4-Line ESD Protection Diode Provides Extreme Size Reduction for Portable Electronics

KEY BENEFITS
- Ultra-compact CLP1007-5L package
  - Measures only 1.0 mm x 0.7 mm with a low height of 0.27 mm
- Low load capacitance of 0.9 pF typical
- Features a “flow through” design
- Low maximum leakage current of < 0.1 µA at the working voltage of 5.5 V
- Breakdown voltage of 7.5 V typical at 1 mA
- Maximum clamping voltage of 15 V at 3 A
- Provides transient protection for data lines as per IEC 61000-4-2 at ± 15 kV (air and contact discharge)
- Supports reflow soldering to +260 °C for 10 s
- Vishay Green

APPLICATIONS
- ESD protection of high-speed data lines including HDMI, DisplayPort, eSATA, USB 3.0, 1394 / FireWire, and Thunderbolt in mobile phones, digital cameras, MP3 players, and portable gaming systems

RESOURCES
- Datasheet: please visit www.vishay.com/ppg?82665
- For technical questions, contact ESDprotection@vishay.com
- Material categorization: For definitions of compliance, please see http://www.vishay.com/doc?99912
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**FEATURES**
- Compact Chip Level Page CLP1007-5L
- Length = 1 mm; Width = 0.7 mm; Height = 0.27 mm
- 4-lines, unidirectional ESD-protection array
- Low leakage current $I_R < 0.1 \mu A$
- Low capacitance at $V_R = 0 V = 0.9 \mu F$ (typ.)
- Ideal for high speed data line like - HDMI, DisplayPort, eSATA - USB, 1394/firewire - Thunderbolt
- ESD-protection acc. IEC 61000-4-2 ± 15 kV contact discharge ± 15 kV air discharge
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?799912

**MARKING**

5F4 = type code
MM = date code Month
YY = date code Year

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>DEVICE NAME</th>
<th>ORDERING CODE</th>
<th>TAPED UNITS PER REEL (8 mm TAPE ON 7&quot; REEL)</th>
<th>MINIMUM ORDER QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBUS54FD-SD1</td>
<td>VBUS54FD-SD1-G4-08</td>
<td>8000</td>
<td>16 000</td>
</tr>
</tbody>
</table>

**PACKAGE DATA**

<table>
<thead>
<tr>
<th>DEVICE NAME</th>
<th>PACKAGE NAME</th>
<th>TYPE CODE</th>
<th>WEIGHT</th>
<th>MOISTURE SENSITIVITY LEVEL</th>
<th>SOLDERING CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBUS54FD-SD1</td>
<td>CLP1007-5L</td>
<td>5F4</td>
<td>0.1 mg</td>
<td>MSL level 1 (according J-STD-020)</td>
<td>260 °C/10 s at terminals</td>
</tr>
</tbody>
</table>

**ABSOLUTE MAXIMUM RATINGS** ($T_{amb} = 25 ^\circ C$, unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak pulse current</td>
<td>Acc. IEC 61000-4-5; $t_p = 8/20 \mu s$; single shot</td>
<td>$I_{PPM}$</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>Peak pulse power</td>
<td>Acc. IEC 61000-4-5; $t_p = 8/20 \mu s$; single shot</td>
<td>$P_{PP}$</td>
<td>45</td>
<td>W</td>
</tr>
<tr>
<td>ESD immunity</td>
<td>Contact discharge acc. IEC 61000-4-2; 10 pulses</td>
<td>$V_{ESD}$</td>
<td>± 15</td>
<td>kV</td>
</tr>
<tr>
<td></td>
<td>Air discharge acc. IEC 61000-4-2; 10 pulses</td>
<td></td>
<td>± 15</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Junction temperature</td>
<td>$T_J$</td>
<td>-40 to +125</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td></td>
<td>$T_{STG}$</td>
<td>-55 to +150</td>
<td>°C</td>
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</tbody>
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