  |
| F1          | NC                | -    |                 |              | PL18A             | 7    | LDQ15                 | T            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G3          | NC                | -    |                 |              | PL18B             | 7    | LDQ15                 | C            |  |
| H5          | PL15A             | 7    |                 | T (LVDS)*    | PL21A             | 7    |                       | T (LVDS)*    |  |
| H4          | PL15B             | 7    |                 | C (LVDS)*    | PL21B             | 7    |                       | C (LVDS)*    |  |
| J5          | PL16A             | 7    |                 | T            | PL22A             | 7    |                       | T            |  |
| J4          | PL16B             | 7    |                 | C            | PL22B             | 7    |                       | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G2          | NC                | -    |                 |              | PL24A             | 7    | LDQ28                 | T (LVDS)*    |  |
| G1          | NC                | -    |                 |              | PL24B             | 7    | LDQ28                 | C (LVDS)*    |  |
| L9          | NC                | -    |                 |              | PL25A             | 7    | LDQ28                 | T            |  |
| L7          | NC                | -    |                 |              | PL25B             | 7    | LDQ28                 | C            |  |
| K6          | NC                | -    |                 |              | PL26A             | 7    | LDQ28                 | T (LVDS)*    |  |
| K5          | NC                | -    |                 |              | PL26B             | 7    | LDQ28                 | C (LVDS)*    |  |
| L8          | NC                | -    |                 |              | PL27A             | 7    | LDQ28                 | T            |  |
| L6          | NC                | -    |                 |              | PL27B             | 7    | LDQ28                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| H3          | PL18A             | 7    |                 | T (LVDS)*    | PL28A             | 7    | LDQS28                | T (LVDS)*    |  |
| H2          | PL18B             | 7    |                 | C (LVDS)*    | PL28B             | 7    | LDQ28                 | C (LVDS)*    |  |
| N8          | PL19A             | 7    |                 | T            | PL29A             | 7    | LDQ28                 | T            |  |
| M9          | PL19B             | 7    |                 | C            | PL29B             | 7    | LDQ28                 | C            |  |
| J3          | PL20A             | 7    |                 | T (LVDS)*    | PL30A             | 7    | LDQ28                 | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                 |              | -                 | -    |                       |              |  |
| J2          | PL20B             | 7    |                 | C (LVDS)*    | PL30B             | 7    | LDQ28                 | C (LVDS)*    |  |
| H1          | PL21A             | 7    |                 | T            | PL31A             | 7    | LDQ28                 | T            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| J1          | PL21B             | 7    |                 | C            | PL31B             | 7    | LDQ28                 | C            |  |
| -           | -                 | -    |                 |              | -                 | -    |                       |              |  |
| -           | -                 | -    |                 |              | -                 | -    |                       |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                       |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| L5          | PL23A             | 7    | LDQ27                 | T (LVDS)*    | PL33A             | 7    | LDQ37                 | T (LVDS)*    |  |
| L4          | PL23B             | 7    | LDQ27                 | C (LVDS)*    | PL33B             | 7    | LDQ37                 | C (LVDS)*    |  |
| N9          | PL24A             | 7    | LDQ27                 | T            | PL34A             | 7    | LDQ37                 | T            |  |
| N7          | PL24B             | 7    | LDQ27                 | C            | PL34B             | 7    | LDQ37                 | C            |  |
| K2          | PL25A             | 7    | LDQ27                 | T (LVDS)*    | PL35A             | 7    | LDQ37                 | T (LVDS)*    |  |
| K1          | PL25B             | 7    | LDQ27                 | C (LVDS)*    | PL35B             | 7    | LDQ37                 | C (LVDS)*    |  |
| P9          | PL26A             | 7    | LDQ27                 | T            | PL36A             | 7    | LDQ37                 | T            |  |
| P7          | PL26B             | 7    | LDQ27                 | C            | PL36B             | 7    | LDQ37                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M6          | PL27A             | 7    | LDQS27                | T (LVDS)*    | PL37A             | 7    | LDQS37                | T (LVDS)*    |  |
| M5          | PL27B             | 7    | LDQ27                 | C (LVDS)*    | PL37B             | 7    | LDQ37                 | C (LVDS)*    |  |
| N5          | PL28A             | 7    | LDQ27                 | T            | PL38A             | 7    | LDQ37                 | T            |  |
| N6          | PL28B             | 7    | LDQ27                 | C            | PL38B             | 7    | LDQ37                 | C            |  |
| M4          | PL29A             | 7    | LDQ27                 | T (LVDS)*    | PL39A             | 7    | LDQ37                 | T (LVDS)*    |  |
| M3          | PL29B             | 7    | LDQ27                 | C (LVDS)*    | PL39B             | 7    | LDQ37                 | C (LVDS)*    |  |
| P6          | PL30A             | 7    | LDQ27                 | T            | PL40A             | 7    | LDQ37                 | T            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| P8          | PL30B             | 7    | LDQ27                 | C            | PL40B             | 7    | LDQ37                 | C            |  |
| L3          | PL32A             | 7    | LUM3_SPLLT_IN_A/LDQ36 | T (LVDS)*    | PL42A             | 7    | LUM3_SPLLT_IN_A/LDQ46 | T (LVDS)*    |  |
| L2          | PL32B             | 7    | LUM3_SPLLC_IN_A/LDQ36 | C (LVDS)*    | PL42B             | 7    | LUM3_SPLLC_IN_A/LDQ46 | C (LVDS)*    |  |
| P5          | PL33A             | 7    | LUM3_SPLLT_FB_A/LDQ36 | T            | PL43A             | 7    | LUM3_SPLLT_FB_A/LDQ46 | T            |  |
| P4          | PL33B             | 7    | LUM3_SPLLC_FB_A/LDQ36 | C            | PL43B             | 7    | LUM3_SPLLC_FB_A/LDQ46 | C            |  |
| L1          | PL34A             | 7    | LDQ36                 | T (LVDS)*    | PL44A             | 7    | LDQ46                 | T (LVDS)*    |  |
| M2          | PL34B             | 7    | LDQ36                 | C (LVDS)*    | PL44B             | 7    | LDQ46                 | C (LVDS)*    |  |
| R5          | PL35A             | 7    | LDQ36                 | T            | PL45A             | 7    | LDQ46                 | T            |  |
| R4          | PL35B             | 7    | LDQ36                 | C            | PL45B             | 7    | LDQ46                 | C            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M1          | PL36A             | 7    | LDQS36                | T (LVDS)*    | PL46A             | 7    | LDQS46                | T (LVDS)*    |  |
| N2          | PL36B             | 7    | LDQ36                 | C (LVDS)*    | PL46B             | 7    | LDQ46                 | C (LVDS)*    |  |
| R8          | PL37A             | 7    | LDQ36                 | T            | PL47A             | 7    | LDQ46                 | T            |  |
| T9          | PL37B             | 7    | LDQ36                 | C            | PL47B             | 7    | LDQ46                 | C            |  |
| P3          | PL38A             | 7    | LDQ36                 | T (LVDS)*    | PL48A             | 7    | LDQ46                 | T (LVDS)*    |  |
| P2          | PL38B             | 7    | LDQ36                 | C (LVDS)*    | PL48B             | 7    | LDQ46                 | C (LVDS)*    |  |
| N1          | PL39A             | 7    | PCLKT7_0/LDQ36        | T            | PL49A             | 7    | PCLKT7_0/LDQ46        | T            |  |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| P1          | PL39B             | 7    | PCLKC7_0/LDQ36        | C            | PL49B             | 7    | PCLKC7_0/LDQ46        | C            |  |
| T5          | PL41A             | 6    | PCLKT6_0              | T (LVDS)*    | PL51A             | 6    | PCLKT6_0/LDQ55        | T (LVDS)*    |  |
| T4          | PL41B             | 6    | PCLKC6_0              | C (LVDS)*    | PL51B             | 6    | PCLKC6_0/LDQ55        | C (LVDS)*    |  |
| U7          | PL42A             | 6    | VREF2_6               | T            | PL52A             | 6    | VREF2_6/LDQ55         | T            |  |
| T8          | PL42B             | 6    | VREF1_6               | C            | PL52B             | 6    | VREF1_6/LDQ55         | C            |  |
| R3          | PL43A             | 6    |                       | T (LVDS)*    | PL53A             | 6    | LDQ55                 | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| R2          | PL43B             | 6    |                       | C (LVDS)*    | PL53B             | 6    | LDQ55                 | C (LVDS)*    |  |
| R1          | PL44A             | 6    |                       | T            | PL54A             | 6    | LDQ55                 | T            |  |
| T1          | PL44B             | 6    |                       | C            | PL54B             | 6    | LDQ55                 | C            |  |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |  |
| -           | -                 | -    |                       |              | VCCIO6            | 6    |                       |              |  |
| T3          | PL45A             | 6    | LLM3_SPLLT_IN_A       | T (LVDS)*    | PL57A             | 6    | LLM3_SPLLT_IN_A/LDQ55 | T (LVDS)*    |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                 |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| T2          | PL45B             | 6    | LLM3_SPLLC_IN_A | C (LVDS)*    | PL57B             | 6    | LLM3_SPLLC_IN_A/LDQ55 | C (LVDS)*    |  |
| U9          | PL46A             | 6    | LLM3_SPLLT_FB_A | T            | PL58A             | 6    | LLM3_SPLLT_FB_A/LDQ55 | T            |  |
| U8          | PL46B             | 6    | LLM3_SPLLC_FB_A | C            | PL58B             | 6    | LLM3_SPLLC_FB_A/LDQ55 | C            |  |
| VCCIO       | VCCIO6            | 6    |                 |              | GNDIO6            | -    |                       |              |  |
| U5          | PL48A             | 6    | LDQ52           | T (LVDS)*    | PL60A             | 6    | LDQ64                 | T (LVDS)*    |  |
| U4          | PL48B             | 6    | LDQ52           | C (LVDS)*    | PL60B             | 6    | LDQ64                 | C (LVDS)*    |  |
| V9          | PL49A             | 6    | LDQ52           | T            | PL61A             | 6    | LDQ64                 | T            |  |
| V7          | PL49B             | 6    | LDQ52           | C            | PL61B             | 6    | LDQ64                 | C            |  |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                       |              |  |
| U3          | PL50A             | 6    | LDQ52           | T (LVDS)*    | PL62A             | 6    | LDQ64                 | T (LVDS)*    |  |
| U2          | PL50B             | 6    | LDQ52           | C (LVDS)*    | PL62B             | 6    | LDQ64                 | C (LVDS)*    |  |
| V8          | PL51A             | 6    | LDQ52           | T            | PL63A             | 6    | LDQ64                 | T            |  |
| U6          | PL51B             | 6    | LDQ52           | C            | PL63B             | 6    | LDQ64                 | C            |  |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                       |              |  |
| U1          | PL52A             | 6    | LDQS52          | T (LVDS)*    | PL64A             | 6    | LDQS64                | T (LVDS)*    |  |
| V2          | PL52B             | 6    | LDQ52           | C (LVDS)*    | PL64B             | 6    | LDQ64                 | C (LVDS)*    |  |
| V5          | PL53A             | 6    | LDQ52           | T            | PL65A             | 6    | LDQ64                 | T            |  |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                       |              |  |
| V6          | PL53B             | 6    | LDQ52           | C            | PL65B             | 6    | LDQ64                 | C            |  |
| V1          | PL54A             | 6    | LDQ52           | T (LVDS)*    | PL66A             | 6    | LDQ64                 | T (LVDS)*    |  |
| W1          | PL54B             | 6    | LDQ52           | C (LVDS)*    | PL66B             | 6    | LDQ64                 | C (LVDS)*    |  |
| W5          | PL55A             | 6    | LDQ52           | T            | PL67A             | 6    | LDQ64                 | T            |  |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                       |              |  |
| W6          | PL55B             | 6    | LDQ52           | C            | PL67B             | 6    | LDQ64                 | C            |  |
| W3          | PL57A             | 6    |                 | T (LVDS)*    | PL69A             | 6    | LDQ73                 | T (LVDS)*    |  |
| W4          | PL57B             | 6    |                 | C (LVDS)*    | PL69B             | 6    | LDQ73                 | C (LVDS)*    |  |
| W2          | PL58A             | 6    |                 | T            | PL70A             | 6    | LDQ73                 | T            |  |
| Y4          | PL58B             | 6    |                 | C            | PL70B             | 6    | LDQ73                 | C            |  |
| Y1          | PL59A             | 6    |                 | T (LVDS)*    | PL71A             | 6    | LDQ73                 | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                 |              | VCCIO6            | 6    |                       |              |  |
| Y2          | PL59B             | 6    |                 | C (LVDS)*    | PL71B             | 6    | LDQ73                 | C (LVDS)*    |  |
| Y5          | PL60A             | 6    |                 | T            | PL72A             | 6    | LDQ73                 | T            |  |
| Y6          | PL60B             | 6    |                 | C            | PL72B             | 6    | LDQ73                 | C            |  |
| AA1         | NC                | -    |                 |              | PL73A             | 6    | LDQS73                | T (LVDS)*    |  |
| GNDIO       | GNDIO6            | -    |                 |              | GNDIO6            | -    |                       |              |  |
| AA2         | NC                | -    |                 |              | PL73B             | 6    | LDQ73                 | C (LVDS)*    |  |
| Y3          | NC                | -    |                 |              | PL74A             | 6    | LDQ73                 | T            |  |
| AB1         | NC                | -    |                 |              | PL74B             | 6    | LDQ73                 | C            |  |
| -           | -                 | -    |                 |              | VCCIO6            | 6    |                       |              |  |
| Y9          | NC                | -    |                 |              | PL75A             | 6    | LDQ73                 | T (LVDS)*    |  |
| Y8          | NC                | -    |                 |              | PL75B             | 6    | LDQ73                 | C (LVDS)*    |  |
| Y7          | NC                | -    |                 |              | PL76A             | 6    | LDQ73                 | T            |  |
| AA7         | NC                | -    |                 |              | PL76B             | 6    | LDQ73                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO6            | -    |                       |              |  |
| -           | -                 | -    |                 |              | -                 | -    |                       |              |  |
| AB2         | NC                | -    |                 |              | PL78A             | 6    | LDQ82                 | T (LVDS)*    |  |
| AB3         | NC                | -    |                 |              | PL78B             | 6    | LDQ82                 | C (LVDS)*    |  |
| AA5         | NC                | -    |                 |              | PL79A             | 6    | LDQ82                 | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                   |              | LFE2M70E/SE       |      |                          |              |  |
|-------------|-------------------|------|-------------------|--------------|-------------------|------|--------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |  |
| AA6         | NC                | -    |                   |              | PL79B             | 6    | LDQ82                    | C            |  |
| AB4         | NC                | -    |                   |              | PL80A             | 6    | LDQ82                    | T (LVDS)*    |  |
| -           | -                 | -    |                   |              | VCCIO6            | 6    |                          |              |  |
| AB5         | NC                | -    |                   |              | PL80B             | 6    | LDQ82                    | C (LVDS)*    |  |
| AA8         | NC                | -    |                   |              | PL81A             | 6    | LDQ82                    | T            |  |
| AA9         | NC                | -    |                   |              | PL81B             | 6    | LDQ82                    | C            |  |
| AC1         | PL62A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL82A             | 6    | LLM0_GPLLT_IN_A**/LDQS82 | T (LVDS)*    |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                          |              |  |
| AC2         | PL62B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL82B             | 6    | LLM0_GPLLC_IN_A**/LDQ82  | C (LVDS)*    |  |
| AC4         | PL63A             | 6    | LLM0_GPLLT_FB_A   | T            | PL83A             | 6    | LLM0_GPLLT_FB_A/LDQ82    | T            |  |
| AC3         | PL63B             | 6    | LLM0_GPLLC_FB_A   | C            | PL83B             | 6    | LLM0_GPLLC_FB_A/LDQ82    | C            |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                          |              |  |
| AC7         | PL64A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL84A             | 6    | LLM0_GDLLT_IN_A**/LDQ82  | T (LVDS)*    |  |
| AC6         | PL64B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL84B             | 6    | LLM0_GDLLC_IN_A**/LDQ82  | C (LVDS)*    |  |
| AC5         | PL65A             | 6    | LLM0_GDLLT_FB_A   | T            | PL85A             | 6    | LLM0_GDLLT_FB_A/LDQ82    | T            |  |
| AD3         | PL65B             | 6    | LLM0_GDLLC_FB_A   | C            | PL85B             | 6    | LLM0_GDLLC_FB_A/LDQ82    | C            |  |
| GNDIO       | GNDIO6            | -    |                   |              | GNDIO6            | -    |                          |              |  |
| AB8         | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                          |              |  |
| AD2         | PL67A             | 6    | LDQ71             | T (LVDS)*    | PL87A             | 6    |                          | T            |  |
| AD1         | PL67B             | 6    | LDQ71             | C (LVDS)*    | PL87B             | 6    |                          | C            |  |
| AE2         | TCK               | -    |                   |              | TCK               | -    |                          |              |  |
| AE1         | TDI               | -    |                   |              | TDI               | -    |                          |              |  |
| AF2         | TMS               | -    |                   |              | TMS               | -    |                          |              |  |
| AF1         | TDO               | -    |                   |              | TDO               | -    |                          |              |  |
| AG1         | VCCJ              | -    |                   |              | VCCJ              | -    |                          |              |  |
| AH1         | VCC               | -    |                   |              | LLC_SQ_VCCR3      | 14   |                          |              |  |
| AK2         | PB11A             | 5    | BDQ15             | T            | LLC_SQ_HDINP3     | 14   |                          | T            |  |
| AJ1         | NC                | -    |                   |              | LLC_SQ_VCCIB3     | 14   |                          |              |  |
| AJ2         | PB11B             | 5    | BDQ15             | C            | LLC_SQ_HDINN3     | 14   |                          | C            |  |
| AH4         | VCC               | -    |                   |              | LLC_SQ_VCCTX3     | 14   |                          |              |  |
| AK5         | PB13A             | 5    | BDQ15             | T            | LLC_SQ_HDOUTP3    | 14   |                          | T            |  |
| AK4         | NC                | -    |                   |              | LLC_SQ_VCCOB3     | 14   |                          |              |  |
| AJ5         | PB13B             | 5    | BDQ15             | C            | LLC_SQ_HDOUTN3    | 14   |                          | C            |  |
| AH5         | VCC               | -    |                   |              | LLC_SQ_VCCTX2     | 14   |                          |              |  |
| AJ6         | PB14B             | 5    | BDQ15             | C            | LLC_SQ_HDOUTN2    | 14   |                          | C            |  |
| AH6         | NC                | -    |                   |              | LLC_SQ_VCCOB2     | 14   |                          |              |  |
| AK6         | PB14A             | 5    | BDQ15             | T            | LLC_SQ_HDOUTP2    | 14   |                          | T            |  |
| AH2         | VCC               | -    |                   |              | LLC_SQ_VCCR2      | 14   |                          |              |  |
| AJ3         | PB12B             | 5    | BDQ15             | C            | LLC_SQ_HDINN2     | 14   |                          | C            |  |
| AH3         | NC                | -    |                   |              | LLC_SQ_VCCIB2     | 14   |                          |              |  |
| AK3         | PB12A             | 5    | BDQ15             | T            | LLC_SQ_HDINP2     | 14   |                          | T            |  |
| AH7         | VCC               | -    |                   |              | LLC_SQ_VCCP       | 14   |                          |              |  |
| AG7         | PB15A             | 5    | BDQS15            | T            | LLC_SQ_REFCLKP    | 14   |                          | T            |  |
| AF7         | PB15B             | 5    | BDQ15             | C            | LLC_SQ_REFCLKN    | 14   |                          | C            |  |
| AJ7         | VCCAUX            | -    |                   |              | LLC_SQ_VCCAUX33   | 14   |                          |              |  |
| AK11        | PB18A             | 5    | BDQ15             | T            | LLC_SQ_HDINP1     | 14   |                          | T            |  |
| AH11        | NC                | -    |                   |              | LLC_SQ_VCCIB1     | 14   |                          |              |  |
| AJ11        | PB18B             | 5    | BDQ15             | C            | LLC_SQ_HDINN1     | 14   |                          | C            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AH12        | VCC               | -    |               |              | LLC_SQ_VCCR1X1    | 14   |               |              |  |
| AK8         | PB16A             | 5    | BDQ15         | T            | LLC_SQ_HDOUTP1    | 14   |               | T            |  |
| AH8         | NC                | -    |               |              | LLC_SQ_VCCOB1     | 14   |               |              |  |
| AJ8         | PB16B             | 5    | BDQ15         | C            | LLC_SQ_HDOUTN1    | 14   |               | C            |  |
| AH9         | VCC               | -    |               |              | LLC_SQ_VCCTX1     | 14   |               |              |  |
| AJ9         | PB17B             | 5    | BDQ15         | C            | LLC_SQ_HDOUTN0    | 14   |               | C            |  |
| AK10        | NC                | -    |               |              | LLC_SQ_VCCOB0     | 14   |               |              |  |
| AK9         | PB17A             | 5    | BDQ15         | T            | LLC_SQ_HDOUTP0    | 14   |               | T            |  |
| AH10        | VCC               | -    |               |              | LLC_SQ_VCCTX0     | 14   |               |              |  |
| AJ12        | PB19B             | 5    | BDQ15         | C            | LLC_SQ_HDINN0     | 14   |               | C            |  |
| AJ13        | NC                | -    |               |              | LLC_SQ_VCCIB0     | 14   |               |              |  |
| AK12        | PB19A             | 5    | BDQ15         | T            | LLC_SQ_HDINP0     | 14   |               | T            |  |
| AH13        | VCC               | -    |               |              | LLC_SQ_VCCR1X0    | 14   |               |              |  |
| AF10        | PB3A              | 5    | BDQ6          | T            | PB30A             | 5    | BDQ33         | T            |  |
| AE8         | PB3B              | 5    | BDQ6          | C            | PB30B             | 5    | BDQ33         | C            |  |
| AE11        | PB4A              | 5    | BDQ6          | T            | PB31A             | 5    | BDQ33         | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AD9         | PB4B              | 5    | BDQ6          | C            | PB31B             | 5    | BDQ33         | C            |  |
| AE10        | PB5A              | 5    | BDQ6          | T            | PB32A             | 5    | BDQ33         | T            |  |
| AD10        | PB5B              | 5    | BDQ6          | C            | PB32B             | 5    | BDQ33         | C            |  |
| AE13        | PB6A              | 5    | BDQS6         | T            | PB33A             | 5    | BDQS33        | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AC12        | PB6B              | 5    | BDQ6          | C            | PB33B             | 5    | BDQ33         | C            |  |
| AG2         | PB7A              | 5    | BDQ6          | T            | PB34A             | 5    | BDQ33         | T            |  |
| AG3         | PB7B              | 5    | BDQ6          | C            | PB34B             | 5    | BDQ33         | C            |  |
| AD13        | PB8A              | 5    | BDQ6          | T            | PB35A             | 5    | BDQ33         | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AC13        | PB8B              | 5    | BDQ6          | C            | PB35B             | 5    | BDQ33         | C            |  |
| AE14        | PB9A              | 5    | BDQ6          | T            | PB36A             | 5    | BDQ33         | T            |  |
| AC14        | PB9B              | 5    | BDQ6          | C            | PB36B             | 5    | BDQ33         | C            |  |
| AF3         | PB10A             | 5    | BDQ6          | T            | PB37A             | 5    | BDQ33         | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AF4         | PB10B             | 5    | BDQ6          | C            | PB37B             | 5    | BDQ33         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | -                 | -    |               |              |  |
| AG4         | PB20A             | 5    | BDQ24         | T            | PB38A             | 5    | BDQ42         | T            |  |
| AG5         | PB20B             | 5    | BDQ24         | C            | PB38B             | 5    | BDQ42         | C            |  |
| GNDIO       | GNDIO5            | -    |               |              | -                 | -    |               |              |  |
| VCCIO       | VCCIO5            | 5    |               |              | -                 | -    |               |              |  |
| AD11        | PB24A             | 5    | BDQS24****    | T            | PB39A             | 5    | BDQ42         | T            |  |
| AF13        | PB24B             | 5    | BDQ24         | C            | PB39B             | 5    | BDQ42         | C            |  |
| AF12        | PB25A             | 5    | BDQ24         | T            | PB40A             | 5    | BDQ42         | T            |  |
| -           | -                 | -    |               |              | VCCIO5            | 5    |               |              |  |
| AD14        | PB25B             | 5    | BDQ24         | C            | PB40B             | 5    | BDQ42         | C            |  |
| AG8         | PB26A             | 5    | BDQ24         | T            | PB41A             | 5    | BDQ42         | T            |  |
| AF8         | PB26B             | 5    | BDQ24         | C            | PB41B             | 5    | BDQ42         | C            |  |
| AE15        | PB27A             | 5    | BDQ24         | T            | PB42A             | 5    | BDQS42****    | T            |  |
| -           | -                 | -    |               |              | GNDIO5            | -    |               |              |  |
| VCCIO       | VCCIO5            | 5    |               |              | -                 | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                |              | LFE2M70E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AC15        | PB27B             | 5    | BDQ24          | C            | PB42B             | 5    | BDQ42          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AD15        | PB38A             | 5    | BDQ42          | T            | PB47A             | 5    | BDQ51          | T            |  |
| AF15        | PB38B             | 5    | BDQ42          | C            | PB47B             | 5    | BDQ51          | C            |  |
| AG10        | PB39A             | 5    | BDQ42          | T            | PB48A             | 5    | BDQ51          | T            |  |
| AG9         | PB39B             | 5    | BDQ42          | C            | PB48B             | 5    | BDQ51          | C            |  |
| AH14        | PB40A             | 5    | BDQ42          | T            | PB49A             | 5    | BDQ51          | T            |  |
| AG12        | PB40B             | 5    | BDQ42          | C            | PB49B             | 5    | BDQ51          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| AG15        | PB41A             | 5    | BDQ42          | T            | PB50A             | 5    | BDQ51          | T            |  |
| AG13        | PB41B             | 5    | BDQ42          | C            | PB50B             | 5    | BDQ51          | C            |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AF16        | PB42A             | 5    | BDQS42         | T            | PB51A             | 5    | BDQS51         | T            |  |
| AH15        | PB42B             | 5    | BDQ42          | C            | PB51B             | 5    | BDQ51          | C            |  |
| AC16        | PB43A             | 5    | VREF2_5/BDQ42  | T            | PB52A             | 5    | VREF2_5/BDQ51  | T            |  |
| AE16        | PB43B             | 5    | VREF1_5/BDQ42  | C            | PB52B             | 5    | VREF1_5/BDQ51  | C            |  |
| AG11        | PB44A             | 5    | PCLKT5_0/BDQ42 | T            | PB53A             | 5    | PCLKT5_0/BDQ51 | T            |  |
| AF11        | PB44B             | 5    | PCLKC5_0/BDQ42 | C            | PB53B             | 5    | PCLKC5_0/BDQ51 | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AJ14        | PB49A             | 4    | PCLKT4_0/BDQ51 | T            | PB58A             | 4    | PCLKT4_0/BDQ60 | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AK14        | PB49B             | 4    | PCLKC4_0/BDQ51 | C            | PB58B             | 4    | PCLKC4_0/BDQ60 | C            |  |
| AK15        | PB50A             | 4    | VREF2_4/BDQ51  | T            | PB59A             | 4    | VREF2_4/BDQ60  | T            |  |
| AK16        | PB50B             | 4    | VREF1_4/BDQ51  | C            | PB59B             | 4    | VREF1_4/BDQ60  | C            |  |
| AF18        | PB51A             | 4    | BDQS51         | T            | PB60A             | 4    | BDQS60         | T            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AD16        | PB51B             | 4    | BDQ51          | C            | PB60B             | 4    | BDQ60          | C            |  |
| AJ15        | PB52A             | 4    | BDQ51          | T            | PB61A             | 4    | BDQ60          | T            |  |
| AG16        | PB52B             | 4    | BDQ51          | C            | PB61B             | 4    | BDQ60          | C            |  |
| AE17        | PB53A             | 4    | BDQ51          | T            | PB62A             | 4    | BDQ60          | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC17        | PB53B             | 4    | BDQ51          | C            | PB62B             | 4    | BDQ60          | C            |  |
| AH16        | PB54A             | 4    | BDQ51          | T            | PB63A             | 4    | BDQ60          | T            |  |
| AK17        | PB54B             | 4    | BDQ51          | C            | PB63B             | 4    | BDQ60          | C            |  |
| AG20        | PB55A             | 4    | BDQ51          | T            | PB64A             | 4    | BDQ60          | T            |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AG21        | PB55B             | 4    | BDQ51          | C            | PB64B             | 4    | BDQ60          | C            |  |
| AG18        | PB56A             | 4    | BDQ60          | T            | PB65A             | 4    | BDQ69          | T            |  |
| AJ16        | PB56B             | 4    | BDQ60          | C            | PB65B             | 4    | BDQ69          | C            |  |
| AF21        | PB57A             | 4    | BDQ60          | T            | PB66A             | 4    | BDQ69          | T            |  |
| AG22        | PB57B             | 4    | BDQ60          | C            | PB66B             | 4    | BDQ69          | C            |  |
| AD17        | PB58A             | 4    | BDQ60          | T            | PB67A             | 4    | BDQ69          | T            |  |
| AF19        | PB58B             | 4    | BDQ60          | C            | PB67B             | 4    | BDQ69          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AH17        | PB62A             | 4    | BDQ60          | T            | PB71A             | 4    | BDQ69          | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AJ17        | PB62B             | 4    | BDQ60         | C            | PB71B             | 4    | BDQ69         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AF26        | PB64A             | 4    | BDQ60         | T            | PB73A             | 4    | BDQ69         | T            |  |
| AE25        | PB64B             | 4    | BDQ60         | C            | PB73B             | 4    | BDQ69         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AD24        | PB65A             | 4    | BDQ69         | T            | PB74A             | 4    | BDQ78         | T            |  |
| AE24        | PB65B             | 4    | BDQ69         | C            | PB74B             | 4    | BDQ78         | C            |  |
| AD18        | PB66A             | 4    | BDQ69         | T            | PB75A             | 4    | BDQ78         | T            |  |
| AC18        | PB66B             | 4    | BDQ69         | C            | PB75B             | 4    | BDQ78         | C            |  |
| AE18        | PB67A             | 4    | BDQ69         | T            | PB76A             | 4    | BDQ78         | T            |  |
| AG19        | PB67B             | 4    | BDQ69         | C            | PB76B             | 4    | BDQ78         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AC19        | PB69A             | 4    | BDQS69        | T            | PB78A             | 4    | BDQS78        | T            |  |
| AD20        | PB69B             | 4    | BDQ69         | C            | PB78B             | 4    | BDQ78         | C            |  |
| AB18        | PB70A             | 4    | BDQ69         | T            | PB79A             | 4    | BDQ78         | T            |  |
| AC20        | PB70B             | 4    | BDQ69         | C            | PB79B             | 4    | BDQ78         | C            |  |
| AE20        | PB71A             | 4    | BDQ69         | T            | PB80A             | 4    | BDQ78         | T            |  |
| AE21        | PB71B             | 4    | BDQ69         | C            | PB80B             | 4    | BDQ78         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AC23        | PB72A             | 4    | BDQ69         | T            | PB81A             | 4    | BDQ78         | T            |  |
| AD23        | PB72B             | 4    | BDQ69         | C            | PB81B             | 4    | BDQ78         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AH18        | LRC_SQ_VCCR3      | 13   |               |              | LRC_SQ_VCCR3      | 13   |               |              |  |
| AK19        | LRC_SQ_HDINP3     | 13   |               | T            | LRC_SQ_HDINP3     | 13   |               | T            |  |
| AJ18        | LRC_SQ_VCCIB3     | 13   |               |              | LRC_SQ_VCCIB3     | 13   |               |              |  |
| AJ19        | LRC_SQ_HDINN3     | 13   |               | C            | LRC_SQ_HDINN3     | 13   |               | C            |  |
| AH21        | LRC_SQ_VCCTX3     | 13   |               |              | LRC_SQ_VCCTX3     | 13   |               |              |  |
| AK22        | LRC_SQ_HDOUTP3    | 13   |               | T            | LRC_SQ_HDOUTP3    | 13   |               | T            |  |
| AK21        | LRC_SQ_VCCOB3     | 13   |               |              | LRC_SQ_VCCOB3     | 13   |               |              |  |
| AJ22        | LRC_SQ_HDOUTN3    | 13   |               | C            | LRC_SQ_HDOUTN3    | 13   |               | C            |  |
| AH22        | LRC_SQ_VCCTX2     | 13   |               |              | LRC_SQ_VCCTX2     | 13   |               |              |  |
| AJ23        | LRC_SQ_HDOUTN2    | 13   |               | C            | LRC_SQ_HDOUTN2    | 13   |               | C            |  |
| AH23        | LRC_SQ_VCCOB2     | 13   |               |              | LRC_SQ_VCCOB2     | 13   |               |              |  |
| AK23        | LRC_SQ_HDOUTP2    | 13   |               | T            | LRC_SQ_HDOUTP2    | 13   |               | T            |  |
| AH19        | LRC_SQ_VCCR2      | 13   |               |              | LRC_SQ_VCCR2      | 13   |               |              |  |
| AJ20        | LRC_SQ_HDINN2     | 13   |               | C            | LRC_SQ_HDINN2     | 13   |               | C            |  |
| AH20        | LRC_SQ_VCCIB2     | 13   |               |              | LRC_SQ_VCCIB2     | 13   |               |              |  |
| AK20        | LRC_SQ_HDINP2     | 13   |               | T            | LRC_SQ_HDINP2     | 13   |               | T            |  |
| AH24        | LRC_SQ_VCCP       | 13   |               |              | LRC_SQ_VCCP       | 13   |               |              |  |
| AG24        | LRC_SQ_REFCLKP    | 13   |               | T            | LRC_SQ_REFCLKP    | 13   |               | T            |  |
| AF24        | LRC_SQ_REFCLKN    | 13   |               | C            | LRC_SQ_REFCLKN    | 13   |               | C            |  |
| AJ24        | LRC_SQ_VCCAUX33   | 13   |               |              | LRC_SQ_VCCAUX33   | 13   |               |              |  |
| AK28        | LRC_SQ_HDINP1     | 13   |               | T            | LRC_SQ_HDINP1     | 13   |               | T            |  |
| AH28        | LRC_SQ_VCCIB1     | 13   |               |              | LRC_SQ_VCCIB1     | 13   |               |              |  |
| AJ28        | LRC_SQ_HDINN1     | 13   |               | C            | LRC_SQ_HDINN1     | 13   |               | C            |  |
| AH29        | LRC_SQ_VCCR1      | 13   |               |              | LRC_SQ_VCCR1      | 13   |               |              |  |
| AK25        | LRC_SQ_HDOUTP1    | 13   |               | T            | LRC_SQ_HDOUTP1    | 13   |               | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                          |      |                    |              | LFE2M70E/SE              |      |                          |              |  |
|-------------|--------------------------|------|--------------------|--------------|--------------------------|------|--------------------------|--------------|--|
| Ball Number | Ball/Pad Function        | Bank | Dual Function      | Differential | Ball/Pad Function        | Bank | Dual Function            | Differential |  |
| AH25        | LRC_SQ_VCCOB1            | 13   |                    |              | LRC_SQ_VCCOB1            | 13   |                          |              |  |
| AJ25        | LRC_SQ_HDOUTN1           | 13   |                    | C            | LRC_SQ_HDOUTN1           | 13   |                          | C            |  |
| AH26        | LRC_SQ_VCCTX1            | 13   |                    |              | LRC_SQ_VCCTX1            | 13   |                          |              |  |
| AJ26        | LRC_SQ_HDOUTN0           | 13   |                    | C            | LRC_SQ_HDOUTN0           | 13   |                          | C            |  |
| AK27        | LRC_SQ_VCCOB0            | 13   |                    |              | LRC_SQ_VCCOB0            | 13   |                          |              |  |
| AK26        | LRC_SQ_HDOUTP0           | 13   |                    | T            | LRC_SQ_HDOUTP0           | 13   |                          | T            |  |
| AH27        | LRC_SQ_VCCTX0            | 13   |                    |              | LRC_SQ_VCCTX0            | 13   |                          |              |  |
| AJ29        | LRC_SQ_HDINN0            | 13   |                    | C            | LRC_SQ_HDINN0            | 13   |                          | C            |  |
| AJ30        | LRC_SQ_VCCIB0            | 13   |                    |              | LRC_SQ_VCCIB0            | 13   |                          |              |  |
| AK29        | LRC_SQ_HDINP0            | 13   |                    | T            | LRC_SQ_HDINP0            | 13   |                          | T            |  |
| AH30        | LRC_SQ_VCCRX0            | 13   |                    |              | LRC_SQ_VCCRX0            | 13   |                          |              |  |
| AG27        | CFG2                     | 8    |                    |              | CFG2                     | 8    |                          |              |  |
| AD25        | CFG1                     | 8    |                    |              | CFG1                     | 8    |                          |              |  |
| AG28        | CFG0                     | 8    |                    |              | CFG0                     | 8    |                          |              |  |
| AG30        | PROGRAMN                 | 8    |                    |              | PROGRAMN                 | 8    |                          |              |  |
| AG29        | CCLK                     | 8    |                    |              | CCLK                     | 8    |                          |              |  |
| AC24        | INITN                    | 8    |                    |              | INITN                    | 8    |                          |              |  |
| AF27        | DONE                     | 8    |                    |              | DONE                     | 8    |                          |              |  |
| GNDIO       | GNDIO8                   | -    |                    |              | GNDIO8                   | -    |                          |              |  |
| AF28        | WRITEN***                | 8    |                    |              | WRITEN***                | 8    |                          |              |  |
| AE26        | CS1N***                  | 8    |                    |              | CS1N***                  | 8    |                          |              |  |
| AB23        | CSN***                   | 8    |                    |              | CSN***                   | 8    |                          |              |  |
| AF29        | D0/SPIFASTN***           | 8    |                    |              | D0/SPIFASTN***           | 8    |                          |              |  |
| VCCIO       | VCCIO8                   | 8    |                    |              | VCCIO8                   | 8    |                          |              |  |
| AF30        | D1***                    | 8    |                    |              | D1***                    | 8    |                          |              |  |
| AD26        | D2***                    | 8    |                    |              | D2***                    | 8    |                          |              |  |
| AE29        | D3***                    | 8    |                    |              | D3***                    | 8    |                          |              |  |
| GNDIO       | GNDIO8                   | -    |                    |              | GNDIO8                   | -    |                          |              |  |
| AE30        | D4***                    | 8    |                    |              | D4***                    | 8    |                          |              |  |
| AD29        | D5***                    | 8    |                    |              | D5***                    | 8    |                          |              |  |
| AC25        | D6***                    | 8    |                    |              | D6***                    | 8    |                          |              |  |
| AD30        | D7/SPID0***              | 8    |                    |              | D7/SPID0***              | 8    |                          |              |  |
| VCCIO       | VCCIO8                   | 8    |                    |              | VCCIO8                   | 8    |                          |              |  |
| AA22        | DI/CSSPI0N***            | 8    |                    |              | DI/CSSPI0N***            | 8    |                          |              |  |
| AC26        | DOUT/CSON/<br>CSSPI1N*** | 8    |                    |              | DOUT/CSON/<br>CSSPI1N*** | 8    |                          |              |  |
| AA23        | BUSY/SISPI***            | 8    |                    |              | BUSY/SISPI***            | 8    |                          |              |  |
| AB22        | RLM0_PLLCAP              | 3    |                    |              | RLM0_PLLCAP              | 3    |                          |              |  |
| AC27        | PR65B                    | 3    | RLM0_GDLLC_FB_A    | C            | PR85B                    | 3    | RLM0_GDLLC_FB_A/RDQ82    | C            |  |
| GNDIO       | GNDIO3                   | -    |                    |              | GNDIO3                   | -    |                          |              |  |
| AC28        | PR65A                    | 3    | RLM0_GDLLT_FB_A    | T            | PR85A                    | 3    | RLM0_GDLLT_FB_A/RDQ82    | T            |  |
| AC29        | PR64B                    | 3    | RLM0_GDLLC_IN_A**  | C (LVDS)*    | PR84B                    | 3    | RLM0_GDLLC_IN_A**/RDQ82  | C (LVDS)*    |  |
| AC30        | PR64A                    | 3    | RLM0_GDLLT_IN_A**  | T (LVDS)*    | PR84A                    | 3    | RLM0_GDLLT_IN_A**/RDQ82  | T (LVDS)*    |  |
| AB30        | PR63B                    | 3    | RLM0_GPLL_C_IN_A** | C            | PR83B                    | 3    | RLM0_GPLL_C_IN_A**/RDQ82 | C            |  |
| VCCIO       | VCCIO3                   | 3    |                    |              | VCCIO3                   | 3    |                          |              |  |
| AA30        | PR63A                    | 3    | RLM0_GPLLT_IN_A**  | T            | PR83A                    | 3    | RLM0_GPLLT_IN_A**/RDQ82  | T            |  |
| AB29        | PR62B                    | 3    | RLM0_GPLL_C_FB_A   | C (LVDS)*    | PR82B                    | 3    | RLM0_GPLL_C_FB_A/RDQ82   | C (LVDS)*    |  |
| AB28        | PR62A                    | 3    | RLM0_GPLLT_FB_A    | T (LVDS)*    | PR82A                    | 3    | RLM0_GPLLT_FB_A/RDQ82    | T (LVDS)*    |  |
| GNDIO       | GNDIO3                   | -    |                    |              | GNDIO3                   | -    |                          |              |  |



## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| Y22         | PR60B             | 3    |               | C            | PR81B             | 3    | RDQ82         | C            |  |
| Y23         | PR60A             | 3    |               | T            | PR81A             | 3    | RDQ82         | T            |  |
| AB26        | NC                | -    |               |              | PR80B             | 3    | RDQ82         | C (LVDS)*    |  |
| AB27        | NC                | -    |               |              | PR80A             | 3    | RDQ82         | T (LVDS)*    |  |
| -           | -                 | -    |               |              | VCCIO3            | 3    |               |              |  |
| Y24         | NC                | -    |               |              | PR79B             | 3    | RDQ82         | C            |  |
| Y25         | NC                | -    |               |              | PR79A             | 3    | RDQ82         | T            |  |
| AA29        | NC                | -    |               |              | PR78B             | 3    | RDQ82         | C (LVDS)*    |  |
| Y28         | NC                | -    |               |              | PR78A             | 3    | RDQ82         | T (LVDS)*    |  |
| Y30         | NC                | -    |               |              | PR76B             | 3    | RDQ73         | C            |  |
| Y29         | NC                | -    |               |              | PR76A             | 3    | RDQ73         | T            |  |
| -           | -                 | -    |               |              | GNDIO3            | -    |               |              |  |
| -           | -                 | -    |               |              | -                 | -    |               |              |  |
| W22         | NC                | -    |               |              | PR75B             | 3    | RDQ73         | C (LVDS)*    |  |
| V22         | NC                | -    |               |              | PR75A             | 3    | RDQ73         | T (LVDS)*    |  |
| Y27         | NC                | -    |               |              | PR74B             | 3    | RDQ73         | C            |  |
| -           | -                 | -    |               |              | VCCIO3            | 3    |               |              |  |
| Y26         | NC                | -    |               |              | PR74A             | 3    | RDQ73         | T            |  |
| W30         | NC                | -    |               |              | PR73B             | 3    | RDQ73         | C (LVDS)*    |  |
| W29         | NC                | -    |               |              | PR73A             | 3    | RDQS73        | T (LVDS)*    |  |
| -           | -                 | -    |               |              | GNDIO3            | -    |               |              |  |
| W25         | NC                | -    |               |              | PR72B             | 3    | RDQ73         | C            |  |
| W26         | NC                | -    |               |              | PR72A             | 3    | RDQ73         | T            |  |
| U29         | PR59B             | 3    |               | C (LVDS)*    | PR71B             | 3    | RDQ73         | C (LVDS)*    |  |
| V29         | PR59A             | 3    |               | T (LVDS)*    | PR71A             | 3    | RDQ73         | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| V30         | PR58B             | 3    |               | C            | PR70B             | 3    | RDQ73         | C            |  |
| U30         | PR58A             | 3    |               | T            | PR70A             | 3    | RDQ73         | T            |  |
| W27         | PR57B             | 3    |               | C (LVDS)*    | PR69B             | 3    | RDQ73         | C (LVDS)*    |  |
| W28         | PR57A             | 3    |               | T (LVDS)*    | PR69A             | 3    | RDQ73         | T (LVDS)*    |  |
| V24         | PR55B             | 3    | RDQ52         | C            | PR67B             | 3    | RDQ64         | C            |  |
| V25         | PR55A             | 3    | RDQ52         | T            | PR67A             | 3    | RDQ64         | T            |  |
| GNDIO       | GNDIO3            | -    |               |              | GNDIO3            | -    |               |              |  |
| U28         | PR54B             | 3    | RDQ52         | C (LVDS)*    | PR66B             | 3    | RDQ64         | C (LVDS)*    |  |
| U27         | PR54A             | 3    | RDQ52         | T (LVDS)*    | PR66A             | 3    | RDQ64         | T (LVDS)*    |  |
| U23         | PR53B             | 3    | RDQ52         | C            | PR65B             | 3    | RDQ64         | C            |  |
| V23         | PR53A             | 3    | RDQ52         | T            | PR65A             | 3    | RDQ64         | T            |  |
| VCCIO       | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| V26         | PR52B             | 3    | RDQ52         | C (LVDS)*    | PR64B             | 3    | RDQ64         | C (LVDS)*    |  |
| U26         | PR52A             | 3    | RDQS52        | T (LVDS)*    | PR64A             | 3    | RDQS64        | T (LVDS)*    |  |
| U25         | PR51B             | 3    | RDQ52         | C            | PR63B             | 3    | RDQ64         | C            |  |
| GNDIO       | GNDIO3            | -    |               |              | GNDIO3            | -    |               |              |  |
| U24         | PR51A             | 3    | RDQ52         | T            | PR63A             | 3    | RDQ64         | T            |  |
| T30         | PR50B             | 3    | RDQ52         | C (LVDS)*    | PR62B             | 3    | RDQ64         | C (LVDS)*    |  |
| R30         | PR50A             | 3    | RDQ52         | T (LVDS)*    | PR62A             | 3    | RDQ64         | T (LVDS)*    |  |
| T23         | PR49B             | 3    | RDQ52         | C            | PR61B             | 3    | RDQ64         | C            |  |
| VCCIO       | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| T22         | PR49A             | 3    | RDQ52         | T            | PR61A             | 3    | RDQ64         | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                       |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| T29         | PR48B             | 3    | RDQ52                 | C (LVDS)*    | PR60B             | 3    | RDQ64                 | C (LVDS)*    |  |
| T28         | PR48A             | 3    | RDQ52                 | T (LVDS)*    | PR60A             | 3    | RDQ64                 | T (LVDS)*    |  |
| R23         | PR46B             | 3    | RLM3_SPLLC_FB_A       | C            | PR58B             | 3    | RLM3_SPLLC_FB_A/RDQ55 | C            |  |
| GNDIO       | GNDIO3            | -    |                       |              | GNDIO3            | -    |                       |              |  |
| VCCIO       | VCCIO3            | 3    |                       |              | -                 | -    |                       |              |  |
| R22         | PR46A             | 3    | RLM3_SPLLT_FB_A       | T            | PR58A             | 3    | RLM3_SPLLT_FB_A/RDQ55 | T            |  |
| P30         | PR45B             | 3    | RLM3_SPLLC_IN_A       | C (LVDS)*    | PR57B             | 3    | RLM3_SPLLC_IN_A/RDQ55 | C (LVDS)*    |  |
| R29         | PR45A             | 3    | RLM3_SPLLT_IN_A       | T (LVDS)*    | PR57A             | 3    | RLM3_SPLLT_IN_A/RDQ55 | T (LVDS)*    |  |
| T27         | PR44B             | 3    |                       | C            | PR56B             | 3    | RDQ55                 | C            |  |
| -           | -                 | -    |                       |              | VCCIO3            | 3    |                       |              |  |
| T26         | PR44A             | 3    |                       | T            | PR56A             | 3    | RDQ55                 | T            |  |
| GNDIO       | GNDIO3            | -    |                       |              | GNDIO3            | -    |                       |              |  |
| N30         | PR43B             | 3    |                       | C (LVDS)*    | PR53B             | 3    | RDQ55                 | C (LVDS)*    |  |
| N29         | PR43A             | 3    |                       | T (LVDS)*    | PR53A             | 3    | RDQ55                 | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |                       |              | VCCIO3            | 3    |                       |              |  |
| R27         | PR42B             | 3    | VREF2_3               | C            | PR52B             | 3    | VREF2_3/RDQ55         | C            |  |
| R28         | PR42A             | 3    | VREF1_3               | T            | PR52A             | 3    | VREF1_3/RDQ55         | T            |  |
| P29         | PR41B             | 3    | PCLKC3_0              | C (LVDS)*    | PR51B             | 3    | PCLKC3_0/RDQ55        | C (LVDS)*    |  |
| P28         | PR41A             | 3    | PCLKT3_0              | T (LVDS)*    | PR51A             | 3    | PCLKT3_0/RDQ55        | T (LVDS)*    |  |
| M30         | PR39B             | 2    | PCLKC2_0/RDQ36        | C            | PR49B             | 2    | PCLKC2_0/RDQ46        | C            |  |
| M29         | PR39A             | 2    | PCLKT2_0/RDQ36        | T            | PR49A             | 2    | PCLKT2_0/RDQ46        | T            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| P23         | PR38B             | 2    | RDQ36                 | C (LVDS)*    | PR48B             | 2    | RDQ46                 | C (LVDS)*    |  |
| P24         | PR38A             | 2    | RDQ36                 | T (LVDS)*    | PR48A             | 2    | RDQ46                 | T (LVDS)*    |  |
| R26         | PR37B             | 2    | RDQ36                 | C            | PR47B             | 2    | RDQ46                 | C            |  |
| P27         | PR37A             | 2    | RDQ36                 | T            | PR47A             | 2    | RDQ46                 | T            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| P25         | PR36B             | 2    | RDQ36                 | C (LVDS)*    | PR46B             | 2    | RDQ46                 | C (LVDS)*    |  |
| P26         | PR36A             | 2    | RDQS36                | T (LVDS)*    | PR46A             | 2    | RDQS46                | T (LVDS)*    |  |
| K30         | PR35B             | 2    | RDQ36                 | C            | PR45B             | 2    | RDQ46                 | C            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| K29         | PR35A             | 2    | RDQ36                 | T            | PR45A             | 2    | RDQ46                 | T            |  |
| N22         | PR34B             | 2    | RDQ36                 | C (LVDS)*    | PR44B             | 2    | RDQ46                 | C (LVDS)*    |  |
| P22         | PR34A             | 2    | RDQ36                 | T (LVDS)*    | PR44A             | 2    | RDQ46                 | T (LVDS)*    |  |
| J30         | PR33B             | 2    | RUM3_SPLLC_FB_A/RDQ36 | C            | PR43B             | 2    | RUM3_SPLLC_FB_A/RDQ46 | C            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| J29         | PR33A             | 2    | RUM3_SPLLT_FB_A/RDQ36 | T            | PR43A             | 2    | RUM3_SPLLT_FB_A/RDQ46 | T            |  |
| N24         | PR32B             | 2    | RUM3_SPLLC_IN_A/RDQ36 | C (LVDS)*    | PR42B             | 2    | RUM3_SPLLC_IN_A/RDQ46 | C (LVDS)*    |  |
| N23         | PR32A             | 2    | RUM3_SPLLT_IN_A/RDQ36 | T (LVDS)*    | PR42A             | 2    | RUM3_SPLLT_IN_A/RDQ46 | T (LVDS)*    |  |
| N25         | PR30B             | 2    | RDQ27                 | C            | PR40B             | 2    | RDQ37                 | C            |  |
| N26         | PR30A             | 2    | RDQ27                 | T            | PR40A             | 2    | RDQ37                 | T            |  |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |  |
| M27         | PR29B             | 2    | RDQ27                 | C (LVDS)*    | PR39B             | 2    | RDQ37                 | C (LVDS)*    |  |
| M28         | PR29A             | 2    | RDQ27                 | T (LVDS)*    | PR39A             | 2    | RDQ37                 | T (LVDS)*    |  |
| H30         | PR28B             | 2    | RDQ27                 | C            | PR38B             | 2    | RDQ37                 | C            |  |
| G30         | PR28A             | 2    | RDQ27                 | T            | PR38A             | 2    | RDQ37                 | T            |  |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |  |
| M25         | PR27B             | 2    | RDQ27                 | C (LVDS)*    | PR37B             | 2    | RDQ37                 | C (LVDS)*    |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| M26         | PR27A             | 2    | RDQS27        | T (LVDS)*    | PR37A             | 2    | RDQS37        | T (LVDS)*    |  |
| L30         | PR26B             | 2    | RDQ27         | C            | PR36B             | 2    | RDQ37         | C            |  |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| L29         | PR26A             | 2    | RDQ27         | T            | PR36A             | 2    | RDQ37         | T            |  |
| L28         | PR25B             | 2    | RDQ27         | C (LVDS)*    | PR35B             | 2    | RDQ37         | C (LVDS)*    |  |
| L27         | PR25A             | 2    | RDQ27         | T (LVDS)*    | PR35A             | 2    | RDQ37         | T (LVDS)*    |  |
| H29         | PR24B             | 2    | RDQ27         | C            | PR34B             | 2    | RDQ37         | C            |  |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| G29         | PR24A             | 2    | RDQ27         | T            | PR34A             | 2    | RDQ37         | T            |  |
| L22         | PR23B             | 2    | RDQ27         | C (LVDS)*    | PR33B             | 2    | RDQ37         | C (LVDS)*    |  |
| M22         | PR23A             | 2    | RDQ27         | T (LVDS)*    | PR33A             | 2    | RDQ37         | T (LVDS)*    |  |
| F30         | PR21B             | 2    |               | C            | PR31B             | 2    | RDQ28         | C            |  |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| F29         | PR21A             | 2    |               | T            | PR31A             | 2    | RDQ28         | T            |  |
| -           | -                 | -    |               |              | -                 | -    |               |              |  |
| -           | -                 | -    |               |              | -                 | -    |               |              |  |
| E30         | PR20B             | 2    |               | C (LVDS)*    | PR30B             | 2    | RDQ28         | C (LVDS)*    |  |
| E29         | PR20A             | 2    |               | T (LVDS)*    | PR30A             | 2    | RDQ28         | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |               |              | -                 | -    |               |              |  |
| L25         | PR19B             | 2    |               | C            | PR29B             | 2    | RDQ28         | C            |  |
| L26         | PR19A             | 2    |               | T            | PR29A             | 2    | RDQ28         | T            |  |
| -           | -                 | -    |               |              | VCCIO2            | 2    |               |              |  |
| H28         | PR18B             | 2    |               | C (LVDS)*    | PR28B             | 2    | RDQ28         | C (LVDS)*    |  |
| J28         | PR18A             | 2    |               | T (LVDS)*    | PR28A             | 2    | RDQS28        | T (LVDS)*    |  |
| G28         | PR16B             | 2    |               | C            | PR27B             | 2    | RDQ28         | C            |  |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |  |
| G27         | PR16A             | 2    |               | T            | PR27A             | 2    | RDQ28         | T            |  |
| L24         | NC                | -    |               |              | PR26B             | 2    | RDQ28         | C (LVDS)*    |  |
| L23         | NC                | -    |               |              | PR26A             | 2    | RDQ28         | T (LVDS)*    |  |
| D30         | NC                | -    |               |              | PR25B             | 2    | RDQ28         | C            |  |
| -           | -                 | -    |               |              | VCCIO2            | 2    |               |              |  |
| D29         | NC                | -    |               |              | PR25A             | 2    | RDQ28         | T            |  |
| K24         | NC                | -    |               |              | PR24B             | 2    | RDQ28         | C (LVDS)*    |  |
| K25         | NC                | -    |               |              | PR24A             | 2    | RDQ28         | T (LVDS)*    |  |
| J27         | NC                | -    |               |              | PR22B             | 2    |               | C            |  |
| -           | -                 | -    |               |              | GNDIO2            | -    |               |              |  |
| K26         | NC                | -    |               |              | PR22A             | 2    |               | T            |  |
| K23         | PR15B             | 2    |               | C (LVDS)*    | PR21B             | 2    |               | C (LVDS)*    |  |
| K22         | PR15A             | 2    |               | T (LVDS)*    | PR21A             | 2    |               | T (LVDS)*    |  |
| J22         | PR14B             | 2    |               | C            | PR20B             | 2    |               | C            |  |
| VCCIO       | VCCIO2            | -    |               |              | VCCIO2            | 2    |               |              |  |
| J23         | PR14A             | 2    |               | T            | PR20A             | 2    |               | T            |  |
| -           | -                 | -    |               |              | GNDIO2            | -    |               |              |  |
| -           | -                 | -    |               |              | -                 | -    |               |              |  |
| J26         | NC                | -    |               |              | PR17B             | 2    | RDQ15         | C (LVDS)*    |  |
| H26         | NC                | -    |               |              | PR17A             | 2    | RDQ15         | T (LVDS)*    |  |
| H27         | NC                | -    |               |              | PR16B             | 2    | RDQ15         | C            |  |
| G26         | NC                | -    |               |              | PR16A             | 2    | RDQ15         | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |                 |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| -           | -                 | -    |                 |              | VCCIO2            | 2    |                       |              |  |
| H23         | NC                | -    |                 |              | PR15B             | 2    | RDQ15                 | C (LVDS)*    |  |
| H24         | NC                | -    |                 |              | PR15A             | 2    | RDQS15                | T (LVDS)*    |  |
| D28         | NC                | -    |                 |              | PR14B             | 2    | RDQ15                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO2            | -    |                       |              |  |
| E28         | NC                | -    |                 |              | PR14A             | 2    | RDQ15                 | T            |  |
| G24         | PR13B             | 2    |                 | C (LVDS)*    | PR13B             | 2    | RDQ15                 | C (LVDS)*    |  |
| H25         | PR13A             | 2    |                 | T (LVDS)*    | PR13A             | 2    | RDQ15                 | T (LVDS)*    |  |
| D27         | PR12B             | 2    | RUM0_SPLLC_FB_A | C            | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |  |
| GNDIO       | GNDIO2            | -    |                 |              | VCCIO2            | 2    |                       |              |  |
| E27         | PR12A             | 2    | RUM0_SPLLT_FB_A | T            | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |  |
| F26         | PR11B             | 2    | RUM0_SPLLC_IN_A | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    |  |
| G25         | PR11A             | 2    | RUM0_SPLLT_IN_A | T (LVDS)*    | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |  |
| F24         | PR9B              | 2    | VREF2_2         | C            | PR9B              | 2    | VREF2_2               | C            |  |
| VCCIO       | VCCIO2            | -    |                 |              | -                 | -    |                       |              |  |
| GNDIO       | GNDIO2            | -    |                 |              | GNDIO2            | -    |                       |              |  |
| F25         | PR9A              | 2    | VREF1_2         | T            | PR9A              | 2    | VREF1_2               | T            |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| G23         | XRES              | -    |                 |              | XRES              | 1    |                       |              |  |
| C30         | URC_SQ_VCCR_X0    | 12   |                 |              | URC_SQ_VCCR_X0    | 12   |                       |              |  |
| A29         | URC_SQ_HDIN_P0    | 12   |                 | T            | URC_SQ_HDIN_P0    | 12   |                       | T            |  |
| B30         | URC_SQ_VCCIB0     | 12   |                 |              | URC_SQ_VCCIB0     | 12   |                       |              |  |
| B29         | URC_SQ_HDINN0     | 12   |                 | C            | URC_SQ_HDINN0     | 12   |                       | C            |  |
| C27         | URC_SQ_VCCTX0     | 12   |                 |              | URC_SQ_VCCTX0     | 12   |                       |              |  |
| A26         | URC_SQ_HDOUT_P0   | 12   |                 | T            | URC_SQ_HDOUT_P0   | 12   |                       | T            |  |
| A27         | URC_SQ_VCCOB0     | 12   |                 |              | URC_SQ_VCCOB0     | 12   |                       |              |  |
| B26         | URC_SQ_HDOUTN0    | 12   |                 | C            | URC_SQ_HDOUTN0    | 12   |                       | C            |  |
| C26         | URC_SQ_VCCTX1     | 12   |                 |              | URC_SQ_VCCTX1     | 12   |                       |              |  |
| B25         | URC_SQ_HDOUTN1    | 12   |                 | C            | URC_SQ_HDOUTN1    | 12   |                       | C            |  |
| C25         | URC_SQ_VCCOB1     | 12   |                 |              | URC_SQ_VCCOB1     | 12   |                       |              |  |
| A25         | URC_SQ_HDOUT_P1   | 12   |                 | T            | URC_SQ_HDOUT_P1   | 12   |                       | T            |  |
| C29         | URC_SQ_VCCR_X1    | 12   |                 |              | URC_SQ_VCCR_X1    | 12   |                       |              |  |
| B28         | URC_SQ_HDINN1     | 12   |                 | C            | URC_SQ_HDINN1     | 12   |                       | C            |  |
| C28         | URC_SQ_VCCIB1     | 12   |                 |              | URC_SQ_VCCIB1     | 12   |                       |              |  |
| A28         | URC_SQ_HDIN_P1    | 12   |                 | T            | URC_SQ_HDIN_P1    | 12   |                       | T            |  |
| B24         | URC_SQ_VCCAUX33   | 12   |                 |              | URC_SQ_VCCAUX33   | 12   |                       |              |  |
| E24         | URC_SQ_REFCLK_N   | 12   |                 | C            | URC_SQ_REFCLK_N   | 12   |                       | C            |  |
| D24         | URC_SQ_REFCLK_P   | 12   |                 | T            | URC_SQ_REFCLK_P   | 12   |                       | T            |  |
| C24         | URC_SQ_VCCP       | 12   |                 |              | URC_SQ_VCCP       | 12   |                       |              |  |
| A20         | URC_SQ_HDIN_P2    | 12   |                 | T            | URC_SQ_HDIN_P2    | 12   |                       | T            |  |
| C20         | URC_SQ_VCCIB2     | 12   |                 |              | URC_SQ_VCCIB2     | 12   |                       |              |  |
| B20         | URC_SQ_HDINN2     | 12   |                 | C            | URC_SQ_HDINN2     | 12   |                       | C            |  |
| C19         | URC_SQ_VCCR_X2    | 12   |                 |              | URC_SQ_VCCR_X2    | 12   |                       |              |  |
| A23         | URC_SQ_HDOUT_P2   | 12   |                 | T            | URC_SQ_HDOUT_P2   | 12   |                       | T            |  |
| C23         | URC_SQ_VCCOB2     | 12   |                 |              | URC_SQ_VCCOB2     | 12   |                       |              |  |
| B23         | URC_SQ_HDOUTN2    | 12   |                 | C            | URC_SQ_HDOUTN2    | 12   |                       | C            |  |
| C22         | URC_SQ_VCCTX2     | 12   |                 |              | URC_SQ_VCCTX2     | 12   |                       |              |  |
| B22         | URC_SQ_HDOUTN3    | 12   |                 | C            | URC_SQ_HDOUTN3    | 12   |                       | C            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| A21         | URC_SQ_VCCOB3     | 12   |               |              | URC_SQ_VCCOB3     | 12   |               |              |  |
| A22         | URC_SQ_HDOUTP3    | 12   |               | T            | URC_SQ_HDOUTP3    | 12   |               | T            |  |
| C21         | URC_SQ_VCCTX3     | 12   |               |              | URC_SQ_VCCTX3     | 12   |               |              |  |
| B19         | URC_SQ_HDINN3     | 12   |               | C            | URC_SQ_HDINN3     | 12   |               | C            |  |
| B18         | URC_SQ_VCCIB3     | 12   |               |              | URC_SQ_VCCIB3     | 12   |               |              |  |
| A19         | URC_SQ_HDINP3     | 12   |               | T            | URC_SQ_HDINP3     | 12   |               | T            |  |
| C18         | URC_SQ_VCCRX3     | 12   |               |              | URC_SQ_VCCRX3     | 12   |               |              |  |
| D23         | PT73B             | 1    |               | C            | PT82B             | 1    |               | C            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| E21         | PT73A             | 1    |               | T            | PT82A             | 1    |               | T            |  |
| D26         | PT72B             | 1    |               | C            | PT81B             | 1    |               | C            |  |
| E26         | PT72A             | 1    |               | T            | PT81A             | 1    |               | T            |  |
| E23         | PT71B             | 1    |               | C            | PT80B             | 1    |               | C            |  |
| -           | -                 | -    |               |              | VCCIO1            | 1    |               |              |  |
| G22         | PT71A             | 1    |               | T            | PT80A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | -                 | -    |               |              |  |
| D22         | PT70B             | 1    |               | C            | PT79B             | 1    |               | C            |  |
| F21         | PT70A             | 1    |               | T            | PT79A             | 1    |               | T            |  |
| G18         | PT69B             | 1    |               | C            | PT78B             | 1    |               | C            |  |
| H18         | PT69A             | 1    |               | T            | PT78A             | 1    |               | T            |  |
| D20         | PT68B             | 1    |               | C            | PT77B             | 1    |               | C            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| D21         | PT68A             | 1    |               | T            | PT77A             | 1    |               | T            |  |
| E20         | PT67B             | 1    |               | C            | PT76B             | 1    |               | C            |  |
| E19         | PT67A             | 1    |               | T            | PT76A             | 1    |               | T            |  |
| D19         | PT66B             | 1    |               | C            | PT75B             | 1    |               | C            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E18         | PT66A             | 1    |               | T            | PT75A             | 1    |               | T            |  |
| D18         | PT65B             | 1    |               | C            | PT74B             | 1    |               | C            |  |
| C17         | PT65A             | 1    |               | T            | PT74A             | 1    |               | T            |  |
| A17         | PT64B             | 1    |               | C            | PT73B             | 1    |               | C            |  |
| B17         | PT64A             | 1    |               | T            | PT73A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| J18         | NC                | -    |               |              | PT66B             | 1    |               | C            |  |
| J19         | NC                | -    |               |              | PT66A             | 1    |               | T            |  |
| H17         | NC                | -    |               |              | PT65B             | 1    |               | C            |  |
| J17         | NC                | -    |               |              | PT65A             | 1    |               | T            |  |
| F18         | NC                | -    |               |              | PT64B             | 1    |               | C            |  |
| F17         | NC                | -    |               |              | PT64A             | 1    |               | T            |  |
| -           | -                 | -    |               |              | GNDIO1            | -    |               |              |  |
| A16         | PT54B             | 1    |               | C            | PT63B             | 1    |               | C            |  |
| B16         | PT54A             | 1    |               | T            | PT63A             | 1    |               | T            |  |
| G17         | PT53B             | 1    |               | C            | PT62B             | 1    |               | C            |  |
| G16         | PT53A             | 1    |               | T            | PT62A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H16         | PT52B             | 1    |               | C            | PT61B             | 1    |               | C            |  |
| F16         | PT52A             | 1    |               | T            | PT61A             | 1    |               | T            |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| J16         | PT51B             | 1    |               | C            | PT60B             | 1    |               | C            |  |
| G15         | PT51A             | 1    |               | T            | PT60A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| C16         | PT50B             | 1    |               | C            | PT59B             | 1    |               | C            |  |
| D16         | PT50A             | 1    |               | T            | PT59A             | 1    |               | T            |  |
| J15         | PT49B             | 1    |               | C            | PT58B             | 1    |               | C            |  |
| H15         | PT49A             | 1    |               | T            | PT58A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| A15         | PT48B             | 1    | VREF2_1       | C            | PT57B             | 1    | VREF2_1       | C            |  |
| B15         | PT48A             | 1    | VREF1_1       | T            | PT57A             | 1    | VREF1_1       | T            |  |
| F15         | PT47B             | 1    | PCLKC1_0      | C            | PT56B             | 1    | PCLKC1_0      | C            |  |
| E16         | PT47A             | 1    | PCLKT1_0      | T            | PT56A             | 1    | PCLKT1_0      | T            |  |
| C15         | PT46B             | 0    | PCLKC0_0      | C            | PT55B             | 0    | PCLKC0_0      | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| D15         | PT46A             | 0    | PCLKT0_0      | T            | PT55A             | 0    | PCLKT0_0      | T            |  |
| C14         | PT45B             | 0    | VREF2_0       | C            | PT54B             | 0    | VREF2_0       | C            |  |
| E15         | PT45A             | 0    | VREF1_0       | T            | PT54A             | 0    | VREF1_0       | T            |  |
| G14         | PT44B             | 0    |               | C            | PT53B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| J14         | PT44A             | 0    |               | T            | PT53A             | 0    |               | T            |  |
| F14         | PT43B             | 0    |               | C            | PT52B             | 0    |               | C            |  |
| H14         | PT43A             | 0    |               | T            | PT52A             | 0    |               | T            |  |
| A14         | PT42B             | 0    |               | C            | PT51B             | 0    |               | C            |  |
| B14         | PT42A             | 0    |               | T            | PT51A             | 0    |               | T            |  |
| D13         | PT41B             | 0    |               | C            | PT50B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| F13         | PT41A             | 0    |               | T            | PT50A             | 0    |               | T            |  |
| G13         | PT40B             | 0    |               | C            | PT49B             | 0    |               | C            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| J11         | PT40A             | 0    |               | T            | PT49A             | 0    |               | T            |  |
| D4          | PT38B             | 0    |               | C            | PT47B             | 0    |               | C            |  |
| D5          | PT38A             | 0    |               | T            | PT47A             | 0    |               | T            |  |
| E5          | PT37B             | 0    |               | C            | PT46B             | 0    |               | C            |  |
| F6          | PT37A             | 0    |               | T            | PT46A             | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F7          | PT34B             | 0    |               | C            | PT43B             | 0    |               | C            |  |
| D8          | PT34A             | 0    |               | T            | PT43A             | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| J13         | PT32B             | 0    |               | C            | PT41B             | 0    |               | C            |  |
| G11         | PT32A             | 0    |               | T            | PT41A             | 0    |               | T            |  |
| H13         | PT31B             | 0    |               | C            | PT40B             | 0    |               | C            |  |
| H12         | PT31A             | 0    |               | T            | PT40A             | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E8          | PT30B             | 0    |               | C            | PT39B             | 0    |               | C            |  |
| D9          | PT30A             | 0    |               | T            | PT39A             | 0    |               | T            |  |
| D12         | PT28B             | 0    |               | C            | PT37B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| E13         | PT28A             | 0    |               | T            | PT37A             | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| J12         | PT5B              | 0    |               | C            | PT31B             | 0    |               | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | -                 | -    |               |              |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H10         | PT5A              | 0    |               | T            | PT31A             | 0    |               | T            |  |
| E12         | PT4B              | 0    |               | C            | PT30B             | 0    |               | C            |  |
| D11         | PT4A              | 0    |               | T            | PT30A             | 0    |               | T            |  |
| H11         | PT3B              | 0    |               | C            | PT29B             | 0    |               | C            |  |
| F11         | PT3A              | 0    |               | T            | PT29A             | 0    |               | T            |  |
| C13         | VCC               | -    |               |              | ULC_SQ_VCCR0      | 11   |               |              |  |
| A12         | PT19A             | 0    |               | T            | ULC_SQ_HDINP0     | 11   |               | T            |  |
| B13         | NC                | -    |               |              | ULC_SQ_VCCIB0     | 11   |               |              |  |
| B12         | PT19B             | 0    |               | C            | ULC_SQ_HDINN0     | 11   |               | C            |  |
| C10         | VCC               | -    |               |              | ULC_SQ_VCCTX0     | 11   |               |              |  |
| A9          | PT17A             | 0    |               | T            | ULC_SQ_HDOUTP0    | 11   |               | T            |  |
| A10         | NC                | -    |               |              | ULC_SQ_VCCOB0     | 11   |               |              |  |
| B9          | PT17B             | 0    |               | C            | ULC_SQ_HDOUTN0    | 11   |               | C            |  |
| C9          | VCC               | -    |               |              | ULC_SQ_VCCTX1     | 11   |               |              |  |
| B8          | PT18B             | 0    |               | C            | ULC_SQ_HDOUTN1    | 11   |               | C            |  |
| C8          | NC                | -    |               |              | ULC_SQ_VCCOB1     | 11   |               |              |  |
| A8          | PT18A             | 0    |               | T            | ULC_SQ_HDOUTP1    | 11   |               | T            |  |
| C12         | VCC               | -    |               |              | ULC_SQ_VCCR1      | 11   |               |              |  |
| B11         | PT16B             | 0    |               | C            | ULC_SQ_HDINN1     | 11   |               | C            |  |
| C11         | NC                | -    |               |              | ULC_SQ_VCCIB1     | 11   |               |              |  |
| A11         | PT16A             | 0    |               | T            | ULC_SQ_HDINP1     | 11   |               | T            |  |
| B7          | VCCAUX            | -    |               |              | ULC_SQ_VCCAUX33   | 11   |               |              |  |
| E7          | PT15B             | 0    |               | C            | ULC_SQ_REFCLKN    | 11   |               | C            |  |
| D7          | PT15A             | 0    |               | T            | ULC_SQ_REFCLKP    | 11   |               | T            |  |
| C7          | VCC               | -    |               |              | ULC_SQ_VCCP       | 11   |               |              |  |
| A3          | PT12A             | 0    |               | T            | ULC_SQ_HDINP2     | 11   |               | T            |  |
| C3          | NC                | -    |               |              | ULC_SQ_VCCIB2     | 11   |               |              |  |
| B3          | PT12B             | 0    |               | C            | ULC_SQ_HDINN2     | 11   |               | C            |  |
| C2          | VCC               | -    |               |              | ULC_SQ_VCCR2      | 11   |               |              |  |
| A6          | PT14A             | 0    |               | T            | ULC_SQ_HDOUTP2    | 11   |               | T            |  |
| C6          | NC                | -    |               |              | ULC_SQ_VCCOB2     | 11   |               |              |  |
| B6          | PT14B             | 0    |               | C            | ULC_SQ_HDOUTN2    | 11   |               | C            |  |
| C5          | VCC               | -    |               |              | ULC_SQ_VCCTX2     | 11   |               |              |  |
| B5          | PT13B             | 0    |               | C            | ULC_SQ_HDOUTN3    | 11   |               | C            |  |
| A4          | NC                | -    |               |              | ULC_SQ_VCCOB3     | 11   |               |              |  |
| A5          | PT13A             | 0    |               | T            | ULC_SQ_HDOUTP3    | 11   |               | T            |  |
| C4          | VCC               | -    |               |              | ULC_SQ_VCCTX3     | 11   |               |              |  |
| B2          | PT11B             | 0    |               | C            | ULC_SQ_HDINN3     | 11   |               | C            |  |
| B1          | NC                | -    |               |              | ULC_SQ_VCCIB3     | 11   |               |              |  |
| A2          | PT11A             | 0    |               | T            | ULC_SQ_HDINP3     | 11   |               | T            |  |
| C1          | VCC               | -    |               |              | ULC_SQ_VCCR3      | 11   |               |              |  |
| L12         | VCC               | -    |               |              | VCC               | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| L13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M17         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| U12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| U19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W17         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| D14         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E6          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| K12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |



## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| K13         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D17         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E22         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E25         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F19         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| K18         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| K19         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F28         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| J25         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K28         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| M21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| M24         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| N21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| N28         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| P21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| R25         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| AA28        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| AB25        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| AE28        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| T25         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| U21         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| V21         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| V28         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| W21         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| W24         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| AA18        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA19        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AE19        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AF22        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AG17        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AG25        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA12        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AA13        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE12        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AF9         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AG14        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AG6         | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AA3         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| AB6         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| AE3         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| T6          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| U10         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| V10         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| V3          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| W10         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| W7          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| F3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| J6          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| K3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| N10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| N3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| P10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| R6          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| AA25        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| AD28        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| AA10        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA11        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA20        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA21        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A1          | GND               | -    |               |              | GND               | -    |               |              |  |
| A13         | GND               | -    |               |              | GND               | -    |               |              |  |
| A18         | GND               | -    |               |              | GND               | -    |               |              |  |
| A24         | GND               | -    |               |              | GND               | -    |               |              |  |
| A30         | GND               | -    |               |              | GND               | -    |               |              |  |
| A7          | GND               | -    |               |              | GND               | -    |               |              |  |
| AA14        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA15        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA16        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA17        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AB7         | GND               | -    |               |              | GND               | -    |               |              |  |
| AD12        | GND               | -    |               |              | GND               | -    |               |              |  |
| AD19        | GND               | -    |               |              | GND               | -    |               |              |  |
| AD27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE22        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AE9         | GND               | -    |               |              | GND               | -    |               |              |  |
| AF14        | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AF17        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF25        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF6         | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ10        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ21        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AK1         | GND               | -    |               |              | GND               | -    |               |              |  |
| AK13        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK18        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK30        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK7         | GND               | -    |               |              | GND               | -    |               |              |  |
| B10         | GND               | -    |               |              | GND               | -    |               |              |  |
| B21         | GND               | -    |               |              | GND               | -    |               |              |  |
| B27         | GND               | -    |               |              | GND               | -    |               |              |  |
| B4          | GND               | -    |               |              | GND               | -    |               |              |  |
| D25         | GND               | -    |               |              | GND               | -    |               |              |  |
| D6          | GND               | -    |               |              | GND               | -    |               |              |  |
| E14         | GND               | -    |               |              | GND               | -    |               |              |  |
| E17         | GND               | -    |               |              | GND               | -    |               |              |  |
| F22         | GND               | -    |               |              | GND               | -    |               |              |  |
| F27         | GND               | -    |               |              | GND               | -    |               |              |  |
| F4          | GND               | -    |               |              | GND               | -    |               |              |  |
| F9          | GND               | -    |               |              | GND               | -    |               |              |  |
| G12         | GND               | -    |               |              | GND               | -    |               |              |  |
| G19         | GND               | -    |               |              | GND               | -    |               |              |  |
| J24         | GND               | -    |               |              | GND               | -    |               |              |  |
| J7          | GND               | -    |               |              | GND               | -    |               |              |  |
| K14         | GND               | -    |               |              | GND               | -    |               |              |  |
| K15         | GND               | -    |               |              | GND               | -    |               |              |  |
| K16         | GND               | -    |               |              | GND               | -    |               |              |  |
| K17         | GND               | -    |               |              | GND               | -    |               |              |  |
| K27         | GND               | -    |               |              | GND               | -    |               |              |  |
| K4          | GND               | -    |               |              | GND               | -    |               |              |  |
| L14         | GND               | -    |               |              | GND               | -    |               |              |  |
| L15         | GND               | -    |               |              | GND               | -    |               |              |  |
| L16         | GND               | -    |               |              | GND               | -    |               |              |  |
| L17         | GND               | -    |               |              | GND               | -    |               |              |  |
| M23         | GND               | -    |               |              | GND               | -    |               |              |  |
| M8          | GND               | -    |               |              | GND               | -    |               |              |  |
| N14         | GND               | -    |               |              | GND               | -    |               |              |  |
| N15         | GND               | -    |               |              | GND               | -    |               |              |  |
| N16         | GND               | -    |               |              | GND               | -    |               |              |  |
| N17         | GND               | -    |               |              | GND               | -    |               |              |  |
| N27         | GND               | -    |               |              | GND               | -    |               |              |  |
| N4          | GND               | -    |               |              | GND               | -    |               |              |  |
| P11         | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| P13         | GND               | -    |               |              | GND               | -    |               |              |  |
| P14         | GND               | -    |               |              | GND               | -    |               |              |  |
| P15         | GND               | -    |               |              | GND               | -    |               |              |  |
| P16         | GND               | -    |               |              | GND               | -    |               |              |  |
| P17         | GND               | -    |               |              | GND               | -    |               |              |  |
| P18         | GND               | -    |               |              | GND               | -    |               |              |  |
| P20         | GND               | -    |               |              | GND               | -    |               |              |  |
| R10         | GND               | -    |               |              | GND               | -    |               |              |  |
| R11         | GND               | -    |               |              | GND               | -    |               |              |  |
| R13         | GND               | -    |               |              | GND               | -    |               |              |  |
| R14         | GND               | -    |               |              | GND               | -    |               |              |  |
| R15         | GND               | -    |               |              | GND               | -    |               |              |  |
| R16         | GND               | -    |               |              | GND               | -    |               |              |  |
| R17         | GND               | -    |               |              | GND               | -    |               |              |  |
| R18         | GND               | -    |               |              | GND               | -    |               |              |  |
| R20         | GND               | -    |               |              | GND               | -    |               |              |  |
| R21         | GND               | -    |               |              | GND               | -    |               |              |  |
| R24         | GND               | -    |               |              | GND               | -    |               |              |  |
| R7          | GND               | -    |               |              | GND               | -    |               |              |  |
| T10         | GND               | -    |               |              | GND               | -    |               |              |  |
| T11         | GND               | -    |               |              | GND               | -    |               |              |  |
| T13         | GND               | -    |               |              | GND               | -    |               |              |  |
| T14         | GND               | -    |               |              | GND               | -    |               |              |  |
| T15         | GND               | -    |               |              | GND               | -    |               |              |  |
| T16         | GND               | -    |               |              | GND               | -    |               |              |  |
| T17         | GND               | -    |               |              | GND               | -    |               |              |  |
| T18         | GND               | -    |               |              | GND               | -    |               |              |  |
| T20         | GND               | -    |               |              | GND               | -    |               |              |  |
| T21         | GND               | -    |               |              | GND               | -    |               |              |  |
| T24         | GND               | -    |               |              | GND               | -    |               |              |  |
| T7          | GND               | -    |               |              | GND               | -    |               |              |  |
| U11         | GND               | -    |               |              | GND               | -    |               |              |  |
| U13         | GND               | -    |               |              | GND               | -    |               |              |  |
| U14         | GND               | -    |               |              | GND               | -    |               |              |  |
| U15         | GND               | -    |               |              | GND               | -    |               |              |  |
| U16         | GND               | -    |               |              | GND               | -    |               |              |  |
| U17         | GND               | -    |               |              | GND               | -    |               |              |  |
| U18         | GND               | -    |               |              | GND               | -    |               |              |  |
| U20         | GND               | -    |               |              | GND               | -    |               |              |  |
| V14         | GND               | -    |               |              | GND               | -    |               |              |  |
| V15         | GND               | -    |               |              | GND               | -    |               |              |  |
| V16         | GND               | -    |               |              | GND               | -    |               |              |  |
| V17         | GND               | -    |               |              | GND               | -    |               |              |  |
| V27         | GND               | -    |               |              | GND               | -    |               |              |  |
| V4          | GND               | -    |               |              | GND               | -    |               |              |  |
| W23         | GND               | -    |               |              | GND               | -    |               |              |  |
| W8          | GND               | -    |               |              | GND               | -    |               |              |  |
| Y14         | GND               | -    |               |              | GND               | -    |               |              |  |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| Y15         | GND               | -    |               |              | GND               | -    |               |              |
| Y16         | GND               | -    |               |              | GND               | -    |               |              |
| Y17         | GND               | -    |               |              | GND               | -    |               |              |
| AA26        | NC                | -    |               |              | NC                | -    |               |              |
| AB10        | PL73B             | 6    | LDQ71         | C (LVDS)*    | NC                | -    |               |              |
| AB11        | NC                | -    |               |              | NC                | -    |               |              |
| AB12        | NC                | -    |               |              | NC                | -    |               |              |
| AB13        | NC                | -    |               |              | NC                | -    |               |              |
| AB14        | NC                | -    |               |              | NC                | -    |               |              |
| AB15        | NC                | -    |               |              | NC                | -    |               |              |
| AB16        | NC                | -    |               |              | NC                | -    |               |              |
| AB17        | NC                | -    |               |              | NC                | -    |               |              |
| AB19        | NC                | -    |               |              | NC                | -    |               |              |
| AB20        | NC                | -    |               |              | NC                | -    |               |              |
| AB21        | NC                | -    |               |              | NC                | -    |               |              |
| AB9         | PL73A             | 6    | LDQ71         | T (LVDS)*    | NC                | -    |               |              |
| AC10        | PL74B             | 6    | LDQ71         | C            | NC                | -    |               |              |
| AC11        | NC                | -    |               |              | NC                | -    |               |              |
| AC21        | NC                | -    |               |              | NC                | -    |               |              |
| AC22        | NC                | -    |               |              | NC                | -    |               |              |
| AC8         | PL70B             | 6    | LDQ71         | C            | NC                | -    |               |              |
| AC9         | PL74A             | 6    | LDQ71         | T            | NC                | -    |               |              |
| AD21        | NC                | -    |               |              | NC                | -    |               |              |
| AD22        | NC                | -    |               |              | NC                | -    |               |              |
| AD4         | PL68A             | 6    | LDQ71         | T            | NC                | -    |               |              |
| AD5         | PL68B             | 6    | LDQ71         | C            | NC                | -    |               |              |
| AD6         | PL71A             | 6    | LDQS71        | T (LVDS)*    | NC                | -    |               |              |
| AD7         | PL72A             | 6    | LDQ71         | T            | NC                | -    |               |              |
| AD8         | PL72B             | 6    | LDQ71         | C            | NC                | -    |               |              |
| AE23        | NC                | -    |               |              | NC                | -    |               |              |
| AE5         | PL69A             | 6    | LDQ71         | T (LVDS)*    | NC                | -    |               |              |
| AE6         | PL70A             | 6    | LDQ71         | T            | NC                | -    |               |              |
| AE7         | PL71B             | 6    | LDQ71         | C (LVDS)*    | NC                | -    |               |              |
| AF20        | NC                | -    |               |              | NC                | -    |               |              |
| AF23        | NC                | -    |               |              | NC                | -    |               |              |
| AF5         | PL69B             | 6    | LDQ71         | C (LVDS)*    | NC                | -    |               |              |
| AG23        | NC                | -    |               |              | NC                | -    |               |              |
| AG26        | NC                | -    |               |              | NC                | -    |               |              |
| D10         | PT10A             | 0    |               | T            | NC                | -    |               |              |
| E10         | PT9B              | 0    |               | C            | NC                | -    |               |              |
| E11         | PT10B             | 0    |               | C            | NC                | -    |               |              |
| F10         | PT9A              | 0    |               | T            | NC                | -    |               |              |
| F20         | NC                | -    |               |              | NC                | -    |               |              |
| F23         | NC                | -    |               |              | NC                | -    |               |              |
| F8          | PL6B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |
| G10         | NC                | -    |               |              | NC                | -    |               |              |
| G20         | NC                | -    |               |              | NC                | -    |               |              |
| G21         | NC                | -    |               |              | NC                | -    |               |              |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| G7          | PL8A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| G8          | PL6A              | 7    | LDQS6****     | T (LVDS)*    | NC                | -    |               |              |  |
| G9          | PL5A              | 7    | LDQ6          | T            | NC                | -    |               |              |  |
| H19         | NC                | -    |               |              | NC                | -    |               |              |  |
| H20         | NC                | -    |               |              | NC                | -    |               |              |  |
| H21         | NC                | -    |               |              | NC                | -    |               |              |  |
| H22         | NC                | -    |               |              | NC                | -    |               |              |  |
| H6          | PL8B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| H8          | PL5B              | 7    | LDQ6          | C            | NC                | -    |               |              |  |
| H9          | PL2A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| J10         | PL2B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| J20         | NC                | -    |               |              | NC                | -    |               |              |  |
| J21         | NC                | -    |               |              | NC                | -    |               |              |  |
| J9          | PL4A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| K9          | PL4B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| R9          | NC                | -    |               |              | NC                | -    |               |              |  |
| U22         | NC                | -    |               |              | NC                | -    |               |              |  |
| W9          | NC                | -    |               |              | NC                | -    |               |              |  |
| N13         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| N18         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| V13         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| V18         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\* These sysCONFIG pins are dedicated I/O pins for configuration. The outputs are actively driven during normal device operation.

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| D2           | PL9A              | 7    | VREF2_7               | T            |
| D3           | PL9B              | 7    | VREF1_7               | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| J8           | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |
| H7           | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |
| E3           | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |
| E4           | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |
| G6           | PL13A             | 7    | LDQ15                 | T (LVDS)*    |
| F5           | PL13B             | 7    | LDQ15                 | C (LVDS)*    |
| E2           | PL14A             | 7    | LDQ15                 | T            |
| D1           | PL14B             | 7    | LDQ15                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| G5           | PL15A             | 7    | LDQS15                | T (LVDS)*    |
| G4           | PL15B             | 7    | LDQ15                 | C (LVDS)*    |
| K7           | PL16A             | 7    | LDQ15                 | T            |
| K8           | PL16B             | 7    | LDQ15                 | C            |
| E1           | PL17A             | 7    | LDQ15                 | T (LVDS)*    |
| F2           | PL17B             | 7    | LDQ15                 | C (LVDS)*    |
| F1           | PL18A             | 7    | LDQ15                 | T            |
| GNDIO        | GNDIO7            | -    |                       |              |
| G3           | PL18B             | 7    | LDQ15                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| H5           | PL25A             | 7    | LDQ23                 | T (LVDS)*    |
| H4           | PL25B             | 7    | LDQ23                 | C (LVDS)*    |
| J5           | PL26A             | 7    | LDQ23                 | T            |
| J4           | PL26B             | 7    | LDQ23                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| G2           | PL28A             | 7    | LDQ32                 | T (LVDS)*    |
| G1           | PL28B             | 7    | LDQ32                 | C (LVDS)*    |
| L9           | PL29A             | 7    | LDQ32                 | T            |
| L7           | PL29B             | 7    | LDQ32                 | C            |
| K6           | PL30A             | 7    | LDQ32                 | T (LVDS)*    |
| K5           | PL30B             | 7    | LDQ32                 | C (LVDS)*    |
| L8           | PL31A             | 7    | LDQ32                 | T            |
| L6           | PL31B             | 7    | LDQ32                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| H3           | PL32A             | 7    | LDQS32                | T (LVDS)*    |
| H2           | PL32B             | 7    | LDQ32                 | C (LVDS)*    |
| N8           | PL33A             | 7    | LDQ32                 | T            |
| M9           | PL33B             | 7    | LDQ32                 | C            |
| J3           | PL34A             | 7    | LDQ32                 | T (LVDS)*    |
| -            | -                 | -    |                       |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| J2           | PL34B             | 7    | LDQ32                 | C (LVDS)*    |
| H1           | PL35A             | 7    | LDQ32                 | T            |
| GNDIO        | GNDIO7            | -    |                       |              |
| J1           | PL35B             | 7    | LDQ32                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| L5           | PL41A             | 7    | LDQ45                 | T (LVDS)*    |
| L4           | PL41B             | 7    | LDQ45                 | C (LVDS)*    |
| N9           | PL42A             | 7    | LDQ45                 | T            |
| N7           | PL42B             | 7    | LDQ45                 | C            |
| K2           | PL43A             | 7    | LDQ45                 | T (LVDS)*    |
| K1           | PL43B             | 7    | LDQ45                 | C (LVDS)*    |
| P9           | PL44A             | 7    | LDQ45                 | T            |
| P7           | PL44B             | 7    | LDQ45                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| M6           | PL45A             | 7    | LDQS45                | T (LVDS)*    |
| M5           | PL45B             | 7    | LDQ45                 | C (LVDS)*    |
| N5           | PL46A             | 7    | LDQ45                 | T            |
| N6           | PL46B             | 7    | LDQ45                 | C            |
| M4           | PL47A             | 7    | LDQ45                 | T (LVDS)*    |
| M3           | PL47B             | 7    | LDQ45                 | C (LVDS)*    |
| P6           | PL48A             | 7    | LDQ45                 | T            |
| GNDIO        | GNDIO7            | -    |                       |              |
| P8           | PL48B             | 7    | LDQ45                 | C            |
| L3           | PL50A             | 7    | LUM3_SPLLT_IN_A/LDQ54 | T (LVDS)*    |
| L2           | PL50B             | 7    | LUM3_SPLLC_IN_A/LDQ54 | C (LVDS)*    |
| P5           | PL51A             | 7    | LUM3_SPLLT_FB_A/LDQ54 | T            |
| P4           | PL51B             | 7    | LUM3_SPLLC_FB_A/LDQ54 | C            |
| L1           | PL52A             | 7    | LDQ54                 | T (LVDS)*    |
| M2           | PL52B             | 7    | LDQ54                 | C (LVDS)*    |
| R5           | PL53A             | 7    | LDQ54                 | T            |
| R4           | PL53B             | 7    | LDQ54                 | C            |
| GNDIO        | GNDIO7            | -    |                       |              |
| M1           | PL54A             | 7    | LDQS54                | T (LVDS)*    |
| N2           | PL54B             | 7    | LDQ54                 | C (LVDS)*    |
| R8           | PL55A             | 7    | LDQ54                 | T            |
| T9           | PL55B             | 7    | LDQ54                 | C            |
| P3           | PL56A             | 7    | LDQ54                 | T (LVDS)*    |
| P2           | PL56B             | 7    | LDQ54                 | C (LVDS)*    |
| N1           | PL57A             | 7    | PCLKT7_0/LDQ54        | T            |
| GNDIO        | GNDIO7            | -    |                       |              |
| P1           | PL57B             | 7    | PCLKC7_0/LDQ54        | C            |
| T5           | PL59A             | 6    | PCLKT6_0/LDQ63        | T (LVDS)*    |
| T4           | PL59B             | 6    | PCLKC6_0/LDQ63        | C (LVDS)*    |



**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| U7           | PL60A             | 6    | VREF2_6/LDQ63         | T            |
| T8           | PL60B             | 6    | VREF1_6/LDQ63         | C            |
| R3           | PL61A             | 6    | LDQ63                 | T (LVDS)*    |
| VCCIO        | VCCIO6            | 6    |                       |              |
| R2           | PL61B             | 6    | LDQ63                 | C (LVDS)*    |
| R1           | PL62A             | 6    | LDQ63                 | T            |
| T1           | PL62B             | 6    | LDQ63                 | C            |
| GNDIO        | GNDIO6            | -    |                       |              |
| VCCIO        | VCCIO6            | 6    |                       |              |
| T3           | PL65A             | 6    | LLM4_SPLLT_IN_A/LDQ63 | T (LVDS)*    |
| T2           | PL65B             | 6    | LLM4_SPLLC_IN_A/LDQ63 | C (LVDS)*    |
| U9           | PL66A             | 6    | LLM4_SPLLT_FB_A/LDQ63 | T            |
| U8           | PL66B             | 6    | LLM4_SPLLC_FB_A/LDQ63 | C            |
| GNDIO        | GNDIO6            | -    |                       |              |
| U5           | PL68A             | 6    | LDQ72                 | T (LVDS)*    |
| U4           | PL68B             | 6    | LDQ72                 | C (LVDS)*    |
| V9           | PL69A             | 6    | LDQ72                 | T            |
| V7           | PL69B             | 6    | LDQ72                 | C            |
| VCCIO        | VCCIO6            | 6    |                       |              |
| U3           | PL70A             | 6    | LDQ72                 | T (LVDS)*    |
| U2           | PL70B             | 6    | LDQ72                 | C (LVDS)*    |
| V8           | PL71A             | 6    | LDQ72                 | T            |
| U6           | PL71B             | 6    | LDQ72                 | C            |
| GNDIO        | GNDIO6            | -    |                       |              |
| U1           | PL72A             | 6    | LDQS72                | T (LVDS)*    |
| V2           | PL72B             | 6    | LDQ72                 | C (LVDS)*    |
| V5           | PL73A             | 6    | LDQ72                 | T            |
| VCCIO        | VCCIO6            | 6    |                       |              |
| V6           | PL73B             | 6    | LDQ72                 | C            |
| V1           | PL74A             | 6    | LDQ72                 | T (LVDS)*    |
| W1           | PL74B             | 6    | LDQ72                 | C (LVDS)*    |
| W5           | PL75A             | 6    | LDQ72                 | T            |
| GNDIO        | GNDIO6            | -    |                       |              |
| W6           | PL75B             | 6    | LDQ72                 | C            |
| W3           | PL77A             | 6    | LDQ81                 | T (LVDS)*    |
| W4           | PL77B             | 6    | LDQ81                 | C (LVDS)*    |
| W2           | PL78A             | 6    | LDQ81                 | T            |
| Y4           | PL78B             | 6    | LDQ81                 | C            |
| Y1           | PL79A             | 6    | LDQ81                 | T (LVDS)*    |
| VCCIO        | VCCIO6            | 6    |                       |              |
| Y2           | PL79B             | 6    | LDQ81                 | C (LVDS)*    |
| Y5           | PL80A             | 6    | LDQ81                 | T            |
| Y6           | PL80B             | 6    | LDQ81                 | C            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                          |              |
|--------------|-------------------|------|--------------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function            | Differential |
| AA1          | PL81A             | 6    | LDQS81                   | T (LVDS)*    |
| GNDIO        | GNDIO6            | -    |                          |              |
| AA2          | PL81B             | 6    | LDQ81                    | C (LVDS)*    |
| Y3           | PL82A             | 6    | LDQ81                    | T            |
| AB1          | PL82B             | 6    | LDQ81                    | C            |
| VCCIO        | VCCIO6            | 6    |                          |              |
| Y9           | PL83A             | 6    | LDQ81                    | T (LVDS)*    |
| Y8           | PL83B             | 6    | LDQ81                    | C (LVDS)*    |
| Y7           | PL84A             | 6    | LDQ81                    | T            |
| AA7          | PL84B             | 6    | LDQ81                    | C            |
| GNDIO        | GNDIO6            | -    |                          |              |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AB2          | PL95A             | 6    | LDQ99                    | T (LVDS)*    |
| AB3          | PL95B             | 6    | LDQ99                    | C (LVDS)*    |
| AA5          | PL96A             | 6    | LDQ99                    | T            |
| AA6          | PL96B             | 6    | LDQ99                    | C            |
| AB4          | PL97A             | 6    | LDQ99                    | T (LVDS)*    |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AB5          | PL97B             | 6    | LDQ99                    | C (LVDS)*    |
| AA8          | PL98A             | 6    | LDQ99                    | T            |
| AA9          | PL98B             | 6    | LDQ99                    | C            |
| AC1          | PL99A             | 6    | LLM0_GPLLT_IN_A**/LDQS99 | T (LVDS)*    |
| GNDIO        | GNDIO6            | -    |                          |              |
| AC2          | PL99B             | 6    | LLM0_GPLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AC4          | PL100A            | 6    | LLM0_GPLLT_FB_A/LDQ99    | T            |
| AC3          | PL100B            | 6    | LLM0_GPLLC_FB_A/LDQ99    | C            |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AC7          | PL101A            | 6    | LLM0_GDLLT_IN_A**/LDQ99  | T (LVDS)*    |
| AC6          | PL101B            | 6    | LLM0_GDLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AC5          | PL102A            | 6    | LLM0_GDLLT_FB_A/LDQ99    | T            |
| AD3          | PL102B            | 6    | LLM0_GDLLC_FB_A/LDQ99    | C            |
| GNDIO        | GNDIO6            | -    |                          |              |
| AB8          | LLM0_PLLCAP       | 6    |                          |              |
| AD2          | PL104A            | 6    |                          | T            |
| AD1          | PL104B            | 6    |                          | C            |
| AE2          | TCK               | -    |                          |              |
| AE1          | TDI               | -    |                          |              |
| AF2          | TMS               | -    |                          |              |
| AF1          | TDO               | -    |                          |              |
| AG1          | VCCJ              | -    |                          |              |
| AH1          | LLC_SQ_VCCR3      | 14   |                          |              |
| AK2          | LLC_SQ_HDINP3     | 14   |                          | T            |
| AJ1          | LLC_SQ_VCCIB3     | 14   |                          |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| AJ2          | LLC_SQ_HDINN3     | 14   |               | C            |
| AH4          | LLC_SQ_VCCTX3     | 14   |               |              |
| AK5          | LLC_SQ_HDOUTP3    | 14   |               | T            |
| AK4          | LLC_SQ_VCCOB3     | 14   |               |              |
| AJ5          | LLC_SQ_HDOUTN3    | 14   |               | C            |
| AH5          | LLC_SQ_VCCTX2     | 14   |               |              |
| AJ6          | LLC_SQ_HDOUTN2    | 14   |               | C            |
| AH6          | LLC_SQ_VCCOB2     | 14   |               |              |
| AK6          | LLC_SQ_HDOUTP2    | 14   |               | T            |
| AH2          | LLC_SQ_VCCR2      | 14   |               |              |
| AJ3          | LLC_SQ_HDINN2     | 14   |               | C            |
| AH3          | LLC_SQ_VCCIB2     | 14   |               |              |
| AK3          | LLC_SQ_HDINP2     | 14   |               | T            |
| AH7          | LLC_SQ_VCCP       | 14   |               |              |
| AG7          | LLC_SQ_REFCLKP    | 14   |               | T            |
| AF7          | LLC_SQ_REFCLKN    | 14   |               | C            |
| AJ7          | LLC_SQ_VCCAUX33   | 14   |               |              |
| AK11         | LLC_SQ_HDINP1     | 14   |               | T            |
| AH11         | LLC_SQ_VCCIB1     | 14   |               |              |
| AJ11         | LLC_SQ_HDINN1     | 14   |               | C            |
| AH12         | LLC_SQ_VCCR1      | 14   |               |              |
| AK8          | LLC_SQ_HDOUTP1    | 14   |               | T            |
| AH8          | LLC_SQ_VCCOB1     | 14   |               |              |
| AJ8          | LLC_SQ_HDOUTN1    | 14   |               | C            |
| AH9          | LLC_SQ_VCCTX1     | 14   |               |              |
| AJ9          | LLC_SQ_HDOUTN0    | 14   |               | C            |
| AK10         | LLC_SQ_VCCOB0     | 14   |               |              |
| AK9          | LLC_SQ_HDOUTP0    | 14   |               | T            |
| AH10         | LLC_SQ_VCCTX0     | 14   |               |              |
| AJ12         | LLC_SQ_HDINN0     | 14   |               | C            |
| AJ13         | LLC_SQ_VCCIB0     | 14   |               |              |
| AK12         | LLC_SQ_HDINP0     | 14   |               | T            |
| AH13         | LLC_SQ_VCCR0      | 14   |               |              |
| AF10         | PB30A             | 5    | BDQ33         | T            |
| AE8          | PB30B             | 5    | BDQ33         | C            |
| AE11         | PB31A             | 5    | BDQ33         | T            |
| VCCIO        | VCCIO5            | 5    |               |              |
| AD9          | PB31B             | 5    | BDQ33         | C            |
| AE10         | PB32A             | 5    | BDQ33         | T            |
| AD10         | PB32B             | 5    | BDQ33         | C            |
| AE13         | PB33A             | 5    | BDQS33        | T            |
| GNDIO        | GNDIO5            | -    |               |              |
| AC12         | PB33B             | 5    | BDQ33         | C            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                |              |
|--------------|-------------------|------|----------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function  | Differential |
| AG2          | PB34A             | 5    | BDQ33          | T            |
| AG3          | PB34B             | 5    | BDQ33          | C            |
| AD13         | PB35A             | 5    | BDQ33          | T            |
| VCCIO        | VCCIO5            | 5    |                |              |
| AC13         | PB35B             | 5    | BDQ33          | C            |
| AE14         | PB36A             | 5    | BDQ33          | T            |
| AC14         | PB36B             | 5    | BDQ33          | C            |
| AF3          | PB37A             | 5    | BDQ33          | T            |
| GNDIO        | GNDIO5            | -    |                |              |
| AF4          | PB37B             | 5    | BDQ33          | C            |
| -            | -                 | -    |                |              |
| AG4          | PB38A             | 5    | BDQ42          | T            |
| AG5          | PB38B             | 5    | BDQ42          | C            |
| GNDIO        | GNDIO5            | -    |                |              |
| -            | -                 | -    |                |              |
| AD11         | PB48A             | 5    | BDQ51          | T            |
| AF13         | PB48B             | 5    | BDQ51          | C            |
| AF12         | PB49A             | 5    | BDQ51          | T            |
| VCCIO        | VCCIO5            | 5    |                |              |
| AD14         | PB49B             | 5    | BDQ51          | C            |
| AG8          | PB50A             | 5    | BDQ51          | T            |
| AF8          | PB50B             | 5    | BDQ51          | C            |
| AE15         | PB51A             | 5    | BDQS51****     | T            |
| GNDIO        | GNDIO5            | -    |                |              |
| -            | -                 | -    |                |              |
| AC15         | PB51B             | 5    | BDQ51          | C            |
| VCCIO        | VCCIO5            | 5    |                |              |
| GNDIO        | GNDIO5            | -    |                |              |
| AD15         | PB56A             | 5    | BDQ60          | T            |
| AF15         | PB56B             | 5    | BDQ60          | C            |
| AG10         | PB57A             | 5    | BDQ60          | T            |
| AG9          | PB57B             | 5    | BDQ60          | C            |
| AH14         | PB58A             | 5    | BDQ60          | T            |
| AG12         | PB58B             | 5    | BDQ60          | C            |
| VCCIO        | VCCIO5            | 5    |                |              |
| AG15         | PB59A             | 5    | BDQ60          | T            |
| AG13         | PB59B             | 5    | BDQ60          | C            |
| GNDIO        | GNDIO5            | -    |                |              |
| AF16         | PB60A             | 5    | BDQS60         | T            |
| AH15         | PB60B             | 5    | BDQ60          | C            |
| AC16         | PB61A             | 5    | VREF2_5/BDQ60  | T            |
| AE16         | PB61B             | 5    | VREF1_5/BDQ60  | C            |
| AG11         | PB62A             | 5    | PCLKT5_0/BDQ60 | T            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                |              |
|--------------|-------------------|------|----------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function  | Differential |
| AF11         | PB62B             | 5    | PCLKC5_0/BDQ60 | C            |
| VCCIO        | VCCIO5            | 5    |                |              |
| GNDIO        | GNDIO5            | -    |                |              |
| AJ14         | PB67A             | 4    | PCLKT4_0/BDQ69 | T            |
| VCCIO        | VCCIO4            | 4    |                |              |
| AK14         | PB67B             | 4    | PCLKC4_0/BDQ69 | C            |
| AK15         | PB68A             | 4    | VREF2_4/BDQ69  | T            |
| AK16         | PB68B             | 4    | VREF1_4/BDQ69  | C            |
| AF18         | PB69A             | 4    | BDQS69         | T            |
| GNDIO        | GNDIO4            | -    |                |              |
| AD16         | PB69B             | 4    | BDQ69          | C            |
| AJ15         | PB70A             | 4    | BDQ69          | T            |
| AG16         | PB70B             | 4    | BDQ69          | C            |
| AE17         | PB71A             | 4    | BDQ69          | T            |
| VCCIO        | VCCIO4            | 4    |                |              |
| AC17         | PB71B             | 4    | BDQ69          | C            |
| AH16         | PB72A             | 4    | BDQ69          | T            |
| AK17         | PB72B             | 4    | BDQ69          | C            |
| AG20         | PB73A             | 4    | BDQ69          | T            |
| GNDIO        | GNDIO4            | -    |                |              |
| AG21         | PB73B             | 4    | BDQ69          | C            |
| AG18         | PB74A             | 4    | BDQ78          | T            |
| AJ16         | PB74B             | 4    | BDQ78          | C            |
| AF21         | PB75A             | 4    | BDQ78          | T            |
| AG22         | PB75B             | 4    | BDQ78          | C            |
| AD17         | PB76A             | 4    | BDQ78          | T            |
| AF19         | PB76B             | 4    | BDQ78          | C            |
| VCCIO        | VCCIO4            | 4    |                |              |
| GNDIO        | GNDIO4            | -    |                |              |
| AH17         | PB80A             | 4    | BDQ78          | T            |
| AJ17         | PB80B             | 4    | BDQ78          | C            |
| VCCIO        | VCCIO4            | 4    |                |              |
| AF26         | PB82A             | 4    | BDQ78          | T            |
| AE25         | PB82B             | 4    | BDQ78          | C            |
| GNDIO        | GNDIO4            | -    |                |              |
| AD24         | PB92A             | 4    | BDQ96          | T            |
| AE24         | PB92B             | 4    | BDQ96          | C            |
| AD18         | PB93A             | 4    | BDQ96          | T            |
| AC18         | PB93B             | 4    | BDQ96          | C            |
| AE18         | PB94A             | 4    | BDQ96          | T            |
| AG19         | PB94B             | 4    | BDQ96          | C            |
| VCCIO        | VCCIO4            | 4    |                |              |
| GNDIO        | GNDIO4            | -    |                |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| AC19         | PB96A             | 4    | BDQS96        | T            |
| AD20         | PB96B             | 4    | BDQ96         | C            |
| AB18         | PB97A             | 4    | BDQ96         | T            |
| AC20         | PB97B             | 4    | BDQ96         | C            |
| AE20         | PB98A             | 4    | BDQ96         | T            |
| AE21         | PB98B             | 4    | BDQ96         | C            |
| VCCIO        | VCCIO4            | 4    |               |              |
| AC23         | PB99A             | 4    | BDQ96         | T            |
| AD23         | PB99B             | 4    | BDQ96         | C            |
| GNDIO        | GNDIO4            | -    |               |              |
| AH18         | LRC_SQ_VCCR3      | 13   |               |              |
| AK19         | LRC_SQ_HDINP3     | 13   |               | T            |
| AJ18         | LRC_SQ_VCCIB3     | 13   |               |              |
| AJ19         | LRC_SQ_HDINN3     | 13   |               | C            |
| AH21         | LRC_SQ_VCCTX3     | 13   |               |              |
| AK22         | LRC_SQ_HDOUTP3    | 13   |               | T            |
| AK21         | LRC_SQ_VCCOB3     | 13   |               |              |
| AJ22         | LRC_SQ_HDOUTN3    | 13   |               | C            |
| AH22         | LRC_SQ_VCCTX2     | 13   |               |              |
| AJ23         | LRC_SQ_HDOUTN2    | 13   |               | C            |
| AH23         | LRC_SQ_VCCOB2     | 13   |               |              |
| AK23         | LRC_SQ_HDOUTP2    | 13   |               | T            |
| AH19         | LRC_SQ_VCCR2      | 13   |               |              |
| AJ20         | LRC_SQ_HDINN2     | 13   |               | C            |
| AH20         | LRC_SQ_VCCIB2     | 13   |               |              |
| AK20         | LRC_SQ_HDINP2     | 13   |               | T            |
| AH24         | LRC_SQ_VCCP       | 13   |               |              |
| AG24         | LRC_SQ_REFCLKP    | 13   |               | T            |
| AF24         | LRC_SQ_REFCLKN    | 13   |               | C            |
| AJ24         | LRC_SQ_VCCAUX33   | 13   |               |              |
| AK28         | LRC_SQ_HDINP1     | 13   |               | T            |
| AH28         | LRC_SQ_VCCIB1     | 13   |               |              |
| AJ28         | LRC_SQ_HDINN1     | 13   |               | C            |
| AH29         | LRC_SQ_VCCR1      | 13   |               |              |
| AK25         | LRC_SQ_HDOUTP1    | 13   |               | T            |
| AH25         | LRC_SQ_VCCOB1     | 13   |               |              |
| AJ25         | LRC_SQ_HDOUTN1    | 13   |               | C            |
| AH26         | LRC_SQ_VCCTX1     | 13   |               |              |
| AJ26         | LRC_SQ_HDOUTN0    | 13   |               | C            |
| AK27         | LRC_SQ_VCCOB0     | 13   |               |              |
| AK26         | LRC_SQ_HDOUTP0    | 13   |               | T            |
| AH27         | LRC_SQ_VCCTX0     | 13   |               |              |
| AJ29         | LRC_SQ_HDINN0     | 13   |               | C            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                      |      |                         |              |
|--------------|----------------------|------|-------------------------|--------------|
| Ball Number  | Ball/Pad Function    | Bank | Dual Function           | Differential |
| AJ30         | LRC_SQ_VCCIB0        | 13   |                         |              |
| AK29         | LRC_SQ_HDINP0        | 13   |                         | T            |
| AH30         | LRC_SQ_VCCRX0        | 13   |                         |              |
| AG27         | CFG2                 | 8    |                         |              |
| AD25         | CFG1                 | 8    |                         |              |
| AG28         | CFG0                 | 8    |                         |              |
| AG30         | PROGRAMN             | 8    |                         |              |
| AG29         | CCLK                 | 8    |                         |              |
| AC24         | INITN                | 8    |                         |              |
| AF27         | DONE                 | 8    |                         |              |
| GNDIO        | GNDIO8               | -    |                         |              |
| AF28         | WRITEN***            | 8    |                         |              |
| AE26         | CS1N***              | 8    |                         |              |
| AB23         | CSN***               | 8    |                         |              |
| AF29         | D0/SPIFASTN***       | 8    |                         |              |
| VCCIO        | VCCIO8               | 8    |                         |              |
| AF30         | D1***                | 8    |                         |              |
| AD26         | D2***                | 8    |                         |              |
| AE29         | D3***                | 8    |                         |              |
| GNDIO        | GNDIO8               | -    |                         |              |
| AE30         | D4***                | 8    |                         |              |
| AD29         | D5***                | 8    |                         |              |
| AC25         | D6***                | 8    |                         |              |
| AD30         | D7/SPID0***          | 8    |                         |              |
| VCCIO        | VCCIO8               | 8    |                         |              |
| AA22         | DI/CSSPI0N***        | 8    |                         |              |
| AC26         | DOUT/CSON/CSSPI1N*** | 8    |                         |              |
| AA23         | BUSY/SISPI***        | 8    |                         |              |
| AB22         | RLM0_PLLCAP          | 3    |                         |              |
| AC27         | PR102B               | 3    | RLM0_GDLLC_FB_A/RDQ99   | C            |
| GNDIO        | GNDIO3               | -    |                         |              |
| AC28         | PR102A               | 3    | RLM0_GDLLT_FB_A/RDQ99   | T            |
| AC29         | PR101B               | 3    | RLM0_GDLLC_IN_A**/RDQ99 | C (LVDS)*    |
| AC30         | PR101A               | 3    | RLM0_GDLLT_IN_A**/RDQ99 | T (LVDS)*    |
| AB30         | PR100B               | 3    | RLM0_GPLLC_IN_A**/RDQ99 | C            |
| VCCIO        | VCCIO3               | 3    |                         |              |
| AA30         | PR100A               | 3    | RLM0_GPLLT_IN_A**/RDQ99 | T            |
| AB29         | PR99B                | 3    | RLM0_GPLLC_FB_A/RDQ99   | C (LVDS)*    |
| AB28         | PR99A                | 3    | RLM0_GPLLT_FB_A/RDQS99  | T (LVDS)*    |
| GNDIO        | GNDIO3               | -    |                         |              |
| Y22          | PR98B                | 3    | RDQ99                   | C            |
| Y23          | PR98A                | 3    | RDQ99                   | T            |
| AB26         | PR97B                | 3    | RDQ99                   | C (LVDS)*    |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| AB27         | PR97A             | 3    | RDQ99         | T (LVDS)*    |
| VCCIO        | VCCIO3            | 3    |               |              |
| Y24          | PR96B             | 3    | RDQ99         | C            |
| Y25          | PR96A             | 3    | RDQ99         | T            |
| AA29         | PR95B             | 3    | RDQ99         | C (LVDS)*    |
| Y28          | PR95A             | 3    | RDQ99         | T (LVDS)*    |
| Y30          | PR93B             | 3    | RDQ90         | C            |
| Y29          | PR93A             | 3    | RDQ90         | T            |
| GNDIO        | GNDIO3            | -    |               |              |
| VCCIO        | VCCIO3            | 3    |               |              |
| W22          | PR83B             | 3    | RDQ81         | C (LVDS)*    |
| V22          | PR83A             | 3    | RDQ81         | T (LVDS)*    |
| Y27          | PR82B             | 3    | RDQ81         | C            |
| VCCIO        | VCCIO3            | 3    |               |              |
| Y26          | PR82A             | 3    | RDQ81         | T            |
| W30          | PR81B             | 3    | RDQ81         | C (LVDS)*    |
| W29          | PR81A             | 3    | RDQS81        | T (LVDS)*    |
| GNDIO        | GNDIO3            | -    |               |              |
| W25          | PR80B             | 3    | RDQ81         | C            |
| W26          | PR80A             | 3    | RDQ81         | T            |
| U29          | PR79B             | 3    | RDQ81         | C (LVDS)*    |
| V29          | PR79A             | 3    | RDQ81         | T (LVDS)*    |
| VCCIO        | VCCIO3            | 3    |               |              |
| V30          | PR78B             | 3    | RDQ81         | C            |
| U30          | PR78A             | 3    | RDQ81         | T            |
| W27          | PR77B             | 3    | RDQ81         | C (LVDS)*    |
| W28          | PR77A             | 3    | RDQ81         | T (LVDS)*    |
| V24          | PR75B             | 3    | RDQ72         | C            |
| V25          | PR75A             | 3    | RDQ72         | T            |
| GNDIO        | GNDIO3            | -    |               |              |
| U28          | PR74B             | 3    | RDQ72         | C (LVDS)*    |
| U27          | PR74A             | 3    | RDQ72         | T (LVDS)*    |
| U23          | PR73B             | 3    | RDQ72         | C            |
| V23          | PR73A             | 3    | RDQ72         | T            |
| VCCIO        | VCCIO3            | 3    |               |              |
| V26          | PR72B             | 3    | RDQ72         | C (LVDS)*    |
| U26          | PR72A             | 3    | RDQS72        | T (LVDS)*    |
| U25          | PR71B             | 3    | RDQ72         | C            |
| GNDIO        | GNDIO3            | -    |               |              |
| U24          | PR71A             | 3    | RDQ72         | T            |
| T30          | PR70B             | 3    | RDQ72         | C (LVDS)*    |
| R30          | PR70A             | 3    | RDQ72         | T (LVDS)*    |
| T23          | PR69B             | 3    | RDQ72         | C            |



**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| VCCIO        | VCCIO3            | 3    |                       |              |
| T22          | PR69A             | 3    | RDQ72                 | T            |
| T29          | PR68B             | 3    | RDQ72                 | C (LVDS)*    |
| T28          | PR68A             | 3    | RDQ72                 | T (LVDS)*    |
| R23          | PR66B             | 3    | RLM4_SPLLC_FB_A/RDQ63 | C            |
| GNDIO        | GNDIO3            | -    |                       |              |
| -            | -                 | -    |                       |              |
| R22          | PR66A             | 3    | RLM4_SPLLT_FB_A/RDQ63 | T            |
| P30          | PR65B             | 3    | RLM4_SPLLC_IN_A/RDQ63 | C (LVDS)*    |
| R29          | PR65A             | 3    | RLM4_SPLLT_IN_A/RDQ63 | T (LVDS)*    |
| T27          | PR64B             | 3    | RDQ63                 | C            |
| VCCIO        | VCCIO3            | 3    |                       |              |
| T26          | PR64A             | 3    | RDQ63                 | T            |
| GNDIO        | GNDIO3            | -    |                       |              |
| N30          | PR61B             | 3    | RDQ63                 | C (LVDS)*    |
| N29          | PR61A             | 3    | RDQ63                 | T (LVDS)*    |
| VCCIO        | VCCIO3            | 3    |                       |              |
| R27          | PR60B             | 3    | VREF2_3/RDQ63         | C            |
| R28          | PR60A             | 3    | VREF1_3/RDQ63         | T            |
| P29          | PR59B             | 3    | PCLKC3_0/RDQ63        | C (LVDS)*    |
| P28          | PR59A             | 3    | PCLKT3_0/RDQ63        | T (LVDS)*    |
| M30          | PR57B             | 2    | PCLKC2_0/RDQ54        | C            |
| M29          | PR57A             | 2    | PCLKT2_0/RDQ54        | T            |
| GNDIO        | GNDIO2            | -    |                       |              |
| P23          | PR56B             | 2    | RDQ54                 | C (LVDS)*    |
| P24          | PR56A             | 2    | RDQ54                 | T (LVDS)*    |
| R26          | PR55B             | 2    | RDQ54                 | C            |
| P27          | PR55A             | 2    | RDQ54                 | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| P25          | PR54B             | 2    | RDQ54                 | C (LVDS)*    |
| P26          | PR54A             | 2    | RDQS54                | T (LVDS)*    |
| K30          | PR53B             | 2    | RDQ54                 | C            |
| GNDIO        | GNDIO2            | -    |                       |              |
| K29          | PR53A             | 2    | RDQ54                 | T            |
| N22          | PR52B             | 2    | RDQ54                 | C (LVDS)*    |
| P22          | PR52A             | 2    | RDQ54                 | T (LVDS)*    |
| J30          | PR51B             | 2    | RUM3_SPLLC_FB_A/RDQ54 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J29          | PR51A             | 2    | RUM3_SPLLT_FB_A/RDQ54 | T            |
| N24          | PR50B             | 2    | RUM3_SPLLC_IN_A/RDQ54 | C (LVDS)*    |
| N23          | PR50A             | 2    | RUM3_SPLLT_IN_A/RDQ54 | T (LVDS)*    |
| N25          | PR48B             | 2    | RDQ45                 | C            |
| N26          | PR48A             | 2    | RDQ45                 | T            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| GNDIO        | GNDIO2            | -    |               |              |
| M27          | PR47B             | 2    | RDQ45         | C (LVDS)*    |
| M28          | PR47A             | 2    | RDQ45         | T (LVDS)*    |
| H30          | PR46B             | 2    | RDQ45         | C            |
| G30          | PR46A             | 2    | RDQ45         | T            |
| VCCIO        | VCCIO2            | 2    |               |              |
| M25          | PR45B             | 2    | RDQ45         | C (LVDS)*    |
| M26          | PR45A             | 2    | RDQS45        | T (LVDS)*    |
| L30          | PR44B             | 2    | RDQ45         | C            |
| GNDIO        | GNDIO2            | -    |               |              |
| L29          | PR44A             | 2    | RDQ45         | T            |
| L28          | PR43B             | 2    | RDQ45         | C (LVDS)*    |
| L27          | PR43A             | 2    | RDQ45         | T (LVDS)*    |
| H29          | PR42B             | 2    | RDQ45         | C            |
| VCCIO        | VCCIO2            | 2    |               |              |
| G29          | PR42A             | 2    | RDQ45         | T            |
| L22          | PR41B             | 2    | RDQ45         | C (LVDS)*    |
| M22          | PR41A             | 2    | RDQ45         | T (LVDS)*    |
| F30          | PR40B             | 2    |               | C            |
| GNDIO        | GNDIO2            | -    |               |              |
| F29          | PR40A             | 2    |               | T            |
| VCCIO        | VCCIO2            | 2    |               |              |
| GNDIO        | GNDIO2            | -    |               |              |
| E30          | PR34B             | 2    | RDQ32         | C (LVDS)*    |
| E29          | PR34A             | 2    | RDQ32         | T (LVDS)*    |
| -            | -                 | -    |               |              |
| L25          | PR33B             | 2    | RDQ32         | C            |
| L26          | PR33A             | 2    | RDQ32         | T            |
| VCCIO        | VCCIO2            | 2    |               |              |
| H28          | PR32B             | 2    | RDQ32         | C (LVDS)*    |
| J28          | PR32A             | 2    | RDQS32        | T (LVDS)*    |
| G28          | PR31B             | 2    | RDQ32         | C            |
| GNDIO        | GNDIO2            | -    |               |              |
| G27          | PR31A             | 2    | RDQ32         | T            |
| L24          | PR30B             | 2    | RDQ32         | C (LVDS)*    |
| L23          | PR30A             | 2    | RDQ32         | T (LVDS)*    |
| D30          | PR29B             | 2    | RDQ32         | C            |
| VCCIO        | VCCIO2            | 2    |               |              |
| D29          | PR29A             | 2    | RDQ32         | T            |
| K24          | PR28B             | 2    | RDQ32         | C (LVDS)*    |
| K25          | PR28A             | 2    | RDQ32         | T (LVDS)*    |
| J27          | PR26B             | 2    | RDQ23         | C            |
| GNDIO        | GNDIO2            | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| K26          | PR26A             | 2    | RDQ23                 | T            |
| K23          | PR25B             | 2    | RDQ23                 | C (LVDS)*    |
| K22          | PR25A             | 2    | RDQ23                 | T (LVDS)*    |
| J22          | PR24B             | 2    | RDQ23                 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J23          | PR24A             | 2    | RDQ23                 | T            |
| GNDIO        | GNDIO2            | -    |                       |              |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J26          | PR17B             | 2    | RDQ15                 | C (LVDS)*    |
| H26          | PR17A             | 2    | RDQ15                 | T (LVDS)*    |
| H27          | PR16B             | 2    | RDQ15                 | C            |
| G26          | PR16A             | 2    | RDQ15                 | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| H23          | PR15B             | 2    | RDQ15                 | C (LVDS)*    |
| H24          | PR15A             | 2    | RDQS15                | T (LVDS)*    |
| D28          | PR14B             | 2    | RDQ15                 | C            |
| GNDIO        | GNDIO2            | -    |                       |              |
| E28          | PR14A             | 2    | RDQ15                 | T            |
| G24          | PR13B             | 2    | RDQ15                 | C (LVDS)*    |
| H25          | PR13A             | 2    | RDQ15                 | T (LVDS)*    |
| D27          | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| E27          | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |
| F26          | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    |
| G25          | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |
| F24          | PR9B              | 2    | VREF2_2               | C            |
| -            | -                 | -    |                       |              |
| GNDIO        | GNDIO2            | -    |                       |              |
| F25          | PR9A              | 2    | VREF1_2               | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| G23          | XRES              | 1    |                       |              |
| C30          | URC_SQ_VCCR0      | 12   |                       |              |
| A29          | URC_SQ_HDINP0     | 12   |                       | T            |
| B30          | URC_SQ_VCCIB0     | 12   |                       |              |
| B29          | URC_SQ_HDINN0     | 12   |                       | C            |
| C27          | URC_SQ_VCCTX0     | 12   |                       |              |
| A26          | URC_SQ_HDOUTP0    | 12   |                       | T            |
| A27          | URC_SQ_VCCOB0     | 12   |                       |              |
| B26          | URC_SQ_HDOUTN0    | 12   |                       | C            |
| C26          | URC_SQ_VCCTX1     | 12   |                       |              |
| B25          | URC_SQ_HDOUTN1    | 12   |                       | C            |
| C25          | URC_SQ_VCCOB1     | 12   |                       |              |
| A25          | URC_SQ_HDOUTP1    | 12   |                       | T            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| C29          | URC_SQ_VCCR1      | 12   |               |              |
| B28          | URC_SQ_HDINN1     | 12   |               | C            |
| C28          | URC_SQ_VCCIB1     | 12   |               |              |
| A28          | URC_SQ_HDINP1     | 12   |               | T            |
| B24          | URC_SQ_VCCAUX33   | 12   |               |              |
| E24          | URC_SQ_REFCLKN    | 12   |               | C            |
| D24          | URC_SQ_REFCLKP    | 12   |               | T            |
| C24          | URC_SQ_VCCP       | 12   |               |              |
| A20          | URC_SQ_HDINP2     | 12   |               | T            |
| C20          | URC_SQ_VCCIB2     | 12   |               |              |
| B20          | URC_SQ_HDINN2     | 12   |               | C            |
| C19          | URC_SQ_VCCR2      | 12   |               |              |
| A23          | URC_SQ_HDOUTP2    | 12   |               | T            |
| C23          | URC_SQ_VCCOB2     | 12   |               |              |
| B23          | URC_SQ_HDOUTN2    | 12   |               | C            |
| C22          | URC_SQ_VCCTX2     | 12   |               |              |
| B22          | URC_SQ_HDOUTN3    | 12   |               | C            |
| A21          | URC_SQ_VCCOB3     | 12   |               |              |
| A22          | URC_SQ_HDOUTP3    | 12   |               | T            |
| C21          | URC_SQ_VCCTX3     | 12   |               |              |
| B19          | URC_SQ_HDINN3     | 12   |               | C            |
| B18          | URC_SQ_VCCIB3     | 12   |               |              |
| A19          | URC_SQ_HDINP3     | 12   |               | T            |
| C18          | URC_SQ_VCCR3      | 12   |               |              |
| D23          | PT100B            | 1    |               | C            |
| GNDIO        | GNDIO1            | -    |               |              |
| E21          | PT100A            | 1    |               | T            |
| D26          | PT99B             | 1    |               | C            |
| E26          | PT99A             | 1    |               | T            |
| E23          | PT98B             | 1    |               | C            |
| VCCIO        | VCCIO1            | 1    |               |              |
| G22          | PT98A             | 1    |               | T            |
| -            | -                 | -    |               |              |
| D22          | PT97B             | 1    |               | C            |
| F21          | PT97A             | 1    |               | T            |
| G18          | PT96B             | 1    |               | C            |
| H18          | PT96A             | 1    |               | T            |
| D20          | PT95B             | 1    |               | C            |
| GNDIO        | GNDIO1            | -    |               |              |
| D21          | PT95A             | 1    |               | T            |
| E20          | PT94B             | 1    |               | C            |
| VCCIO        | VCCIO1            | 1    |               |              |
| E19          | PT94A             | 1    |               | T            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| D19          | PT93B             | 1    |               | C            |
| E18          | PT93A             | 1    |               | T            |
| D18          | PT92B             | 1    |               | C            |
| C17          | PT92A             | 1    |               | T            |
| A17          | PT91B             | 1    |               | C            |
| B17          | PT91A             | 1    |               | T            |
| GNDIO        | GNDIO1            | -    |               |              |
| VCCIO        | VCCIO1            | 1    |               |              |
| J18          | PT75B             | 1    |               | C            |
| J19          | PT75A             | 1    |               | T            |
| H17          | PT74B             | 1    |               | C            |
| J17          | PT74A             | 1    |               | T            |
| F18          | PT73B             | 1    |               | C            |
| F17          | PT73A             | 1    |               | T            |
| GNDIO        | GNDIO1            | -    |               |              |
| A16          | PT72B             | 1    |               | C            |
| B16          | PT72A             | 1    |               | T            |
| G17          | PT71B             | 1    |               | C            |
| G16          | PT71A             | 1    |               | T            |
| VCCIO        | VCCIO1            | 1    |               |              |
| H16          | PT70B             | 1    |               | C            |
| F16          | PT70A             | 1    |               | T            |
| J16          | PT69B             | 1    |               | C            |
| G15          | PT69A             | 1    |               | T            |
| GNDIO        | GNDIO1            | -    |               |              |
| C16          | PT68B             | 1    |               | C            |
| D16          | PT68A             | 1    |               | T            |
| J15          | PT67B             | 1    |               | C            |
| H15          | PT67A             | 1    |               | T            |
| VCCIO        | VCCIO1            | 1    |               |              |
| A15          | PT66B             | 1    | VREF2_1       | C            |
| B15          | PT66A             | 1    | VREF1_1       | T            |
| F15          | PT65B             | 1    | PCLKC1_0      | C            |
| E16          | PT65A             | 1    | PCLKT1_0      | T            |
| C15          | PT64B             | 0    | PCLKC0_0      | C            |
| GNDIO        | GNDIO0            | -    |               |              |
| D15          | PT64A             | 0    | PCLKT0_0      | T            |
| C14          | PT63B             | 0    | VREF2_0       | C            |
| E15          | PT63A             | 0    | VREF1_0       | T            |
| G14          | PT62B             | 0    |               | C            |
| VCCIO        | VCCIO0            | 0    |               |              |
| J14          | PT62A             | 0    |               | T            |
| F14          | PT61B             | 0    |               | C            |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| H14          | PT61A             | 0    |               | T            |
| A14          | PT60B             | 0    |               | C            |
| B14          | PT60A             | 0    |               | T            |
| D13          | PT59B             | 0    |               | C            |
| GNDIO        | GNDIO0            | -    |               |              |
| F13          | PT59A             | 0    |               | T            |
| G13          | PT58B             | 0    |               | C            |
| VCCIO        | VCCIO0            | 0    |               |              |
| J11          | PT58A             | 0    |               | T            |
| D4           | PT57B             | 0    |               |              |
| D5           | PT56A             | 0    |               |              |
| E5           | PT55B             | 0    |               | C            |
| F6           | PT55A             | 0    |               | T            |
| GNDIO        | GNDIO0            | -    |               |              |
| VCCIO        | VCCIO0            | 0    |               |              |
| F7           | PT52B             | 0    |               | C            |
| D8           | PT52A             | 0    |               | T            |
| GNDIO        | GNDIO0            | -    |               |              |
| J13          | PT50B             | 0    |               | C            |
| G11          | PT50A             | 0    |               | T            |
| H13          | PT49B             | 0    |               | C            |
| H12          | PT49A             | 0    |               | T            |
| VCCIO        | VCCIO0            | 0    |               |              |
| E8           | PT48B             | 0    |               | C            |
| D9           | PT48A             | 0    |               | T            |
| D12          | PT46B             | 0    |               | C            |
| GNDIO        | GNDIO0            | -    |               |              |
| E13          | PT46A             | 0    |               | T            |
| VCCIO        | VCCIO0            | 0    |               |              |
| GNDIO        | GNDIO0            | -    |               |              |
| J12          | PT31B             | 0    |               | C            |
| -            | -                 | -    |               |              |
| VCCIO        | VCCIO0            | 0    |               |              |
| H10          | PT31A             | 0    |               | T            |
| E12          | PT30B             | 0    |               | C            |
| D11          | PT30A             | 0    |               | T            |
| H11          | PT29B             | 0    |               | C            |
| F11          | PT29A             | 0    |               | T            |
| C13          | ULC_SQ_VCCR0      | 11   |               |              |
| A12          | ULC_SQ_HDINP0     | 11   |               | T            |
| B13          | ULC_SQ_VCCIB0     | 11   |               |              |
| B12          | ULC_SQ_HDINN0     | 11   |               | C            |
| C10          | ULC_SQ_VCCTX0     | 11   |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| A9           | ULC_SQ_HDOUTP0    | 11   |               | T            |
| A10          | ULC_SQ_VCCOB0     | 11   |               |              |
| B9           | ULC_SQ_HDOUTN0    | 11   |               | C            |
| C9           | ULC_SQ_VCCTX1     | 11   |               |              |
| B8           | ULC_SQ_HDOUTN1    | 11   |               | C            |
| C8           | ULC_SQ_VCCOB1     | 11   |               |              |
| A8           | ULC_SQ_HDOUTP1    | 11   |               | T            |
| C12          | ULC_SQ_VCCRX1     | 11   |               |              |
| B11          | ULC_SQ_HDINN1     | 11   |               | C            |
| C11          | ULC_SQ_VCCIB1     | 11   |               |              |
| A11          | ULC_SQ_HDINP1     | 11   |               | T            |
| B7           | ULC_SQ_VCCAUX33   | 11   |               |              |
| E7           | ULC_SQ_REFCLKN    | 11   |               | C            |
| D7           | ULC_SQ_REFCLKP    | 11   |               | T            |
| C7           | ULC_SQ_VCCP       | 11   |               |              |
| A3           | ULC_SQ_HDINP2     | 11   |               | T            |
| C3           | ULC_SQ_VCCIB2     | 11   |               |              |
| B3           | ULC_SQ_HDINN2     | 11   |               | C            |
| C2           | ULC_SQ_VCCRX2     | 11   |               |              |
| A6           | ULC_SQ_HDOUTP2    | 11   |               | T            |
| C6           | ULC_SQ_VCCOB2     | 11   |               |              |
| B6           | ULC_SQ_HDOUTN2    | 11   |               | C            |
| C5           | ULC_SQ_VCCTX2     | 11   |               |              |
| B5           | ULC_SQ_HDOUTN3    | 11   |               | C            |
| A4           | ULC_SQ_VCCOB3     | 11   |               |              |
| A5           | ULC_SQ_HDOUTP3    | 11   |               | T            |
| C4           | ULC_SQ_VCCTX3     | 11   |               |              |
| B2           | ULC_SQ_HDINN3     | 11   |               | C            |
| B1           | ULC_SQ_VCCIB3     | 11   |               |              |
| A2           | ULC_SQ_HDINP3     | 11   |               | T            |
| C1           | ULC_SQ_VCCRX3     | 11   |               |              |
| L12          | VCC               | -    |               |              |
| L13          | VCC               | -    |               |              |
| L18          | VCC               | -    |               |              |
| L19          | VCC               | -    |               |              |
| M11          | VCC               | -    |               |              |
| M12          | VCC               | -    |               |              |
| M13          | VCC               | -    |               |              |
| M14          | VCC               | -    |               |              |
| M15          | VCC               | -    |               |              |
| M16          | VCC               | -    |               |              |
| M17          | VCC               | -    |               |              |
| M18          | VCC               | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| M19          | VCC               | -    |               |              |
| M20          | VCC               | -    |               |              |
| N11          | VCC               | -    |               |              |
| N12          | VCC               | -    |               |              |
| N19          | VCC               | -    |               |              |
| N20          | VCC               | -    |               |              |
| P12          | VCC               | -    |               |              |
| P19          | VCC               | -    |               |              |
| R12          | VCC               | -    |               |              |
| R19          | VCC               | -    |               |              |
| T12          | VCC               | -    |               |              |
| T19          | VCC               | -    |               |              |
| U12          | VCC               | -    |               |              |
| U19          | VCC               | -    |               |              |
| V11          | VCC               | -    |               |              |
| V12          | VCC               | -    |               |              |
| V19          | VCC               | -    |               |              |
| V20          | VCC               | -    |               |              |
| W11          | VCC               | -    |               |              |
| W12          | VCC               | -    |               |              |
| W13          | VCC               | -    |               |              |
| W14          | VCC               | -    |               |              |
| W15          | VCC               | -    |               |              |
| W16          | VCC               | -    |               |              |
| W17          | VCC               | -    |               |              |
| W18          | VCC               | -    |               |              |
| W19          | VCC               | -    |               |              |
| W20          | VCC               | -    |               |              |
| Y12          | VCC               | -    |               |              |
| Y13          | VCC               | -    |               |              |
| Y18          | VCC               | -    |               |              |
| Y19          | VCC               | -    |               |              |
| D14          | VCCIO0            | 0    |               |              |
| E6           | VCCIO0            | 0    |               |              |
| E9           | VCCIO0            | 0    |               |              |
| F12          | VCCIO0            | 0    |               |              |
| K12          | VCCIO0            | 0    |               |              |
| K13          | VCCIO0            | 0    |               |              |
| D17          | VCCIO1            | 1    |               |              |
| E22          | VCCIO1            | 1    |               |              |
| E25          | VCCIO1            | 1    |               |              |
| F19          | VCCIO1            | 1    |               |              |
| K18          | VCCIO1            | 1    |               |              |



**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| K19          | VCCIO1            | 1    |               |              |
| F28          | VCCIO2            | 2    |               |              |
| J25          | VCCIO2            | 2    |               |              |
| K28          | VCCIO2            | 2    |               |              |
| M21          | VCCIO2            | 2    |               |              |
| M24          | VCCIO2            | 2    |               |              |
| N21          | VCCIO2            | 2    |               |              |
| N28          | VCCIO2            | 2    |               |              |
| P21          | VCCIO2            | 2    |               |              |
| R25          | VCCIO2            | 2    |               |              |
| AA28         | VCCIO3            | 3    |               |              |
| AB25         | VCCIO3            | 3    |               |              |
| AE28         | VCCIO3            | 3    |               |              |
| T25          | VCCIO3            | 3    |               |              |
| U21          | VCCIO3            | 3    |               |              |
| V21          | VCCIO3            | 3    |               |              |
| V28          | VCCIO3            | 3    |               |              |
| W21          | VCCIO3            | 3    |               |              |
| W24          | VCCIO3            | 3    |               |              |
| AA18         | VCCIO4            | 4    |               |              |
| AA19         | VCCIO4            | 4    |               |              |
| AE19         | VCCIO4            | 4    |               |              |
| AF22         | VCCIO4            | 4    |               |              |
| AG17         | VCCIO4            | 4    |               |              |
| AG25         | VCCIO4            | 4    |               |              |
| AA12         | VCCIO5            | 5    |               |              |
| AA13         | VCCIO5            | 5    |               |              |
| AE12         | VCCIO5            | 5    |               |              |
| AF9          | VCCIO5            | 5    |               |              |
| AG14         | VCCIO5            | 5    |               |              |
| AG6          | VCCIO5            | 5    |               |              |
| AA3          | VCCIO6            | 6    |               |              |
| AB6          | VCCIO6            | 6    |               |              |
| AE3          | VCCIO6            | 6    |               |              |
| T6           | VCCIO6            | 6    |               |              |
| U10          | VCCIO6            | 6    |               |              |
| V10          | VCCIO6            | 6    |               |              |
| V3           | VCCIO6            | 6    |               |              |
| W10          | VCCIO6            | 6    |               |              |
| W7           | VCCIO6            | 6    |               |              |
| F3           | VCCIO7            | 7    |               |              |
| J6           | VCCIO7            | 7    |               |              |
| K3           | VCCIO7            | 7    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| M10          | VCCIO7            | 7    |               |              |
| M7           | VCCIO7            | 7    |               |              |
| N10          | VCCIO7            | 7    |               |              |
| N3           | VCCIO7            | 7    |               |              |
| P10          | VCCIO7            | 7    |               |              |
| R6           | VCCIO7            | 7    |               |              |
| AA25         | VCCIO8            | 8    |               |              |
| AD28         | VCCIO8            | 8    |               |              |
| AA10         | VCCAUX            | -    |               |              |
| AA11         | VCCAUX            | -    |               |              |
| AA20         | VCCAUX            | -    |               |              |
| AA21         | VCCAUX            | -    |               |              |
| K10          | VCCAUX            | -    |               |              |
| K11          | VCCAUX            | -    |               |              |
| K20          | VCCAUX            | -    |               |              |
| K21          | VCCAUX            | -    |               |              |
| L10          | VCCAUX            | -    |               |              |
| L11          | VCCAUX            | -    |               |              |
| L20          | VCCAUX            | -    |               |              |
| L21          | VCCAUX            | -    |               |              |
| Y10          | VCCAUX            | -    |               |              |
| Y11          | VCCAUX            | -    |               |              |
| Y20          | VCCAUX            | -    |               |              |
| Y21          | VCCAUX            | -    |               |              |
| A1           | GND               | -    |               |              |
| A13          | GND               | -    |               |              |
| A18          | GND               | -    |               |              |
| A24          | GND               | -    |               |              |
| A30          | GND               | -    |               |              |
| A7           | GND               | -    |               |              |
| AA14         | GND               | -    |               |              |
| AA15         | GND               | -    |               |              |
| AA16         | GND               | -    |               |              |
| AA17         | GND               | -    |               |              |
| AA24         | GND               | -    |               |              |
| AA27         | GND               | -    |               |              |
| AA4          | GND               | -    |               |              |
| AB24         | GND               | -    |               |              |
| AB7          | GND               | -    |               |              |
| AD12         | GND               | -    |               |              |
| AD19         | GND               | -    |               |              |
| AD27         | GND               | -    |               |              |
| AE22         | GND               | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| AE27         | GND               | -    |               |              |
| AE4          | GND               | -    |               |              |
| AE9          | GND               | -    |               |              |
| AF14         | GND               | -    |               |              |
| AF17         | GND               | -    |               |              |
| AF25         | GND               | -    |               |              |
| AF6          | GND               | -    |               |              |
| AJ10         | GND               | -    |               |              |
| AJ21         | GND               | -    |               |              |
| AJ27         | GND               | -    |               |              |
| AJ4          | GND               | -    |               |              |
| AK1          | GND               | -    |               |              |
| AK13         | GND               | -    |               |              |
| AK18         | GND               | -    |               |              |
| AK24         | GND               | -    |               |              |
| AK30         | GND               | -    |               |              |
| AK7          | GND               | -    |               |              |
| B10          | GND               | -    |               |              |
| B21          | GND               | -    |               |              |
| B27          | GND               | -    |               |              |
| B4           | GND               | -    |               |              |
| D25          | GND               | -    |               |              |
| D6           | GND               | -    |               |              |
| E14          | GND               | -    |               |              |
| E17          | GND               | -    |               |              |
| F22          | GND               | -    |               |              |
| F27          | GND               | -    |               |              |
| F4           | GND               | -    |               |              |
| F9           | GND               | -    |               |              |
| G12          | GND               | -    |               |              |
| G19          | GND               | -    |               |              |
| J24          | GND               | -    |               |              |
| J7           | GND               | -    |               |              |
| K14          | GND               | -    |               |              |
| K15          | GND               | -    |               |              |
| K16          | GND               | -    |               |              |
| K17          | GND               | -    |               |              |
| K27          | GND               | -    |               |              |
| K4           | GND               | -    |               |              |
| L14          | GND               | -    |               |              |
| L15          | GND               | -    |               |              |
| L16          | GND               | -    |               |              |
| L17          | GND               | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| M23          | GND               | -    |               |              |
| M8           | GND               | -    |               |              |
| N14          | GND               | -    |               |              |
| N15          | GND               | -    |               |              |
| N16          | GND               | -    |               |              |
| N17          | GND               | -    |               |              |
| N27          | GND               | -    |               |              |
| N4           | GND               | -    |               |              |
| P11          | GND               | -    |               |              |
| P13          | GND               | -    |               |              |
| P14          | GND               | -    |               |              |
| P15          | GND               | -    |               |              |
| P16          | GND               | -    |               |              |
| P17          | GND               | -    |               |              |
| P18          | GND               | -    |               |              |
| P20          | GND               | -    |               |              |
| R10          | GND               | -    |               |              |
| R11          | GND               | -    |               |              |
| R13          | GND               | -    |               |              |
| R14          | GND               | -    |               |              |
| R15          | GND               | -    |               |              |
| R16          | GND               | -    |               |              |
| R17          | GND               | -    |               |              |
| R18          | GND               | -    |               |              |
| R20          | GND               | -    |               |              |
| R21          | GND               | -    |               |              |
| R24          | GND               | -    |               |              |
| R7           | GND               | -    |               |              |
| T10          | GND               | -    |               |              |
| T11          | GND               | -    |               |              |
| T13          | GND               | -    |               |              |
| T14          | GND               | -    |               |              |
| T15          | GND               | -    |               |              |
| T16          | GND               | -    |               |              |
| T17          | GND               | -    |               |              |
| T18          | GND               | -    |               |              |
| T20          | GND               | -    |               |              |
| T21          | GND               | -    |               |              |
| T24          | GND               | -    |               |              |
| T7           | GND               | -    |               |              |
| U11          | GND               | -    |               |              |
| U13          | GND               | -    |               |              |
| U14          | GND               | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| U15          | GND               | -    |               |              |
| U16          | GND               | -    |               |              |
| U17          | GND               | -    |               |              |
| U18          | GND               | -    |               |              |
| U20          | GND               | -    |               |              |
| V14          | GND               | -    |               |              |
| V15          | GND               | -    |               |              |
| V16          | GND               | -    |               |              |
| V17          | GND               | -    |               |              |
| V27          | GND               | -    |               |              |
| V4           | GND               | -    |               |              |
| W23          | GND               | -    |               |              |
| W8           | GND               | -    |               |              |
| Y14          | GND               | -    |               |              |
| Y15          | GND               | -    |               |              |
| Y16          | GND               | -    |               |              |
| Y17          | GND               | -    |               |              |
| AA26         | NC                | -    |               |              |
| AB10         | NC                | -    |               |              |
| AB11         | NC                | -    |               |              |
| AB12         | NC                | -    |               |              |
| AB13         | NC                | -    |               |              |
| AB14         | NC                | -    |               |              |
| AB15         | NC                | -    |               |              |
| AB16         | NC                | -    |               |              |
| AB17         | NC                | -    |               |              |
| AB19         | NC                | -    |               |              |
| AB20         | NC                | -    |               |              |
| AB21         | NC                | -    |               |              |
| AB9          | NC                | -    |               |              |
| AC10         | NC                | -    |               |              |
| AC11         | NC                | -    |               |              |
| AC21         | NC                | -    |               |              |
| AC22         | NC                | -    |               |              |
| AC8          | NC                | -    |               |              |
| AC9          | NC                | -    |               |              |
| AD21         | NC                | -    |               |              |
| AD22         | NC                | -    |               |              |
| AD4          | NC                | -    |               |              |
| AD5          | NC                | -    |               |              |
| AD6          | NC                | -    |               |              |
| AD7          | NC                | -    |               |              |
| AD8          | NC                | -    |               |              |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| AE23         | NC                | -    |               |              |
| AE5          | NC                | -    |               |              |
| AE6          | NC                | -    |               |              |
| AE7          | NC                | -    |               |              |
| AF20         | NC                | -    |               |              |
| AF23         | NC                | -    |               |              |
| AF5          | NC                | -    |               |              |
| AG23         | NC                | -    |               |              |
| AG26         | NC                | -    |               |              |
| D10          | NC                | -    |               |              |
| E10          | NC                | -    |               |              |
| E11          | NC                | -    |               |              |
| F10          | NC                | -    |               |              |
| F20          | NC                | -    |               |              |
| F23          | NC                | -    |               |              |
| F8           | NC                | -    |               |              |
| G10          | NC                | -    |               |              |
| G20          | NC                | -    |               |              |
| G21          | NC                | -    |               |              |
| G7           | NC                | -    |               |              |
| G8           | NC                | -    |               |              |
| G9           | NC                | -    |               |              |
| H19          | NC                | -    |               |              |
| H20          | NC                | -    |               |              |
| H21          | NC                | -    |               |              |
| H22          | NC                | -    |               |              |
| H6           | NC                | -    |               |              |
| H8           | NC                | -    |               |              |
| H9           | NC                | -    |               |              |
| J10          | NC                | -    |               |              |
| J20          | NC                | -    |               |              |
| J21          | NC                | -    |               |              |
| J9           | NC                | -    |               |              |
| K9           | NC                | -    |               |              |
| R9           | NC                | -    |               |              |
| U22          | NC                | -    |               |              |
| W9           | NC                | -    |               |              |
| N13          | VCCPLL            | -    |               |              |
| N18          | VCCPLL            | -    |               |              |
| V13          | VCCPLL            | -    |               |              |

## LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M100E/SE |                   |      |               |              |
|--------------|-------------------|------|---------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function | Differential |
| V18          | VCCPLL            | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\* These sysCONFIG pins are dedicated I/O pins for configuration. The outputs are actively driven during normal device operation.

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| F4          | PL9A              | 7    | VREF2_7               | T            | PL9A              | 7    | VREF2_7               | T            |
| F3          | PL9B              | 7    | VREF1_7               | C            | PL9B              | 7    | VREF1_7               | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| E1          | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |
| E2          | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |
| K9          | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |
| H7          | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| F1          | PL13A             | 7    | LDQ15                 | T (LVDS)*    | PL13A             | 7    | LDQ15                 | T (LVDS)*    |
| F2          | PL13B             | 7    | LDQ15                 | C (LVDS)*    | PL13B             | 7    | LDQ15                 | C (LVDS)*    |
| J8          | PL14A             | 7    | LDQ15                 | T            | PL14A             | 7    | LDQ15                 | T            |
| H6          | PL14B             | 7    | LDQ15                 | C            | PL14B             | 7    | LDQ15                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| G2          | PL15A             | 7    | LDQS15                | T (LVDS)*    | PL15A             | 7    | LDQS15                | T (LVDS)*    |
| G1          | PL15B             | 7    | LDQ15                 | C (LVDS)*    | PL15B             | 7    | LDQ15                 | C (LVDS)*    |
| J7          | PL16A             | 7    | LDQ15                 | T            | PL16A             | 7    | LDQ15                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| L8          | PL16B             | 7    | LDQ15                 | C            | PL16B             | 7    | LDQ15                 | C            |
| L9          | PL17A             | 7    | LDQ15                 | T (LVDS)*    | PL17A             | 7    | LDQ15                 | T (LVDS)*    |
| L10         | PL17B             | 7    | LDQ15                 | C (LVDS)*    | PL17B             | 7    | LDQ15                 | C (LVDS)*    |
| H5          | PL18A             | 7    | LDQ15                 | T            | PL18A             | 7    | LDQ15                 | T            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| J6          | PL18B             | 7    | LDQ15                 | C            | PL18B             | 7    | LDQ15                 | C            |
| H2          | NC                | -    |                       |              | PL19A             | 7    | LDQ23                 | T (LVDS)*    |
| H1          | NC                | -    |                       |              | PL19B             | 7    | LDQ23                 | C (LVDS)*    |
| G5          | NC                | -    |                       |              | PL20A             | 7    | LDQ23                 | T            |
| G6          | NC                | -    |                       |              | PL20B             | 7    | LDQ23                 | C            |
| M9          | NC                | -    |                       |              | PL21A             | 7    | LDQ23                 | T (LVDS)*    |
| -           | -                 | -    |                       |              | VCCIO7            | 7    |                       |              |
| M10         | NC                | -    |                       |              | PL21B             | 7    | LDQ23                 | C (LVDS)*    |
| H3          | NC                | -    |                       |              | PL22A             | 7    | LDQ23                 | T            |
| H4          | NC                | -    |                       |              | PL22B             | 7    | LDQ23                 | C            |
| J2          | PL19A             | 7    |                       | T (LVDS)*    | PL23A             | 7    | LDQS23                | T (LVDS)*    |
| -           | -                 | -    |                       |              | GNDIO7            | -    |                       |              |
| J1          | PL19B             | 7    |                       | C (LVDS)*    | PL23B             | 7    | LDQ23                 | C (LVDS)*    |
| K2          | PL20A             | 7    |                       | T            | PL24A             | 7    | LDQ23                 | T            |
| K1          | PL20B             | 7    |                       | C            | PL24B             | 7    | LDQ23                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| J4          | PL21A             | 7    |                       | T (LVDS)*    | PL25A             | 7    | LDQ23                 | T (LVDS)*    |
| J3          | PL21B             | 7    |                       | C (LVDS)*    | PL25B             | 7    | LDQ23                 | C (LVDS)*    |
| J5          | PL22A             | 7    |                       | T            | PL26A             | 7    | LDQ23                 | T            |
| K5          | PL22B             | 7    |                       | C            | PL26B             | 7    | LDQ23                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| L2          | PL24A             | 7    | LDQ28                 | T (LVDS)*    | PL28A             | 7    | LDQ32                 | T (LVDS)*    |
| L1          | PL24B             | 7    | LDQ28                 | C (LVDS)*    | PL28B             | 7    | LDQ32                 | C (LVDS)*    |
| L7          | PL25A             | 7    | LDQ28                 | T            | PL29A             | 7    | LDQ32                 | T            |
| K6          | PL25B             | 7    | LDQ28                 | C            | PL29B             | 7    | LDQ32                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |



## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| M2          | PL26A             | 7    | LDQ28                 | T (LVDS)*    | PL30A             | 7    | LDQ32                 | T (LVDS)*    |
| M1          | PL26B             | 7    | LDQ28                 | C (LVDS)*    | PL30B             | 7    | LDQ32                 | C (LVDS)*    |
| L6          | PL27A             | 7    | LDQ28                 | T            | PL31A             | 7    | LDQ32                 | T            |
| L5          | PL27B             | 7    | LDQ28                 | C            | PL31B             | 7    | LDQ32                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| L3          | PL28A             | 7    | LDQS28                | T (LVDS)*    | PL32A             | 7    | LDQS32                | T (LVDS)*    |
| L4          | PL28B             | 7    | LDQ28                 | C (LVDS)*    | PL32B             | 7    | LDQ32                 | C (LVDS)*    |
| M3          | PL29A             | 7    | LDQ28                 | T            | PL33A             | 7    | LDQ32                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| M4          | PL29B             | 7    | LDQ28                 | C            | PL33B             | 7    | LDQ32                 | C            |
| N1          | PL30A             | 7    | LDQ28                 | T (LVDS)*    | PL34A             | 7    | LDQ32                 | T (LVDS)*    |
| N2          | PL30B             | 7    | LDQ28                 | C (LVDS)*    | PL34B             | 7    | LDQ32                 | C (LVDS)*    |
| M5          | PL31A             | 7    | LDQ28                 | T            | PL35A             | 7    | LDQ32                 | T            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| N6          | PL31B             | 7    | LDQ28                 | C            | PL35B             | 7    | LDQ32                 | C            |
| P3          | NC                | -    |                       |              | PL37A             | 7    |                       | T (LVDS)*    |
| -           | -                 | -    |                       |              | GNDIO7            | -    |                       |              |
| P4          | NC                | -    |                       |              | PL37B             | 7    |                       | C (LVDS)*    |
| P9          | NC                | -    |                       |              | PL38A             | 7    |                       | T            |
| M7          | NC                | -    |                       |              | PL38B             | 7    |                       | C            |
| -           | -                 | -    |                       |              | VCCIO7            | 7    |                       |              |
| P1          | NC                | -    |                       |              | PL39A             | 7    |                       | T (LVDS)*    |
| P2          | NC                | -    |                       |              | PL39B             | 7    |                       | C (LVDS)*    |
| N7          | NC                | -    |                       |              | PL40A             | 7    |                       | T            |
| P7          | NC                | -    |                       |              | PL40B             | 7    |                       | C            |
| -           | -                 | -    |                       |              | GNDIO7            | -    |                       |              |
| P5          | PL33A             | 7    | LDQ37                 | T (LVDS)*    | PL41A             | 7    | LDQ45                 | T (LVDS)*    |
| N5          | PL33B             | 7    | LDQ37                 | C (LVDS)*    | PL41B             | 7    | LDQ45                 | C (LVDS)*    |
| P8          | PL34A             | 7    | LDQ37                 | T            | PL42A             | 7    | LDQ45                 | T            |
| P6          | PL34B             | 7    | LDQ37                 | C            | PL42B             | 7    | LDQ45                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| R3          | PL35A             | 7    | LDQ37                 | T (LVDS)*    | PL43A             | 7    | LDQ45                 | T (LVDS)*    |
| R4          | PL35B             | 7    | LDQ37                 | C (LVDS)*    | PL43B             | 7    | LDQ45                 | C (LVDS)*    |
| R10         | PL36A             | 7    | LDQ37                 | T            | PL44A             | 7    | LDQ45                 | T            |
| P11         | PL36B             | 7    | LDQ37                 | C            | PL44B             | 7    | LDQ45                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| R7          | PL37A             | 7    | LDQS37                | T (LVDS)*    | PL45A             | 7    | LDQS45                | T (LVDS)*    |
| R8          | PL37B             | 7    | LDQ37                 | C (LVDS)*    | PL45B             | 7    | LDQ45                 | C (LVDS)*    |
| R5          | PL38A             | 7    | LDQ37                 | T            | PL46A             | 7    | LDQ45                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| T5          | PL38B             | 7    | LDQ37                 | C            | PL46B             | 7    | LDQ45                 | C            |
| R1          | PL39A             | 7    | LDQ37                 | T (LVDS)*    | PL47A             | 7    | LDQ45                 | T (LVDS)*    |
| R2          | PL39B             | 7    | LDQ37                 | C (LVDS)*    | PL47B             | 7    | LDQ45                 | C (LVDS)*    |
| R11         | PL40A             | 7    | LDQ37                 | T            | PL48A             | 7    | LDQ45                 | T            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| T10         | PL40B             | 7    | LDQ37                 | C            | PL48B             | 7    | LDQ45                 | C            |
| T1          | PL42A             | 7    | LUM3_SPLLT_IN_A/LDQ46 | T (LVDS)*    | PL50A             | 7    | LUM3_SPLLT_IN_A/LDQ54 | T (LVDS)*    |
| T2          | PL42B             | 7    | LUM3_SPLLC_IN_A/LDQ46 | C (LVDS)*    | PL50B             | 7    | LUM3_SPLLC_IN_A/LDQ54 | C (LVDS)*    |
| U10         | PL43A             | 7    | LUM3_SPLLT_FB_A/LDQ46 | T            | PL51A             | 7    | LUM3_SPLLT_FB_A/LDQ54 | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| U8          | PL43B             | 7    | LUM3_SPLLC_FB_A/LDQ46 | C            | PL51B             | 7    | LUM3_SPLLC_FB_A/LDQ54 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| T6          | PL44A             | 7    | LDQ46                 | T (LVDS)*    | PL52A             | 7    | LDQ54                 | T (LVDS)*    |
| R6          | PL44B             | 7    | LDQ46                 | C (LVDS)*    | PL52B             | 7    | LDQ54                 | C (LVDS)*    |
| U9          | PL45A             | 7    | LDQ46                 | T            | PL53A             | 7    | LDQ54                 | T            |
| T7          | PL45B             | 7    | LDQ46                 | C            | PL53B             | 7    | LDQ54                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| U5          | PL46A             | 7    | LDQS46                | T (LVDS)*    | PL54A             | 7    | LDQS54                | T (LVDS)*    |
| U6          | PL46B             | 7    | LDQ46                 | C (LVDS)*    | PL54B             | 7    | LDQ54                 | C (LVDS)*    |
| U7          | PL47A             | 7    | LDQ46                 | T            | PL55A             | 7    | LDQ54                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| V9          | PL47B             | 7    | LDQ46                 | C            | PL55B             | 7    | LDQ54                 | C            |
| V11         | PL48A             | 7    | LDQ46                 | T (LVDS)*    | PL56A             | 7    | LDQ54                 | T (LVDS)*    |
| V10         | PL48B             | 7    | LDQ46                 | C (LVDS)*    | PL56B             | 7    | LDQ54                 | C (LVDS)*    |
| U4          | PL49A             | 7    | PCLKT7_0/LDQ46        | T            | PL57A             | 7    | PCLKT7_0/LDQ54        | T            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| U3          | PL49B             | 7    | PCLKC7_0/LDQ46        | C            | PL57B             | 7    | PCLKC7_0/LDQ54        | C            |
| U2          | PL51A             | 6    | PCLKT6_0/LDQ55        | T (LVDS)*    | PL59A             | 6    | PCLKT6_0/LDQ63        | T (LVDS)*    |
| U1          | PL51B             | 6    | PCLKC6_0/LDQ55        | C (LVDS)*    | PL59B             | 6    | PCLKC6_0/LDQ63        | C (LVDS)*    |
| V5          | PL52A             | 6    | VREF2_6/LDQ55         | T            | PL60A             | 6    | VREF2_6/LDQ63         | T            |
| V6          | PL52B             | 6    | VREF1_6/LDQ55         | C            | PL60B             | 6    | VREF1_6/LDQ63         | C            |
| V7          | PL53A             | 6    | LDQ55                 | T (LVDS)*    | PL61A             | 6    | LDQ63                 | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| V8          | PL53B             | 6    | LDQ55                 | C (LVDS)*    | PL61B             | 6    | LDQ63                 | C (LVDS)*    |
| V4          | PL54A             | 6    | LDQ55                 | T            | PL62A             | 6    | LDQ63                 | T            |
| V3          | PL54B             | 6    | LDQ55                 | C            | PL62B             | 6    | LDQ63                 | C            |
| V2          | PL55A             | 6    | LDQS55                | T (LVDS)*    | PL63A             | 6    | LDQS63                | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| V1          | PL55B             | 6    | LDQ55                 | C (LVDS)*    | PL63B             | 6    | LDQ63                 | C (LVDS)*    |
| W7          | PL56A             | 6    | LDQ55                 | T            | PL64A             | 6    | LDQ63                 | T            |
| W5          | PL56B             | 6    | LDQ55                 | C            | PL64B             | 6    | LDQ63                 | C            |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| W2          | PL57A             | 6    | LLM3_SPLLT_IN_A/LDQ55 | T (LVDS)*    | PL65A             | 6    | LLM4_SPLLT_IN_A/LDQ63 | T (LVDS)*    |
| W1          | PL57B             | 6    | LLM3_SPLLC_IN_A/LDQ55 | C (LVDS)*    | PL65B             | 6    | LLM4_SPLLC_IN_A/LDQ63 | C (LVDS)*    |
| Y6          | PL58A             | 6    | LLM3_SPLLT_FB_A/LDQ55 | T            | PL66A             | 6    | LLM4_SPLLT_FB_A/LDQ63 | T            |
| W6          | PL58B             | 6    | LLM3_SPLLC_FB_A/LDQ55 | C            | PL66B             | 6    | LLM4_SPLLC_FB_A/LDQ63 | C            |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| Y1          | PL60A             | 6    | LDQ64                 | T (LVDS)*    | PL68A             | 6    | LDQ72                 | T (LVDS)*    |
| Y2          | PL60B             | 6    | LDQ64                 | C (LVDS)*    | PL68B             | 6    | LDQ72                 | C (LVDS)*    |
| Y7          | PL61A             | 6    | LDQ64                 | T            | PL69A             | 6    | LDQ72                 | T            |
| Y5          | PL61B             | 6    | LDQ64                 | C            | PL69B             | 6    | LDQ72                 | C            |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| W10         | PL62A             | 6    | LDQ64                 | T (LVDS)*    | PL70A             | 6    | LDQ72                 | T (LVDS)*    |
| Y8          | PL62B             | 6    | LDQ64                 | C (LVDS)*    | PL70B             | 6    | LDQ72                 | C (LVDS)*    |
| Y4          | PL63A             | 6    | LDQ64                 | T            | PL71A             | 6    | LDQ72                 | T            |
| Y3          | PL63B             | 6    | LDQ64                 | C            | PL71B             | 6    | LDQ72                 | C            |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| AA1         | PL64A             | 6    | LDQS64                | T (LVDS)*    | PL72A             | 6    | LDQS72                | T (LVDS)*    |
| AA2         | PL64B             | 6    | LDQ64                 | C (LVDS)*    | PL72B             | 6    | LDQ72                 | C (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AA8         | PL65A             | 6    | LDQ64         | T            | PL73A             | 6    | LDQ72         | T            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| Y9          | PL65B             | 6    | LDQ64         | C            | PL73B             | 6    | LDQ72         | C            |
| AA6         | PL66A             | 6    | LDQ64         | T (LVDS)*    | PL74A             | 6    | LDQ72         | T (LVDS)*    |
| AA7         | PL66B             | 6    | LDQ64         | C (LVDS)*    | PL74B             | 6    | LDQ72         | C (LVDS)*    |
| AA4         | PL67A             | 6    | LDQ64         | T            | PL75A             | 6    | LDQ72         | T            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AA3         | PL67B             | 6    | LDQ64         | C            | PL75B             | 6    | LDQ72         | C            |
| AA9         | PL69A             | 6    | LDQ73         | T (LVDS)*    | PL77A             | 6    | LDQ81         | T (LVDS)*    |
| AA10        | PL69B             | 6    | LDQ73         | C (LVDS)*    | PL77B             | 6    | LDQ81         | C (LVDS)*    |
| AA5         | PL70A             | 6    | LDQ73         | T            | PL78A             | 6    | LDQ81         | T            |
| AB6         | PL70B             | 6    | LDQ73         | C            | PL78B             | 6    | LDQ81         | C            |
| AB1         | PL71A             | 6    | LDQ73         | T (LVDS)*    | PL79A             | 6    | LDQ81         | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AB2         | PL71B             | 6    | LDQ73         | C (LVDS)*    | PL79B             | 6    | LDQ81         | C (LVDS)*    |
| AC8         | PL72A             | 6    | LDQ73         | T            | PL80A             | 6    | LDQ81         | T            |
| AB10        | PL72B             | 6    | LDQ73         | C            | PL80B             | 6    | LDQ81         | C            |
| AC1         | PL73A             | 6    | LDQS73        | T (LVDS)*    | PL81A             | 6    | LDQS81        | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AC2         | PL73B             | 6    | LDQ73         | C (LVDS)*    | PL81B             | 6    | LDQ81         | C (LVDS)*    |
| AB7         | PL74A             | 6    | LDQ73         | T            | PL82A             | 6    | LDQ81         | T            |
| AB5         | PL74B             | 6    | LDQ73         | C            | PL82B             | 6    | LDQ81         | C            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AC3         | PL75A             | 6    | LDQ73         | T (LVDS)*    | PL83A             | 6    | LDQ81         | T (LVDS)*    |
| AC4         | PL75B             | 6    | LDQ73         | C (LVDS)*    | PL83B             | 6    | LDQ81         | C (LVDS)*    |
| AC10        | PL76A             | 6    | LDQ73         | T            | PL84A             | 6    | LDQ81         | T            |
| AC9         | PL76B             | 6    | LDQ73         | C            | PL84B             | 6    | LDQ81         | C            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AC7         | NC                | -    |               |              | PL86A             | 6    | LDQ90         | T (LVDS)*    |
| AC5         | NC                | -    |               |              | PL86B             | 6    | LDQ90         | C (LVDS)*    |
| AC6         | NC                | -    |               |              | PL87A             | 6    | LDQ90         | T            |
| AD5         | NC                | -    |               |              | PL87B             | 6    | LDQ90         | C            |
| -           | -                 | -    |               |              | VCCIO6            | 6    |               |              |
| AD4         | NC                | -    |               |              | PL88A             | 6    | LDQ90         | T (LVDS)*    |
| AD3         | NC                | -    |               |              | PL88B             | 6    | LDQ90         | C (LVDS)*    |
| AD10        | NC                | -    |               |              | PL89A             | 6    | LDQ90         | T            |
| AD8         | NC                | -    |               |              | PL89B             | 6    | LDQ90         | C            |
| -           | -                 | -    |               |              | GNDIO6            | -    |               |              |
| AD2         | NC                | -    |               |              | PL90A             | 6    | LDQS90        | T (LVDS)*    |
| AD1         | NC                | -    |               |              | PL90B             | 6    | LDQ90         | C (LVDS)*    |
| AD9         | NC                | -    |               |              | PL91A             | 6    | LDQ90         | T            |
| -           | -                 | -    |               |              | VCCIO6            | 6    |               |              |
| AC11        | NC                | -    |               |              | PL91B             | 6    | LDQ90         | C            |
| AD6         | NC                | -    |               |              | PL92A             | 6    | LDQ90         | T (LVDS)*    |
| AD7         | NC                | -    |               |              | PL92B             | 6    | LDQ90         | C (LVDS)*    |
| AE1         | NC                | -    |               |              | PL93A             | 6    | LDQ90         | T            |
| -           | -                 | -    |               |              | GNDIO6            | -    |               |              |
| AE2         | NC                | -    |               |              | PL93B             | 6    | LDQ90         | C            |
| AF2         | PL78A             | 6    | LDQ82         | T (LVDS)*    | PL95A             | 6    | LDQ99         | T (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                          | LFE2M100E/SE |                   |      |                          |              |
|-------------|-------------------|------|--------------------------|--------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |
| AF1         | PL78B             | 6    | LDQ82                    | C (LVDS)*    | PL95B             | 6    | LDQ99                    | C (LVDS)*    |
| AE5         | PL79A             | 6    | LDQ82                    | T            | PL96A             | 6    | LDQ99                    | T            |
| AE6         | PL79B             | 6    | LDQ82                    | C            | PL96B             | 6    | LDQ99                    | C            |
| AF4         | PL80A             | 6    | LDQ82                    | T (LVDS)*    | PL97A             | 6    | LDQ99                    | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                          |              | VCCIO6            | 6    |                          |              |
| AF3         | PL80B             | 6    | LDQ82                    | C (LVDS)*    | PL97B             | 6    | LDQ99                    | C (LVDS)*    |
| AF5         | PL81A             | 6    | LDQ82                    | T            | PL98A             | 6    | LDQ99                    | T            |
| AF6         | PL81B             | 6    | LDQ82                    | C            | PL98B             | 6    | LDQ99                    | C            |
| AG1         | PL82A             | 6    | LLM0_GPLLT_IN_A**/LDQS82 | T (LVDS)*    | PL99A             | 6    | LLM0_GPLLT_IN_A**/LDQS99 | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                          |              | GNDIO6            | -    |                          |              |
| AG2         | PL82B             | 6    | LLM0_GPLLC_IN_A**/LDQ82  | C (LVDS)*    | PL99B             | 6    | LLM0_GPLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AE9         | PL83A             | 6    | LLM0_GPLLT_FB_A/LDQ82    | T            | PL100A            | 6    | LLM0_GPLLT_FB_A/LDQ99    | T            |
| AF7         | PL83B             | 6    | LLM0_GPLLC_FB_A/LDQ82    | C            | PL100B            | 6    | LLM0_GPLLC_FB_A/LDQ99    | C            |
| VCCIO       | VCCIO6            | 6    |                          |              | VCCIO6            | 6    |                          |              |
| AH1         | PL84A             | 6    | LLM0_GDLLT_IN_A**/LDQ82  | T (LVDS)*    | PL101A            | 6    | LLM0_GDLLT_IN_A**/LDQ99  | T (LVDS)*    |
| AH2         | PL84B             | 6    | LLM0_GDLLC_IN_A**/LDQ82  | C (LVDS)*    | PL101B            | 6    | LLM0_GDLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AG5         | PL85A             | 6    | LLM0_GDLLT_FB_A/LDQ82    | T            | PL102A            | 6    | LLM0_GDLLT_FB_A/LDQ99    | T            |
| AG4         | PL85B             | 6    | LLM0_GDLLC_FB_A/LDQ82    | C            | PL102B            | 6    | LLM0_GDLLC_FB_A/LDQ99    | C            |
| GNDIO       | GNDIO6            | -    |                          |              | GNDIO6            | -    |                          |              |
| AG6         | LLM0_PLLCAP       | 6    |                          |              | LLM0_PLLCAP       | 6    |                          |              |
| AJ1         | PL87A             | 6    |                          | T            | PL104A            | 6    |                          | T            |
| AJ2         | PL87B             | 6    |                          | C            | PL104B            | 6    |                          | C            |
| AK2         | TCK               | -    |                          |              | TCK               | -    |                          |              |
| AK1         | TDI               | -    |                          |              | TDI               | -    |                          |              |
| AL1         | TMS               | -    |                          |              | TMS               | -    |                          |              |
| AF10        | TDO               | -    |                          |              | TDO               | -    |                          |              |
| AK3         | VCCJ              | -    |                          |              | VCCJ              | -    |                          |              |
| AN2         | LLC_SQ_VCCRX3     | 14   |                          |              | LLC_SQ_VCCRX3     | 14   |                          |              |
| AM2         | LLC_SQ_HDINP3     | 14   |                          | T            | LLC_SQ_HDINP3     | 14   |                          | T            |
| AN1         | LLC_SQ_VCCIB3     | 14   |                          |              | LLC_SQ_VCCIB3     | 14   |                          |              |
| AM3         | LLC_SQ_HDINN3     | 14   |                          | C            | LLC_SQ_HDINN3     | 14   |                          | C            |
| AN3         | LLC_SQ_VCCTX3     | 14   |                          |              | LLC_SQ_VCCTX3     | 14   |                          |              |
| AP2         | LLC_SQ_HDOUTP3    | 14   |                          | T            | LLC_SQ_HDOUTP3    | 14   |                          | T            |
| AM1         | LLC_SQ_VCCOB3     | 14   |                          |              | LLC_SQ_VCCOB3     | 14   |                          |              |
| AP3         | LLC_SQ_HDOUTN3    | 14   |                          | C            | LLC_SQ_HDOUTN3    | 14   |                          | C            |
| AN4         | LLC_SQ_VCCTX2     | 14   |                          |              | LLC_SQ_VCCTX2     | 14   |                          |              |
| AP4         | LLC_SQ_HDOUTN2    | 14   |                          | C            | LLC_SQ_HDOUTN2    | 14   |                          | C            |
| AL3         | LLC_SQ_VCCOB2     | 14   |                          |              | LLC_SQ_VCCOB2     | 14   |                          |              |
| AP5         | LLC_SQ_HDOUTP2    | 14   |                          | T            | LLC_SQ_HDOUTP2    | 14   |                          | T            |
| AN5         | LLC_SQ_VCCRX2     | 14   |                          |              | LLC_SQ_VCCRX2     | 14   |                          |              |
| AM4         | LLC_SQ_HDINN2     | 14   |                          | C            | LLC_SQ_HDINN2     | 14   |                          | C            |
| AL4         | LLC_SQ_VCCIB2     | 14   |                          |              | LLC_SQ_VCCIB2     | 14   |                          |              |
| AM5         | LLC_SQ_HDINP2     | 14   |                          | T            | LLC_SQ_HDINP2     | 14   |                          | T            |
| AL6         | LLC_SQ_VCCP       | 14   |                          |              | LLC_SQ_VCCP       | 14   |                          |              |
| AL5         | LLC_SQ_REFCLKP    | 14   |                          | T            | LLC_SQ_REFCLKP    | 14   |                          | T            |
| AK5         | LLC_SQ_REFCLKN    | 14   |                          | C            | LLC_SQ_REFCLKN    | 14   |                          | C            |
| AK6         | LLC_SQ_VCCAUX33   | 14   |                          |              | LLC_SQ_VCCAUX33   | 14   |                          |              |
| AM6         | LLC_SQ_HDINP1     | 14   |                          | T            | LLC_SQ_HDINP1     | 14   |                          | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AL8         | LLC_SQ_VCCIB1     | 14   |               |              | LLC_SQ_VCCIB1     | 14   |               |              |
| AM7         | LLC_SQ_HDINN1     | 14   |               | C            | LLC_SQ_HDINN1     | 14   |               | C            |
| AN6         | LLC_SQ_VCCRX1     | 14   |               |              | LLC_SQ_VCCRX1     | 14   |               |              |
| AP6         | LLC_SQ_HDOUTP1    | 14   |               | T            | LLC_SQ_HDOUTP1    | 14   |               | T            |
| AK7         | LLC_SQ_VCCOB1     | 14   |               |              | LLC_SQ_VCCOB1     | 14   |               |              |
| AP7         | LLC_SQ_HDOUTN1    | 14   |               | C            | LLC_SQ_HDOUTN1    | 14   |               | C            |
| AN7         | LLC_SQ_VCCTX1     | 14   |               |              | LLC_SQ_VCCTX1     | 14   |               |              |
| AP8         | LLC_SQ_HDOUTN0    | 14   |               | C            | LLC_SQ_HDOUTN0    | 14   |               | C            |
| AL9         | LLC_SQ_VCCOB0     | 14   |               |              | LLC_SQ_VCCOB0     | 14   |               |              |
| AP9         | LLC_SQ_HDOUTP0    | 14   |               | T            | LLC_SQ_HDOUTP0    | 14   |               | T            |
| AN8         | LLC_SQ_VCCTX0     | 14   |               |              | LLC_SQ_VCCTX0     | 14   |               |              |
| AM8         | LLC_SQ_HDINN0     | 14   |               | C            | LLC_SQ_HDINN0     | 14   |               | C            |
| AN9         | LLC_SQ_VCCIB0     | 14   |               |              | LLC_SQ_VCCIB0     | 14   |               |              |
| AM9         | LLC_SQ_HDINP0     | 14   |               | T            | LLC_SQ_HDINP0     | 14   |               | T            |
| AL7         | LLC_SQ_VCCRX0     | 14   |               |              | LLC_SQ_VCCRX0     | 14   |               |              |
| -           | -                 | -    |               |              | VCCIO5            | 5    |               |              |
| AJ12        | NC                | -    |               |              | PB32A             | 5    | BDQ33         | T            |
| AH12        | NC                | -    |               |              | PB32B             | 5    | BDQ33         | C            |
| -           | -                 | -    |               |              | GNDIO5            | -    |               |              |
| -           | -                 | -    |               |              | VCCIO5            | 5    |               |              |
| AL13        | NC                | -    |               |              | PB36A             | 5    | BDQ33         | T            |
| AK13        | NC                | -    |               |              | PB36B             | 5    | BDQ33         | C            |
| -           | -                 | -    |               |              | GNDIO5            | -    |               |              |
| AE14        | NC                | -    |               |              | PB38A             | 5    | BDQ42         | T            |
| AG13        | NC                | -    |               |              | PB38B             | 5    | BDQ42         | C            |
| AN14        | PB30A             | 5    | BDQ33         | T            | PB39A             | 5    | BDQ42         | T            |
| AP14        | PB30B             | 5    | BDQ33         | C            | PB39B             | 5    | BDQ42         | C            |
| AH14        | PB31A             | 5    | BDQ33         | T            | PB40A             | 5    | BDQ42         | T            |
| AJ15        | PB31B             | 5    | BDQ33         | C            | PB40B             | 5    | BDQ42         | C            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |
| AL14        | PB33A             | 5    | BDQS33        | T            | PB42A             | 5    | BDQS42        | T            |
| AM14        | PB33B             | 5    | BDQ33         | C            | PB42B             | 5    | BDQ42         | C            |
| AF14        | PB35A             | 5    | BDQ33         | T            | PB44A             | 5    | BDQ42         | T            |
| AF13        | PB35B             | 5    | BDQ33         | C            | PB44B             | 5    | BDQ42         | C            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AE15        | PB36A             | 5    | BDQ33         | T            | PB45A             | 5    | BDQ42         | T            |
| AG14        | PB36B             | 5    | BDQ33         | C            | PB45B             | 5    | BDQ42         | C            |
| AH15        | PB37A             | 5    | BDQ33         | T            | PB46A             | 5    | BDQ42         | T            |
| AK15        | PB37B             | 5    | BDQ33         | C            | PB46B             | 5    | BDQ42         | C            |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |
| AL15        | PB38A             | 5    | BDQ42         | T            | PB47A             | 5    | BDQ51         | T            |
| AM15        | PB38B             | 5    | BDQ42         | C            | PB47B             | 5    | BDQ51         | C            |
| AK16        | PB39A             | 5    | BDQ42         | T            | PB48A             | 5    | BDQ51         | T            |
| AJ16        | PB39B             | 5    | BDQ42         | C            | PB48B             | 5    | BDQ51         | C            |
| AN15        | PB40A             | 5    | BDQ42         | T            | PB49A             | 5    | BDQ51         | T            |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AP15        | PB40B             | 5    | BDQ42         | C            | PB49B             | 5    | BDQ51         | C            |
| AG15        | PB42A             | 5    | BDQS42        | T            | PB51A             | 5    | BDQS51        | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                | LFE2M100E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AE16        | PB42B             | 5    | BDQ42          | C            | PB51B             | 5    | BDQ51          | C            |
| AF15        | PB44A             | 5    | BDQ42          | T            | PB53A             | 5    | BDQ51          | T            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| AD16        | PB44B             | 5    | BDQ42          | C            | PB53B             | 5    | BDQ51          | C            |
| AK17        | PB45A             | 5    | BDQ42          | T            | PB54A             | 5    | BDQ51          | T            |
| AH16        | PB45B             | 5    | BDQ42          | C            | PB54B             | 5    | BDQ51          | C            |
| AN16        | PB46A             | 5    | BDQ42          | T            | PB55A             | 5    | BDQ51          | T            |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AP16        | PB46B             | 5    | BDQ42          | C            | PB55B             | 5    | BDQ51          | C            |
| AL17        | PB47A             | 5    | BDQ51          | T            | PB56A             | 5    | BDQ60          | T            |
| AM17        | PB47B             | 5    | BDQ51          | C            | PB56B             | 5    | BDQ60          | C            |
| AN17        | PB48A             | 5    | BDQ51          | T            | PB57A             | 5    | BDQ60          | T            |
| AP17        | PB48B             | 5    | BDQ51          | C            | PB57B             | 5    | BDQ60          | C            |
| AD17        | PB49A             | 5    | BDQ51          | T            | PB58A             | 5    | BDQ60          | T            |
| AE17        | PB49B             | 5    | BDQ51          | C            | PB58B             | 5    | BDQ60          | C            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| AL18        | PB50A             | 5    | BDQ51          | T            | PB59A             | 5    | BDQ60          | T            |
| AM18        | PB50B             | 5    | BDQ51          | C            | PB59B             | 5    | BDQ60          | C            |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AP18        | PB51A             | 5    | BDQS51         | T            | PB60A             | 5    | BDQS60         | T            |
| AN18        | PB51B             | 5    | BDQ51          | C            | PB60B             | 5    | BDQ60          | C            |
| AG17        | PB52A             | 5    | VREF2_5/BDQ51  | T            | PB61A             | 5    | VREF2_5/BDQ60  | T            |
| AJ17        | PB52B             | 5    | VREF1_5/BDQ51  | C            | PB61B             | 5    | VREF1_5/BDQ60  | C            |
| AF17        | PB53A             | 5    | PCLKT5_0/BDQ51 | T            | PB62A             | 5    | PCLKT5_0/BDQ60 | T            |
| AH17        | PB53B             | 5    | PCLKC5_0/BDQ51 | C            | PB62B             | 5    | PCLKC5_0/BDQ60 | C            |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |
| GNDIO       | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |
| AF18        | PB58A             | 4    | PCLKT4_0/BDQ60 | T            | PB67A             | 4    | PCLKT4_0/BDQ69 | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| AD18        | PB58B             | 4    | PCLKC4_0/BDQ60 | C            | PB67B             | 4    | PCLKC4_0/BDQ69 | C            |
| AP19        | PB59A             | 4    | VREF2_4/BDQ60  | T            | PB68A             | 4    | VREF2_4/BDQ69  | T            |
| AN19        | PB59B             | 4    | VREF1_4/BDQ60  | C            | PB68B             | 4    | VREF1_4/BDQ69  | C            |
| AP20        | PB60A             | 4    | BDQS60         | T            | PB69A             | 4    | BDQS69         | T            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| AM20        | PB60B             | 4    | BDQ60          | C            | PB69B             | 4    | BDQ69          | C            |
| AN20        | PB61A             | 4    | BDQ60          | T            | PB70A             | 4    | BDQ69          | T            |
| AM21        | PB61B             | 4    | BDQ60          | C            | PB70B             | 4    | BDQ69          | C            |
| AG18        | PB62A             | 4    | BDQ60          | T            | PB71A             | 4    | BDQ69          | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| AE18        | PB62B             | 4    | BDQ60          | C            | PB71B             | 4    | BDQ69          | C            |
| AJ18        | PB63A             | 4    | BDQ60          | T            | PB72A             | 4    | BDQ69          | T            |
| AH18        | PB63B             | 4    | BDQ60          | C            | PB72B             | 4    | BDQ69          | C            |
| AK18        | PB64A             | 4    | BDQ60          | T            | PB73A             | 4    | BDQ69          | T            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| AK19        | PB64B             | 4    | BDQ60          | C            | PB73B             | 4    | BDQ69          | C            |
| AP21        | PB65A             | 4    | BDQ69          | T            | PB74A             | 4    | BDQ78          | T            |
| AN21        | PB65B             | 4    | BDQ69          | C            | PB74B             | 4    | BDQ78          | C            |
| AL20        | PB66A             | 4    | BDQ69          | T            | PB75A             | 4    | BDQ78          | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AK20        | PB66B             | 4    | BDQ69         | C            | PB75B             | 4    | BDQ78         | C            |
| AN22        | PB67A             | 4    | BDQ69         | T            | PB76A             | 4    | BDQ78         | T            |
| AL21        | PB67B             | 4    | BDQ69         | C            | PB76B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AH19        | PB69A             | 4    | BDQS69        | T            | PB78A             | 4    | BDQS78        | T            |
| AJ20        | PB69B             | 4    | BDQ69         | C            | PB78B             | 4    | BDQ78         | C            |
| AD20        | PB71A             | 4    | BDQ69         | T            | PB80A             | 4    | BDQ78         | T            |
| AF20        | PB71B             | 4    | BDQ69         | C            | PB80B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AJ19        | PB72A             | 4    | BDQ69         | T            | PB81A             | 4    | BDQ78         | T            |
| AH20        | PB72B             | 4    | BDQ69         | C            | PB81B             | 4    | BDQ78         | C            |
| AE20        | PB73A             | 4    | BDQ69         | T            | PB82A             | 4    | BDQ78         | T            |
| AG20        | PB73B             | 4    | BDQ69         | C            | PB82B             | 4    | BDQ78         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AH22        | NC                | -    |               |              | PB89A             | 4    | BDQ87         | T            |
| -           | -                 | -    |               |              | VCCIO4            | 4    |               |              |
| AH21        | NC                | -    |               |              | PB89B             | 4    | BDQ87         | C            |
| AG22        | NC                | -    |               |              | PB90A             | 4    | BDQ87         | T            |
| AG21        | NC                | -    |               |              | PB90B             | 4    | BDQ87         | C            |
| -           | -                 | -    |               |              | GNDIO4            | -    |               |              |
| AM22        | PB74A             | 4    | BDQ78         | T            | PB92A             | 4    | BDQ96         | T            |
| AL22        | PB74B             | 4    | BDQ78         | C            | PB92B             | 4    | BDQ96         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AP23        | PB77A             | 4    | BDQ78         | T            | PB95A             | 4    | BDQ96         | T            |
| AN23        | PB77B             | 4    | BDQ78         | C            | PB95B             | 4    | BDQ96         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AM24        | PB78A             | 4    | BDQS78        | T            | PB96A             | 4    | BDQS96        | T            |
| AL24        | PB78B             | 4    | BDQ78         | C            | PB96B             | 4    | BDQ96         | C            |
| AK22        | PB79A             | 4    | BDQ78         | T            | PB97A             | 4    | BDQ96         | T            |
| AJ22        | PB79B             | 4    | BDQ78         | C            | PB97B             | 4    | BDQ96         | C            |
| AL23        | PB80A             | 4    | BDQ78         | T            | PB98A             | 4    | BDQ96         | T            |
| AK23        | PB80B             | 4    | BDQ78         | C            | PB98B             | 4    | BDQ96         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AJ23        | PB81A             | 4    | BDQ78         | T            | PB99A             | 4    | BDQ96         | T            |
| AH23        | PB81B             | 4    | BDQ78         | C            | PB99B             | 4    | BDQ96         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AL28        | LRC_SQ_VCCRX3     | 13   |               |              | LRC_SQ_VCCRX3     | 13   |               |              |
| AM26        | LRC_SQ_HDINP3     | 13   |               | T            | LRC_SQ_HDINP3     | 13   |               | T            |
| AN26        | LRC_SQ_VCCIB3     | 13   |               |              | LRC_SQ_VCCIB3     | 13   |               |              |
| AM27        | LRC_SQ_HDINN3     | 13   |               | C            | LRC_SQ_HDINN3     | 13   |               | C            |
| AN27        | LRC_SQ_VCCTX3     | 13   |               |              | LRC_SQ_VCCTX3     | 13   |               |              |
| AP26        | LRC_SQ_HDOUTP3    | 13   |               | T            | LRC_SQ_HDOUTP3    | 13   |               | T            |
| AL26        | LRC_SQ_VCCOB3     | 13   |               |              | LRC_SQ_VCCOB3     | 13   |               |              |
| AP27        | LRC_SQ_HDOUTN3    | 13   |               | C            | LRC_SQ_HDOUTN3    | 13   |               | C            |
| AN28        | LRC_SQ_VCCTX2     | 13   |               |              | LRC_SQ_VCCTX2     | 13   |               |              |
| AP28        | LRC_SQ_HDOUTN2    | 13   |               | C            | LRC_SQ_HDOUTN2    | 13   |               | C            |
| AK28        | LRC_SQ_VCCOB2     | 13   |               |              | LRC_SQ_VCCOB2     | 13   |               |              |
| AP29        | LRC_SQ_HDOUTP2    | 13   |               | T            | LRC_SQ_HDOUTP2    | 13   |               | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                         |      |               | LFE2M100E/SE |                         |      |               |              |
|-------------|-------------------------|------|---------------|--------------|-------------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function       | Bank | Dual Function | Differential | Ball/Pad Function       | Bank | Dual Function | Differential |
| AN29        | LRC_SQ_VCCRX2           | 13   |               |              | LRC_SQ_VCCRX2           | 13   |               |              |
| AM28        | LRC_SQ_HDINN2           | 13   |               | C            | LRC_SQ_HDINN2           | 13   |               | C            |
| AL27        | LRC_SQ_VCCIB2           | 13   |               |              | LRC_SQ_VCCIB2           | 13   |               |              |
| AM29        | LRC_SQ_HDINP2           | 13   |               | T            | LRC_SQ_HDINP2           | 13   |               | T            |
| AL29        | LRC_SQ_VCCP             | 13   |               |              | LRC_SQ_VCCP             | 13   |               |              |
| AL30        | LRC_SQ_REFCLKP          | 13   |               | T            | LRC_SQ_REFCLKP          | 13   |               | T            |
| AK30        | LRC_SQ_REFCLKN          | 13   |               | C            | LRC_SQ_REFCLKN          | 13   |               | C            |
| AK29        | LRC_SQ_VCCAUX33         | 13   |               |              | LRC_SQ_VCCAUX33         | 13   |               |              |
| AM30        | LRC_SQ_HDINP1           | 13   |               | T            | LRC_SQ_HDINP1           | 13   |               | T            |
| AL31        | LRC_SQ_VCCIB1           | 13   |               |              | LRC_SQ_VCCIB1           | 13   |               |              |
| AM31        | LRC_SQ_HDINN1           | 13   |               | C            | LRC_SQ_HDINN1           | 13   |               | C            |
| AN30        | LRC_SQ_VCCRX1           | 13   |               |              | LRC_SQ_VCCRX1           | 13   |               |              |
| AP30        | LRC_SQ_HDOUTP1          | 13   |               | T            | LRC_SQ_HDOUTP1          | 13   |               | T            |
| AL32        | LRC_SQ_VCCOB1           | 13   |               |              | LRC_SQ_VCCOB1           | 13   |               |              |
| AP31        | LRC_SQ_HDOUTN1          | 13   |               | C            | LRC_SQ_HDOUTN1          | 13   |               | C            |
| AN31        | LRC_SQ_VCCTX1           | 13   |               |              | LRC_SQ_VCCTX1           | 13   |               |              |
| AP32        | LRC_SQ_HDOUTN0          | 13   |               | C            | LRC_SQ_HDOUTN0          | 13   |               | C            |
| AM34        | LRC_SQ_VCCOB0           | 13   |               |              | LRC_SQ_VCCOB0           | 13   |               |              |
| AP33        | LRC_SQ_HDOUTP0          | 13   |               | T            | LRC_SQ_HDOUTP0          | 13   |               | T            |
| AN32        | LRC_SQ_VCCTX0           | 13   |               |              | LRC_SQ_VCCTX0           | 13   |               |              |
| AM32        | LRC_SQ_HDINN0           | 13   |               | C            | LRC_SQ_HDINN0           | 13   |               | C            |
| AN34        | LRC_SQ_VCCIB0           | 13   |               |              | LRC_SQ_VCCIB0           | 13   |               |              |
| AM33        | LRC_SQ_HDINP0           | 13   |               | T            | LRC_SQ_HDINP0           | 13   |               | T            |
| AN33        | LRC_SQ_VCCRX0           | 13   |               |              | LRC_SQ_VCCRX0           | 13   |               |              |
| AH28        | CFG2                    | 8    |               |              | CFG2                    | 8    |               |              |
| AD24        | CFG1                    | 8    |               |              | CFG1                    | 8    |               |              |
| AJ29        | CFG0                    | 8    |               |              | CFG0                    | 8    |               |              |
| AF25        | PROGRAMN                | 8    |               |              | PROGRAMN                | 8    |               |              |
| AJ28        | CCLK                    | 8    |               |              | CCLK                    | 8    |               |              |
| AE25        | INITN                   | 8    |               |              | INITN                   | 8    |               |              |
| AK31        | DONE                    | 8    |               |              | DONE                    | 8    |               |              |
| GNDIO       | GNDIO8                  | -    |               |              | GNDIO8                  | -    |               |              |
| AE24        | WRITEN***               | 8    |               |              | WRITEN***               | 8    |               |              |
| AJ30        | CS1N***                 | 8    |               |              | CS1N***                 | 8    |               |              |
| AD25        | CSN***                  | 8    |               |              | CSN***                  | 8    |               |              |
| AG29        | D0/SPIFASTN***          | 8    |               |              | D0/SPIFASTN***          | 8    |               |              |
| VCCIO       | VCCIO8                  | 8    |               |              | VCCIO8                  | 8    |               |              |
| AG28        | D1***                   | 8    |               |              | D1***                   | 8    |               |              |
| AG30        | D2***                   | 8    |               |              | D2***                   | 8    |               |              |
| AH29        | D3***                   | 8    |               |              | D3***                   | 8    |               |              |
| GNDIO       | GNDIO8                  | -    |               |              | GNDIO8                  | -    |               |              |
| AF26        | D4***                   | 8    |               |              | D4***                   | 8    |               |              |
| AH30        | D5***                   | 8    |               |              | D5***                   | 8    |               |              |
| AE26        | D6***                   | 8    |               |              | D6***                   | 8    |               |              |
| AJ31        | D7/SPID0***             | 8    |               |              | D7/SPID0***             | 8    |               |              |
| VCCIO       | VCCIO8                  | 8    |               |              | VCCIO8                  | 8    |               |              |
| AG27        | DI/CSSPI0N***           | 8    |               |              | DI/CSSPI0N***           | 8    |               |              |
| AK32        | DOUT/CSN/<br>CSSPI1N*** | 8    |               |              | DOUT/CSN/<br>CSSPI1N*** | 8    |               |              |
| AK33        | BUSY/SISPI***           | 8    |               |              | BUSY/SISPI***           | 8    |               |              |



## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                            | LFE2M100E/SE |                   |      |                             |              |
|-------------|-------------------|------|----------------------------|--------------|-------------------|------|-----------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function              | Differential | Ball/Pad Function | Bank | Dual Function               | Differential |
| AF27        | RLM0_PLLCAP       | 3    |                            |              | RLM0_PLLCAP       | 3    |                             |              |
| AF28        | PR85B             | 3    | RLM0_GDLLC_FB_A            | C            | PR102B            | 3    | RLM0_GDLLC_FB_A/RDQ99       | C            |
| GNDIO       | GNDIO3            | -    |                            |              | GNDIO3            | -    |                             |              |
| AD26        | PR85A             | 3    | RLM0_GDLLT_FB_A            | T            | PR102A            | 3    | RLM0_GDLLT_FB_A/RDQ99       | T            |
| AJ32        | PR84B             | 3    | RLM0_GDLLC_IN_A**          | C (LVDS)*    | PR101B            | 3    | RLM0_GDLLC_IN_A**/<br>RDQ99 | C (LVDS)*    |
| AJ33        | PR84A             | 3    | RLM0_GDLLT_IN_A**          | T (LVDS)*    | PR101A            | 3    | RLM0_GDLLT_IN_A**/<br>RDQ99 | T (LVDS)*    |
| AJ34        | PR83B             | 3    | RLM0_GPLLC_IN_A**          | C            | PR100B            | 3    | RLM0_GPLLC_IN_A**/<br>RDQ99 | C            |
| VCCIO       | VCCIO3            | 3    |                            |              | VCCIO3            | 3    |                             |              |
| AK34        | PR83A             | 3    | RLM0_GPLLT_IN_A**          | T            | PR100A            | 3    | RLM0_GPLLT_IN_A**/<br>RDQ99 | T            |
| AH33        | PR82B             | 3    | RLM0_GPLLC_FB_A            | C (LVDS)*    | PR99B             | 3    | RLM0_GPLLC_FB_A/RDQ99       | C (LVDS)*    |
| AH34        | PR82A             | 3    | RLM0_GPLLT_FB_A/RDQS82**** | T (LVDS)*    | PR99A             | 3    | RLM0_GPLLT_FB_A/<br>RDQS99  | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                            |              | GNDIO3            | -    |                             |              |
| AF29        | PR81B             | 3    | RDQ82                      | C            | PR98B             | 3    | RDQ99                       | C            |
| AF31        | PR81A             | 3    | RDQ82                      | T            | PR98A             | 3    | RDQ99                       | T            |
| AG33        | PR80B             | 3    | RDQ82                      | C (LVDS)*    | PR97B             | 3    | RDQ99                       | C (LVDS)*    |
| AG34        | PR80A             | 3    | RDQ82                      | T (LVDS)*    | PR97A             | 3    | RDQ99                       | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                            |              | VCCIO3            | 3    |                             |              |
| AF30        | PR79B             | 3    | RDQ82                      | C            | PR96B             | 3    | RDQ99                       | C            |
| AF32        | PR79A             | 3    | RDQ82                      | T            | PR96A             | 3    | RDQ99                       | T            |
| AE29        | PR78B             | 3    | RDQ82                      | C (LVDS)*    | PR95B             | 3    | RDQ99                       | C (LVDS)*    |
| AE30        | PR78A             | 3    | RDQ82                      | T (LVDS)*    | PR95A             | 3    | RDQ99                       | T (LVDS)*    |
| AF33        | NC                | -    |                            |              | PR93B             | 3    | RDQ90                       | C            |
| AF34        | NC                | -    |                            |              | PR93A             | 3    | RDQ90                       | T            |
| -           | -                 | -    |                            |              | GNDIO3            | -    |                             |              |
| AC27        | NC                | -    |                            |              | PR92B             | 3    | RDQ90                       | C (LVDS)*    |
| AC28        | NC                | -    |                            |              | PR92A             | 3    | RDQ90                       | T (LVDS)*    |
| AD29        | NC                | -    |                            |              | PR91B             | 3    | RDQ90                       | C            |
| AD30        | NC                | -    |                            |              | PR91A             | 3    | RDQ90                       | T            |
| -           | -                 | -    |                            |              | VCCIO3            | 3    |                             |              |
| AE33        | NC                | -    |                            |              | PR90B             | 3    | RDQ90                       | C (LVDS)*    |
| AE34        | NC                | -    |                            |              | PR90A             | 3    | RDQS90                      | T (LVDS)*    |
| AD32        | NC                | -    |                            |              | PR89B             | 3    | RDQ90                       | C            |
| -           | -                 | -    |                            |              | GNDIO3            | -    |                             |              |
| AD31        | NC                | -    |                            |              | PR89A             | 3    | RDQ90                       | T            |
| AB25        | NC                | -    |                            |              | PR88B             | 3    | RDQ90                       | C (LVDS)*    |
| AC25        | NC                | -    |                            |              | PR88A             | 3    | RDQ90                       | T (LVDS)*    |
| AB28        | NC                | -    |                            |              | PR87B             | 3    | RDQ90                       | C            |
| -           | -                 | -    |                            |              | VCCIO3            | 3    |                             |              |
| AA26        | NC                | -    |                            |              | PR87A             | 3    | RDQ90                       | T            |
| AD33        | NC                | -    |                            |              | PR86B             | 3    | RDQ90                       | C (LVDS)*    |
| AD34        | NC                | -    |                            |              | PR86A             | 3    | RDQ90                       | T (LVDS)*    |
| AC29        | PR76B             | 3    | RDQ73                      | C            | PR84B             | 3    | RDQ81                       | C            |
| GNDIO       | GNDIO3            | -    |                            |              | GNDIO3            | -    |                             |              |
| AA27        | PR76A             | 3    | RDQ73                      | T            | PR84A             | 3    | RDQ81                       | T            |
| AC32        | PR75B             | 3    | RDQ73                      | C (LVDS)*    | PR83B             | 3    | RDQ81                       | C (LVDS)*    |
| AC31        | PR75A             | 3    | RDQ73                      | T (LVDS)*    | PR83A             | 3    | RDQ81                       | T (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                        | LFE2M100E/SE |                   |      |                        |              |
|-------------|-------------------|------|------------------------|--------------|-------------------|------|------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function          | Differential | Ball/Pad Function | Bank | Dual Function          | Differential |
| AA25        | PR74B             | 3    | RDQ73                  | C            | PR82B             | 3    | RDQ81                  | C            |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |
| AC24        | PR74A             | 3    | RDQ73                  | T            | PR82A             | 3    | RDQ81                  | T            |
| AC33        | PR73B             | 3    | RDQ73                  | C (LVDS)*    | PR81B             | 3    | RDQ81                  | C (LVDS)*    |
| AC34        | PR73A             | 3    | RDQS73                 | T (LVDS)*    | PR81A             | 3    | RDQS81                 | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |
| AB24        | PR72B             | 3    | RDQ73                  | C            | PR80B             | 3    | RDQ81                  | C            |
| Y26         | PR72A             | 3    | RDQ73                  | T            | PR80A             | 3    | RDQ81                  | T            |
| AB33        | PR71B             | 3    | RDQ73                  | C (LVDS)*    | PR79B             | 3    | RDQ81                  | C (LVDS)*    |
| AB34        | PR71A             | 3    | RDQ73                  | T (LVDS)*    | PR79A             | 3    | RDQ81                  | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |
| Y27         | PR70B             | 3    | RDQ73                  | C            | PR78B             | 3    | RDQ81                  | C            |
| AB29        | PR70A             | 3    | RDQ73                  | T            | PR78A             | 3    | RDQ81                  | T            |
| AA34        | PR69B             | 3    | RDQ73                  | C (LVDS)*    | PR77B             | 3    | RDQ81                  | C (LVDS)*    |
| AA33        | PR69A             | 3    | RDQ73                  | T (LVDS)*    | PR77A             | 3    | RDQ81                  | T (LVDS)*    |
| AA31        | PR67B             | 3    | RDQ64                  | C            | PR75B             | 3    | RDQ72                  | C            |
| AA32        | PR67A             | 3    | RDQ64                  | T            | PR75A             | 3    | RDQ72                  | T            |
| GNDIO       | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |
| AA28        | PR66B             | 3    | RDQ64                  | C (LVDS)*    | PR74B             | 3    | RDQ72                  | C (LVDS)*    |
| AA29        | PR66A             | 3    | RDQ64                  | T (LVDS)*    | PR74A             | 3    | RDQ72                  | T (LVDS)*    |
| AA30        | PR65B             | 3    | RDQ64                  | C            | PR73B             | 3    | RDQ72                  | C            |
| AB30        | PR65A             | 3    | RDQ64                  | T            | PR73A             | 3    | RDQ72                  | T            |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |
| Y28         | PR64B             | 3    | RDQ64                  | C (LVDS)*    | PR72B             | 3    | RDQ72                  | C (LVDS)*    |
| Y29         | PR64A             | 3    | RDQS64                 | T (LVDS)*    | PR72A             | 3    | RDQS72                 | T (LVDS)*    |
| AA24        | PR63B             | 3    | RDQ64                  | C            | PR71B             | 3    | RDQ72                  | C            |
| GNDIO       | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |
| Y25         | PR63A             | 3    | RDQ64                  | T            | PR71A             | 3    | RDQ72                  | T            |
| Y31         | PR62B             | 3    | RDQ64                  | C (LVDS)*    | PR70B             | 3    | RDQ72                  | C (LVDS)*    |
| Y30         | PR62A             | 3    | RDQ64                  | T (LVDS)*    | PR70A             | 3    | RDQ72                  | T (LVDS)*    |
| Y24         | PR61B             | 3    | RDQ64                  | C            | PR69B             | 3    | RDQ72                  | C            |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |
| W25         | PR61A             | 3    | RDQ64                  | T            | PR69A             | 3    | RDQ72                  | T            |
| Y33         | PR60B             | 3    | RDQ64                  | C (LVDS)*    | PR68B             | 3    | RDQ72                  | C (LVDS)*    |
| Y34         | PR60A             | 3    | RDQ64                  | T (LVDS)*    | PR68A             | 3    | RDQ72                  | T (LVDS)*    |
| W28         | PR58B             | 3    | RLM3_SPLL_C_FB_A/RDQ55 | C            | PR66B             | 3    | RLM4_SPLL_C_FB_A/RDQ63 | C            |
| GNDIO       | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |
| V26         | PR58A             | 3    | RLM3_SPLL_T_FB_A/RDQ55 | T            | PR66A             | 3    | RLM4_SPLL_T_FB_A/RDQ63 | T            |
| V28         | PR57B             | 3    | RLM3_SPLL_C_IN_A/RDQ55 | C (LVDS)*    | PR65B             | 3    | RLM4_SPLL_C_IN_A/RDQ63 | C (LVDS)*    |
| V27         | PR57A             | 3    | RLM3_SPLL_T_IN_A/RDQ55 | T (LVDS)*    | PR65A             | 3    | RLM4_SPLL_T_IN_A/RDQ63 | T (LVDS)*    |
| V25         | PR56B             | 3    | RDQ55                  | C            | PR64B             | 3    | RDQ63                  | C            |
| VCCIO       | VCCIO3            | 3    |                        |              | VCCIO3            | 3    |                        |              |
| W24         | PR56A             | 3    | RDQ55                  | T            | PR64A             | 3    | RDQ63                  | T            |
| W33         | PR55B             | 3    | RDQ55                  | C (LVDS)*    | PR63B             | 3    | RDQ63                  | C (LVDS)*    |
| W34         | PR55A             | 3    | RDQS55                 | T (LVDS)*    | PR63A             | 3    | RDQS63                 | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                        |              | GNDIO3            | -    |                        |              |
| V24         | PR54B             | 3    | RDQ55                  | C            | PR62B             | 3    | RDQ63                  | C            |
| U26         | PR54A             | 3    | RDQ55                  | T            | PR62A             | 3    | RDQ63                  | T            |
| W29         | PR53B             | 3    | RDQ55                  | C (LVDS)*    | PR61B             | 3    | RDQ63                  | C (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| W30         | PR53A             | 3    | RDQ55                 | T (LVDS)*    | PR61A             | 3    | RDQ63                 | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                       |              | VCCIO3            | 3    |                       |              |
| U27         | PR52B             | 3    | VREF2_3/RDQ55         | C            | PR60B             | 3    | VREF2_3/RDQ63         | C            |
| V29         | PR52A             | 3    | VREF1_3/RDQ55         | T            | PR60A             | 3    | VREF1_3/RDQ63         | T            |
| V31         | PR51B             | 3    | PCLKC3_0/RDQ55        | C (LVDS)*    | PR59B             | 3    | PCLKC3_0/RDQ63        | C (LVDS)*    |
| V32         | PR51A             | 3    | PCLKT3_0/RDQ55        | T (LVDS)*    | PR59A             | 3    | PCLKT3_0/RDQ63        | T (LVDS)*    |
| V33         | PR49B             | 2    | PCLKC2_0/RDQ46        | C            | PR57B             | 2    | PCLKC2_0/RDQ54        | C            |
| V34         | PR49A             | 2    | PCLKT2_0/RDQ46        | T            | PR57A             | 2    | PCLKT2_0/RDQ54        | T            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| U24         | PR48B             | 2    | RDQ46                 | C (LVDS)*    | PR56B             | 2    | RDQ54                 | C (LVDS)*    |
| U25         | PR48A             | 2    | RDQ46                 | T (LVDS)*    | PR56A             | 2    | RDQ54                 | T (LVDS)*    |
| V30         | PR47B             | 2    | RDQ46                 | C            | PR55B             | 2    | RDQ54                 | C            |
| Y32         | PR47A             | 2    | RDQ46                 | T            | PR55A             | 2    | RDQ54                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| U28         | PR46B             | 2    | RDQ46                 | C (LVDS)*    | PR54B             | 2    | RDQ54                 | C (LVDS)*    |
| U29         | PR46A             | 2    | RDQS46                | T (LVDS)*    | PR54A             | 2    | RDQS54                | T (LVDS)*    |
| U33         | PR45B             | 2    | RDQ46                 | C            | PR53B             | 2    | RDQ54                 | C            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| U34         | PR45A             | 2    | RDQ46                 | T            | PR53A             | 2    | RDQ54                 | T            |
| T30         | PR44B             | 2    | RDQ46                 | C (LVDS)*    | PR52B             | 2    | RDQ54                 | C (LVDS)*    |
| U30         | PR44A             | 2    | RDQ46                 | T (LVDS)*    | PR52A             | 2    | RDQ54                 | T (LVDS)*    |
| T29         | PR43B             | 2    | RUM3_SPLLC_FB_A/RDQ46 | C            | PR51B             | 2    | RUM3_SPLLC_FB_A/RDQ54 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| T28         | PR43A             | 2    | RUM3_SPLLT_FB_A/RDQ46 | T            | PR51A             | 2    | RUM3_SPLLT_FB_A/RDQ54 | T            |
| U31         | PR42B             | 2    | RUM3_SPLLC_IN_A/RDQ46 | C (LVDS)*    | PR50B             | 2    | RUM3_SPLLC_IN_A/RDQ54 | C (LVDS)*    |
| U32         | PR42A             | 2    | RUM3_SPLLT_IN_A/RDQ46 | T (LVDS)*    | PR50A             | 2    | RUM3_SPLLT_IN_A/RDQ54 | T (LVDS)*    |
| T33         | PR40B             | 2    | RDQ37                 | C            | PR48B             | 2    | RDQ45                 | C            |
| T34         | PR40A             | 2    | RDQ37                 | T            | PR48A             | 2    | RDQ45                 | T            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| R27         | PR39B             | 2    | RDQ37                 | C (LVDS)*    | PR47B             | 2    | RDQ45                 | C (LVDS)*    |
| R28         | PR39A             | 2    | RDQ37                 | T (LVDS)*    | PR47A             | 2    | RDQ45                 | T (LVDS)*    |
| R29         | PR38B             | 2    | RDQ37                 | C            | PR46B             | 2    | RDQ45                 | C            |
| R30         | PR38A             | 2    | RDQ37                 | T            | PR46A             | 2    | RDQ45                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| R33         | PR37B             | 2    | RDQ37                 | C (LVDS)*    | PR45B             | 2    | RDQ45                 | C (LVDS)*    |
| R34         | PR37A             | 2    | RDQS37                | T (LVDS)*    | PR45A             | 2    | RDQS45                | T (LVDS)*    |
| R32         | PR36B             | 2    | RDQ37                 | C            | PR44B             | 2    | RDQ45                 | C            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| R31         | PR36A             | 2    | RDQ37                 | T            | PR44A             | 2    | RDQ45                 | T            |
| P34         | PR35B             | 2    | RDQ37                 | C (LVDS)*    | PR43B             | 2    | RDQ45                 | C (LVDS)*    |
| P33         | PR35A             | 2    | RDQ37                 | T (LVDS)*    | PR43A             | 2    | RDQ45                 | T (LVDS)*    |
| R26         | PR34B             | 2    | RDQ37                 | C            | PR42B             | 2    | RDQ45                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| T25         | PR34A             | 2    | RDQ37                 | T            | PR42A             | 2    | RDQ45                 | T            |
| P28         | PR33B             | 2    | RDQ37                 | C (LVDS)*    | PR41B             | 2    | RDQ45                 | C (LVDS)*    |
| P27         | PR33A             | 2    | RDQ37                 | T (LVDS)*    | PR41A             | 2    | RDQ45                 | T (LVDS)*    |
| P30         | NC                | -    |                       |              | PR40B             | 2    |                       | C            |
| -           | -                 | -    |                       |              | GNDIO2            | -    |                       |              |
| P29         | NC                | -    |                       |              | PR40A             | 2    |                       | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| P31         | NC                | -    |               |              | PR39B             | 2    |               | C (LVDS)*    |
| P32         | NC                | -    |               |              | PR39A             | 2    |               | T (LVDS)*    |
| R25         | NC                | -    |               |              | PR38B             | 2    |               | C            |
| -           | -                 | -    |               |              | VCCIO2            | 2    |               |              |
| T24         | NC                | -    |               |              | PR38A             | 2    |               | T            |
| N34         | NC                | -    |               |              | PR37B             | 2    |               | C (LVDS)*    |
| N33         | NC                | -    |               |              | PR37A             | 2    |               | T (LVDS)*    |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| M34         | PR31B             | 2    | RDQ28         | C            | PR35B             | 2    | RDQ32         | C            |
| M33         | PR31A             | 2    | RDQ28         | T            | PR35A             | 2    | RDQ32         | T            |
| -           | -                 | -    |               |              | GNDIO2            | -    |               |              |
| R24         | PR30B             | 2    | RDQ28         | C (LVDS)*    | PR34B             | 2    | RDQ32         | C (LVDS)*    |
| P24         | PR30A             | 2    | RDQ28         | T (LVDS)*    | PR34A             | 2    | RDQ32         | T (LVDS)*    |
| N30         | PR29B             | 2    | RDQ28         | C            | PR33B             | 2    | RDQ32         | C            |
| M29         | PR29A             | 2    | RDQ28         | T            | PR33A             | 2    | RDQ32         | T            |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| N28         | PR28B             | 2    | RDQ28         | C (LVDS)*    | PR32B             | 2    | RDQ32         | C (LVDS)*    |
| N29         | PR28A             | 2    | RDQS28        | T (LVDS)*    | PR32A             | 2    | RDQS32        | T (LVDS)*    |
| N24         | PR27B             | 2    | RDQ28         | C            | PR31B             | 2    | RDQ32         | C            |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| N25         | PR27A             | 2    | RDQ28         | T            | PR31A             | 2    | RDQ32         | T            |
| M28         | PR26B             | 2    | RDQ28         | C (LVDS)*    | PR30B             | 2    | RDQ32         | C (LVDS)*    |
| M27         | PR26A             | 2    | RDQ28         | T (LVDS)*    | PR30A             | 2    | RDQ32         | T (LVDS)*    |
| L27         | PR25B             | 2    | RDQ28         | C            | PR29B             | 2    | RDQ32         | C            |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| M26         | PR25A             | 2    | RDQ28         | T            | PR29A             | 2    | RDQ32         | T            |
| M32         | PR24B             | 2    | RDQ28         | C (LVDS)*    | PR28B             | 2    | RDQ32         | C (LVDS)*    |
| M31         | PR24A             | 2    | RDQ28         | T (LVDS)*    | PR28A             | 2    | RDQ32         | T (LVDS)*    |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| -           | -                 | -    |               |              | VCCIO2            | 2    |               |              |
| L34         | PR22B             | 2    |               | C            | PR22B             | 2    | RDQ23         | C            |
| L33         | PR22A             | 2    |               | T            | PR22A             | 2    | RDQ23         | T            |
| L32         | PR21B             | 2    |               | C (LVDS)*    | PR21B             | 2    | RDQ23         | C (LVDS)*    |
| L31         | PR21A             | 2    |               | T (LVDS)*    | PR21A             | 2    | RDQ23         | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| L28         | PR20B             | 2    |               | C            | PR20B             | 2    | RDQ23         | C            |
| L29         | PR20A             | 2    |               | T            | PR20A             | 2    | RDQ23         | T            |
| M30         | PR19B             | 2    |               | C (LVDS)*    | PR19B             | 2    | RDQ23         | C (LVDS)*    |
| L30         | PR19A             | 2    |               | T (LVDS)*    | PR19A             | 2    | RDQ23         | T (LVDS)*    |
| K34         | PR18B             | 2    | RDQ15         | C            | PR18B             | 2    | RDQ15         | C            |
| K33         | PR18A             | 2    | RDQ15         | T            | PR18A             | 2    | RDQ15         | T            |
| GNDIO       | GNDIO2            | -    |               |              | GNDIO2            | -    |               |              |
| K30         | PR17B             | 2    | RDQ15         | C (LVDS)*    | PR17B             | 2    | RDQ15         | C (LVDS)*    |
| K29         | PR17A             | 2    | RDQ15         | T (LVDS)*    | PR17A             | 2    | RDQ15         | T (LVDS)*    |
| J34         | PR16B             | 2    | RDQ15         | C            | PR16B             | 2    | RDQ15         | C            |
| J33         | PR16A             | 2    | RDQ15         | T            | PR16A             | 2    | RDQ15         | T            |
| VCCIO       | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| J32         | PR15B             | 2    | RDQ15         | C (LVDS)*    | PR15B             | 2    | RDQ15         | C (LVDS)*    |
| J31         | PR15A             | 2    | RDQS15        | T (LVDS)*    | PR15A             | 2    | RDQS15        | T (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| H33         | PR14B             | 2    | RDQ15                 | C            | PR14B             | 2    | RDQ15                 | C            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| H34         | PR14A             | 2    | RDQ15                 | T            | PR14A             | 2    | RDQ15                 | T            |
| J30         | PR13B             | 2    | RDQ15                 | C (LVDS)*    | PR13B             | 2    | RDQ15                 | C (LVDS)*    |
| J29         | PR13A             | 2    | RDQ15                 | T (LVDS)*    | PR13A             | 2    | RDQ15                 | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| J27         | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    |
| J28         | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |
| H31         | PR9B              | 2    | VREF2_2               | C            | PR9B              | 2    | VREF2_2               | C            |
| GNDIO       | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| H32         | PR9A              | 2    | VREF1_2               | T            | PR9A              | 2    | VREF1_2               | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| H30         | XRES              | 1    |                       |              | XRES              | 1    |                       |              |
| B33         | URC_SQ_VCCRX0     | 12   |                       |              | URC_SQ_VCCRX0     | 12   |                       |              |
| C33         | URC_SQ_HDINP0     | 12   |                       | T            | URC_SQ_HDINP0     | 12   |                       | T            |
| B34         | URC_SQ_VCCIB0     | 12   |                       |              | URC_SQ_VCCIB0     | 12   |                       |              |
| C32         | URC_SQ_HDINN0     | 12   |                       | C            | URC_SQ_HDINN0     | 12   |                       | C            |
| B32         | URC_SQ_VCCTX0     | 12   |                       |              | URC_SQ_VCCTX0     | 12   |                       |              |
| A33         | URC_SQ_HDOUTP0    | 12   |                       | T            | URC_SQ_HDOUTP0    | 12   |                       | T            |
| C34         | URC_SQ_VCCOB0     | 12   |                       |              | URC_SQ_VCCOB0     | 12   |                       |              |
| A32         | URC_SQ_HDOUTN0    | 12   |                       | C            | URC_SQ_HDOUTN0    | 12   |                       | C            |
| B31         | URC_SQ_VCCTX1     | 12   |                       |              | URC_SQ_VCCTX1     | 12   |                       |              |
| A31         | URC_SQ_HDOUTN1    | 12   |                       | C            | URC_SQ_HDOUTN1    | 12   |                       | C            |
| D32         | URC_SQ_VCCOB1     | 12   |                       |              | URC_SQ_VCCOB1     | 12   |                       |              |
| A30         | URC_SQ_HDOUTP1    | 12   |                       | T            | URC_SQ_HDOUTP1    | 12   |                       | T            |
| B30         | URC_SQ_VCCRX1     | 12   |                       |              | URC_SQ_VCCRX1     | 12   |                       |              |
| C31         | URC_SQ_HDINN1     | 12   |                       | C            | URC_SQ_HDINN1     | 12   |                       | C            |
| D31         | URC_SQ_VCCIB1     | 12   |                       |              | URC_SQ_VCCIB1     | 12   |                       |              |
| C30         | URC_SQ_HDINP1     | 12   |                       | T            | URC_SQ_HDINP1     | 12   |                       | T            |
| E29         | URC_SQ_VCCAUX33   | 12   |                       |              | URC_SQ_VCCAUX33   | 12   |                       |              |
| E30         | URC_SQ_REFCLKN    | 12   |                       | C            | URC_SQ_REFCLKN    | 12   |                       | C            |
| D30         | URC_SQ_REFCLKP    | 12   |                       | T            | URC_SQ_REFCLKP    | 12   |                       | T            |
| D29         | URC_SQ_VCCP       | 12   |                       |              | URC_SQ_VCCP       | 12   |                       |              |
| C29         | URC_SQ_HDINP2     | 12   |                       | T            | URC_SQ_HDINP2     | 12   |                       | T            |
| D27         | URC_SQ_VCCIB2     | 12   |                       |              | URC_SQ_VCCIB2     | 12   |                       |              |
| C28         | URC_SQ_HDINN2     | 12   |                       | C            | URC_SQ_HDINN2     | 12   |                       | C            |
| B29         | URC_SQ_VCCRX2     | 12   |                       |              | URC_SQ_VCCRX2     | 12   |                       |              |
| A29         | URC_SQ_HDOUTP2    | 12   |                       | T            | URC_SQ_HDOUTP2    | 12   |                       | T            |
| E28         | URC_SQ_VCCOB2     | 12   |                       |              | URC_SQ_VCCOB2     | 12   |                       |              |
| A28         | URC_SQ_HDOUTN2    | 12   |                       | C            | URC_SQ_HDOUTN2    | 12   |                       | C            |
| B28         | URC_SQ_VCCTX2     | 12   |                       |              | URC_SQ_VCCTX2     | 12   |                       |              |
| A27         | URC_SQ_HDOUTN3    | 12   |                       | C            | URC_SQ_HDOUTN3    | 12   |                       | C            |
| D26         | URC_SQ_VCCOB3     | 12   |                       |              | URC_SQ_VCCOB3     | 12   |                       |              |
| A26         | URC_SQ_HDOUTP3    | 12   |                       | T            | URC_SQ_HDOUTP3    | 12   |                       | T            |
| B27         | URC_SQ_VCCTX3     | 12   |                       |              | URC_SQ_VCCTX3     | 12   |                       |              |
| C27         | URC_SQ_HDINN3     | 12   |                       | C            | URC_SQ_HDINN3     | 12   |                       | C            |
| B26         | URC_SQ_VCCIB3     | 12   |                       |              | URC_SQ_VCCIB3     | 12   |                       |              |
| C26         | URC_SQ_HDINP3     | 12   |                       | T            | URC_SQ_HDINP3     | 12   |                       | T            |
| D28         | URC_SQ_VCCRX3     | 12   |                       |              | URC_SQ_VCCRX3     | 12   |                       |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| E23         | PT82B             | 1    |               | C            | PT100B            | 1    |               | C            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| F23         | PT82A             | 1    |               | T            | PT100A            | 1    |               | T            |
| F24         | NC                | -    |               |              | PT99B             | 1    |               | C            |
| G23         | NC                | -    |               |              | PT99A             | 1    |               | T            |
| D23         | PT80B             | 1    |               | C            | PT98B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| D22         | PT80A             | 1    |               | T            | PT98A             | 1    |               | T            |
| -           | -                 | -    |               |              | GNDIO1            | -    |               |              |
| -           | -                 | -    |               |              | VCCIO1            | 1    |               |              |
| C21         | PT79B             | 1    |               | C            | PT88B             | 1    |               | C            |
| D21         | PT79A             | 1    |               | T            | PT88A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B21         | PT77B             | 1    |               | C            | PT86B             | 1    |               | C            |
| A21         | PT77A             | 1    |               | T            | PT86A             | 1    |               | T            |
| F22         | PT76B             | 1    |               | C            | PT85B             | 1    |               | C            |
| E22         | PT76A             | 1    |               | T            | PT85A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| GNDIO       | GNDIO1            | -    |               |              | -                 | -    |               |              |
| J22         | NC                | -    |               |              | PT84B             | 1    |               | C            |
| G22         | NC                | -    |               |              | PT84A             | 1    |               | T            |
| -           | -                 | -    |               |              | GNDIO1            | -    |               |              |
| H22         | PT72B             | 1    |               | C            | PT81B             | 1    |               | C            |
| K22         | PT72A             | 1    |               | T            | PT81A             | 1    |               | T            |
| G21         | PT71B             | 1    |               | C            | PT80B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| J21         | PT71A             | 1    |               | T            | PT80A             | 1    |               | T            |
| H21         | NC                | -    |               |              | PT79B             | 1    |               | C            |
| K21         | NC                | -    |               |              | PT79A             | 1    |               | T            |
| D20         | PT69B             | 1    |               | C            | PT78B             | 1    |               | C            |
| F20         | PT69A             | 1    |               | T            | PT78A             | 1    |               | T            |
| C20         | PT68B             | 1    |               | C            | PT77B             | 1    |               | C            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| E20         | PT68A             | 1    |               | T            | PT77A             | 1    |               | T            |
| G20         | PT67B             | 1    |               | C            | PT76B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| J20         | PT67A             | 1    |               | T            | PT76A             | 1    |               | T            |
| A20         | PT66B             | 1    |               | C            | PT75B             | 1    |               | C            |
| B20         | PT66A             | 1    |               | T            | PT75A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A19         | PT63B             | 1    |               | C            | PT72B             | 1    |               | C            |
| B19         | PT63A             | 1    |               | T            | PT72A             | 1    |               | T            |
| K20         | PT62B             | 1    |               | C            | PT71B             | 1    |               | C            |
| H20         | PT62A             | 1    |               | T            | PT71A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| L19         | NC                | -    |               |              | PT70B             | 1    |               | C            |
| L20         | NC                | -    |               |              | PT70A             | 1    |               | T            |
| E19         | PT60B             | 1    |               | C            | PT69B             | 1    |               | C            |
| C18         | PT60A             | 1    |               | T            | PT69A             | 1    |               | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| F19         | PT59B             | 1    |               | C            | PT68B             | 1    |               | C            |
| D18         | PT59A             | 1    |               | T            | PT68A             | 1    |               | T            |
| L18         | NC                | -    |               |              | PT67B             | 1    |               | C            |
| K19         | NC                | -    |               |              | PT67A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A18         | PT57B             | 1    | VREF2_1       | C            | PT66B             | 1    | VREF2_1       | C            |
| B18         | PT57A             | 1    | VREF1_1       | T            | PT66A             | 1    | VREF1_1       | T            |
| G18         | PT56B             | 1    | PCLKC1_0      | C            | PT65B             | 1    | PCLKC1_0      | C            |
| E18         | PT56A             | 1    | PCLKT1_0      | T            | PT65A             | 1    | PCLKT1_0      | T            |
| F18         | PT55B             | 0    | PCLKC0_0      | C            | PT64B             | 0    | PCLKC0_0      | C            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| G19         | PT55A             | 0    | PCLKT0_0      | T            | PT64A             | 0    | PCLKT0_0      | T            |
| H18         | PT54B             | 0    | VREF2_0       | C            | PT63B             | 0    | VREF2_0       | C            |
| K18         | PT54A             | 0    | VREF1_0       | T            | PT63A             | 0    | VREF1_0       | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| J18         | PT53B             | 0    |               | C            | PT60B             | 0    |               | C            |
| L17         | PT53A             | 0    |               | T            | PT60A             | 0    |               | T            |
| G17         | PT52B             | 0    |               | C            | PT59B             | 0    |               | C            |
| -           | -                 | -    |               |              | GNDIO0            | -    |               |              |
| J17         | PT52A             | 0    |               | T            | PT59A             | 0    |               | T            |
| H17         | PT51B             | 0    |               | C            | PT58B             | 0    |               | C            |
| -           | -                 | -    |               |              | VCCIO0            | 0    |               |              |
| K17         | PT51A             | 0    |               | T            | PT58A             | 0    |               | T            |
| B17         | PT50B             | 0    |               | C            | PT57B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              | -                 | -    |               |              |
| A17         | PT50A             | 0    |               | T            | PT57A             | 0    |               | T            |
| D17         | PT49B             | 0    |               | C            | PT56B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | -                 | -    |               |              |
| F17         | PT49A             | 0    |               | T            | PT56A             | 0    |               | T            |
| B16         | PT48B             | 0    |               | C            | PT55B             | 0    |               | C            |
| A16         | PT48A             | 0    |               | T            | PT55A             | 0    |               | T            |
| -           | -                 | -    |               |              | GNDIO0            | -    |               |              |
| -           | -                 | -    |               |              | VCCIO0            | 0    |               |              |
| E17         | PT47B             | 0    |               | C            | PT52B             | 0    |               | C            |
| C17         | PT47A             | 0    |               | T            | PT52A             | 0    |               | T            |
| K16         | PT46B             | 0    |               | C            | PT51B             | 0    |               | C            |
| J15         | PT46A             | 0    |               | T            | PT51A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| G16         | PT45B             | 0    |               | C            | PT50B             | 0    |               | C            |
| H15         | PT45A             | 0    |               | T            | PT50A             | 0    |               | T            |
| A15         | PT44B             | 0    |               | C            | PT49B             | 0    |               | C            |
| B15         | PT44A             | 0    |               | T            | PT49A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| L16         | PT43B             | 0    |               | C            | PT48B             | 0    |               | C            |
| K15         | PT43A             | 0    |               | T            | PT48A             | 0    |               | T            |
| F16         | PT42B             | 0    |               | C            | PT47B             | 0    |               | C            |
| E16         | PT42A             | 0    |               | T            | PT47A             | 0    |               | T            |
| E15         | PT41B             | 0    |               | C            | PT46B             | 0    |               | C            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| G15         | PT41A             | 0    |               | T            | PT46A             | 0    |               | T            |
| J14         | NC                | -    |               |              | PT45B             | 0    |               | C            |
| L15         | NC                | -    |               |              | PT45A             | 0    |               | T            |
| H14         | NC                | -    |               |              | PT44B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| K14         | NC                | -    |               |              | PT44A             | 0    |               | T            |
| F15         | PT38B             | 0    |               | C            | PT42B             | 0    |               | C            |
| G14         | PT38A             | 0    |               | T            | PT42A             | 0    |               | T            |
| C15         | PT37B             | 0    |               | C            | PT41B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| D14         | PT37A             | 0    |               | T            | PT41A             | 0    |               | T            |
| G13         | PT36B             | 0    |               | C            | PT40B             | 0    |               | C            |
| -           | -                 | -    |               |              | VCCIO0            | 0    |               |              |
| J13         | PT36A             | 0    |               | T            | PT40A             | 0    |               | T            |
| B14         | PT35B             | 0    |               | C            | PT39B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | -                 | -    |               |              |
| A14         | PT35A             | 0    |               | T            | PT39A             | 0    |               | T            |
| F13         | PT34B             | 0    |               | C            | PT38B             | 0    |               | C            |
| H13         | PT34A             | 0    |               | T            | PT38A             | 0    |               | T            |
| D13         | PT33B             | 0    |               | C            | PT37B             | 0    |               | C            |
| C14         | PT33A             | 0    |               | T            | PT37A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E13         | PT32B             | 0    |               | C            | PT32B             | 0    |               | C            |
| D12         | PT32A             | 0    |               | T            | PT32A             | 0    |               | T            |
| G12         | PT31B             | 0    |               | C            | PT31B             | 0    |               | C            |
| E12         | PT31A             | 0    |               | T            | PT31A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F12         | NC                | -    |               |              | PT30B             | 0    |               | C            |
| D11         | NC                | -    |               |              | PT30A             | 0    |               | T            |
| F11         | NC                | -    |               |              | PT29B             | 0    |               | C            |
| E11         | NC                | -    |               |              | PT29A             | 0    |               | T            |
| D7          | ULC_SQ_VCCRX0     | 11   |               |              | ULC_SQ_VCCRX0     | 11   |               |              |
| C9          | ULC_SQ_HDINP0     | 11   |               | T            | ULC_SQ_HDINP0     | 11   |               | T            |
| B9          | ULC_SQ_VCCIB0     | 11   |               |              | ULC_SQ_VCCIB0     | 11   |               |              |
| C8          | ULC_SQ_HDINN0     | 11   |               | C            | ULC_SQ_HDINN0     | 11   |               | C            |
| B8          | ULC_SQ_VCCTX0     | 11   |               |              | ULC_SQ_VCCTX0     | 11   |               |              |
| A9          | ULC_SQ_HDOUTP0    | 11   |               | T            | ULC_SQ_HDOUTP0    | 11   |               | T            |
| D9          | ULC_SQ_VCCOB0     | 11   |               |              | ULC_SQ_VCCOB0     | 11   |               |              |
| A8          | ULC_SQ_HDOUTN0    | 11   |               | C            | ULC_SQ_HDOUTN0    | 11   |               | C            |
| B7          | ULC_SQ_VCCTX1     | 11   |               |              | ULC_SQ_VCCTX1     | 11   |               |              |
| A7          | ULC_SQ_HDOUTN1    | 11   |               | C            | ULC_SQ_HDOUTN1    | 11   |               | C            |
| E7          | ULC_SQ_VCCOB1     | 11   |               |              | ULC_SQ_VCCOB1     | 11   |               |              |
| A6          | ULC_SQ_HDOUTP1    | 11   |               | T            | ULC_SQ_HDOUTP1    | 11   |               | T            |
| B6          | ULC_SQ_VCCRX1     | 11   |               |              | ULC_SQ_VCCRX1     | 11   |               |              |
| C7          | ULC_SQ_HDINN1     | 11   |               | C            | ULC_SQ_HDINN1     | 11   |               | C            |
| D8          | ULC_SQ_VCCIB1     | 11   |               |              | ULC_SQ_VCCIB1     | 11   |               |              |
| C6          | ULC_SQ_HDINP1     | 11   |               | T            | ULC_SQ_HDINP1     | 11   |               | T            |
| E6          | ULC_SQ_VCCAUX33   | 11   |               |              | ULC_SQ_VCCAUX33   | 11   |               |              |



## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| E5          | ULC_SQ_REFCLKN    | 11   |               | C            | ULC_SQ_REFCLKN    | 11   |               | C            |
| D5          | ULC_SQ_REFCLKP    | 11   |               | T            | ULC_SQ_REFCLKP    | 11   |               | T            |
| D6          | ULC_SQ_VCCP       | 11   |               |              | ULC_SQ_VCCP       | 11   |               |              |
| C5          | ULC_SQ_HDINP2     | 11   |               | T            | ULC_SQ_HDINP2     | 11   |               | T            |
| D4          | ULC_SQ_VCCIB2     | 11   |               |              | ULC_SQ_VCCIB2     | 11   |               |              |
| C4          | ULC_SQ_HDINN2     | 11   |               | C            | ULC_SQ_HDINN2     | 11   |               | C            |
| B5          | ULC_SQ_VCCRX2     | 11   |               |              | ULC_SQ_VCCRX2     | 11   |               |              |
| A5          | ULC_SQ_HDOUTP2    | 11   |               | T            | ULC_SQ_HDOUTP2    | 11   |               | T            |
| D3          | ULC_SQ_VCCOB2     | 11   |               |              | ULC_SQ_VCCOB2     | 11   |               |              |
| A4          | ULC_SQ_HDOUTN2    | 11   |               | C            | ULC_SQ_HDOUTN2    | 11   |               | C            |
| B4          | ULC_SQ_VCCTX2     | 11   |               |              | ULC_SQ_VCCTX2     | 11   |               |              |
| A3          | ULC_SQ_HDOUTN3    | 11   |               | C            | ULC_SQ_HDOUTN3    | 11   |               | C            |
| C1          | ULC_SQ_VCCOB3     | 11   |               |              | ULC_SQ_VCCOB3     | 11   |               |              |
| A2          | ULC_SQ_HDOUTP3    | 11   |               | T            | ULC_SQ_HDOUTP3    | 11   |               | T            |
| B3          | ULC_SQ_VCCTX3     | 11   |               |              | ULC_SQ_VCCTX3     | 11   |               |              |
| C3          | ULC_SQ_HDINN3     | 11   |               | C            | ULC_SQ_HDINN3     | 11   |               | C            |
| B1          | ULC_SQ_VCCIB3     | 11   |               |              | ULC_SQ_VCCIB3     | 11   |               |              |
| C2          | ULC_SQ_HDINP3     | 11   |               | T            | ULC_SQ_HDINP3     | 11   |               | T            |
| B2          | ULC_SQ_VCCRX3     | 11   |               |              | ULC_SQ_VCCRX3     | 11   |               |              |
| AA13        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA14        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA15        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA16        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA17        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA18        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA19        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA20        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA21        | VCC               | -    |               |              | VCC               | -    |               |              |
| AA22        | VCC               | -    |               |              | VCC               | -    |               |              |
| AB14        | VCC               | -    |               |              | VCC               | -    |               |              |
| AB15        | VCC               | -    |               |              | VCC               | -    |               |              |
| AB20        | VCC               | -    |               |              | VCC               | -    |               |              |
| AB21        | VCC               | -    |               |              | VCC               | -    |               |              |
| N14         | VCC               | -    |               |              | VCC               | -    |               |              |
| N15         | VCC               | -    |               |              | VCC               | -    |               |              |
| N20         | VCC               | -    |               |              | VCC               | -    |               |              |
| N21         | VCC               | -    |               |              | VCC               | -    |               |              |
| P13         | VCC               | -    |               |              | VCC               | -    |               |              |
| P14         | VCC               | -    |               |              | VCC               | -    |               |              |
| P15         | VCC               | -    |               |              | VCC               | -    |               |              |
| P16         | VCC               | -    |               |              | VCC               | -    |               |              |
| P17         | VCC               | -    |               |              | VCC               | -    |               |              |
| P18         | VCC               | -    |               |              | VCC               | -    |               |              |
| P19         | VCC               | -    |               |              | VCC               | -    |               |              |
| P20         | VCC               | -    |               |              | VCC               | -    |               |              |
| P21         | VCC               | -    |               |              | VCC               | -    |               |              |
| P22         | VCC               | -    |               |              | VCC               | -    |               |              |
| R13         | VCC               | -    |               |              | VCC               | -    |               |              |
| R14         | VCC               | -    |               |              | VCC               | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| R21         | VCC               | -    |               |              | VCC               | -    |               |              |
| R22         | VCC               | -    |               |              | VCC               | -    |               |              |
| T14         | VCC               | -    |               |              | VCC               | -    |               |              |
| T21         | VCC               | -    |               |              | VCC               | -    |               |              |
| U14         | VCC               | -    |               |              | VCC               | -    |               |              |
| U21         | VCC               | -    |               |              | VCC               | -    |               |              |
| V14         | VCC               | -    |               |              | VCC               | -    |               |              |
| V21         | VCC               | -    |               |              | VCC               | -    |               |              |
| W14         | VCC               | -    |               |              | VCC               | -    |               |              |
| W21         | VCC               | -    |               |              | VCC               | -    |               |              |
| Y13         | VCC               | -    |               |              | VCC               | -    |               |              |
| Y14         | VCC               | -    |               |              | VCC               | -    |               |              |
| Y21         | VCC               | -    |               |              | VCC               | -    |               |              |
| Y22         | VCC               | -    |               |              | VCC               | -    |               |              |
| C12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C16         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| E14         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H16         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| M14         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| M15         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C19         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| C23         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| E21         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H19         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H23         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| M20         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| M21         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G32         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K28         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K32         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| N27         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| N32         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| P23         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| R23         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| T27         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| T32         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| AA23        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AB27        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AB32        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AE28        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AE32        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AH32        | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| W27         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| W32         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| Y23         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| AC20        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC21        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AG19        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AG23        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AK21        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AM19        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AM23        | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AC14        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AC15        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AG12        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AG16        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AK14        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AM12        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AM16        | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |
| AA12        | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AB3         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AB8         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AE3         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AE7         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AH3         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| W3          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| W8          | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| Y12         | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| G3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| K3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| K7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| N3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| N8          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| P12         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| R12         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| T3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| T8          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |
| AD28        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| AG32        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |
| AB12        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| AB13        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| AB22        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| AB23        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| AC13        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| AC22        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| M13         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| M22         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| N12         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| N13         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| N22         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| N23         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |
| A1          | GND               | -    |               |              | GND               | -    |               |              |
| A10         | GND               | -    |               |              | GND               | -    |               |              |
| A13         | GND               | -    |               |              | GND               | -    |               |              |
| A22         | GND               | -    |               |              | GND               | -    |               |              |
| A25         | GND               | -    |               |              | GND               | -    |               |              |
| A34         | GND               | -    |               |              | GND               | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AB16        | GND               | -    |               |              | GND               | -    |               |              |
| AB17        | GND               | -    |               |              | GND               | -    |               |              |
| AB18        | GND               | -    |               |              | GND               | -    |               |              |
| AB19        | GND               | -    |               |              | GND               | -    |               |              |
| AB26        | GND               | -    |               |              | GND               | -    |               |              |
| AB31        | GND               | -    |               |              | GND               | -    |               |              |
| AB4         | GND               | -    |               |              | GND               | -    |               |              |
| AB9         | GND               | -    |               |              | GND               | -    |               |              |
| AC16        | GND               | -    |               |              | GND               | -    |               |              |
| AC17        | GND               | -    |               |              | GND               | -    |               |              |
| AC18        | GND               | -    |               |              | GND               | -    |               |              |
| AC19        | GND               | -    |               |              | GND               | -    |               |              |
| AD27        | GND               | -    |               |              | GND               | -    |               |              |
| AE27        | GND               | -    |               |              | GND               | -    |               |              |
| AE31        | GND               | -    |               |              | GND               | -    |               |              |
| AE4         | GND               | -    |               |              | GND               | -    |               |              |
| AE8         | GND               | -    |               |              | GND               | -    |               |              |
| AF12        | GND               | -    |               |              | GND               | -    |               |              |
| AF16        | GND               | -    |               |              | GND               | -    |               |              |
| AF19        | GND               | -    |               |              | GND               | -    |               |              |
| AF23        | GND               | -    |               |              | GND               | -    |               |              |
| AG31        | GND               | -    |               |              | GND               | -    |               |              |
| AH31        | GND               | -    |               |              | GND               | -    |               |              |
| AH4         | GND               | -    |               |              | GND               | -    |               |              |
| AJ14        | GND               | -    |               |              | GND               | -    |               |              |
| AJ21        | GND               | -    |               |              | GND               | -    |               |              |
| AK27        | GND               | -    |               |              | GND               | -    |               |              |
| AK8         | GND               | -    |               |              | GND               | -    |               |              |
| AL10        | GND               | -    |               |              | GND               | -    |               |              |
| AL16        | GND               | -    |               |              | GND               | -    |               |              |
| AL19        | GND               | -    |               |              | GND               | -    |               |              |
| AL2         | GND               | -    |               |              | GND               | -    |               |              |
| AL25        | GND               | -    |               |              | GND               | -    |               |              |
| AL33        | GND               | -    |               |              | GND               | -    |               |              |
| AP1         | GND               | -    |               |              | GND               | -    |               |              |
| AP10        | GND               | -    |               |              | GND               | -    |               |              |
| AP13        | GND               | -    |               |              | GND               | -    |               |              |
| AP22        | GND               | -    |               |              | GND               | -    |               |              |
| AP25        | GND               | -    |               |              | GND               | -    |               |              |
| AP34        | GND               | -    |               |              | GND               | -    |               |              |
| D10         | GND               | -    |               |              | GND               | -    |               |              |
| D16         | GND               | -    |               |              | GND               | -    |               |              |
| D19         | GND               | -    |               |              | GND               | -    |               |              |
| D2          | GND               | -    |               |              | GND               | -    |               |              |
| D25         | GND               | -    |               |              | GND               | -    |               |              |
| D33         | GND               | -    |               |              | GND               | -    |               |              |
| E27         | GND               | -    |               |              | GND               | -    |               |              |
| E8          | GND               | -    |               |              | GND               | -    |               |              |
| F14         | GND               | -    |               |              | GND               | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| F21         | GND               | -    |               |              | GND               | -    |               |              |
| G31         | GND               | -    |               |              | GND               | -    |               |              |
| G4          | GND               | -    |               |              | GND               | -    |               |              |
| J12         | GND               | -    |               |              | GND               | -    |               |              |
| J16         | GND               | -    |               |              | GND               | -    |               |              |
| J19         | GND               | -    |               |              | GND               | -    |               |              |
| J23         | GND               | -    |               |              | GND               | -    |               |              |
| K27         | GND               | -    |               |              | GND               | -    |               |              |
| K31         | GND               | -    |               |              | GND               | -    |               |              |
| K4          | GND               | -    |               |              | GND               | -    |               |              |
| K8          | GND               | -    |               |              | GND               | -    |               |              |
| M16         | GND               | -    |               |              | GND               | -    |               |              |
| M17         | GND               | -    |               |              | GND               | -    |               |              |
| M18         | GND               | -    |               |              | GND               | -    |               |              |
| M19         | GND               | -    |               |              | GND               | -    |               |              |
| N16         | GND               | -    |               |              | GND               | -    |               |              |
| N17         | GND               | -    |               |              | GND               | -    |               |              |
| N18         | GND               | -    |               |              | GND               | -    |               |              |
| N19         | GND               | -    |               |              | GND               | -    |               |              |
| N26         | GND               | -    |               |              | GND               | -    |               |              |
| N31         | GND               | -    |               |              | GND               | -    |               |              |
| N4          | GND               | -    |               |              | GND               | -    |               |              |
| N9          | GND               | -    |               |              | GND               | -    |               |              |
| R16         | GND               | -    |               |              | GND               | -    |               |              |
| R17         | GND               | -    |               |              | GND               | -    |               |              |
| R18         | GND               | -    |               |              | GND               | -    |               |              |
| R19         | GND               | -    |               |              | GND               | -    |               |              |
| T12         | GND               | -    |               |              | GND               | -    |               |              |
| T13         | GND               | -    |               |              | GND               | -    |               |              |
| T15         | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |
| T17         | GND               | -    |               |              | GND               | -    |               |              |
| T18         | GND               | -    |               |              | GND               | -    |               |              |
| T19         | GND               | -    |               |              | GND               | -    |               |              |
| T20         | GND               | -    |               |              | GND               | -    |               |              |
| T22         | GND               | -    |               |              | GND               | -    |               |              |
| T23         | GND               | -    |               |              | GND               | -    |               |              |
| T26         | GND               | -    |               |              | GND               | -    |               |              |
| T31         | GND               | -    |               |              | GND               | -    |               |              |
| T4          | GND               | -    |               |              | GND               | -    |               |              |
| T9          | GND               | -    |               |              | GND               | -    |               |              |
| U12         | GND               | -    |               |              | GND               | -    |               |              |
| U13         | GND               | -    |               |              | GND               | -    |               |              |
| U15         | GND               | -    |               |              | GND               | -    |               |              |
| U16         | GND               | -    |               |              | GND               | -    |               |              |
| U17         | GND               | -    |               |              | GND               | -    |               |              |
| U18         | GND               | -    |               |              | GND               | -    |               |              |
| U19         | GND               | -    |               |              | GND               | -    |               |              |
| U20         | GND               | -    |               |              | GND               | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| U22         | GND               | -    |               |              | GND               | -    |               |              |
| U23         | GND               | -    |               |              | GND               | -    |               |              |
| V12         | GND               | -    |               |              | GND               | -    |               |              |
| V13         | GND               | -    |               |              | GND               | -    |               |              |
| V15         | GND               | -    |               |              | GND               | -    |               |              |
| V16         | GND               | -    |               |              | GND               | -    |               |              |
| V17         | GND               | -    |               |              | GND               | -    |               |              |
| V18         | GND               | -    |               |              | GND               | -    |               |              |
| V19         | GND               | -    |               |              | GND               | -    |               |              |
| V20         | GND               | -    |               |              | GND               | -    |               |              |
| V22         | GND               | -    |               |              | GND               | -    |               |              |
| V23         | GND               | -    |               |              | GND               | -    |               |              |
| W12         | GND               | -    |               |              | GND               | -    |               |              |
| W13         | GND               | -    |               |              | GND               | -    |               |              |
| W15         | GND               | -    |               |              | GND               | -    |               |              |
| W16         | GND               | -    |               |              | GND               | -    |               |              |
| W17         | GND               | -    |               |              | GND               | -    |               |              |
| W18         | GND               | -    |               |              | GND               | -    |               |              |
| W19         | GND               | -    |               |              | GND               | -    |               |              |
| W20         | GND               | -    |               |              | GND               | -    |               |              |
| W22         | GND               | -    |               |              | GND               | -    |               |              |
| W23         | GND               | -    |               |              | GND               | -    |               |              |
| W26         | GND               | -    |               |              | GND               | -    |               |              |
| W31         | GND               | -    |               |              | GND               | -    |               |              |
| W4          | GND               | -    |               |              | GND               | -    |               |              |
| W9          | GND               | -    |               |              | GND               | -    |               |              |
| Y16         | GND               | -    |               |              | GND               | -    |               |              |
| Y17         | GND               | -    |               |              | GND               | -    |               |              |
| Y18         | GND               | -    |               |              | GND               | -    |               |              |
| Y19         | GND               | -    |               |              | GND               | -    |               |              |
| A11         | NC                | -    |               |              | NC                | -    |               |              |
| A12         | NC                | -    |               |              | NC                | -    |               |              |
| A23         | NC                | -    |               |              | NC                | -    |               |              |
| A24         | NC                | -    |               |              | NC                | -    |               |              |
| AA11        | NC                | -    |               |              | NC                | -    |               |              |
| AB11        | NC                | -    |               |              | NC                | -    |               |              |
| AC26        | NC                | -    |               |              | NC                | -    |               |              |
| AC30        | NC                | -    |               |              | NC                | -    |               |              |
| AD11        | NC                | -    |               |              | NC                | -    |               |              |
| AD12        | NC                | -    |               |              | NC                | -    |               |              |
| AD13        | NC                | -    |               |              | NC                | -    |               |              |
| AD14        | NC                | -    |               |              | NC                | -    |               |              |
| AD15        | NC                | -    |               |              | NC                | -    |               |              |
| AD19        | NC                | -    |               |              | NC                | -    |               |              |
| AD21        | NC                | -    |               |              | NC                | -    |               |              |
| AD22        | NC                | -    |               |              | NC                | -    |               |              |
| AD23        | NC                | -    |               |              | NC                | -    |               |              |
| AE10        | NC                | -    |               |              | NC                | -    |               |              |
| AE11        | NC                | -    |               |              | NC                | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AE12        | NC                | -    |               |              | NC                | -    |               |              |
| AE13        | NC                | -    |               |              | NC                | -    |               |              |
| AE19        | NC                | -    |               |              | NC                | -    |               |              |
| AE21        | NC                | -    |               |              | NC                | -    |               |              |
| AE22        | NC                | -    |               |              | NC                | -    |               |              |
| AE23        | NC                | -    |               |              | NC                | -    |               |              |
| AF11        | NC                | -    |               |              | NC                | -    |               |              |
| AF21        | NC                | -    |               |              | NC                | -    |               |              |
| AF22        | NC                | -    |               |              | NC                | -    |               |              |
| AF24        | NC                | -    |               |              | NC                | -    |               |              |
| AF8         | NC                | -    |               |              | NC                | -    |               |              |
| AF9         | NC                | -    |               |              | NC                | -    |               |              |
| AG10        | NC                | -    |               |              | NC                | -    |               |              |
| AG11        | NC                | -    |               |              | NC                | -    |               |              |
| AG24        | NC                | -    |               |              | NC                | -    |               |              |
| AG25        | NC                | -    |               |              | NC                | -    |               |              |
| AG26        | NC                | -    |               |              | NC                | -    |               |              |
| AG3         | NC                | -    |               |              | NC                | -    |               |              |
| AG7         | NC                | -    |               |              | NC                | -    |               |              |
| AG8         | NC                | -    |               |              | NC                | -    |               |              |
| AG9         | NC                | -    |               |              | NC                | -    |               |              |
| AH10        | NC                | -    |               |              | NC                | -    |               |              |
| AH11        | NC                | -    |               |              | NC                | -    |               |              |
| AH13        | NC                | -    |               |              | NC                | -    |               |              |
| AH24        | NC                | -    |               |              | NC                | -    |               |              |
| AH25        | NC                | -    |               |              | NC                | -    |               |              |
| AH26        | NC                | -    |               |              | NC                | -    |               |              |
| AH27        | NC                | -    |               |              | NC                | -    |               |              |
| AH5         | NC                | -    |               |              | NC                | -    |               |              |
| AH6         | NC                | -    |               |              | NC                | -    |               |              |
| AH7         | NC                | -    |               |              | NC                | -    |               |              |
| AH8         | NC                | -    |               |              | NC                | -    |               |              |
| AH9         | NC                | -    |               |              | NC                | -    |               |              |
| AJ10        | NC                | -    |               |              | NC                | -    |               |              |
| AJ11        | NC                | -    |               |              | NC                | -    |               |              |
| AJ13        | NC                | -    |               |              | NC                | -    |               |              |
| AJ24        | NC                | -    |               |              | NC                | -    |               |              |
| AJ25        | NC                | -    |               |              | NC                | -    |               |              |
| AJ26        | NC                | -    |               |              | NC                | -    |               |              |
| AJ27        | NC                | -    |               |              | NC                | -    |               |              |
| AJ3         | NC                | -    |               |              | NC                | -    |               |              |
| AJ4         | NC                | -    |               |              | NC                | -    |               |              |
| AJ5         | NC                | -    |               |              | NC                | -    |               |              |
| AJ6         | NC                | -    |               |              | NC                | -    |               |              |
| AJ7         | NC                | -    |               |              | NC                | -    |               |              |
| AJ8         | NC                | -    |               |              | NC                | -    |               |              |
| AJ9         | NC                | -    |               |              | NC                | -    |               |              |
| AK10        | NC                | -    |               |              | NC                | -    |               |              |
| AK11        | NC                | -    |               |              | NC                | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AK12        | NC                | -    |               |              | NC                | -    |               |              |
| AK24        | NC                | -    |               |              | NC                | -    |               |              |
| AK25        | NC                | -    |               |              | NC                | -    |               |              |
| AK26        | NC                | -    |               |              | NC                | -    |               |              |
| AK4         | NC                | -    |               |              | NC                | -    |               |              |
| AK9         | NC                | -    |               |              | NC                | -    |               |              |
| AL11        | NC                | -    |               |              | NC                | -    |               |              |
| AL12        | NC                | -    |               |              | NC                | -    |               |              |
| AL34        | NC                | -    |               |              | NC                | -    |               |              |
| AM10        | NC                | -    |               |              | NC                | -    |               |              |
| AM11        | NC                | -    |               |              | NC                | -    |               |              |
| AM13        | NC                | -    |               |              | NC                | -    |               |              |
| AM25        | NC                | -    |               |              | NC                | -    |               |              |
| AN10        | NC                | -    |               |              | NC                | -    |               |              |
| AN11        | NC                | -    |               |              | NC                | -    |               |              |
| AN12        | NC                | -    |               |              | NC                | -    |               |              |
| AN13        | NC                | -    |               |              | NC                | -    |               |              |
| AN24        | NC                | -    |               |              | NC                | -    |               |              |
| AN25        | NC                | -    |               |              | NC                | -    |               |              |
| AP11        | NC                | -    |               |              | NC                | -    |               |              |
| AP12        | NC                | -    |               |              | NC                | -    |               |              |
| AP24        | NC                | -    |               |              | NC                | -    |               |              |
| B10         | NC                | -    |               |              | NC                | -    |               |              |
| B11         | NC                | -    |               |              | NC                | -    |               |              |
| B12         | NC                | -    |               |              | NC                | -    |               |              |
| B13         | NC                | -    |               |              | NC                | -    |               |              |
| B22         | NC                | -    |               |              | NC                | -    |               |              |
| B23         | NC                | -    |               |              | NC                | -    |               |              |
| B24         | NC                | -    |               |              | NC                | -    |               |              |
| B25         | NC                | -    |               |              | NC                | -    |               |              |
| C10         | NC                | -    |               |              | NC                | -    |               |              |
| C11         | NC                | -    |               |              | NC                | -    |               |              |
| C13         | NC                | -    |               |              | NC                | -    |               |              |
| C22         | NC                | -    |               |              | NC                | -    |               |              |
| C24         | NC                | -    |               |              | NC                | -    |               |              |
| C25         | NC                | -    |               |              | NC                | -    |               |              |
| D1          | NC                | -    |               |              | NC                | -    |               |              |
| D15         | NC                | -    |               |              | NC                | -    |               |              |
| D24         | NC                | -    |               |              | NC                | -    |               |              |
| D34         | NC                | -    |               |              | NC                | -    |               |              |
| E10         | NC                | -    |               |              | NC                | -    |               |              |
| E24         | NC                | -    |               |              | NC                | -    |               |              |
| E25         | NC                | -    |               |              | NC                | -    |               |              |
| E26         | NC                | -    |               |              | NC                | -    |               |              |
| E3          | NC                | -    |               |              | NC                | -    |               |              |
| E31         | NC                | -    |               |              | NC                | -    |               |              |
| E32         | NC                | -    |               |              | NC                | -    |               |              |
| E33         | NC                | -    |               |              | NC                | -    |               |              |
| E34         | NC                | -    |               |              | NC                | -    |               |              |



## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| E4          | NC                | -    |               |              | NC                | -    |               |              |
| E9          | NC                | -    |               |              | NC                | -    |               |              |
| F10         | NC                | -    |               |              | NC                | -    |               |              |
| F25         | NC                | -    |               |              | NC                | -    |               |              |
| F26         | NC                | -    |               |              | NC                | -    |               |              |
| F27         | NC                | -    |               |              | NC                | -    |               |              |
| F28         | NC                | -    |               |              | NC                | -    |               |              |
| F29         | NC                | -    |               |              | NC                | -    |               |              |
| F30         | NC                | -    |               |              | NC                | -    |               |              |
| F31         | NC                | -    |               |              | NC                | -    |               |              |
| F32         | NC                | -    |               |              | NC                | -    |               |              |
| F33         | NC                | -    |               |              | NC                | -    |               |              |
| F34         | NC                | -    |               |              | NC                | -    |               |              |
| F5          | NC                | -    |               |              | NC                | -    |               |              |
| F6          | NC                | -    |               |              | NC                | -    |               |              |
| F7          | NC                | -    |               |              | NC                | -    |               |              |
| F8          | NC                | -    |               |              | NC                | -    |               |              |
| F9          | NC                | -    |               |              | NC                | -    |               |              |
| G10         | NC                | -    |               |              | NC                | -    |               |              |
| G11         | NC                | -    |               |              | NC                | -    |               |              |
| G24         | NC                | -    |               |              | NC                | -    |               |              |
| G25         | NC                | -    |               |              | NC                | -    |               |              |
| G26         | NC                | -    |               |              | NC                | -    |               |              |
| G27         | NC                | -    |               |              | NC                | -    |               |              |
| G28         | NC                | -    |               |              | NC                | -    |               |              |
| G29         | NC                | -    |               |              | NC                | -    |               |              |
| G30         | NC                | -    |               |              | NC                | -    |               |              |
| G33         | NC                | -    |               |              | NC                | -    |               |              |
| G34         | NC                | -    |               |              | NC                | -    |               |              |
| G7          | NC                | -    |               |              | NC                | -    |               |              |
| G8          | NC                | -    |               |              | NC                | -    |               |              |
| G9          | NC                | -    |               |              | NC                | -    |               |              |
| H10         | NC                | -    |               |              | NC                | -    |               |              |
| H11         | NC                | -    |               |              | NC                | -    |               |              |
| H24         | NC                | -    |               |              | NC                | -    |               |              |
| H25         | NC                | -    |               |              | NC                | -    |               |              |
| H26         | NC                | -    |               |              | NC                | -    |               |              |
| H27         | NC                | -    |               |              | NC                | -    |               |              |
| H28         | NC                | -    |               |              | NC                | -    |               |              |
| H29         | NC                | -    |               |              | NC                | -    |               |              |
| H8          | NC                | -    |               |              | NC                | -    |               |              |
| H9          | NC                | -    |               |              | NC                | -    |               |              |
| J10         | NC                | -    |               |              | NC                | -    |               |              |
| J11         | NC                | -    |               |              | NC                | -    |               |              |
| J24         | NC                | -    |               |              | NC                | -    |               |              |
| J25         | NC                | -    |               |              | NC                | -    |               |              |
| J26         | NC                | -    |               |              | NC                | -    |               |              |
| J9          | NC                | -    |               |              | NC                | -    |               |              |
| K10         | NC                | -    |               |              | NC                | -    |               |              |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| K11         | NC                | -    |               |              | NC                | -    |               |              |
| K12         | NC                | -    |               |              | NC                | -    |               |              |
| K13         | NC                | -    |               |              | NC                | -    |               |              |
| K23         | NC                | -    |               |              | NC                | -    |               |              |
| K24         | NC                | -    |               |              | NC                | -    |               |              |
| K25         | NC                | -    |               |              | NC                | -    |               |              |
| K26         | NC                | -    |               |              | NC                | -    |               |              |
| L11         | NC                | -    |               |              | NC                | -    |               |              |
| L12         | NC                | -    |               |              | NC                | -    |               |              |
| L13         | NC                | -    |               |              | NC                | -    |               |              |
| L14         | NC                | -    |               |              | NC                | -    |               |              |
| L21         | NC                | -    |               |              | NC                | -    |               |              |
| L22         | NC                | -    |               |              | NC                | -    |               |              |
| L23         | NC                | -    |               |              | NC                | -    |               |              |
| L24         | NC                | -    |               |              | NC                | -    |               |              |
| L25         | NC                | -    |               |              | NC                | -    |               |              |
| L26         | NC                | -    |               |              | NC                | -    |               |              |
| M11         | NC                | -    |               |              | NC                | -    |               |              |
| M24         | NC                | -    |               |              | NC                | -    |               |              |
| M25         | NC                | -    |               |              | NC                | -    |               |              |
| M6          | NC                | -    |               |              | NC                | -    |               |              |
| M8          | NC                | -    |               |              | NC                | -    |               |              |
| N10         | NC                | -    |               |              | NC                | -    |               |              |
| N11         | NC                | -    |               |              | NC                | -    |               |              |
| P10         | NC                | -    |               |              | NC                | -    |               |              |
| P25         | NC                | -    |               |              | NC                | -    |               |              |
| P26         | NC                | -    |               |              | NC                | -    |               |              |
| R9          | NC                | -    |               |              | NC                | -    |               |              |
| T11         | NC                | -    |               |              | NC                | -    |               |              |
| U11         | NC                | -    |               |              | NC                | -    |               |              |
| W11         | NC                | -    |               |              | NC                | -    |               |              |
| Y10         | NC                | -    |               |              | NC                | -    |               |              |
| Y11         | NC                | -    |               |              | NC                | -    |               |              |
| R15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |
| R20         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |
| Y15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |
| Y20         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

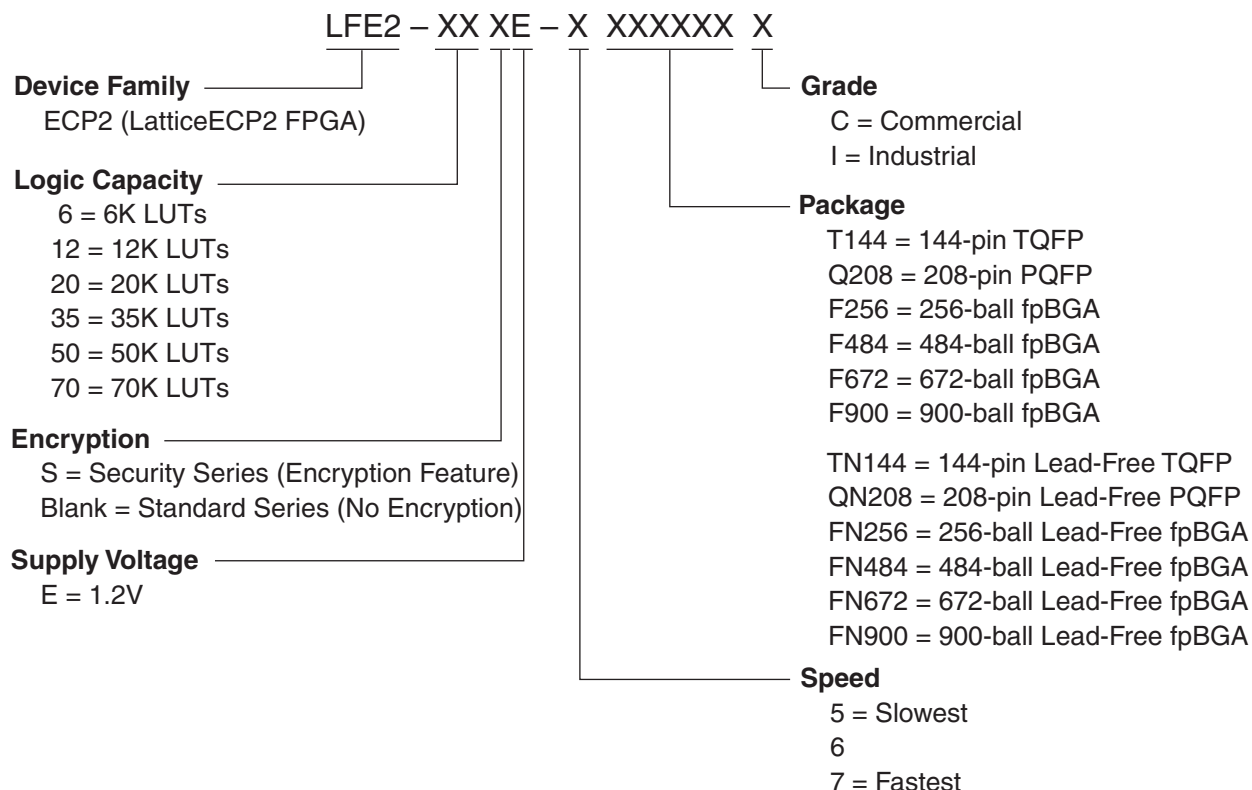
\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

\*\*\* For density migration, board design must take into account that these sysCONFIG pins are dual function for the lower density devices (ECP2M20 and ECP2M35). They can be either sysCONFIG pins or general purpose I/Os. These pins are dedicated pins for the higher density devices (ECP2M50, ECP2M70, and ECP2M100).

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

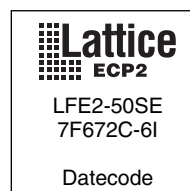
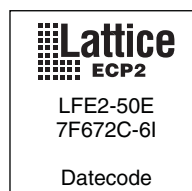
Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

### LatticeECP2 Part Number Description



### Ordering Information

Note: LatticeECP2 devices are dual marked. For example, the commercial speed grade LFE2-50E-7F672C is also marked with industrial grade -6I (LFE2-50E-6F672I). The commercial grade is one speed grade faster than the associated dual mark industrial grade. The slowest commercial speed grade does not have industrial markings. The markings appear as follows:



**LatticeECP2 Standard Series Devices, Conventional Packaging**
**Commercial**

| Part Number    | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-6E-5T144C | 90   | 1.2V    | -5    | TQFP    | 144  | COM   | 6        |
| LFE2-6E-6T144C | 90   | 1.2V    | -6    | TQFP    | 144  | COM   | 6        |
| LFE2-6E-7T144C | 90   | 1.2V    | -7    | TQFP    | 144  | COM   | 6        |
| LFE2-6E-5F256C | 190  | 1.2V    | -5    | fpBGA   | 256  | COM   | 6        |
| LFE2-6E-6F256C | 190  | 1.2V    | -6    | fpBGA   | 256  | COM   | 6        |
| LFE2-6E-7F256C | 190  | 1.2V    | -7    | fpBGA   | 256  | COM   | 6        |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-12E-5T144C | 93   | 1.2V    | -5    | TQFP    | 144  | COM   | 12       |
| LFE2-12E-6T144C | 93   | 1.2V    | -6    | TQFP    | 144  | COM   | 12       |
| LFE2-12E-7T144C | 93   | 1.2V    | -7    | TQFP    | 144  | COM   | 12       |
| LFE2-12E-5Q208C | 131  | 1.2V    | -5    | PQFP    | 208  | COM   | 12       |
| LFE2-12E-6Q208C | 131  | 1.2V    | -6    | PQFP    | 208  | COM   | 12       |
| LFE2-12E-7Q208C | 131  | 1.2V    | -7    | PQFP    | 208  | COM   | 12       |
| LFE2-12E-5F256C | 193  | 1.2V    | -5    | fpBGA   | 256  | COM   | 12       |
| LFE2-12E-6F256C | 193  | 1.2V    | -6    | fpBGA   | 256  | COM   | 12       |
| LFE2-12E-7F256C | 193  | 1.2V    | -7    | fpBGA   | 256  | COM   | 12       |
| LFE2-12E-5F484C | 297  | 1.2V    | -5    | fpBGA   | 484  | COM   | 12       |
| LFE2-12E-6F484C | 297  | 1.2V    | -6    | fpBGA   | 484  | COM   | 12       |
| LFE2-12E-7F484C | 297  | 1.2V    | -7    | fpBGA   | 484  | COM   | 12       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-20E-5Q208C | 131  | 1.2V    | -5    | PQFP    | 208  | COM   | 20       |
| LFE2-20E-6Q208C | 131  | 1.2V    | -6    | PQFP    | 208  | COM   | 20       |
| LFE2-20E-7Q208C | 131  | 1.2V    | -7    | PQFP    | 208  | COM   | 20       |
| LFE2-20E-5F256C | 193  | 1.2V    | -5    | fpBGA   | 256  | COM   | 20       |
| LFE2-20E-6F256C | 193  | 1.2V    | -6    | fpBGA   | 256  | COM   | 20       |
| LFE2-20E-7F256C | 193  | 1.2V    | -7    | fpBGA   | 256  | COM   | 20       |
| LFE2-20E-5F484C | 331  | 1.2V    | -5    | fpBGA   | 484  | COM   | 20       |
| LFE2-20E-6F484C | 331  | 1.2V    | -6    | fpBGA   | 484  | COM   | 20       |
| LFE2-20E-7F484C | 331  | 1.2V    | -7    | fpBGA   | 484  | COM   | 20       |
| LFE2-20E-5F672C | 402  | 1.2V    | -5    | fpBGA   | 672  | COM   | 20       |
| LFE2-20E-6F672C | 402  | 1.2V    | -6    | fpBGA   | 672  | COM   | 20       |
| LFE2-20E-7F672C | 402  | 1.2V    | -7    | fpBGA   | 672  | COM   | 20       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-35E-5F484C | 331  | 1.2V    | -5    | fpBGA   | 484  | COM   | 35       |
| LFE2-35E-6F484C | 331  | 1.2V    | -6    | fpBGA   | 484  | COM   | 35       |
| LFE2-35E-7F484C | 331  | 1.2V    | -7    | fpBGA   | 484  | COM   | 35       |
| LFE2-35E-5F672C | 450  | 1.2V    | -5    | fpBGA   | 672  | COM   | 35       |
| LFE2-35E-6F672C | 450  | 1.2V    | -6    | fpBGA   | 672  | COM   | 35       |
| LFE2-35E-7F672C | 450  | 1.2V    | -7    | fpBGA   | 672  | COM   | 35       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-50E-5F484C | 339  | 1.2V    | -5    | fpBGA   | 484  | COM   | 50       |
| LFE2-50E-6F484C | 339  | 1.2V    | -6    | fpBGA   | 484  | COM   | 50       |
| LFE2-50E-7F484C | 339  | 1.2V    | -7    | fpBGA   | 484  | COM   | 50       |
| LFE2-50E-5F672C | 500  | 1.2V    | -5    | fpBGA   | 672  | COM   | 50       |
| LFE2-50E-6F672C | 500  | 1.2V    | -6    | fpBGA   | 672  | COM   | 50       |
| LFE2-50E-7F672C | 500  | 1.2V    | -7    | fpBGA   | 672  | COM   | 50       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-70E-5F672C | 500  | 1.2V    | -5    | fpBGA   | 672  | COM   | 70       |
| LFE2-70E-6F672C | 500  | 1.2V    | -6    | fpBGA   | 672  | COM   | 70       |
| LFE2-70E-7F672C | 500  | 1.2V    | -7    | fpBGA   | 672  | COM   | 70       |
| LFE2-70E-5F900C | 583  | 1.2V    | -5    | fpBGA   | 900  | COM   | 70       |
| LFE2-70E-6F900C | 583  | 1.2V    | -6    | fpBGA   | 900  | COM   | 70       |
| LFE2-70E-7F900C | 583  | 1.2V    | -7    | fpBGA   | 900  | COM   | 70       |

### Industrial

| Part Number    | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-6E-5T144I | 90   | 1.2V    | -5    | TQFP    | 144  | IND   | 6        |
| LFE2-6E-6T144I | 90   | 1.2V    | -6    | TQFP    | 144  | IND   | 6        |
| LFE2-6E-5F256I | 190  | 1.2V    | -5    | fpBGA   | 256  | IND   | 6        |
| LFE2-6E-6F256I | 190  | 1.2V    | -6    | fpBGA   | 256  | IND   | 6        |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-12E-5T144I | 93   | 1.2V    | -5    | TQFP    | 144  | IND   | 12       |
| LFE2-12E-6T144I | 93   | 1.2V    | -6    | TQFP    | 144  | IND   | 12       |
| LFE2-12E-5Q208I | 131  | 1.2V    | -5    | PQFP    | 208  | IND   | 12       |
| LFE2-12E-6Q208I | 131  | 1.2V    | -6    | PQFP    | 208  | IND   | 12       |
| LFE2-12E-5F256I | 193  | 1.2V    | -5    | fpBGA   | 256  | IND   | 12       |
| LFE2-12E-6F256I | 193  | 1.2V    | -6    | fpBGA   | 256  | IND   | 12       |
| LFE2-12E-5F484I | 297  | 1.2V    | -5    | fpBGA   | 484  | IND   | 12       |
| LFE2-12E-6F484I | 297  | 1.2V    | -6    | fpBGA   | 484  | IND   | 12       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-20E-5Q208I | 131  | 1.2V    | -5    | PQFP    | 208  | IND   | 20       |
| LFE2-20E-6Q208I | 131  | 1.2V    | -6    | PQFP    | 208  | IND   | 20       |
| LFE2-20E-5F256I | 193  | 1.2V    | -5    | fpBGA   | 256  | IND   | 20       |
| LFE2-20E-6F256I | 193  | 1.2V    | -6    | fpBGA   | 256  | IND   | 20       |
| LFE2-20E-5F484I | 331  | 1.2V    | -5    | fpBGA   | 484  | IND   | 20       |
| LFE2-20E-6F484I | 331  | 1.2V    | -6    | fpBGA   | 484  | IND   | 20       |
| LFE2-20E-5F672I | 402  | 1.2V    | -5    | fpBGA   | 672  | IND   | 20       |
| LFE2-20E-6F672I | 402  | 1.2V    | -6    | fpBGA   | 672  | IND   | 20       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-35E-5F484I | 331  | 1.2V    | -5    | fpBGA   | 484  | IND   | 35       |
| LFE2-35E-6F484I | 331  | 1.2V    | -6    | fpBGA   | 484  | IND   | 35       |
| LFE2-35E-5F672I | 450  | 1.2V    | -5    | fpBGA   | 672  | IND   | 35       |
| LFE2-35E-6F672I | 450  | 1.2V    | -6    | fpBGA   | 672  | IND   | 35       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-50E-5F484I | 339  | 1.2V    | -5    | fpBGA   | 484  | IND   | 50       |
| LFE2-50E-6F484I | 339  | 1.2V    | -6    | fpBGA   | 484  | IND   | 50       |
| LFE2-50E-5F672I | 500  | 1.2V    | -5    | fpBGA   | 672  | IND   | 50       |
| LFE2-50E-6F672I | 500  | 1.2V    | -6    | fpBGA   | 672  | IND   | 50       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-70E-5F672I | 500  | 1.2V    | -5    | fpBGA   | 672  | IND   | 70       |
| LFE2-70E-6F672I | 500  | 1.2V    | -6    | fpBGA   | 672  | IND   | 70       |
| LFE2-70E-5F900I | 583  | 1.2V    | -5    | fpBGA   | 900  | IND   | 70       |
| LFE2-70E-6F900I | 583  | 1.2V    | -6    | fpBGA   | 900  | IND   | 70       |

## LatticeECP2 Standard Series Devices, Lead-Free Packaging

### Commercial

| Part Number     | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-6E-5TN144C | 90   | 1.2V    | -5    | Lead-Free TQFP  | 144  | COM   | 6        |
| LFE2-6E-6TN144C | 90   | 1.2V    | -6    | Lead-Free TQFP  | 144  | COM   | 6        |
| LFE2-6E-7TN144C | 90   | 1.2V    | -7    | Lead-Free TQFP  | 144  | COM   | 6        |
| LFE2-6E-5FN256C | 190  | 1.2V    | -5    | Lead-Free fpBGA | 256  | COM   | 6        |
| LFE2-6E-6FN256C | 190  | 1.2V    | -6    | Lead-Free fpBGA | 256  | COM   | 6        |
| LFE2-6E-7FN256C | 190  | 1.2V    | -7    | Lead-Free fpBGA | 256  | COM   | 6        |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-12E-5TN144C | 93   | 1.2V    | -5    | Lead-Free TQFP  | 144  | COM   | 12       |
| LFE2-12E-6TN144C | 93   | 1.2V    | -6    | Lead-Free TQFP  | 144  | COM   | 12       |
| LFE2-12E-7TN144C | 93   | 1.2V    | -7    | Lead-Free TQFP  | 144  | COM   | 12       |
| LFE2-12E-5QN208C | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | COM   | 12       |
| LFE2-12E-6QN208C | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | COM   | 12       |
| LFE2-12E-7QN208C | 131  | 1.2V    | -7    | Lead-Free PQFP  | 208  | COM   | 12       |
| LFE2-12E-5FN256C | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | COM   | 12       |
| LFE2-12E-6FN256C | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | COM   | 12       |
| LFE2-12E-7FN256C | 193  | 1.2V    | -7    | Lead-Free fpBGA | 256  | COM   | 12       |
| LFE2-12E-5FN484C | 297  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 12       |
| LFE2-12E-6FN484C | 297  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 12       |
| LFE2-12E-7FN484C | 297  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 12       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-20E-5QN208C | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | COM   | 20       |
| LFE2-20E-6QN208C | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | COM   | 20       |
| LFE2-20E-7QN208C | 131  | 1.2V    | -7    | Lead-Free PQFP  | 208  | COM   | 20       |
| LFE2-20E-5FN256C | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | COM   | 20       |
| LFE2-20E-6FN256C | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | COM   | 20       |
| LFE2-20E-7FN256C | 193  | 1.2V    | -7    | Lead-Free fpBGA | 256  | COM   | 20       |
| LFE2-20E-5FN484C | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2-20E-6FN484C | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2-20E-7FN484C | 331  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2-20E-5FN672C | 402  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 20       |
| LFE2-20E-6FN672C | 402  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 20       |
| LFE2-20E-7FN672C | 402  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-35E-5FN484C | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2-35E-6FN484C | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2-35E-7FN484C | 331  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2-35E-5FN672C | 450  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 35       |
| LFE2-35E-6FN672C | 450  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 35       |
| LFE2-35E-7FN672C | 450  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-50E-5FN484C | 339  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 50       |
| LFE2-50E-6FN484C | 339  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 50       |
| LFE2-50E-7FN484C | 339  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 50       |
| LFE2-50E-5FN672C | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 50       |
| LFE2-50E-6FN672C | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 50       |
| LFE2-50E-7FN672C | 500  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-70E-5FN672C | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 70       |
| LFE2-70E-6FN672C | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 70       |
| LFE2-70E-7FN672C | 500  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 70       |
| LFE2-70E-5FN900C | 583  | 1.2V    | -5    | Lead-Free fpBGA | 900  | COM   | 70       |
| LFE2-70E-6FN900C | 583  | 1.2V    | -6    | Lead-Free fpBGA | 900  | COM   | 70       |
| LFE2-70E-7FN900C | 583  | 1.2V    | -7    | Lead-Free fpBGA | 900  | COM   | 70       |

### Industrial

| Part Number     | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-6E-5TN144I | 90   | 1.2V    | -5    | Lead-Free TQFP  | 144  | IND   | 6        |
| LFE2-6E-6TN144I | 90   | 1.2V    | -6    | Lead-Free TQFP  | 144  | IND   | 6        |
| LFE2-6E-5FN256I | 190  | 1.2V    | -5    | Lead-Free fpBGA | 256  | IND   | 6        |
| LFE2-6E-6FN256I | 190  | 1.2V    | -6    | Lead-Free fpBGA | 256  | IND   | 6        |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-12E-5TN144I | 93   | 1.2V    | -5    | Lead-Free TQFP  | 144  | IND   | 12       |
| LFE2-12E-6TN144I | 93   | 1.2V    | -6    | Lead-Free TQFP  | 144  | IND   | 12       |
| LFE2-12E-5QN208I | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | IND   | 12       |
| LFE2-12E-6QN208I | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | IND   | 12       |
| LFE2-12E-5FN256I | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | IND   | 12       |
| LFE2-12E-6FN256I | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | IND   | 12       |
| LFE2-12E-5FN484I | 297  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 12       |
| LFE2-12E-6FN484I | 297  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 12       |



| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-20E-5QN208I | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | IND   | 20       |
| LFE2-20E-6QN208I | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | IND   | 20       |
| LFE2-20E-5FN256I | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | IND   | 20       |
| LFE2-20E-6FN256I | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | IND   | 20       |
| LFE2-20E-5FN484I | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 20       |
| LFE2-20E-6FN484I | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 20       |
| LFE2-20E-5FN672I | 402  | 1.2V    | -5    | Lead-Free fpBGA | 672  | IND   | 20       |
| LFE2-20E-6FN672I | 402  | 1.2V    | -6    | Lead-Free fpBGA | 672  | IND   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-35E-5FN484I | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 35       |
| LFE2-35E-6FN484I | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 35       |
| LFE2-35E-5FN672I | 450  | 1.2V    | -5    | Lead-Free fpBGA | 672  | IND   | 35       |
| LFE2-35E-6FN672I | 450  | 1.2V    | -6    | Lead-Free fpBGA | 672  | IND   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-50E-5FN484I | 339  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 50       |
| LFE2-50E-6FN484I | 339  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 50       |
| LFE2-50E-5FN672I | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | IND   | 50       |
| LFE2-50E-6FN672I | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | IND   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-70E-5FN672I | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | IND   | 70       |
| LFE2-70E-6FN672I | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | IND   | 70       |
| LFE2-70E-5FN900I | 583  | 1.2V    | -5    | Lead-Free fpBGA | 900  | IND   | 70       |
| LFE2-70E-6FN900I | 583  | 1.2V    | -6    | Lead-Free fpBGA | 900  | IND   | 70       |

**LatticeECP2 S-Series Devices, Conventional Packaging**
**Commercial**

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-6SE-5T144C | 90   | 1.2V    | -5    | TQFP    | 144  | Com   | 6        |
| LFE2-6SE-6T144C | 90   | 1.2V    | -6    | TQFP    | 144  | Com   | 6        |
| LFE2-6SE-7T144C | 90   | 1.2V    | -7    | TQFP    | 144  | Com   | 6        |
| LFE2-6SE-5F256C | 190  | 1.2V    | -5    | fpBGA   | 256  | Com   | 6        |
| LFE2-6SE-6F256C | 190  | 1.2V    | -6    | fpBGA   | 256  | Com   | 6        |
| LFE2-6SE-7F256C | 190  | 1.2V    | -7    | fpBGA   | 256  | Com   | 6        |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-12SE-5T144C | 93   | 1.2V    | -5    | TQFP    | 144  | Com   | 12       |
| LFE2-12SE-6T144C | 93   | 1.2V    | -6    | TQFP    | 144  | Com   | 12       |
| LFE2-12SE-7T144C | 93   | 1.2V    | -7    | TQFP    | 144  | Com   | 12       |
| LFE2-12SE-5Q208C | 131  | 1.2V    | -5    | PQFP    | 208  | Com   | 12       |
| LFE2-12SE-6Q208C | 131  | 1.2V    | -6    | PQFP    | 208  | Com   | 12       |
| LFE2-12SE-7Q208C | 131  | 1.2V    | -7    | PQFP    | 208  | Com   | 12       |
| LFE2-12SE-5F256C | 193  | 1.2V    | -5    | fpBGA   | 256  | Com   | 12       |
| LFE2-12SE-6F256C | 193  | 1.2V    | -6    | fpBGA   | 256  | Com   | 12       |
| LFE2-12SE-7F256C | 193  | 1.2V    | -7    | fpBGA   | 256  | Com   | 12       |
| LFE2-12SE-5F484C | 297  | 1.2V    | -5    | fpBGA   | 484  | Com   | 12       |
| LFE2-12SE-6F484C | 297  | 1.2V    | -6    | fpBGA   | 484  | Com   | 12       |
| LFE2-12SE-7F484C | 297  | 1.2V    | -7    | fpBGA   | 484  | Com   | 12       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-20SE-5Q208C | 131  | 1.2V    | -5    | PQFP    | 208  | Com   | 20       |
| LFE2-20SE-6Q208C | 131  | 1.2V    | -6    | PQFP    | 208  | Com   | 20       |
| LFE2-20SE-7Q208C | 131  | 1.2V    | -7    | PQFP    | 208  | Com   | 20       |
| LFE2-20SE-5F256C | 193  | 1.2V    | -5    | fpBGA   | 256  | Com   | 20       |
| LFE2-20SE-6F256C | 193  | 1.2V    | -6    | fpBGA   | 256  | Com   | 20       |
| LFE2-20SE-7F256C | 193  | 1.2V    | -7    | fpBGA   | 256  | Com   | 20       |
| LFE2-20SE-5F484C | 331  | 1.2V    | -5    | fpBGA   | 484  | Com   | 20       |
| LFE2-20SE-6F484C | 331  | 1.2V    | -6    | fpBGA   | 484  | Com   | 20       |
| LFE2-20SE-7F484C | 331  | 1.2V    | -7    | fpBGA   | 484  | Com   | 20       |
| LFE2-20SE-5F672C | 402  | 1.2V    | -5    | fpBGA   | 672  | Com   | 20       |
| LFE2-20SE-6F672C | 402  | 1.2V    | -6    | fpBGA   | 672  | Com   | 20       |
| LFE2-20SE-7F672C | 402  | 1.2V    | -7    | fpBGA   | 672  | Com   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-35SE-5F484C | 331  | 1.2V    | -5    | fpBGA   | 484  | Com   | 35       |
| LFE2-35SE-6F484C | 331  | 1.2V    | -6    | fpBGA   | 484  | Com   | 35       |
| LFE2-35SE-7F484C | 331  | 1.2V    | -7    | fpBGA   | 484  | Com   | 35       |
| LFE2-35SE-5F672C | 450  | 1.2V    | -5    | fpBGA   | 672  | Com   | 35       |
| LFE2-35SE-6F672C | 450  | 1.2V    | -6    | fpBGA   | 672  | Com   | 35       |
| LFE2-35SE-7F672C | 450  | 1.2V    | -7    | fpBGA   | 672  | Com   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-50SE-5F484C | 339  | 1.2V    | -5    | fpBGA   | 484  | Com   | 50       |
| LFE2-50SE-6F484C | 339  | 1.2V    | -6    | fpBGA   | 484  | Com   | 50       |
| LFE2-50SE-7F484C | 339  | 1.2V    | -7    | fpBGA   | 484  | Com   | 50       |
| LFE2-50SE-5F672C | 500  | 1.2V    | -5    | fpBGA   | 672  | Com   | 50       |
| LFE2-50SE-6F672C | 500  | 1.2V    | -6    | fpBGA   | 672  | Com   | 50       |
| LFE2-50SE-7F672C | 500  | 1.2V    | -7    | fpBGA   | 672  | Com   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-70SE-5F672C | 500  | 1.2V    | -5    | fpBGA   | 672  | Com   | 70       |
| LFE2-70SE-6F672C | 500  | 1.2V    | -6    | fpBGA   | 672  | Com   | 70       |
| LFE2-70SE-7F672C | 500  | 1.2V    | -7    | fpBGA   | 672  | Com   | 70       |
| LFE2-70SE-5F900C | 583  | 1.2V    | -5    | fpBGA   | 900  | Com   | 70       |
| LFE2-70SE-6F900C | 583  | 1.2V    | -6    | fpBGA   | 900  | Com   | 70       |
| LFE2-70SE-7F900C | 583  | 1.2V    | -7    | fpBGA   | 900  | Com   | 70       |

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| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2-6SE-5T144I | 90   | 1.2V    | -5    | TQFP    | 144  | Ind   | 6        |
| LFE2-6SE-6T144I | 90   | 1.2V    | -6    | TQFP    | 144  | Ind   | 6        |
| LFE2-6SE-5F256I | 190  | 1.2V    | -5    | fpBGA   | 256  | Ind   | 6        |
| LFE2-6SE-6F256I | 190  | 1.2V    | -6    | fpBGA   | 256  | Ind   | 6        |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-12SE-5T144I | 93   | 1.2V    | -5    | TQFP    | 144  | Ind   | 12       |
| LFE2-12SE-6T144I | 93   | 1.2V    | -6    | TQFP    | 144  | Ind   | 12       |
| LFE2-12SE-5Q208I | 131  | 1.2V    | -5    | PQFP    | 208  | Ind   | 12       |
| LFE2-12SE-6Q208I | 131  | 1.2V    | -6    | PQFP    | 208  | Ind   | 12       |
| LFE2-12SE-5F256I | 193  | 1.2V    | -5    | fpBGA   | 256  | Ind   | 12       |
| LFE2-12SE-6F256I | 193  | 1.2V    | -6    | fpBGA   | 256  | Ind   | 12       |
| LFE2-12SE-5F484I | 297  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 12       |
| LFE2-12SE-6F484I | 297  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 12       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-20SE-5Q208I | 131  | 1.2V    | -5    | PQFP    | 208  | Ind   | 20       |
| LFE2-20SE-6Q208I | 131  | 1.2V    | -6    | PQFP    | 208  | Ind   | 20       |
| LFE2-20SE-5F256I | 193  | 1.2V    | -5    | fpBGA   | 256  | Ind   | 20       |
| LFE2-20SE-6F256I | 193  | 1.2V    | -6    | fpBGA   | 256  | Ind   | 20       |
| LFE2-20SE-5F484I | 331  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 20       |
| LFE2-20SE-6F484I | 331  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 20       |
| LFE2-20SE-5F672I | 402  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 20       |
| LFE2-20SE-6F672I | 402  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-35SE-5F484I | 331  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 35       |
| LFE2-35SE-6F484I | 331  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 35       |
| LFE2-35SE-5F672I | 450  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 35       |
| LFE2-35SE-6F672I | 450  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-50SE-5F484I | 339  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 50       |
| LFE2-50SE-6F484I | 339  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 50       |
| LFE2-50SE-5F672I | 500  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 50       |
| LFE2-50SE-6F672I | 500  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2-70SE-5F672I | 500  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 70       |
| LFE2-70SE-6F672I | 500  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 70       |
| LFE2-70SE-5F900I | 583  | 1.2V    | -5    | fpBGA   | 900  | Ind   | 70       |
| LFE2-70SE-6F900I | 583  | 1.2V    | -6    | fpBGA   | 900  | Ind   | 70       |

**LatticeECP2 S-Series Devices, Lead-Free Packaging**
**Commercial**

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-6SE-5TN144C | 90   | 1.2V    | -5    | Lead-Free TQFP  | 144  | Com   | 6        |
| LFE2-6SE-6TN144C | 90   | 1.2V    | -6    | Lead-Free TQFP  | 144  | Com   | 6        |
| LFE2-6SE-7TN144C | 90   | 1.2V    | -7    | Lead-Free TQFP  | 144  | Com   | 6        |
| LFE2-6SE-5FN256C | 190  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Com   | 6        |
| LFE2-6SE-6FN256C | 190  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Com   | 6        |
| LFE2-6SE-7FN256C | 190  | 1.2V    | -7    | Lead-Free fpBGA | 256  | Com   | 6        |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-12SE-5TN144C | 93   | 1.2V    | -5    | Lead-Free TQFP  | 144  | Com   | 12       |
| LFE2-12SE-6TN144C | 93   | 1.2V    | -6    | Lead-Free TQFP  | 144  | Com   | 12       |
| LFE2-12SE-7TN144C | 93   | 1.2V    | -7    | Lead-Free TQFP  | 144  | Com   | 12       |
| LFE2-12SE-5QN208C | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | Com   | 12       |
| LFE2-12SE-6QN208C | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | Com   | 12       |
| LFE2-12SE-7QN208C | 131  | 1.2V    | -7    | Lead-Free PQFP  | 208  | Com   | 12       |
| LFE2-12SE-5FN256C | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Com   | 12       |
| LFE2-12SE-6FN256C | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Com   | 12       |
| LFE2-12SE-7FN256C | 193  | 1.2V    | -7    | Lead-Free fpBGA | 256  | Com   | 12       |
| LFE2-12SE-5FN484C | 297  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 12       |
| LFE2-12SE-6FN484C | 297  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 12       |
| LFE2-12SE-7FN484C | 297  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 12       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-20SE-5QN208C | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | Com   | 20       |
| LFE2-20SE-6QN208C | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | Com   | 20       |
| LFE2-20SE-7QN208C | 131  | 1.2V    | -7    | Lead-Free PQFP  | 208  | Com   | 20       |
| LFE2-20SE-5FN256C | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Com   | 20       |
| LFE2-20SE-6FN256C | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Com   | 20       |
| LFE2-20SE-7FN256C | 193  | 1.2V    | -7    | Lead-Free fpBGA | 256  | Com   | 20       |
| LFE2-20SE-5FN484C | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2-20SE-6FN484C | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2-20SE-7FN484C | 331  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2-20SE-5FN672C | 402  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 20       |
| LFE2-20SE-6FN672C | 402  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 20       |
| LFE2-20SE-7FN672C | 402  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 20       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-35SE-5FN484C | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2-35SE-6FN484C | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2-35SE-7FN484C | 331  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2-35SE-5FN672C | 450  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 35       |
| LFE2-35SE-6FN672C | 450  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 35       |
| LFE2-35SE-7FN672C | 450  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 35       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-50SE-5FN484C | 339  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 50       |
| LFE2-50SE-6FN484C | 339  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 50       |
| LFE2-50SE-7FN484C | 339  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 50       |
| LFE2-50SE-5FN672C | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 50       |
| LFE2-50SE-6FN672C | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 50       |
| LFE2-50SE-7FN672C | 500  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 50       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-70SE-5FN672C | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 70       |
| LFE2-70SE-6FN672C | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 70       |
| LFE2-70SE-7FN672C | 500  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 70       |
| LFE2-70SE-5FN900C | 583  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Com   | 70       |
| LFE2-70SE-6FN900C | 583  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Com   | 70       |
| LFE2-70SE-7FN900C | 583  | 1.2V    | -7    | Lead-Free fpBGA | 900  | Com   | 70       |

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| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-6SE-5TN144I | 90   | 1.2V    | -5    | Lead-Free TQFP  | 144  | Ind   | 6        |
| LFE2-6SE-6TN144I | 90   | 1.2V    | -6    | Lead-Free TQFP  | 144  | Ind   | 6        |
| LFE2-6SE-5FN256I | 190  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Ind   | 6        |
| LFE2-6SE-6FN256I | 190  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Ind   | 6        |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-12SE-5TN144I | 93   | 1.2V    | -5    | Lead-Free TQFP  | 144  | Ind   | 12       |
| LFE2-12SE-6TN144I | 93   | 1.2V    | -6    | Lead-Free TQFP  | 144  | Ind   | 12       |
| LFE2-12SE-5QN208I | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | Ind   | 12       |
| LFE2-12SE-6QN208I | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | Ind   | 12       |
| LFE2-12SE-5FN256I | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Ind   | 12       |
| LFE2-12SE-6FN256I | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Ind   | 12       |
| LFE2-12SE-5FN484I | 297  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 12       |
| LFE2-12SE-6FN484I | 297  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 12       |

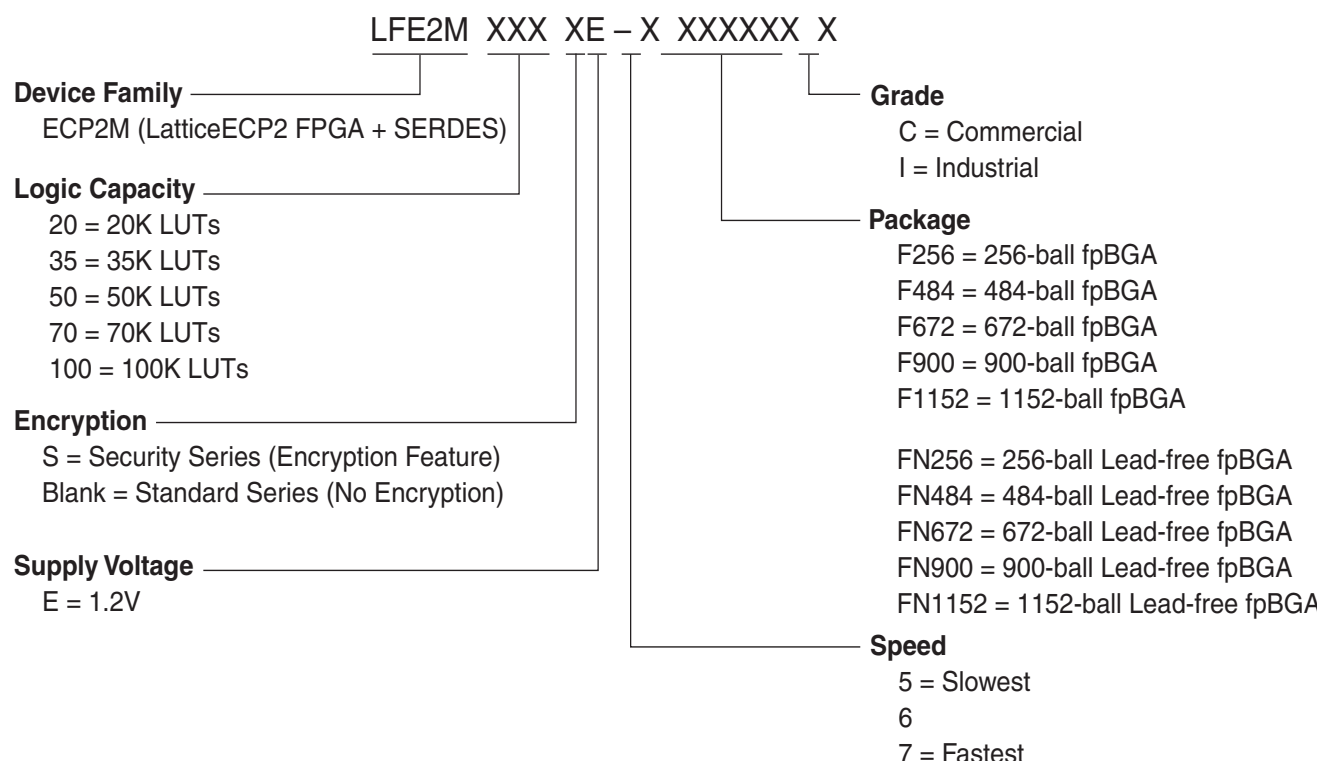
| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-20SE-5QN208I | 131  | 1.2V    | -5    | Lead-Free PQFP  | 208  | Ind   | 20       |
| LFE2-20SE-6QN208I | 131  | 1.2V    | -6    | Lead-Free PQFP  | 208  | Ind   | 20       |
| LFE2-20SE-5FN256I | 193  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Ind   | 20       |
| LFE2-20SE-6FN256I | 193  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Ind   | 20       |
| LFE2-20SE-5FN484I | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 20       |
| LFE2-20SE-6FN484I | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 20       |
| LFE2-20SE-5FN672I | 402  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 20       |
| LFE2-20SE-6FN672I | 402  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 20       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-35SE-5FN484I | 331  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 35       |
| LFE2-35SE-6FN484I | 331  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 35       |
| LFE2-35SE-5FN672I | 450  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 35       |
| LFE2-35SE-6FN672I | 450  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 35       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-50SE-5FN484I | 339  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 50       |
| LFE2-50SE-6FN484I | 339  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 50       |
| LFE2-50SE-5FN672I | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 50       |
| LFE2-50SE-6FN672I | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 50       |

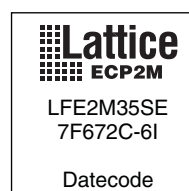
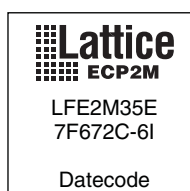
| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2-70SE-5FN672I | 500  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 70       |
| LFE2-70SE-6FN672I | 500  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 70       |
| LFE2-70SE-5FN900I | 583  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 70       |
| LFE2-70SE-6FN900I | 583  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 70       |

### LatticeECP2M Part Number Description



### Ordering Information

Note: LatticeECP2M devices are dual marked. For example, the commercial speed grade LFE2M50E-7F672C is also marked with industrial grade -6I (LFE2M50E-6F672I). The commercial grade is one speed grade faster than the associated dual mark industrial grade. The slowest commercial grade does not have industrial markings. The markings appear as follows:





**LatticeECP2M Standard Series Devices, Conventional Packaging**
**Commercial**

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M20E-5F484C | 304  | 1.2V    | -5    | fpBGA   | 484  | COM   | 20       |
| LFE2M20E-6F484C | 304  | 1.2V    | -6    | fpBGA   | 484  | COM   | 20       |
| LFE2M20E-7F484C | 304  | 1.2V    | -7    | fpBGA   | 484  | COM   | 20       |
| LFE2M20E-5F256C | 140  | 1.2V    | -5    | fpBGA   | 256  | COM   | 20       |
| LFE2M20E-6F256C | 140  | 1.2V    | -6    | fpBGA   | 256  | COM   | 20       |
| LFE2M20E-7F256C | 140  | 1.2V    | -7    | fpBGA   | 256  | COM   | 20       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M35E-5F672C | 410  | 1.2V    | -5    | fpBGA   | 672  | COM   | 35       |
| LFE2M35E-6F672C | 410  | 1.2V    | -6    | fpBGA   | 672  | COM   | 35       |
| LFE2M35E-7F672C | 410  | 1.2V    | -7    | fpBGA   | 672  | COM   | 35       |
| LFE2M35E-5F484C | 303  | 1.2V    | -5    | fpBGA   | 484  | COM   | 35       |
| LFE2M35E-6F484C | 303  | 1.2V    | -6    | fpBGA   | 484  | COM   | 35       |
| LFE2M35E-7F484C | 303  | 1.2V    | -7    | fpBGA   | 484  | COM   | 35       |
| LFE2M35E-5F256C | 140  | 1.2V    | -5    | fpBGA   | 256  | COM   | 35       |
| LFE2M35E-6F256C | 140  | 1.2V    | -6    | fpBGA   | 256  | COM   | 35       |
| LFE2M35E-7F256C | 140  | 1.2V    | -7    | fpBGA   | 256  | COM   | 35       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M50E-5F900C | 410  | 1.2V    | -5    | fpBGA   | 900  | COM   | 50       |
| LFE2M50E-6F900C | 410  | 1.2V    | -6    | fpBGA   | 900  | COM   | 50       |
| LFE2M50E-7F900C | 410  | 1.2V    | -7    | fpBGA   | 900  | COM   | 50       |
| LFE2M50E-5F672C | 372  | 1.2V    | -5    | fpBGA   | 672  | COM   | 50       |
| LFE2M50E-6F672C | 372  | 1.2V    | -6    | fpBGA   | 672  | COM   | 50       |
| LFE2M50E-7F672C | 372  | 1.2V    | -7    | fpBGA   | 672  | COM   | 50       |
| LFE2M50E-5F484C | 270  | 1.2V    | -5    | fpBGA   | 484  | COM   | 50       |
| LFE2M50E-6F484C | 270  | 1.2V    | -6    | fpBGA   | 484  | COM   | 50       |
| LFE2M50E-7F484C | 270  | 1.2V    | -7    | fpBGA   | 484  | COM   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M70E-5F1152C | 436  | 1.2V    | -5    | fpBGA   | 1152 | COM   | 70       |
| LFE2M70E-6F1152C | 436  | 1.2V    | -6    | fpBGA   | 1152 | COM   | 70       |
| LFE2M70E-7F1152C | 436  | 1.2V    | -7    | fpBGA   | 1152 | COM   | 70       |
| LFE2M70E-5F900C  | 416  | 1.2V    | -5    | fpBGA   | 900  | COM   | 70       |
| LFE2M70E-6F900C  | 416  | 1.2V    | -6    | fpBGA   | 900  | COM   | 70       |
| LFE2M70E-7F900C  | 416  | 1.2V    | -7    | fpBGA   | 900  | COM   | 70       |

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| Part Number       | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M100E-5F1152C | 520  | 1.2V    | -5    | fpBGA   | 1152 | COM   | 100      |
| LFE2M100E-6F1152C | 520  | 1.2V    | -6    | fpBGA   | 1152 | COM   | 100      |
| LFE2M100E-7F1152C | 520  | 1.2V    | -7    | fpBGA   | 1152 | COM   | 100      |
| LFE2M100E-5F900C  | 416  | 1.2V    | -5    | fpBGA   | 900  | COM   | 100      |
| LFE2M100E-6F900C  | 416  | 1.2V    | -6    | fpBGA   | 900  | COM   | 100      |
| LFE2M100E-7F900C  | 416  | 1.2V    | -7    | fpBGA   | 900  | COM   | 100      |

**Industrial**

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M20E-5F484I | 304  | 1.2V    | -5    | fpBGA   | 484  | IND   | 20       |
| LFE2M20E-6F484I | 304  | 1.2V    | -6    | fpBGA   | 484  | IND   | 20       |
| LFE2M20E-5F256I | 140  | 1.2V    | -5    | fpBGA   | 256  | IND   | 20       |
| LFE2M20E-6F256I | 140  | 1.2V    | -6    | fpBGA   | 256  | IND   | 20       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M35E-5F672I | 410  | 1.2V    | -5    | fpBGA   | 672  | IND   | 35       |
| LFE2M35E-6F672I | 410  | 1.2V    | -6    | fpBGA   | 672  | IND   | 35       |
| LFE2M35E-5F484I | 303  | 1.2V    | -5    | fpBGA   | 484  | IND   | 35       |
| LFE2M35E-6F484I | 303  | 1.2V    | -6    | fpBGA   | 484  | IND   | 35       |
| LFE2M35E-5F256I | 140  | 1.2V    | -5    | fpBGA   | 256  | IND   | 35       |
| LFE2M35E-6F256I | 140  | 1.2V    | -6    | fpBGA   | 256  | IND   | 35       |

| Part Number     | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-----------------|------|---------|-------|---------|------|-------|----------|
| LFE2M50E-5F900I | 410  | 1.2V    | -5    | fpBGA   | 900  | IND   | 50       |
| LFE2M50E-6F900I | 410  | 1.2V    | -6    | fpBGA   | 900  | IND   | 50       |
| LFE2M50E-5F672I | 372  | 1.2V    | -5    | fpBGA   | 672  | IND   | 50       |
| LFE2M50E-6F672I | 372  | 1.2V    | -6    | fpBGA   | 672  | IND   | 50       |
| LFE2M50E-5F484I | 270  | 1.2V    | -5    | fpBGA   | 484  | IND   | 50       |
| LFE2M50E-6F484I | 270  | 1.2V    | -6    | fpBGA   | 484  | IND   | 50       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M70E-5F1152I | 436  | 1.2V    | -5    | fpBGA   | 1152 | IND   | 70       |
| LFE2M70E-6F1152I | 436  | 1.2V    | -6    | fpBGA   | 1152 | IND   | 70       |
| LFE2M70E-5F900I  | 416  | 1.2V    | -5    | fpBGA   | 900  | IND   | 70       |
| LFE2M70E-6F900I  | 416  | 1.2V    | -6    | fpBGA   | 900  | IND   | 70       |

| Part Number       | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M100E-5F1152I | 520  | 1.2V    | -5    | fpBGA   | 1152 | IND   | 100      |
| LFE2M100E-6F1152I | 520  | 1.2V    | -6    | fpBGA   | 1152 | IND   | 100      |
| LFE2M100E-5F900I  | 416  | 1.2V    | -5    | fpBGA   | 900  | IND   | 100      |
| LFE2M100E-6F900I  | 416  | 1.2V    | -6    | fpBGA   | 900  | IND   | 100      |

**LatticeECP2M Standard Series Devices, Lead-Free Packaging**
**Commercial**

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M20E-5FN484C | 304  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2M20E-6FN484C | 304  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2M20E-7FN484C | 304  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 20       |
| LFE2M20E-5FN256C | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | COM   | 20       |
| LFE2M20E-6FN256C | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | COM   | 20       |
| LFE2M20E-7FN256C | 140  | 1.2V    | -7    | Lead-Free fpBGA | 256  | COM   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M35E-5FN672C | 410  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 35       |
| LFE2M35E-6FN672C | 410  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 35       |
| LFE2M35E-7FN672C | 410  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 35       |
| LFE2M35E-5FN484C | 303  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2M35E-6FN484C | 303  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2M35E-7FN484C | 303  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 35       |
| LFE2M35E-5FN256C | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | COM   | 35       |
| LFE2M35E-6FN256C | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | COM   | 35       |
| LFE2M35E-7FN256C | 140  | 1.2V    | -7    | Lead-Free fpBGA | 256  | COM   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M50E-5FN900C | 410  | 1.2V    | -5    | Lead-Free fpBGA | 900  | COM   | 50       |
| LFE2M50E-6FN900C | 410  | 1.2V    | -6    | Lead-Free fpBGA | 900  | COM   | 50       |
| LFE2M50E-7FN900C | 410  | 1.2V    | -7    | Lead-Free fpBGA | 900  | COM   | 50       |
| LFE2M50E-5FN672C | 372  | 1.2V    | -5    | Lead-Free fpBGA | 672  | COM   | 50       |
| LFE2M50E-6FN672C | 372  | 1.2V    | -6    | Lead-Free fpBGA | 672  | COM   | 50       |
| LFE2M50E-7FN672C | 372  | 1.2V    | -7    | Lead-Free fpBGA | 672  | COM   | 50       |
| LFE2M50E-5FN484C | 270  | 1.2V    | -5    | Lead-Free fpBGA | 484  | COM   | 50       |
| LFE2M50E-6FN484C | 270  | 1.2V    | -6    | Lead-Free fpBGA | 484  | COM   | 50       |
| LFE2M50E-7FN484C | 270  | 1.2V    | -7    | Lead-Free fpBGA | 484  | COM   | 50       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M70E-5FN1152C | 436  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | COM   | 70       |
| LFE2M70E-6FN1152C | 436  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | COM   | 70       |
| LFE2M70E-7FN1152C | 436  | 1.2V    | -7    | Lead-Free fpBGA | 1152 | COM   | 70       |
| LFE2M70E-5FN900C  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | COM   | 70       |
| LFE2M70E-6FN900C  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | COM   | 70       |
| LFE2M70E-7FN900C  | 416  | 1.2V    | -7    | Lead-Free fpBGA | 900  | COM   | 70       |

| Part Number        | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M100E-5FN1152C | 520  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | COM   | 100      |
| LFE2M100E-6FN1152C | 520  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | COM   | 100      |
| LFE2M100E-7FN1152C | 520  | 1.2V    | -7    | Lead-Free fpBGA | 1152 | COM   | 100      |
| LFE2M100E-5FN900C  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | COM   | 100      |
| LFE2M100E-6FN900C  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | COM   | 100      |
| LFE2M100E-7FN900C  | 416  | 1.2V    | -7    | Lead-Free fpBGA | 900  | COM   | 100      |

### Industrial

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M20E-5FN484I | 304  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 20       |
| LFE2M20E-6FN484I | 304  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 20       |
| LFE2M20E-5FN256I | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | IND   | 20       |
| LFE2M20E-6FN256I | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | IND   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M35E-5FN672I | 410  | 1.2V    | -5    | Lead-Free fpBGA | 672  | IND   | 35       |
| LFE2M35E-6FN672I | 410  | 1.2V    | -6    | Lead-Free fpBGA | 672  | IND   | 35       |
| LFE2M35E-5FN484I | 303  | 1.2V    | -5    | Lead-Free fpBGA | 484  | IND   | 35       |
| LFE2M35E-6FN484I | 303  | 1.2V    | -6    | Lead-Free fpBGA | 484  | IND   | 35       |
| LFE2M35E-5FN256I | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | IND   | 35       |
| LFE2M35E-6FN256I | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | IND   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M50E-5FN900I | 410  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 50       |
| LFE2M50E-6FN900I | 410  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 50       |
| LFE2M50E-5FN672I | 372  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 50       |
| LFE2M50E-6FN672I | 372  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 50       |
| LFE2M50E-5FN484I | 270  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 50       |
| LFE2M50E-6FN484I | 270  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 50       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M70E-5FN1152I | 436  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Ind   | 70       |
| LFE2M70E-6FN1152I | 436  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Ind   | 70       |
| LFE2M70E-5FN900I  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 70       |
| LFE2M70E-6FN900I  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 70       |

| Part Number        | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M100E-5FN1152I | 520  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Ind   | 100      |
| LFE2M100E-6FN1152I | 520  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Ind   | 100      |
| LFE2M100E-5FN900I  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 100      |
| LFE2M100E-6FN900I  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 100      |

## LatticeECP2M S-Series Devices, Conventional Packaging

### Commercial

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M20SE-5F484C | 304  | 1.2V    | -5    | fpBGA   | 484  | Com   | 20       |
| LFE2M20SE-6F484C | 304  | 1.2V    | -6    | fpBGA   | 484  | Com   | 20       |
| LFE2M20SE-7F484C | 304  | 1.2V    | -7    | fpBGA   | 484  | Com   | 20       |
| LFE2M20SE-5F256C | 140  | 1.2V    | -5    | fpBGA   | 256  | Com   | 20       |
| LFE2M20SE-6F256C | 140  | 1.2V    | -6    | fpBGA   | 256  | Com   | 20       |
| LFE2M20SE-7F256C | 140  | 1.2V    | -7    | fpBGA   | 256  | Com   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M35SE-5F672C | 410  | 1.2V    | -5    | fpBGA   | 672  | Com   | 35       |
| LFE2M35SE-6F672C | 410  | 1.2V    | -6    | fpBGA   | 672  | Com   | 35       |
| LFE2M35SE-7F672C | 410  | 1.2V    | -7    | fpBGA   | 672  | Com   | 35       |
| LFE2M35SE-5F484C | 303  | 1.2V    | -5    | fpBGA   | 484  | Com   | 35       |
| LFE2M35SE-6F484C | 303  | 1.2V    | -6    | fpBGA   | 484  | Com   | 35       |
| LFE2M35SE-7F484C | 303  | 1.2V    | -7    | fpBGA   | 484  | Com   | 35       |
| LFE2M35SE-5F256C | 140  | 1.2V    | -5    | fpBGA   | 256  | Com   | 35       |
| LFE2M35SE-6F256C | 140  | 1.2V    | -6    | fpBGA   | 256  | Com   | 35       |
| LFE2M35SE-7F256C | 140  | 1.2V    | -7    | fpBGA   | 256  | Com   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M50SE-5F900C | 410  | 1.2V    | -5    | fpBGA   | 900  | Com   | 50       |
| LFE2M50SE-6F900C | 410  | 1.2V    | -6    | fpBGA   | 900  | Com   | 50       |
| LFE2M50SE-7F900C | 410  | 1.2V    | -7    | fpBGA   | 900  | Com   | 50       |
| LFE2M50SE-5F672C | 372  | 1.2V    | -5    | fpBGA   | 672  | Com   | 50       |
| LFE2M50SE-6F672C | 372  | 1.2V    | -6    | fpBGA   | 672  | Com   | 50       |
| LFE2M50SE-7F672C | 372  | 1.2V    | -7    | fpBGA   | 672  | Com   | 50       |
| LFE2M50SE-5F484C | 270  | 1.2V    | -5    | fpBGA   | 484  | Com   | 50       |
| LFE2M50SE-6F484C | 270  | 1.2V    | -6    | fpBGA   | 484  | Com   | 50       |
| LFE2M50SE-7F484C | 270  | 1.2V    | -7    | fpBGA   | 484  | Com   | 50       |

| Part Number       | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M70SE-5F1152C | 436  | 1.2V    | -5    | fpBGA   | 1152 | Com   | 70       |
| LFE2M70SE-6F1152C | 436  | 1.2V    | -6    | fpBGA   | 1152 | Com   | 70       |
| LFE2M70SE-7F1152C | 436  | 1.2V    | -7    | fpBGA   | 1152 | Com   | 70       |
| LFE2M70SE-5F900C  | 416  | 1.2V    | -5    | fpBGA   | 900  | Com   | 70       |
| LFE2M70SE-6F900C  | 416  | 1.2V    | -6    | fpBGA   | 900  | Com   | 70       |
| LFE2M70SE-7F900C  | 416  | 1.2V    | -7    | fpBGA   | 900  | Com   | 70       |

| Part Number        | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M100SE-5F1152C | 520  | 1.2V    | -5    | fpBGA   | 1152 | Com   | 100      |
| LFE2M100SE-6F1152C | 520  | 1.2V    | -6    | fpBGA   | 1152 | Com   | 100      |
| LFE2M100SE-7F1152C | 520  | 1.2V    | -7    | fpBGA   | 1152 | Com   | 100      |
| LFE2M100SE-5F900C  | 416  | 1.2V    | -5    | fpBGA   | 900  | Com   | 100      |
| LFE2M100SE-6F900C  | 416  | 1.2V    | -6    | fpBGA   | 900  | Com   | 100      |
| LFE2M100SE-7F900C  | 416  | 1.2V    | -7    | fpBGA   | 900  | Com   | 100      |

**Industrial**

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M20SE-5F484I | 304  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 20       |
| LFE2M20SE-6F484I | 304  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 20       |
| LFE2M20SE-5F256I | 140  | 1.2V    | -5    | fpBGA   | 256  | Ind   | 20       |
| LFE2M20SE-6F256I | 140  | 1.2V    | -6    | fpBGA   | 256  | Ind   | 20       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M35SE-5F672I | 410  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 35       |
| LFE2M35SE-6F672I | 410  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 35       |
| LFE2M35SE-5F484I | 303  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 35       |
| LFE2M35SE-6F484I | 303  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 35       |
| LFE2M35SE-5F256I | 140  | 1.2V    | -5    | fpBGA   | 256  | Ind   | 35       |
| LFE2M35SE-6F256I | 140  | 1.2V    | -6    | fpBGA   | 256  | Ind   | 35       |

| Part Number      | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M50SE-5F900I | 410  | 1.2V    | -5    | fpBGA   | 900  | Ind   | 50       |
| LFE2M50SE-6F900I | 410  | 1.2V    | -6    | fpBGA   | 900  | Ind   | 50       |
| LFE2M50SE-5F672I | 372  | 1.2V    | -5    | fpBGA   | 672  | Ind   | 50       |
| LFE2M50SE-6F672I | 372  | 1.2V    | -6    | fpBGA   | 672  | Ind   | 50       |
| LFE2M50SE-5F484I | 270  | 1.2V    | -5    | fpBGA   | 484  | Ind   | 50       |
| LFE2M50SE-6F484I | 270  | 1.2V    | -6    | fpBGA   | 484  | Ind   | 50       |

| Part Number       | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M70SE-5F1152I | 436  | 1.2V    | -5    | fpBGA   | 1152 | Ind   | 70       |
| LFE2M70SE-6F1152I | 436  | 1.2V    | -6    | fpBGA   | 1152 | Ind   | 70       |
| LFE2M70SE-5F900I  | 416  | 1.2V    | -5    | fpBGA   | 900  | Ind   | 70       |
| LFE2M70SE-6F900I  | 416  | 1.2V    | -6    | fpBGA   | 900  | Ind   | 70       |

| Part Number        | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|---------|------|-------|----------|
| LFE2M100SE-5F1152I | 520  | 1.2V    | -5    | fpBGA   | 1152 | Ind   | 100      |
| LFE2M100SE-6F1152I | 520  | 1.2V    | -6    | fpBGA   | 1152 | Ind   | 100      |
| LFE2M100SE-5F900I  | 416  | 1.2V    | -5    | fpBGA   | 900  | Ind   | 100      |
| LFE2M100SE-6F900I  | 416  | 1.2V    | -6    | fpBGA   | 900  | Ind   | 100      |



**LatticeECP2M S-Series Devices, Lead-Free Packaging**
**Commercial**

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M20SE-5FN484C | 304  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2M20SE-6FN484C | 304  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2M20SE-7FN484C | 304  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 20       |
| LFE2M20SE-5FN256C | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Com   | 20       |
| LFE2M20SE-6FN256C | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Com   | 20       |
| LFE2M20SE-7FN256C | 140  | 1.2V    | -7    | Lead-Free fpBGA | 256  | Com   | 20       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M35SE-5FN672C | 410  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 35       |
| LFE2M35SE-6FN672C | 410  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 35       |
| LFE2M35SE-7FN672C | 410  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 35       |
| LFE2M35SE-5FN484C | 303  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2M35SE-6FN484C | 303  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2M35SE-7FN484C | 303  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 35       |
| LFE2M35SE-5FN256C | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Com   | 35       |
| LFE2M35SE-6FN256C | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Com   | 35       |
| LFE2M35SE-7FN256C | 140  | 1.2V    | -7    | Lead-Free fpBGA | 256  | Com   | 35       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M50SE-5FN900C | 410  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Com   | 50       |
| LFE2M50SE-6FN900C | 410  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Com   | 50       |
| LFE2M50SE-7FN900C | 410  | 1.2V    | -7    | Lead-Free fpBGA | 900  | Com   | 50       |
| LFE2M50SE-5FN672C | 372  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Com   | 50       |
| LFE2M50SE-6FN672C | 372  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Com   | 50       |
| LFE2M50SE-7FN672C | 372  | 1.2V    | -7    | Lead-Free fpBGA | 672  | Com   | 50       |
| LFE2M50SE-5FN484C | 270  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Com   | 50       |
| LFE2M50SE-6FN484C | 270  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Com   | 50       |
| LFE2M50SE-7FN484C | 270  | 1.2V    | -7    | Lead-Free fpBGA | 484  | Com   | 50       |

| Part Number        | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M70SE-5FN1152C | 436  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Com   | 70       |
| LFE2M70SE-6FN1152C | 436  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Com   | 70       |
| LFE2M70SE-7FN1152C | 436  | 1.2V    | -7    | Lead-Free fpBGA | 1152 | Com   | 70       |
| LFE2M70SE-5FN900C  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Com   | 70       |
| LFE2M70SE-6FN900C  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Com   | 70       |
| LFE2M70SE-7FN900C  | 416  | 1.2V    | -7    | Lead-Free fpBGA | 900  | Com   | 70       |

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| Part Number         | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|---------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M100SE-5FN1152C | 520  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Com   | 100      |
| LFE2M100SE-6FN1152C | 520  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Com   | 100      |
| LFE2M100SE-7FN1152C | 520  | 1.2V    | -7    | Lead-Free fpBGA | 1152 | Com   | 100      |
| LFE2M100SE-5FN900C  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Com   | 100      |
| LFE2M100SE-6FN900C  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Com   | 100      |
| LFE2M100SE-7FN900C  | 416  | 1.2V    | -7    | Lead-Free fpBGA | 900  | Com   | 100      |

**Industrial**

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M20SE-5FN484I | 304  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 20       |
| LFE2M20SE-6FN484I | 304  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 20       |
| LFE2M20SE-5FN256I | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Ind   | 20       |
| LFE2M20SE-6FN256I | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Ind   | 20       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M35SE-5FN672I | 410  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 35       |
| LFE2M35SE-6FN672I | 410  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 35       |
| LFE2M35SE-5FN484I | 303  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 35       |
| LFE2M35SE-6FN484I | 303  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 35       |
| LFE2M35SE-5FN256I | 140  | 1.2V    | -5    | Lead-Free fpBGA | 256  | Ind   | 35       |
| LFE2M35SE-6FN256I | 140  | 1.2V    | -6    | Lead-Free fpBGA | 256  | Ind   | 35       |

| Part Number       | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|-------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M50SE-5FN900I | 410  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 50       |
| LFE2M50SE-6FN900I | 410  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 50       |
| LFE2M50SE-5FN672I | 372  | 1.2V    | -5    | Lead-Free fpBGA | 672  | Ind   | 50       |
| LFE2M50SE-6FN672I | 372  | 1.2V    | -6    | Lead-Free fpBGA | 672  | Ind   | 50       |
| LFE2M50SE-5FN484I | 270  | 1.2V    | -5    | Lead-Free fpBGA | 484  | Ind   | 50       |
| LFE2M50SE-6FN484I | 270  | 1.2V    | -6    | Lead-Free fpBGA | 484  | Ind   | 50       |

| Part Number        | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|--------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M70SE-5FN1152I | 436  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Ind   | 70       |
| LFE2M70SE-6FN1152I | 436  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Ind   | 70       |
| LFE2M70SE-5FN900I  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 70       |
| LFE2M70SE-6FN900I  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 70       |

| Part Number         | I/Os | Voltage | Grade | Package         | Pins | Temp. | LUTs (K) |
|---------------------|------|---------|-------|-----------------|------|-------|----------|
| LFE2M100SE-5FN1152I | 520  | 1.2V    | -5    | Lead-Free fpBGA | 1152 | Ind   | 100      |
| LFE2M100SE-6FN1152I | 520  | 1.2V    | -6    | Lead-Free fpBGA | 1152 | Ind   | 100      |
| LFE2M100SE-5FN900I  | 416  | 1.2V    | -5    | Lead-Free fpBGA | 900  | Ind   | 100      |
| LFE2M100SE-6FN900I  | 416  | 1.2V    | -6    | Lead-Free fpBGA | 900  | Ind   | 100      |



# LatticeECP2/M Family Data Sheet Supplemental Information

July 2012

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## For Further Information

A variety of technical notes for the LatticeECP2/M family are available on the Lattice web site at [www.latticesemi.com](http://www.latticesemi.com).

- TN1102, [LatticeECP2/M sysIO Usage Guide](#)
- TN1103, [LatticeECP2/M sysCLOCK PLL Design and Usage Guide](#)
- TN1104, [LatticeECP2/M Memory Usage Guide](#)
- TN1105, [LatticeECP2/M High-Speed I/O Interface](#)
- TN1106, [Power Estimation and Management for LatticeECP2/M Devices](#)
- TN1107, [LatticeECP2/M sysDSP Usage Guide](#)
- TN1108, [LatticeECP2/M sysCONFIG Usage Guide](#)
- TN1109, [LatticeECP2/M Configuration Encryption Usage Guide](#)
- TN1113, [LatticeECP2/M Soft Error Detection \(SED\) Usage Guide](#)
- TN1124, [LatticeECP2M SERDES/PCS Usage Guide](#)
- TN1162, [LatticeECP2/M Hardware Checklist](#)

For further information about interface standards refer to the following web sites:

- JEDEC Standards (LVTTTL, LVCMOS, SSTL, HSTL): [www.jedec.org](http://www.jedec.org)
- PCI: [www.pcisig.com](http://www.pcisig.com)



# LatticeECP2/M Family Data Sheet

## Revision History

September 2013

Data Sheet DS1006

| Date          | Version | Section                          | Change Summary                                                                                                              |
|---------------|---------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| February 2006 | 01.0    | —                                | Initial release.                                                                                                            |
| August 2006   | 01.1    | Introduction                     |                                                                                                                             |
|               |         |                                  | Updated Table 1-1 "LatticeECP2 Family Selection Guide".                                                                     |
|               |         | Architecture                     | Updated Figure 2-2 "PFU Diagram".                                                                                           |
|               |         |                                  | Updated Figure 2-13 "Secondary Clock Regions ECP2-50".                                                                      |
|               |         |                                  | Updated Figure 2-25 "PIC Diagram".                                                                                          |
|               |         |                                  | Updated Figure 2-26 "Input Register Block for Left, Right and Bottom Edges".                                                |
|               |         |                                  | Updated Figure 2-28 "Output Register Block for Left, Right and Bottom Edges".                                               |
|               |         |                                  | Updated Figure 2-30 "DQS Input Routing for Left and Right Edges".                                                           |
|               |         |                                  | Updated Figure 2-32 "Edge Clock, DLL Calibration and DQS Local Bus Distribution".                                           |
|               |         |                                  | Table 2-15 Selectable Master Clock (CCLK) Frequencies - Removed frequencies 15, 20, 21, 22, 23, 30, 34, 41, 45, 51, 55, 60. |
|               |         |                                  | Replaced "CLKINDEL" with "CLKO".                                                                                            |
|               |         |                                  | Updated SED section.                                                                                                        |
|               |         |                                  | Qualified device migration capability when using DQS banks for DDR interfaces.                                              |
|               |         | DC and Switching Characteristics | Added VCCPLL to the Recommended Operating Conditions table.                                                                 |
|               |         |                                  | Removed note 5 from "Hot Specifications" section.                                                                           |
|               |         |                                  | Added notes 7 and 8 to "Initialization Supply" Current table.                                                               |
|               |         |                                  | Change note 6 - "...down to 95MHz" to "...down to 95MHz for DDR and 133MHz for DDR2" .                                      |
|               |         |                                  | New "Typical Building Block Function Performance" numbers.                                                                  |
|               |         |                                  | New External Switching Characteristics numbers.                                                                             |
|               |         |                                  | New Internal Switching Characteristics numbers.                                                                             |
|               |         |                                  | New Family Timing Adders numbers.                                                                                           |
|               |         |                                  | Updated Timings for GPLLs, SPLLs and DLLs.                                                                                  |
|               |         |                                  | Added sysCONFIG waveforms.                                                                                                  |
|               |         |                                  | Remove HSTL15D_II from sysIO Recommended Operating Conditions table.                                                        |
|               |         |                                  | Updated Supply and Initialization Currents for ECP2-50.                                                                     |
|               |         | Pinout Information               | Added VCCPLL to the Signal Descriptions table.                                                                              |
|               |         |                                  | Updated Logic Signal Connections tables to include 484-fpBGA for the ECP2-50.                                               |
|               |         |                                  | Added Logic Signal Connections tables for ECP2-12 devices.                                                                  |
|               |         |                                  | Updated Pin Information Summary table to include ECP2-12.                                                                   |
|               |         |                                  | Updated Power Supply and NC Connections table to include ECP2-12.                                                           |
|               |         |                                  | Added note 2 to DDR Strobe (DQS) Pin table.                                                                                 |
|               |         |                                  | Added Information on: PCI, DDR & SPI4.2 Capabilities of the device-Package combination.                                     |

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| Date                   | Version         | Section                             | Change Summary                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-----------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| August 2006<br>(cont.) | 01.1<br>(cont.) | Pinout Information<br>(cont.)       | Added Information on: Available Device Resources per Packaged Device table.                                                                                                                                                                                                                                                                                                                                                                  |
|                        |                 | Ordering Information                | Updated ordering part number table to include ECP2-12.                                                                                                                                                                                                                                                                                                                                                                                       |
|                        |                 |                                     | Updated topside mark drawing.                                                                                                                                                                                                                                                                                                                                                                                                                |
| September 2006         | 02.0            | Multiple                            | Added information regarding LatticeECP2M support throughout.                                                                                                                                                                                                                                                                                                                                                                                 |
| September 2006         | 02.1            | DC and Switching<br>Characteristics | Added Receiver Total Jitter Tolerance Specification table.                                                                                                                                                                                                                                                                                                                                                                                   |
|                        |                 |                                     | Removed power-up requirements for proper configuration footnote in Recommended Operating Conditions table.                                                                                                                                                                                                                                                                                                                                   |
| December 2006          | 02.2            | Introduction                        | LatticeECP2M Selection Guide table has been updated.                                                                                                                                                                                                                                                                                                                                                                                         |
|                        |                 | Architecture                        | Figure 2-16. Per Region Secondary Clock Selection has been updated.                                                                                                                                                                                                                                                                                                                                                                          |
|                        |                 |                                     | Figure 2-39. Simplified Channel Block Diagram for SERDES and PCS has been updated.                                                                                                                                                                                                                                                                                                                                                           |
|                        |                 | DC and Switching                    | Footnotes have been added to Recommended Operating Conditions.                                                                                                                                                                                                                                                                                                                                                                               |
|                        |                 |                                     | DC Electrical Characteristics table has been updated.                                                                                                                                                                                                                                                                                                                                                                                        |
|                        |                 |                                     | Supply Current (Standby) tables have been updated.                                                                                                                                                                                                                                                                                                                                                                                           |
|                        |                 |                                     | Initialization Supply Current table have been updated.                                                                                                                                                                                                                                                                                                                                                                                       |
|                        |                 |                                     | Updated timing numbers to include LFE2-12E (rev A 0.08).                                                                                                                                                                                                                                                                                                                                                                                     |
|                        |                 | Pinout Information                  | Updated to include the entire ECP2 device information as well as 256-fpBGA and 484-fpBGA pin information for the ECP2M35E.                                                                                                                                                                                                                                                                                                                   |
|                        |                 | Ordering Information                | Updated to include the entire ECP2 and ECP2M device ordering information.                                                                                                                                                                                                                                                                                                                                                                    |
| February 2007          | 02.3            | Architecture                        | Updated EBR Asynchronous Reset section.                                                                                                                                                                                                                                                                                                                                                                                                      |
| March 2007             | 02.4            | DC and Switching<br>Characteristics | Power-sequencing footnotes have been added to the Recommended Operating Conditions. DDR2 performance has been updated to 266MHz.                                                                                                                                                                                                                                                                                                             |
| March 2007             | 02.5            | Introduction                        | Added "Security Series" to the LatticeECP2 and LatticeECP2M families.                                                                                                                                                                                                                                                                                                                                                                        |
|                        |                 | Architecture                        | Enhanced Configuration Option section updated.                                                                                                                                                                                                                                                                                                                                                                                               |
|                        |                 | DC and Switching                    | Recommended Operating Conditions table - footnote 4 updated.                                                                                                                                                                                                                                                                                                                                                                                 |
|                        |                 | Ordering Information                | "Security Series" ordering part numbers added.                                                                                                                                                                                                                                                                                                                                                                                               |
| April 2007             | 02.6            | Introduction                        | LatticeECP2M family table has been updated for user I/O counts.                                                                                                                                                                                                                                                                                                                                                                              |
|                        |                 | Ordering Information                | LatticeECP2M family ordering part number section has been updated to add 1152-fpBGA package for the ECP2M70 and ECP2M100.                                                                                                                                                                                                                                                                                                                    |
| July 2007              | 02.7            | Architecture                        | Updated text in Ripple Mode section.                                                                                                                                                                                                                                                                                                                                                                                                         |
|                        |                 | DC and Switching                    | ECP2/M Supply Current information has been updated.<br>Typical Building Block Function Performance, External Switching Characteristics, Internal Switching Characteristics, Family Timing Adders, sysCLOCK GPLL Timing, sysCLOCK SPLL Timing, DLL Timing and sysCONFIG Port Timing Specifications have been updated (timing rev. A 0.10).<br>SERDES timing information has been updated.<br>PCI Express timing information has been updated. |
|                        |                 | Pinout Information                  | Added LatticeECP2M20 pinout information.                                                                                                                                                                                                                                                                                                                                                                                                     |
| August 2007            | 02.8            | Introduction                        | 1156-fpBGA package option has been removed from the LatticeECP2M family.                                                                                                                                                                                                                                                                                                                                                                     |
|                        |                 | Architecture                        | Table 2-16. Selectable Master Clock (CCLK) Frequencies During Configuration table has been updated.                                                                                                                                                                                                                                                                                                                                          |
|                        |                 | DC and Switching                    | Supply Current (Standby) table has been updated.                                                                                                                                                                                                                                                                                                                                                                                             |
|                        |                 |                                     | DSP Function timing has been updated.                                                                                                                                                                                                                                                                                                                                                                                                        |

| Date                   | Version         | Section                                                        | Change Summary                                                                                                                                                                                                                                                                     |
|------------------------|-----------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| August 2007<br>(cont.) | 02.8<br>(cont.) | DC and Switching<br>(cont.)                                    | sysCLOCK GPLL timing has been updated.                                                                                                                                                                                                                                             |
|                        |                 | Pinout Information                                             | Added ECP2M50 (484/672/900-fpBGA), ECP2M70 (900-fpBGA) and ECP2M100 (900-fpBGA) pinout information.                                                                                                                                                                                |
|                        |                 | Ordering Information                                           | 1156-fpBGA package option has been removed from the LatticeECP2M family.                                                                                                                                                                                                           |
| September 2007         | 02.9            | Pinout Information                                             | Added Thermal Management text section.                                                                                                                                                                                                                                             |
| February 2008          | 03.0            | Architecture                                                   | Added LVC MOS33D description.                                                                                                                                                                                                                                                      |
|                        |                 | DC and Switching                                               | LatticeECP2M Supply Current has been updated.                                                                                                                                                                                                                                      |
|                        |                 |                                                                | Typical Building Block Function Performance, External Switching Characteristics, Internal Switching Characteristics, Family Timing Adders, sysCLOCK GPLL Timing, sysCLOCK SPLL Timing, DLL Timing and sysCONFIG Port Timing Specifications have been updated (timing rev. A 0.11). |
|                        |                 |                                                                | Figure 3-9. Read/Write Mode (Normal) and Figure 3-10. Read/Write Mode with Input and Output Registers have been updated.                                                                                                                                                           |
|                        |                 |                                                                | Table 3-8. Channel output Jitter (Max) has been updated.                                                                                                                                                                                                                           |
|                        |                 | Pinout Information                                             | Signal description has been updated.                                                                                                                                                                                                                                               |
| April 2008             | 03.1            | Pinout Information                                             | Added 1152-fpBGA pinouts for the ECP2M70 and ECP2M100.                                                                                                                                                                                                                             |
| June 2008              | 03.2            | Pinout Information                                             | Available DDR Interfaces per I/O Bank for the LFE2M35 (484/672-fpBGA) have been updated.                                                                                                                                                                                           |
|                        |                 | Introduction                                                   | Family Selection Guide table - Updated number of EBR SRAM Blocks for the ECP2-70 device.                                                                                                                                                                                           |
|                        |                 | Architecture                                                   | Removed Read-Before-Write sysMEM EBR mode.                                                                                                                                                                                                                                         |
|                        |                 | Clarification of the operation of the secondary clock regions. |                                                                                                                                                                                                                                                                                    |
| August 2008            | 03.3            | DC and Switching<br>Characteristics                            | Removed Read-Before-Write sysMEM EBR mode.                                                                                                                                                                                                                                         |
|                        |                 | Architecture                                                   | Clarification of the operation of the secondary clock regions.                                                                                                                                                                                                                     |
|                        |                 | Pinout Information                                             | Added information for [LOC]DQ[num] to Signal Descriptions table.                                                                                                                                                                                                                   |
| January 2009           | 03.4            | DC and Switching<br>Characteristics                            | Updated typical and max. jitter numbers in Channel Output Jitter table for x10 mode.                                                                                                                                                                                               |
|                        |                 |                                                                | Added Channel Output Jitter table for x20 mode.                                                                                                                                                                                                                                    |
| November 2009          | 03.5            | DC and Switching<br>Characteristics                            | Updated SPI/SPI <sub>m</sub> Configuration Waveforms diagram.                                                                                                                                                                                                                      |
|                        |                 |                                                                | Updated footnotes in LatticeECP2 Initialization Supply Current table.                                                                                                                                                                                                              |
|                        |                 |                                                                | Updated footnotes in LatticeECP2M Initialization Supply Current table.                                                                                                                                                                                                             |
|                        |                 |                                                                | Updated footnotes in SERDES High Speed Data Receiver (LatticeECP2M Family Only) table.                                                                                                                                                                                             |
|                        |                 |                                                                | Updated max. value for t <sub>DINIT</sub> parameter in LatticeECP2/M sysCONFIG Port Timing Specifications table.                                                                                                                                                                   |
|                        |                 |                                                                | Updated Serial Output Timing and Levels table.                                                                                                                                                                                                                                     |
|                        |                 |                                                                | Updated Figure 3-5 MLVDS                                                                                                                                                                                                                                                           |
|                        |                 |                                                                | Updated Table 3-7 Serial Output Timing and Levels                                                                                                                                                                                                                                  |
|                        |                 |                                                                | Updated Table 3-15 Power Down/Power Up Specification                                                                                                                                                                                                                               |
|                        |                 | Pinout Information                                             | Signal Descriptions table - corrected references to ULM, URM, LRM (changed to LUM, RUM and RLM), added footnote 5.                                                                                                                                                                 |

| Date                     | Version         | Section                          | Change Summary                                                                                                                                                 |
|--------------------------|-----------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| November 2009<br>(cont.) | 03.5<br>(cont.) | Pinout Information<br>(cont.)    | LatticeECP2M Pin Information Summary, LFE2M50, LFE2M70 and LFE2M100 table - corrected values for LFE2M50, 672 fpBGA in Available DDR-Interfaces per I/O Bank.  |
|                          |                 |                                  | Minor corrections in LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA table.                                                                    |
|                          |                 |                                  | Minor corrections in LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA table.                                                                    |
|                          |                 |                                  | Minor corrections in LFE2M100E/SE Logic Signal Connections: 900 fpBGA table.                                                                                   |
|                          |                 |                                  | Updated LFE2-6E/SE and LFE2-12E/SE Logical Signal Connections (changed D1/SPIDS to D1).                                                                        |
|                          |                 | Ordering Information             | Updated LatticeECP2M Part Number Description diagram.                                                                                                          |
| March 2010               | 03.6            | DC and Switching Characteristics | Footnote for SED operating frequency added to the sysCONFIG Port Timing Specifications table.                                                                  |
|                          |                 | Pinout Information               | Changed Dual Function pin E7 to be D7/SPDI0 in Logic Signal Connections tables. Changed footnote (***) in Logic Signal Connections table.                      |
| July 2010                | 03.7            | Architecture                     | Updated the Typical sysIO Behavior During Power-up text section.                                                                                               |
|                          |                 | Pinout Information               | Added reference to powerup information.                                                                                                                        |
|                          |                 |                                  | Corrected reference to footnote for pins 131 and 132 for the LFE-20E/SE, 208 PQFP.                                                                             |
|                          |                 |                                  | Referenced footnote (***) for all D7/SPID0.                                                                                                                    |
|                          |                 |                                  | Changed D7*** to D7/SPID0.                                                                                                                                     |
|                          |                 |                                  | Corrected *** footnote.                                                                                                                                        |
|                          |                 | All Sections                     | Included references to Lattice Diamond design software wherever ispLEVER and ispLeverCORE is specified.                                                        |
| April 2011               | 03.8            | DC and Switching Characteristics | DC Electrical Characteristics table:<br>- Added footnote 3 to $I_{IH}$<br>- Added footnote 2 to $I_{IL}$ , $I_{IH}$<br>- Updated C1 and C2 typ. and max. data. |
|                          |                 |                                  | DLL Timing table – Removed line for $t_R$ and $t_F$                                                                                                            |
|                          |                 |                                  | LatticeECP2/M sysCONFIG Port Timing Specifications table – added footnote to $t_{DINIT}$ .                                                                     |
|                          |                 |                                  | Figure 3-18 – Corrected label to be PRGM (not PRGMRJ).                                                                                                         |
|                          |                 | Pinout Information               | LFE2-12E/SE and LFE-20/SE Logical Signal Connections for 208 PQFP – Corrected Dual Function information for pins 112, 114, 117, 119.                           |
| January 2012             | 03.9            | Multiple                         | Removed references to ispLEVER design software.                                                                                                                |
|                          |                 | Architecture                     | Corrected information regarding SED support.                                                                                                                   |
|                          |                 | DC and Switching Characteristics | Added reference to ESD information.                                                                                                                            |
| June 2013                | 04.0            | All                              | Updated document with new corporate logo.                                                                                                                      |
|                          |                 | Architecture                     | Architecture Overview – Added information on the state of the register on power up and after configuration.                                                    |



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| June 2013<br>(cont.) | 04.0<br>(cont.) | DC and Switching<br>Characteristics | sysCLOCK SPLL Timing table – Corrected signal names for $t_{RST}$ parameter.                              |
|                      |                 |                                     | LatticeECP2/M sysCONFIG Port Timing Specifications table – added $t_{SUMCDI}$ and $t_{HMCDI}$ parameters. |
| September 2013       | 04.1            | Architecture                        | Updated Selectable Master Clock (CCLK) Frequencies during Configuration table.                            |
|                      |                 | DC and Switching<br>Characteristics | Added information on $f_{MAXSPI}$ parameter in LatticeECP2/M sys-CONFIG Port Timing Specifications table. |