

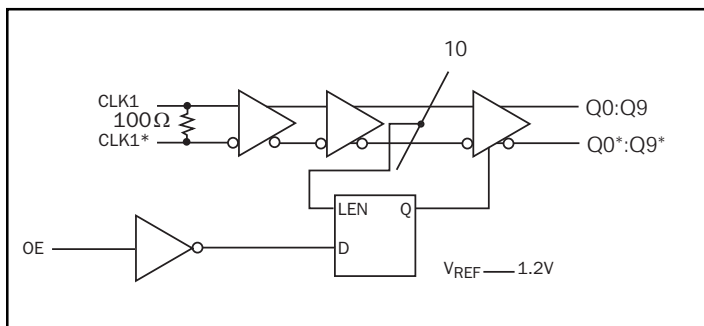
### TEST AND MEASUREMENT PRODUCTS

#### Description

SK2111 is a 1 to 10 data/clock distributor utilizing LVDS (Low Voltage Differential Signaling) technology for high speed operation. Data paths are fully differential from input-to-output for low noise generation and low pulse width distortion. The design allows connection of 1 input to all 10 outputs. LVDS I/O enable high speed data transmission for point-to-point interconnects. This device can be used as a high speed differential 1 to 10 signal distribution / fanout replacing multi-drop bus applications for higher speed links with improved signal quality. It can also be used for clock distribution up to 800 MHz.

The SK2111 accepts LVDS signal levels, LVPECL levels directly or PECL with attenuation network resistors. The inputs of SK2111 have an on-chip 100  $\Omega$  termination resistors to minimize the component count. The OE input is synchronous so that the outputs will only be enabled/disabled when they are already in the low state. This feature prevents generating any runt clocks. The EDQUAD LQFP package has an exposed heatslug which is connected to VEE substrate.

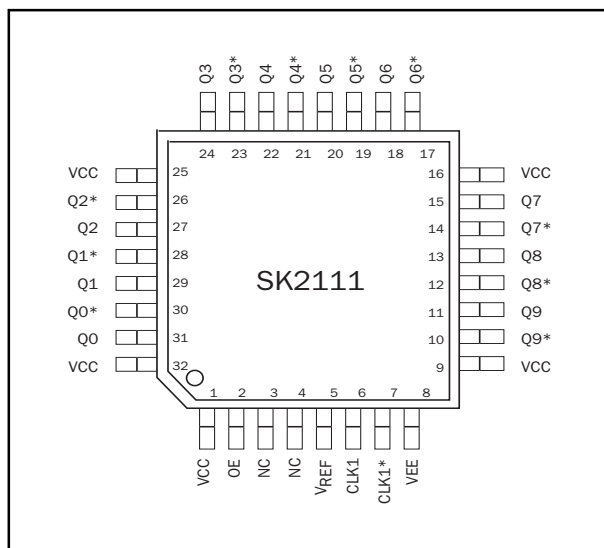
#### Functional Block Diagram



#### Features

- Supply Voltage Range: +3.0V to +3.6V
- Part-to-part skew 75 ps (Max.)
- Output channel-to-channel skew is 60 ps (Max.)
- 800 MHz minimum toggle frequency
- Differential output voltage ( $DV_{OUT}$ ) is 350 mV (typical) with 100  $\Omega$  termination load
- LVDS receiver inputs accept LVPECL signals
- On-chip 100  $\Omega$  input termination resistor
- Fast propagation delay of 500 ps (typical)
- Receiver input threshold  $< \pm 100$  mV
- $V_{REF}$  for LVDS single-ended input applications
- ESD Protection of >4000V
- Industrial Temperature Range: -40°C to +85°C
- Available in Thermally Enhanced EDQUAD 32 Pin LQFP Package
- Conforms to ANSI/TIA/EIA-644 LVDS standard

#### Pin Description



#### Pin Names

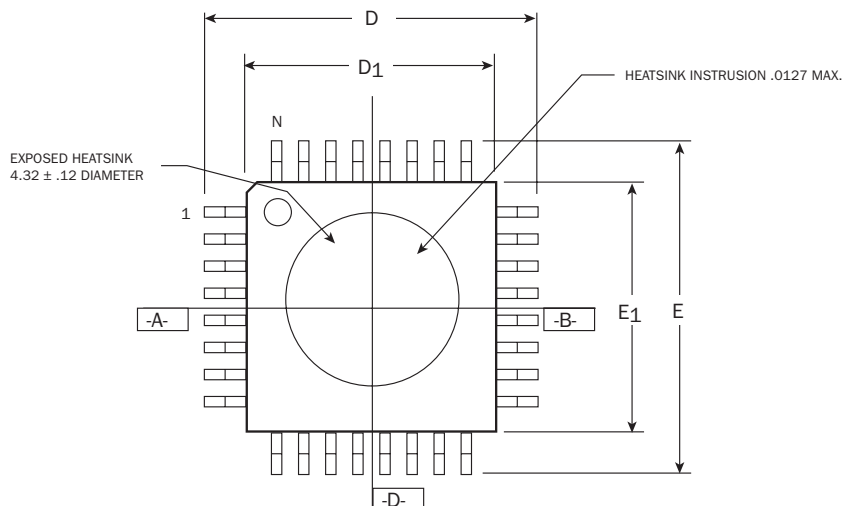
| Pin              | Function                            |
|------------------|-------------------------------------|
| CLK1, CLK1*      | Differential LVDS Input Pair        |
| Q0, Q9, Q0*, Q9* | Differential LVDS Outputs           |
| $V_{REF}$        | LVDS Reference Voltage 1.2V         |
| OE               | Output Enable Input LVTTTL / LVCMOS |

| OE | Q0-Q9 | Q0*-Q9* |
|----|-------|---------|
| 0  | LOW   | HIGH    |
| 1  | Qn    | Qn*     |

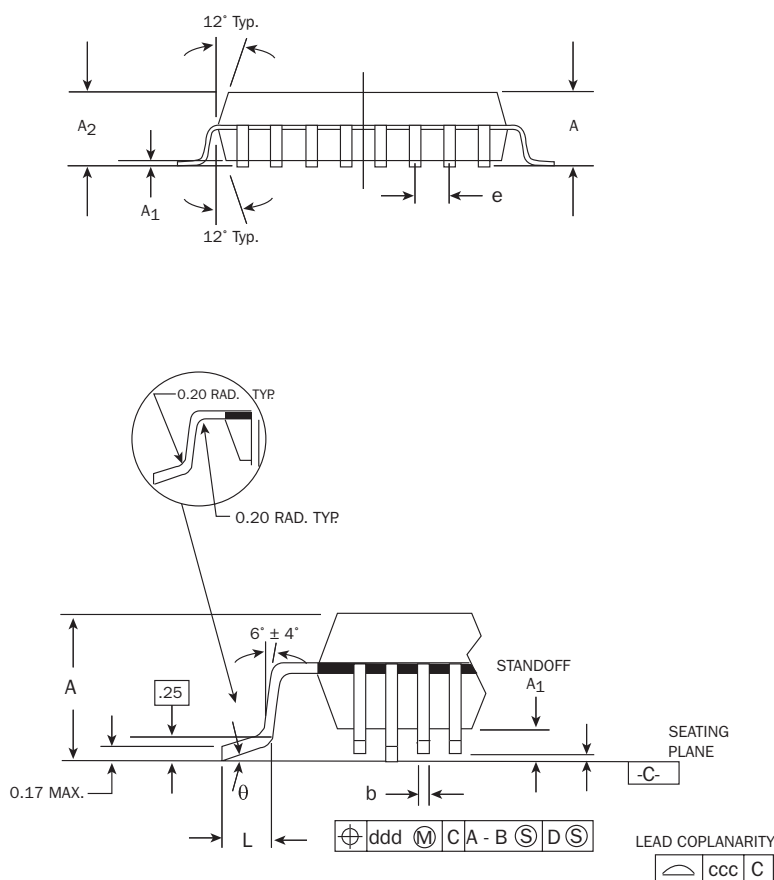
Truth Table

**TEST AND MEASUREMENT PRODUCTS**
**Package Information**

## Thermally Enhanced EDQUAD 32 Pin LQFP Package


**NOTES:**

1. All dimensions are in millimeters (mm).
2. Dimensions shown are nominal with tolerance as indicated.
3. L / F: EFTEC 64T copper, or equivalent, 0.127 mm (.005") thick.
4. Foot length "L" is measured at gage plane, at 0.25 above the seating plane.



| DIMS.          | TOL.       | Millimeters       |
|----------------|------------|-------------------|
| A              | 0.2        | 1.4 Min./1.6 Max. |
| A <sub>1</sub> |            | .05 Min./ .15 Max |
| A <sub>2</sub> | ±.05       | 1.40              |
| D              | ±.20       | 9.00              |
| D <sub>1</sub> | ±.10       | 7.00              |
| E              | ±.20       | 9.00              |
| E <sub>1</sub> | ±.10       | 7.00              |
| L              | +.15/- .10 | .60               |
| e              | BASIC      | .80               |
| b              | ±.05       | .35               |
| θ              |            | 0° - 7°           |
| ddd            | MAX.       | .20               |
| ccc            | MAX.       | .10               |

**TEST AND MEASUREMENT PRODUCTS**
**Absolute Maximum Ratings\***

| Symbol                          | Parameter                                                               | Value                         | Unit     |
|---------------------------------|-------------------------------------------------------------------------|-------------------------------|----------|
| V <sub>CC</sub>                 | Power Supply                                                            | -0.3 to 4.6                   | V        |
| V <sub>I</sub>                  | Input Voltage                                                           | -0.3 to V <sub>CC</sub> + 0.3 | V        |
| I <sub>IN</sub>                 | Input Current                                                           | ±20                           | mA       |
| I <sub>OUT</sub>                | Output Current<br>Continuous<br>Surge                                   | 50<br>100                     | mA<br>mA |
| θ <sub>JA</sub> for EDQUAD LQFP | Thermal Resistance (Junction-to-ambient)<br>at 400 LFPM, 4 layer board  | 29.8                          | °C/W     |
| θ <sub>JA</sub> for EDQUAD LQFP | Thermal Resistance (Junction-to-ambient)<br>at Still Air, 4 layer board | 44                            | °C/W     |
| T <sub>stg</sub>                | Storage Temperature Range                                               | -40 to 125                    | °C       |

\* Maximum Ratings are those beyond which damage to the device may occur.

**DC Characteristics**
**SK2111 LVCMOS/LVTTL DC Electrical Characteristics**

(V<sub>CC</sub> = 3.0V to 3.6V, V<sub>EE</sub> = 0V)

| Symbol          | Characteristics     | TA = -40°C |      |     | TA = 0°C |      |     | TA = 25°C |      |     | TA = 85°C |      |     | Conditions              | Units |
|-----------------|---------------------|------------|------|-----|----------|------|-----|-----------|------|-----|-----------|------|-----|-------------------------|-------|
|                 |                     | Min        | Typ  | Max | Min      | Typ  | Max | Min       | Typ  | Max | Min       | Typ  | Max |                         |       |
| V <sub>IH</sub> | Input HIGH Voltage  | 2.0        |      |     | 2.0      |      |     | 2.0       |      |     | 2.0       |      |     |                         | V     |
| V <sub>IL</sub> | Input LOW Voltage   |            |      | 0.8 |          |      | 0.8 |           |      | 0.8 |           |      | 0.8 |                         | V     |
| V <sub>CL</sub> | Input Clamp Voltage | -1.5       | -0.8 |     | -1.5     | -0.8 |     | -1.5      | -0.8 |     | -1.5      | -0.8 |     | I <sub>CL</sub> = 18 mA | V     |

**TEST AND MEASUREMENT PRODUCTS**
**DC Characteristics (continued)**
**SK2111 LVDS Input/Output DC Electrical Characteristics**

(VCC = 3.0V to 3.6V, VEE = 0V)

| Symbol            | Characteristics                   | TA = - 40°C |      |      | TA = 0°C |      |      | TA = 25°C |      |      | TA = 85°C |     |      | Units |
|-------------------|-----------------------------------|-------------|------|------|----------|------|------|-----------|------|------|-----------|-----|------|-------|
|                   |                                   | Min         | Typ  | Max  | Min      | Typ  | Max  | Min       | Typ  | Max  | Min       | Typ | Max  |       |
| V <sub>IH</sub>   | Input High Voltage                | 0.9         |      | 2.6  | 0.9      |      | 2.6  | 0.9       |      | 2.6  | 0.9       |     | 2.6  | V     |
| V <sub>IL</sub>   | Input Low Voltage                 | 0.65        |      | 2.4  | 0.65     |      | 2.4  | 0.65      |      | 2.4  | 0.65      |     | 2.4  | V     |
| V <sub>OH</sub>   | Output High Voltage               | 1.25        |      | 1.8  | 1.25     |      | 1.8  | 1.25      |      | 1.8  | 1.25      |     | 1.8  | V     |
| V <sub>OL</sub>   | Output Low Voltage                | 0.95        |      | 1.5  | 0.95     |      | 1.5  | 0.95      |      | 1.5  | 0.95      |     | 1.5  | V     |
| V <sub>PP</sub>   | Peak-to-Peak Input Swing          | 0.1         |      | 1.0  | 0.1      |      | 1.0  | 0.1       |      | 1.0  | 0.1       |     | 1.0  | V     |
| DV <sub>OUT</sub> | Peak-to-peak Voltage <sup>1</sup> | 0.25        | 0.35 | 0.47 | 0.25     | 0.37 | 0.47 | 0.25      | 0.39 | 0.47 | 0.25      | 0.4 | 0.47 | V     |
| V <sub>REF</sub>  | LVDS Reference Voltage            | 1.1         | 1.2  | 1.3  | 1.1      | 1.2  | 1.3  | 1.1       | 1.2  | 1.3  | 1.1       | 1.2 | 1.3  | V     |
| R <sub>IN</sub>   | Input Impedance                   | 80          | 95   | 120  | 80       | 100  | 120  | 80        | 105  | 120  | 80        | 110 | 120  | Ω     |

**SK2111 Power Supply DC Electrical Characteristics**

(VCC = 3.0V to 3.6V, VEE = 0V)

| Symbol          | Characteristics                   | TA = - 40°C |     |     | TA = 0°C |     |     | TA = 25°C |     |     | TA = 85°C |     |     | Units |
|-----------------|-----------------------------------|-------------|-----|-----|----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-------|
|                 |                                   | Min         | Typ | Max | Min      | Typ | Max | Min       | Typ | Max | Min       | Typ | Max |       |
| I <sub>CC</sub> | Total Supply Current <sup>4</sup> | 120         | 165 | 230 | 120      | 175 | 230 | 120       | 185 | 230 | 120       | 190 | 230 | mA    |

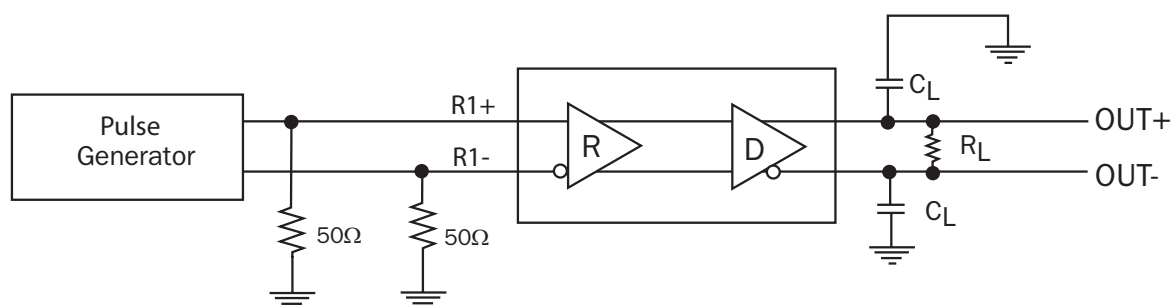
**TEST AND MEASUREMENT PRODUCTS**
**AC Characteristics**
**SK2111 AC Electrical Characteristics**

(VCC = 3.0V to 3.6V, VEE = 0V)

| Symbol                               | Characteristics                           | TA = -40°C |     |     | TA = 0°C |     |     | TA = 25°C |     |     | TA = 85°C |     |     | Units |
|--------------------------------------|-------------------------------------------|------------|-----|-----|----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-------|
|                                      |                                           | Min        | Typ | Max | Min      | Typ | Max | Min       | Typ | Max | Min       | Typ | Max |       |
| F <sub>MAX</sub>                     | Max Toggle Frequency <sup>2</sup>         | 800        |     |     | 800      |     |     | 800       |     |     | 800       |     |     | MHz   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>CLK to Output        | 400        | 485 | 570 | 390      | 480 | 570 | 410       | 495 | 580 | 430       | 515 | 600 | ps    |
| t <sub>r</sub> ,t <sub>f</sub>       | Output Rise and Fall Time<br>(20% to 80%) | 150        |     | 320 | 155      |     | 330 | 160       |     | 340 | 165       |     | 360 | ps    |
| T <sub>CCS</sub>                     | Output Channel-to-Channel<br>Skew         |            |     | 60  |          |     | 60  |           |     | 60  |           |     | 60  | ps    |

**NOTES:**

1. DV<sub>OUT</sub> is obtained as follows: Voltages of Q and Q\* outputs with respect to V<sub>EE</sub> are measured. The absolute difference between the high and the low is equal to DV<sub>OUT</sub>.
2. 250 mV minimum output peak-to-peak swing for Max toggle frequency.
3. For part ordering information, see HPP Part Ordering Information Data Sheet
4. R<sub>L</sub> = 100Ω, 800 MHz, OE = High

**TEST AND MEASUREMENT PRODUCTS**
**AC Characteristics (continued)**
**AC Timing Diagrams**

**Figure 1: LVDS Output Load**
**Ordering Information**

| Ordering Code | Package ID     |
|---------------|----------------|
| SK2111AXF     | 32-LQFP-EDQUAD |
| SK2111AXFT    | 32-LQFP-EDQUAD |

**Contact Information**

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