

## DS90C3201

### 3.3V 8 MHz to 135 MHz Dual FPD-Link Transmitter

#### General Description

The DS90C3201 is a 3.3V single/dual FPD-Link 10-bit color transmitter is designed to be used in Liquid Crystal Display TVs, LCD Monitors, Digital TVs, and Plasma Display Panel TVs. The DS90C3201 is designed to interface between the digital video processor and the display device using the low-power, low-EMI LVDS (Low Voltage Differential Signaling) interface. The DS90C3201 converts up to 70 bits of LVCMOS/LVTTL data into ten LVDS data streams. The transmitter can be programmed clocking data with rising edge or falling edge clock. Optional two-wire serial programming allows fine tuning in development and production environments. At a transmitted clock frequency of 135 MHz, 70 bits of LVCMOS/LVTTL data are transmitted at an effective rate of 945 Mbps per LVDS channel. Using a 135 MHz clock, the data throughput is 9.45Gbit/s (945Mbytes/s). This allows the dual 10-bit LVDS Transmitter to support HDTV resolutions.

#### Features

- Up to 9.45Gbit/s data throughput
- 8 MHz to 135 MHz input clock support
- Supports up to QXGA panel resolutions
- Supports HDTV resolutions and frame rates up to 1920 x 1080p
- LVDS 30-bit, 24-bit or 18-bit color data outputs
- Supports single pixel and dual pixel interfaces
- Supports spread spectrum clocking
- Two-wire serial communication interface
- Programmable clock edge and control strobe select
- Power down mode
- +3.3V supply voltage
- 128-pin TQFP
- Compliant to TIA/EIA-644-A-2001 LVDS Standard
- Backward compatible configuration with FPD-Link

#### Block Diagram

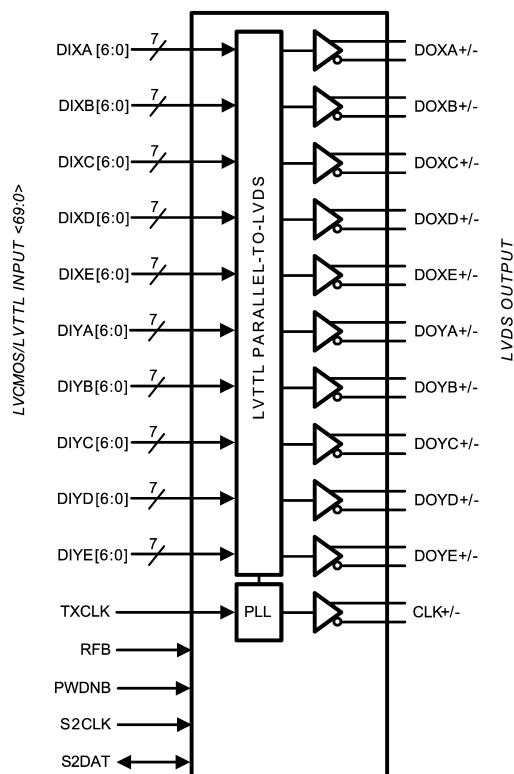
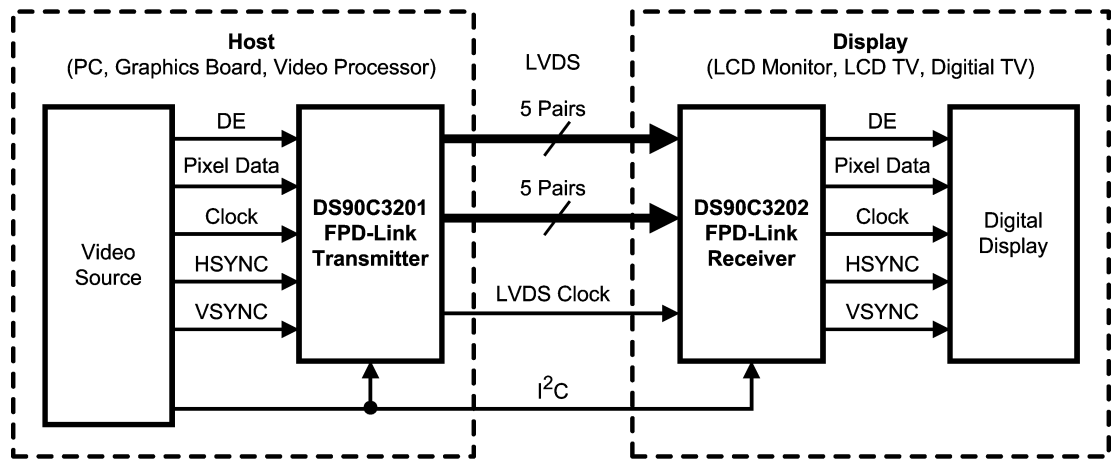


FIGURE 1. Transmitter Block Diagram

## Typical Application Diagram



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FIGURE 2. LCD Panel Application Diagram

## Functional Description

The DS90C3201 and DS90C3202 are a dual 10-bit color Transmitter and Receiver FPD-Link chipset designed to transmit data at clocks speeds from 8 to 135 MHz. DS90C3201 and DS90C3202 are designed to interface between the digital video processor and the display using a LVDS interface. The DS90C3201 transmitter serializes 2 channels of video data (10-bit each for RGB for each channel, totaling 60 bits) and control signals (HSYNC, VSYNC, DE and two user-defined signals) along with clock signal to 10 channels of LVDS signals and transmits them. The DS90C3202 receiver converts 10 channels of LVDS signals into parallel signals and outputs 2 channels of video data (10-bit each for RGB for each channel, totaling 60 bits) and control signals (HSYNC, VSYNC, DE and two user-defined signals) along with clock signal. The dual high speed LVDS channels supports single pixel in-single pixel out and dual pixel in-dual pixel out transmission modes. The FPD-Link chipset is suitable for a variety of display applications including LCD Monitors, LCD TV, Digital TV, and DLP TV, and Plasma Display Panels.

Using a true 10-bit color depth system, the 30-bit RGB color produces over 1.07 billion colors to represent High Definition (HD) displays in their most natural color, surpassing the maximum 16.7 million colors achieved by 6/8-bit color conventionally used for large-scale LCD televisions and LCD monitors.

### LVDS TRANSMITTER

The LVDS Transmitter serializes LVCMOS/LVTTL RGB video data and control signal timing into LVDS data streams.

### SINGLE PIXEL AND DUAL PIXEL INTERFACE

The DS90C3201 LVDS ports support two modes: Single Pixel mode (30-bit LVDS output) and Dual Pixel mode (2 x 30-bit LVDS output). For Single Pixel mode, LVDS ports

DOX[A-E] for 10-bit RGB data are utilized. For the Dual Pixel mode, both DOX[A-E] and DOY[A-E] LVDS ports for odd and even 10-bit RGB data are utilized.

### SELECTABLE INPUT DATA STROBE

The Transmitter input data edge strobe can be latched on the rising or falling edges of input clock signal. The dedicated RFB pin is used to program input strobe select on the rising edge of TXCLK or the falling edge of TXCLK.

### 2-WIRE SERIAL COMMUNICATION INTERFACE

Optional I2C programming allows fine tuning in development and production environments. The I2C interface provides several capabilities to reduce EMI and to customize output timing. These capabilities are selectable/programmable via I2C: Programmable LVDS Swing Control, Adjustable Input Setup/Hold Control, Input/Output Channel Control.

### PROGRAMMABLE LVDS SWING CONTROL

Programmable LVDS amplitude (VOD) and LVDS offset voltage (VOS) of the differential signals can be adjusted for better impedance matching for noise and EMI reduction. The low level LVDS swing mode and offset voltage can be controlled via I2C.

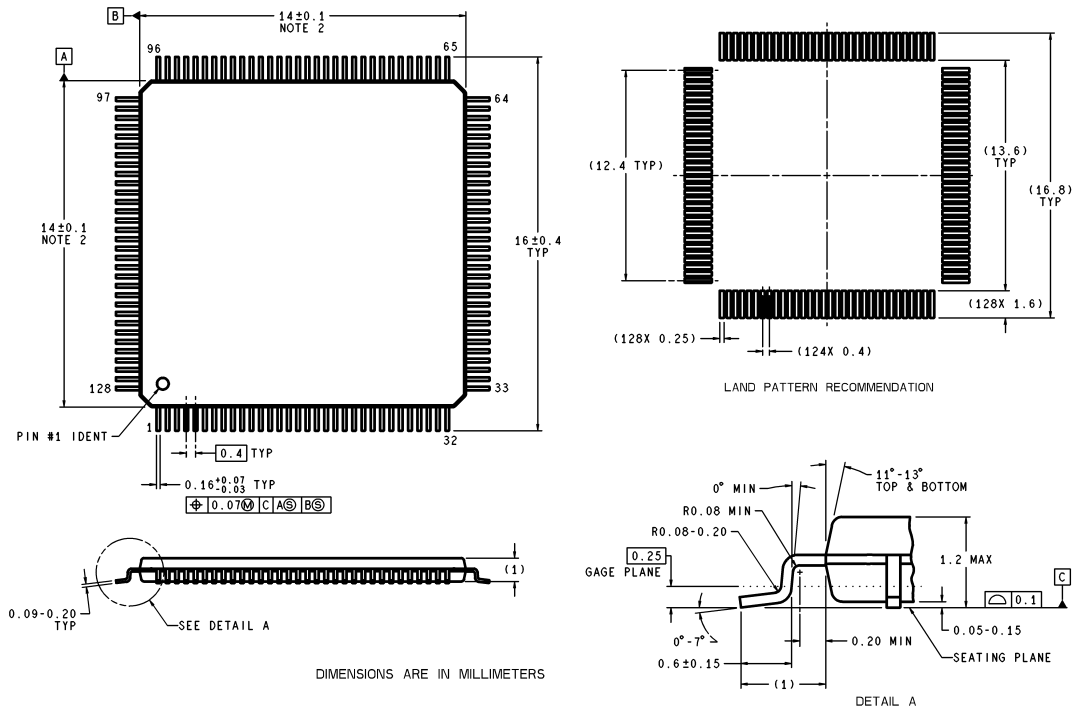
### ADJUSTABLE INPUT SETUP/HOLD CONTROL

Programmable LVCMOS/LVTTL Data Input Setup and Hold Times can be adjusted with respect to TXCLK for convenient interface with a variety of graphic controllers and video processors. Feature is controlled via I2C.

### INPUT/OUTPUT CHANNEL CONTROL

Full independent control for input/output channels can be disabled to minimize power supply line noise and overall power dissipation. Feature is configured via I2C.

## Physical Dimensions inches (millimeters) unless otherwise noted



**128-Pin TQFP Package**  
**Order Number DS90C3201VS**  
**NS Package Number VJX128A**

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