

Compatibility of 3.3V and 5.0V LVDS Drivers and Receivers

Table 1: Cross Reference of Applicable Products

Product Name:	Manufacturer Part Number	SMD #	Device Type	Internal PIC
3.3V Quad Driver	UT54LVDS031LV/E	5962-98651	02, 03, 04, 05	WD03, WD07, WD28, WD30
3.3V Quad Receiver	UT54LVDS032LV/E	5962-98652	02, 03, 04, 05	WD04, WD08, WD29, WD31
3.3V Quad Receiver with Termination Resistor	UT54LVDS032LVT	5962-04201	01, 02	WD06, WD10
3.3V Bus Quad Driver	UT54LVDM031LV	5962-06201	01	WD21
3.3V Dual Driver and Receiver	UT54LVDM055LV	5962-06202	01	WD22
5.0V Quad Driver	UT54LVDS031	5962-95833	02	JR05, JR08
5.0V Quad Receiver	UT54LVDS032	5962-95834	02	JR06, JR09
5.0V Quad Driver with Cold Spare	UT54LVDS031	5962-95833	03	JR10
5.0V Quad Receiver with Cold Spare	UT54LVDS032	5962-95834	03	JR11
3.3V Quad Bus LVDS Crosspoint Switch	UT54LVDM228	5962-01537	01	WD15, WD16
3.3V Octal Bus LVDS Repeater	UT54LVDM328	5962-01536	01	WD17, WD18
3.3V Serializer	UT54LVDS217	5962-01534	01, 02	WD11, WD13
3.3V Deserializer	UT54LVDS218	5962-01535	01, 02	WD12, WD14

1.0 Overview

CAES Colorado Springs has reviewed the I/O specifications of all the LVDS Drivers and Receivers for compatibility. The 5.0V drivers and receivers: UT54LVDS031, UT54LVDS031, UT54LVDS032, and UT54LVDS032 are compatible with the 3.3V drivers and receivers: UT54LVDS031LV/E, UT54LVDS032LV, UT54LVDS032LVT, UT54LVDM055LV, UT54LVDM228, UT54LVDM328, UT54LVDS217, and the UT54LVDS218. This application note covers compatibility assessment between the 5.0V devices and the 3.3V devices.

2.0 LVDS Specifications

Low Voltage Differential Signaling or LVDS is a method used to transmit and receive hundreds of megabits per second over differential media using a low voltage swing (~350mV). LVDS communications are performed by a driver and a receiver. The driver accepts a standard Complementary Metal Oxide Semiconductor (CMOS) single ended signal and outputs a differential signal. Standard CMOS signals have voltage levels of 0.0V for a logic Low and 3.3V for logic High. The receiver senses the differential signal and outputs a standard CMOS signal.

The LVDS driver contains a constant current source that drives $\pm 3.5\text{mA}$ or $\pm 10\text{mA}$. The Driver output current travels through a 100Ω or 35Ω resistive load across the receiver inputs. The current flow through the resistor results in a voltage across the differential terminals of $\pm 350\text{mV}$. The state of the driver's constant current source determines the logic state sensed at the receiver.

Input/Output signal levels for LVDS are defined by the Telecommunications Industry Association/ Electronic Industries Association ANSI/TIA/EIA-644 and TIA/EIA-899. ANSI/TIA/EIA-644 and TIA/EIA-899 are electrical standards only and do not define a protocol. CAES LVDS drivers and receivers designed to work within this specification regardless of supply voltage.

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3.0 Compatibility Assessment

The output and input characteristics of the 5.0V and 3.3V CAES LVDS Drivers and Receivers are designed to operate within the TIA/EIA-644 LVDS specification. Based on the limits listed in the datasheets and corresponding SMDs, there are no compatibility problems when using a 5.0V driver with a 3.3V receiver or 5.0V receiver with a 3.3V driver in normal operating conditions. Normal operating conditions are described as having the Driver and Receiver properly connected to the datasheet and SMD specified VDD (5.0V or 3.3V), enable signals are correctly connected, and no fault conditions are occurring.

Permanent damage to the 3.3V drivers and receivers may occur if any of the pins are shorted to 5.0V because 5.0V is outside of the Absolute Maximum Ratings of the UT54LVDS031LV/E, UT54LVDS032LV, UT54LVDS032LVT, UT54LVDM055LV, UT54LVDM228, UT54LVDM328, UT54LVDS217, and UT54LVDS218. Additionally exposure to any of the absolute maximum rating conditions for an extended period may also effect device reliability and performance.

Operating 5.0V drivers and receivers with 3.3V drivers and receivers under normal non-fault operating conditions do not cause any operational problems or compatibility issues.

The results discussed above are not guaranteed by CAES. Any operation outside of the ABSOLUTE MAXIMUM RATINGS as stated in the datasheet and/or SMD may affect negatively device reliability and performance.

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APPLICATION NOTE

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