APPLICATION NOTE

RELEASED 1/12/11

AN-LVS-006-001

Cold Spare Functionality of the LVDS Family

Table 1: Cross Reference of Applicable Products

Product Name:	Manufacturer Part Number	SMD #	Device Type	Internal PIC*
UT54LVDM031LV	Low Voltage Bus-LVDS Quad Driver 3.3V	5962-06201	01	WD21
UT54LVDM055LV	Dual Bus-LVDS Driver and Receiver 3.3V	5962-06202	01	WD22
UT54LVDS032LVT	Low Voltage Quad Receiver with Integrated Termination Resistor 3.3V	5962-04201	01, 02	WD06, WD10
UT54LVDS031LV	LVDS quad driver 3.3V	5962-98651	02, 03, 04, 05	WD03, WD28
UT54LVDS032LV	LVDS quad receiver 3.3V	5962-98652	02, 03, 04, 05	WD04, WD29
UT54LVDSC031	LVDS Quad Driver 5.0V	5962-95833	03	JR10
UT54LVDSC032	LVDS Quad Receiver 5.0V	5962-95834	03	JR11
UT54LVDS217	Serializer 3.3V	5962-01534	01, 02	WD11, WD13
UT54LVDS218	Deserializer 3.3V	5962-01535	01, 02	WD12, WD14
UT54LVDM328	Octal Bus-LVDS Repeater 3.3V	5962-01536	01	WD17
UT54LVDM228	Quad 2×2 Crosspoint Bus-LVDS Switch 3.3V	5962-01537	01	WD15
UT54LVDM031LV	Low Voltage Bus-LVDS Quad Driver 3.3V	5962-06201	01	WD21

*PIC = Product Identification Code

1.0 Overview

CAES Colorado Springs offers Low Voltage Differential Signaling, LVDS, and Multidrop Low Voltage Differential Signaling, LVDM, devices that contain cold-sparing buffers. These devices are ideal in applications where redundant subsystems are to remain in a high impedance power-off state. This also allows a redundant subsystem to be connected to the LVDS/LVDM bus while being electrically isolated from the data bus.

Redundancy of mission critical subsystems is a common practice used to ensure reliable operation of high reliability applications. LVDS/LVDM inputs and outputs of the devices shown in table 1 can be tied to an active bus while remaining in a high impedance state with no power being supplied to the device. When VDD is within 300mV of VSS (0.0V), the cold spared outputs and inputs present a minimum impedance of 1MΩ.

2.0 Cold Sparing

In applications requiring high reliability, cold sparing enables a redundant device to be on the data bus with its power supply within ±300mV of VSS. Or a device can be kept in cold spare mode and powered up only when necessary, allowing the application to save power. In order for a redundant device to hang off an active bus, the cold spare device must present high impedance to the active signal to avoid signal distortion.

The high impedance, 1MΩ, present on the LVDS I/O lines of a device with VDD = VSS does not add significant loading to the active bus, thus interfering very little with the signal. The ESD structure on a cold spare device is said to be non-typical. CAES Colorado Springs' cold spared I/O on the LVDS/LVDM products contain proprietary cold-spare buffers, schematics are not released. However, the equivalent circuit behaves like back-to-back diodes. See Figure 1.

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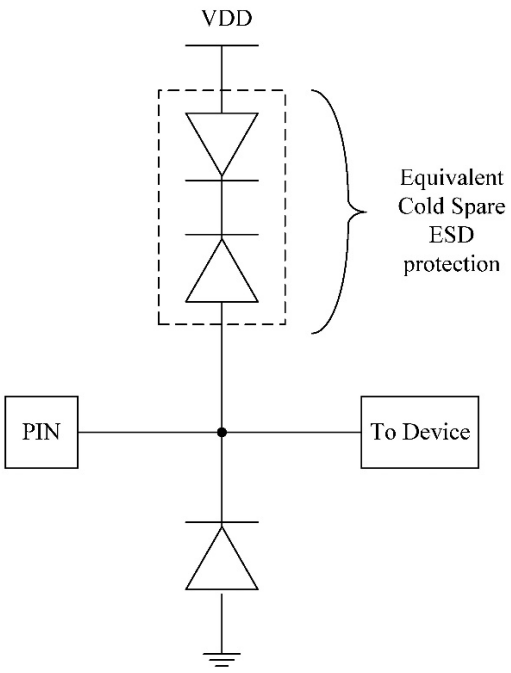

Figure 1. Notional Cold Spare ESD protection circuit

3.0 Conclusion

The CAES Colorado Springs LVDS and LVDM family of devices are shown to be useful in providing electrical isolation to a redundant powered-down subsystem, provide power savings for infrequently active devices, provide noise immunity, and high-speed point-to-point communications.

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4.0 References

1) CAES Colorado Springs, "UT54LVDM031LV Low Voltage Bus-LVDS Quad Driver Datasheet", Colorado Springs, Colorado
2) CAES Colorado Springs, "UT54LVDM055LV Dual Driver and Receiver Datasheet", Colorado Springs, Colorado
3) CAES Colorado Springs, "UT54LVDS032LVT Low Voltage Quad Receiver with Integrated Termination Resistor Datasheet", Colorado Springs, Colorado
4) CAES Colorado Springs, "UT54LVDS031LV 3.3-VOLT QUAD DRIVER Datasheet", Colorado Springs, Colorado
5) CAES Colorado Springs, "UT54LVDS032LV 3.3 VOLT QUAD RECEIVER Datasheet", Colorado Springs, Colorado
6) CAES Colorado Springs, "UT54LVDSC031 5-VOLT QUAD DRIVER WITH COLD SPARE LVDS OUTPUTS Datasheet", Colorado Springs, Colorado
7) CAES Colorado Springs, "UT54LVDSC032 5-VOLT QUAD RECEIVER WITH COLD SPARE LVDS INPUTS Datasheet", Colorado Springs, Colorado
8) CAES Colorado Springs, "UT54LVDS217 Serializer 3.3-Volt with Cold Spare all pins Datasheet", Colorado Springs, Colorado
9) CAES Colorado Springs, "UT54LVDS218 Deserializer 3.3-Volt with Cold Spare all pins Datasheet", Colorado Springs, Colorado
10) CAES Colorado Springs, "UT54LVDM328 Octal 400 Mbps Bus LVDS Repeater with Cold Spare all pins Datasheet", Colorado Springs, Colorado
11) CAES Colorado Springs, "UT54LVDM228 Quad 2×2 400 Mbps Crosspoint Switch with Cold Spare all pins Datasheet", Colorado Springs, Colorado