Description

The SLVU2.8-4BTG-S was designed to protect low voltage, CMOS devices from ESD and lightning induced transients. There is a compensating diode in series with each low voltage TVS to present a low loading capacitance to the line being protected. These robust structures can safely absorb repetitive ESD strikes at ±30kV (contact discharge) per IEC61000-4-2 standard and each structure can safely dissipate up to 40A (IEC61000-4-5 2nd edition, t<sub>P</sub>=8/20μs) with very low clamping voltages.

Features

- ESD, IEC61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5 2nd edition, 40A (8/20μs)
- Low capacitance of 2pF per line
- Low leakage current of 1μA (MAX) at 2.8V
- SOIC-8 (JEDEC MO-012) pin configuration allows for simple flow-through layout
- Halogen free, Lead free and RoHS compliant

Applications

- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Switching Systems
- Desktops, Servers, and Notebooks
- Analog Inputs
- Base Stations

Application Example

SLVU2.8-4BTG-S - 2.8V 40A TVS Array
### Electrical Characteristics (T_{op} = 25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse Standoff Voltage</td>
<td>V_{RWM}</td>
<td>I_{R} ≤ 1μA</td>
<td>2.8</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Breakdown Voltage</td>
<td>V_{BR}</td>
<td>I_{R} = 2μA</td>
<td>3.0</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snap Back Voltage</td>
<td>V_{SB}</td>
<td>I_{R} = 50mA</td>
<td>2.8</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>I_{LEAK}</td>
<td>V_{R} = 2.8V (Each Line)</td>
<td>1</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping Voltage$^1$</td>
<td>V_{C}</td>
<td>I_{IP}=5A, t_{IP}=8/20μs (Each Line)</td>
<td>9.0</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping Voltage$^1$</td>
<td>V_{C}</td>
<td>I_{IP}=24A, t_{IP}=8/20μs (Each Line)</td>
<td>18.0</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESD Withstand Voltage$^1$</td>
<td>V_{ESD}</td>
<td>IEC61000-4-2 (Contact)</td>
<td>±30</td>
<td>kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IEC61000-4-2 (Air)</td>
<td>±30</td>
<td>kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic Resistance</td>
<td>R_{DYN}</td>
<td>(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1}) (Each Line)</td>
<td>1.1</td>
<td>Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diode Capacitance$^1$</td>
<td>C_{D}</td>
<td>V_{R}=0V, f=1MHz (Each Line)</td>
<td>2.0</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $^1$Parameter is guaranteed by design and/or device characterization.

### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Pulse Power (t_{p}=8/20μs)</td>
<td>600</td>
<td>W</td>
</tr>
<tr>
<td>Peak Pulse Current (t_{p}=8/20μs)</td>
<td>40</td>
<td>A</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to 125</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

CAUTION: Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### Capacitance vs. Reverse Voltage

![Capacitance vs. Reverse Voltage](image)

### Clamping Voltage vs. I_{IP}

![Clamping Voltage vs. I_{IP}](image)

### 8/20μS Pulse Waveform

![8/20μS Pulse Waveform](image)
**Product Characteristics**

- **Lead Plating**: Matte Tin
- **Lead Material**: Copper Alloy
- **Lead Coplanarity**: 0.004 inches (0.102 mm)
- **Substrate material**: Silicon
- **Body Material**: Molded Epoxy
- **Flammability**: UL 94 V-0

**Notes:**
1. All dimensions are in millimeters.
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to JEDEC SPEC MO-203 Issue A.
5. B is facing up for mold and facing down for trim/form, i.e. reverse trim/form.

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**Soldering Parameters**

- **Reflow Condition**: Pb – Free assembly
  - Temperature Min ($T_{S(min)}$): 150°C
  - Temperature Max ($T_{S(max)}$): 200°C
  - Time (min to max) ($t_s$): 60 – 180 secs
- **Average ramp up rate (Liquidus) Temp** ($T_L$) to peak: 5°C/second max
- **$T_{S(max)}$ to $T_L$ - Ramp-up Rate**: 5°C/second max
- **Reflow**
  - Temperature ($T_L$) (Liquidus): 217°C
  - Temperature ($t_L$): 60 – 150 seconds
- **Peak Temperature ($T_P$)**: 260°C ± 5 °C
- **Time within 5°C of actual peak Temperature ($t_P$)**: 20 – 40 seconds
- **Ramp-down Rate**: 5°C/second max
- **Time 25°C to peak Temperature ($T_P$)**: 8 minutes Max.
- Do not exceed 260°C

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**Package Dimensions – Mechanical Drawings and Recommended Solder Pad Outline**

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**Notes**:  
1. All dimensions are in millimeters. 
2. Dimensions include solder plating. 
3. Dimensions are exclusive of mold flash & metal burr. 
4. All specifications comply to JEDEC SPEC MO-203 Issue A.
5. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
**Part Numbering System**

- **SLVU2.8-4BTG-S**
  - Series
  - No. of channels
  - Package: B = SOIC-8
  - Customer Code
  - G = Green
  - T = Tape & Reel

**Part Marking System**

- **Marking Code**
  - U2.8-4
  - XYYWW

- **Date Code Marking**
  - X: Location
  - YYWW: Date Code

**Embosed Carrier Tape & Reel Specification — SOIC Package**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Millimetres</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>E</td>
<td>1.65</td>
<td>1.85</td>
</tr>
<tr>
<td>F</td>
<td>5.4</td>
<td>5.6</td>
</tr>
<tr>
<td>P2</td>
<td>1.95</td>
<td>2.05</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>D1</td>
<td>1.50 Min</td>
<td>0.059 Min</td>
</tr>
<tr>
<td>P0</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>10P0</td>
<td>40.0 +/- 0.20</td>
<td>1.574 +/- 0.008</td>
</tr>
<tr>
<td>W</td>
<td>11.9</td>
<td>12.1</td>
</tr>
<tr>
<td>P</td>
<td>7.9</td>
<td>8.1</td>
</tr>
<tr>
<td>A0</td>
<td>6.3</td>
<td>6.5</td>
</tr>
<tr>
<td>B0</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>K0</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>t</td>
<td>0.30 +/- 0.05</td>
<td>0.012 +/- 0.002</td>
</tr>
</tbody>
</table>

**Ordering Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Marking</th>
<th>Min. Order Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLVU2.8-4BTG-S</td>
<td>SOIC-8</td>
<td>U2.8-4</td>
<td>2500</td>
</tr>
</tbody>
</table>

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