

RADHARD
LVDS LOW-VOLTAGE

DIFFERENTIAL SIGNALING BY
AEROFLEX COLORADO SPRINGS

is an excellent solution for spaceborne applications that need to move large amounts of data quickly between systems or components within a satellite.

In fact, using current $0.25\mu\text{m}$ CMOS technology, LVDS can be used to achieve a radiation-hardened solution for transferring information at data rates in excess of one Gigabit/second.



YOUR PATH TO GIGABIT PER SECOND

LVDS QUAD DRIVERS AND RECEIVERS

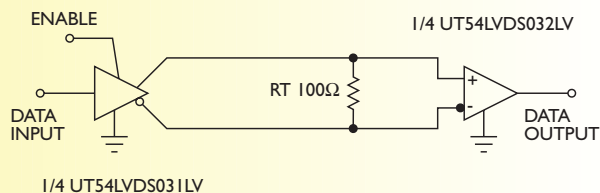
UT54LVDS031, UT54LVDS031LV, UT54LVDS032, UT54LVDS032LV

DRIVERS

- 3.3V at >400.0 Mbps (200 MHz) switching rates
- 5V at >155.5 Mbps (77.7 Mhz) switching rates
- Cold sparing (3.3V - all pins; 5V - LVDS outputs)
- 1.5ns maximum, 3.3V
- 5.0ns maximum, 5V
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- 16-lead flatpack (dual in-line) package
- SMD 5962-98651/95833
- QML Q and V compliant

RECEIVERS

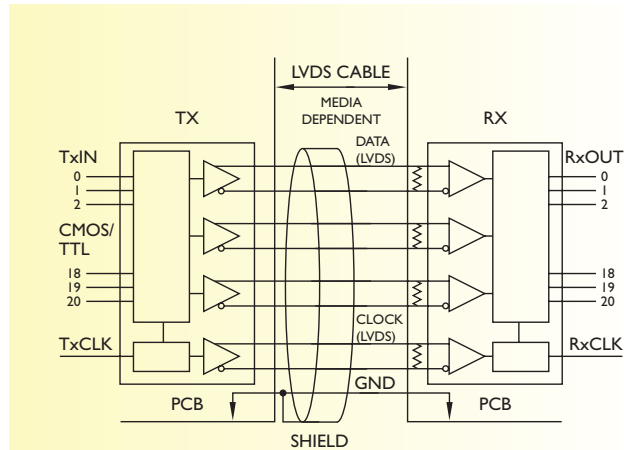
- 3.3V at >400.0 Mbps (200 MHz) switching rates
- 5V at >155.5 Mbps (77.7 Mhz) switching rates
- Cold sparing (3.3V - all pins; 5V - LVDS inputs)
- 1.9ns maximum, 3.3V
- 8.0ns maximum, 5V
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- 16-lead flatpack (dual in-line) package
- SMD 5962-98652/95834
- QML Q and V compliant



LVDS SERIALIZER/DESERIALIZER

UT54LVDS217, UT54LVDS218

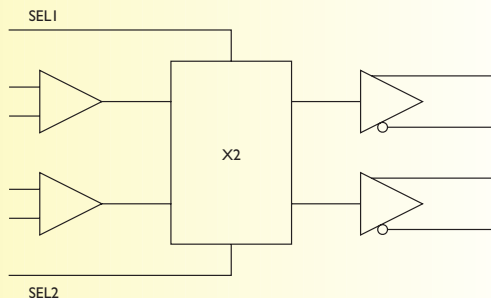
- 15 to 75MHz shift clock support
- 3.3V power
- Cold sparing all pins
- Up to 1.575 Gbps throughput
- PLL requires no external components
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- 48-lead flatpack package
- QML Q and V compliant
- SMD 5962-01534 and 5962-01535



LVDS QUAD CROSSPOINT SWITCH

UT54LVDM228

- 400 Mbps low jitter fully differential data path
- 3.3V
- 10mA LVDS output drivers
- Cold sparing all pins
- Configurable as quad 2:1 mux, 1:2 demux, repeater, or 1:2 signal splitter
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- 64-lead flatpack package
- SMD 5962-01537
- QML Q and V compliant

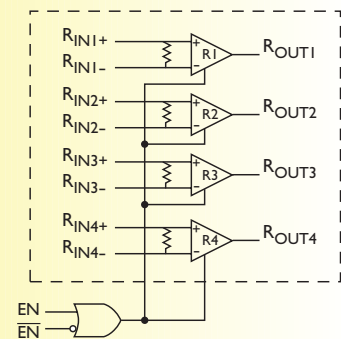


Device may be configured as a 1:2 splitter, repeater, or switch

LVDS TERMINATION RESISTOR

UT54LVDS032LVT

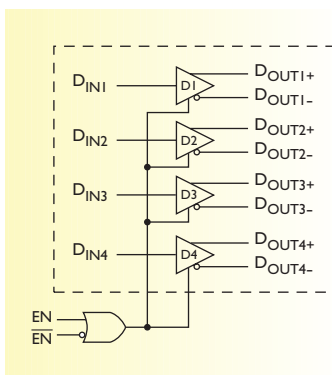
- >400 Mbps (200 MHz) switching rates
- 3.3V power
- ±340mV differential signaling
- Cold sparing all pins
- Nominal 105Ω integrated termination resistor
- 3.3ns maximum propagation delay
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- SMD 5962-04201
- QML Q and V



LVDS LOW-VOLTAGE BUS QUAD DRIVER

UT545LVDM031LV

- >400.0 Mbps switching rates
- 3.3V power
- $\pm 340\text{mV}$ differential signaling
- Cold sparing all pins
- 10mA LVDS output
- 1.8ns maximum propagation delay
- 0.4ns maximum differential skew
- Radiation-hardened design - total dose 300krad(Si)
- SMD 5962-06201

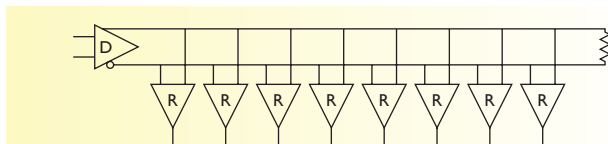


- 16-lead flatpack (dual in-line) package
- QML Q and V

LVDS OCTAL BUS REPEATER

UT54LVDM328

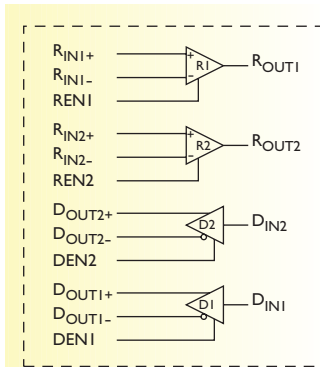
- 400 Mbps low jitter fully differential data path
- 3.3V power ■ 10mA LVDS output drivers
- Cold sparing all pins
- Radiation-hardened design - total dose 300 krad(Si) and 1Mrad(Si)
- 48-lead flatpack package
- SMD 5962-01536
- QML Q and V compliant



LVDS DUAL DRIVER AND RECEIVER

UT54LVDM055LV

- Two drivers and two receivers with individual enables
- >400.0 Mbps switching rates
- 3.3V power
- $\pm 340\text{mV}$ differential signaling
- Cold sparing all pins
- 10mA LVDS output
- TTL compatible inputs and outputs
- Radiation-hardened design - total dose 300krad(Si)
- SMD 5962-06202



- 18-lead flatpack (dual in-line) package
- QML Q and V

Planned Applications of the Aeroflex Colorado Springs RadHard LVDS

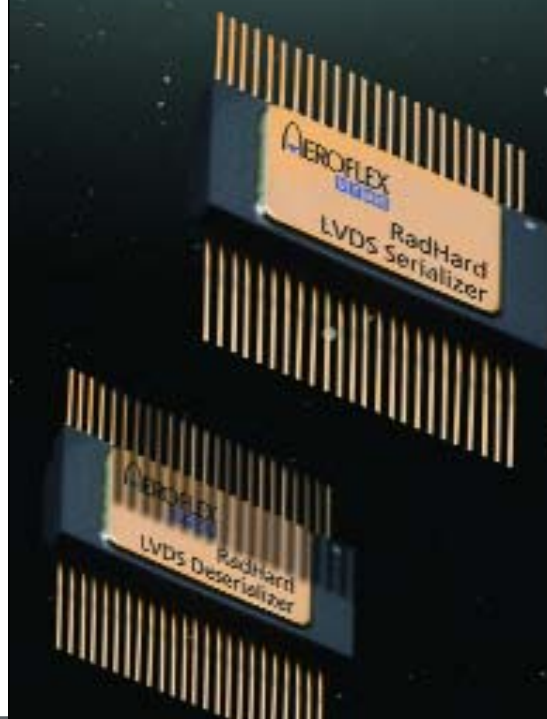
**Intra-Satellite
Communication**

**Planetary
Exploration Vehicle**

**Payload and Sensor
Integration**

Science Instruments

**Future Imaging
Architectures**

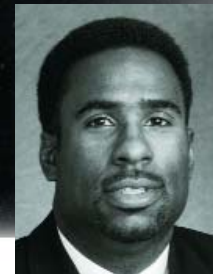


YOUR PATH TO GIGABIT PER SECOND



“Customers came to us with their requirements for LVDS for space: cold sparing, high speed, low power, etc. It is our prime directive to meet those requirements...and then some.”

*~ Anthony Jordan
Aeroflex Colorado Springs, Director Standard Products*



WHAT IS RADHARD LVDS?

Transmission of large amounts of data on satellites requires a high performance solution that is fast, low power, low noise, and resistant to the natural space radiation environment. A generic physical-layer commercial standard (ANSI/TIA/EIA-644) is ideal for this critical application.

Aeroflex Colorado Springs’s Low Voltage Differential Signaling (LVDS) technology, as its name implies, uses differential data transmission and reception. This has the distinct advantage of being much less susceptible to common mode noise versus single-ended transmission standards. The low voltage aspect of LVDS (maximum of 400mV differential) allows for extremely power-efficient data transmission.

The most popular commercial application for LVDS is data transmission to/from flat-panel displays (laptop computers being the single largest marketplace). It is interesting to note that the high-speed, low-power portable computing market has created a nearly ideal data transmission standard for the satellite market.

In order to be successfully transitioned from the commercial market into the radiation-tolerant space marketplace, LVDS is manufactured on a radiation hardened process so that it is resistant to total dose radiation, single event latch-up (SEL), and single event transients (SET). Many current-generation commercial LVDS components suffer from SEL. Adapting them to space use is difficult since shielding — the most common method of protecting commercial components — is ineffective against the heavy ions responsible for single event latch-up.

Aeroflex Colorado Springs has adapted the LVDS standard for spaceborne applications by redesigning and processing the device for total dose tolerance and SEL immunity.

WHAT IS COLD SPARING?

Aeroflex Colorado Springs is one of the few vendors to offer cold sparing on all LVDS products. Cold spare systems have either a redundant device or a subsystem electrically connected without power supplied. The trick to cold sparing is that the spare must present a high-input impedance to the system without drawing power.

Cold sparing is required to implement redundant system architectures or subsystems electrically connected without power supplied. Aeroflex Colorado Springs has designed in cold spare capable I/O buffers on all new LVDS products.

WHAT IS SPACEWIRE?

SpaceWire is a simple protocol handler, a FIFO user interface with high data rates and low power. Using LVDS, it has point-to-point full duplex communication and supports networked systems via routers.

SpaceWire marries IEEE-1355 with an LVDS physical layer transceiver designed to handle the critical timing issues associated with the SpaceWire data/strobe encoding scheme.

Aeroflex Colorado Spring’s history of producing RadHard LVDS flight-proven products makes the recently-announced SpaceWire family possible.

WEB SITE Aeroflex Colorado Springs
www.aeroflex.com/LVDS

TELEPHONE 800-645-8862



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

Specifications are subject to change without notice.

Aeroflex Colorado Springs acknowledges the support from DTRA for the development of our deep sub-micron Mixed-Signal technology.