Protecting LVDS Interfaces
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Low-Voltage Differential Signaling (LVDS) is a technology used in a variety of high-speed data transmission applications such as switches, set-top boxes and flat panel displays. In the simplest form, an LVDS interface, as defined by IEEE 1596.3 and ANSI/TIA/EIA-644, is a driver that transmits the signal over a trace or a cable to a receiver. If not protected properly, electrostatic discharge can damage the driver and receiver. In addition, the typical data transmission rate of LVDS is typically 500Mbps up to a theoretical maximum of 1.9Gbps. High data transmission rate applications require protection devices that can provide adequate protection while maintaining signal integrity.

ProTek Devices SRV05-4LC is a 5 Volt, transient voltage suppression device that provides up to four channels of protection. The SRV05-4LC has a significantly low device capacitance (0.7pF typical) and breakdown voltage. These features make it an ideal device to protect LVDS Interfaces. LVDS calls for a protection device with low clamping voltage owing to its characteristic of low voltage operation. LVDS IEEE 1596.3 and ANSI/TIA/EIA-644 standard supports a maximum data rate of 655Mbps, which requires a protection device with a very low device capacitance to avoid loading or signal distortion. Table 1 shows the electrical characteristics for the SRV05-4LC.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>RATED STAND-OFF VOLTAGE</th>
<th>MINIMUM BREAKDOWN VOLTAGE @ 1mA</th>
<th>MAXIMUM CLAMPING VOLTAGE @ I_p = 5A</th>
<th>MAXIMUM LEAKAGE CURRENT @V_TOT</th>
<th>TYPICAL CAPACITANCE I/O TO I/O</th>
<th>MAXIMUM CAPACITANCE I/O TO GND</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRV05-4LC</td>
<td>5.0</td>
<td>6.0</td>
<td>15.0</td>
<td>5</td>
<td>0.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>

The figure below shows two SRV05-4LC devices which protect both sides of the LVDS transmission system. The SRV05-4LC is connected in a line to line configuration where it protects a differential data line and also in a line to ground configuration showing a single ended.

When operated in a differential mode (I/O to I/O) configuration, the SRV05-4LC has a typical device capacitance of 0.7pF. In a common mode configuration (I/O to ground), the capacitance rises to 1.4pF. In either case, the SRV05-4LC can handle up to 1Gbps data rate without any observable depreciation in signal integrity.

The SRV05-4LC is qualified to meet and exceed the IEC 61000-4-2 (Level 4 (ESD): ±8kV contact and ±15kV air) standard. It is also compatible with IEC 61000-4-4 (EFT: 40A, 5/50ns) and IEC 61000-4-5 (Surge: 24A, 8/20µs – Level 2 and Level 3) standards.
COMPANY INFORMATION

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