Surface-Mount TRANSZORB® Transient Voltage Suppressors

FEATURES
- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 600 W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle): 0.01%
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

MECHANICAL DATA
Case: SMB (DO-214AA)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS-compliant, commercial grade
Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade
Base P/NHE3_X - RoHS-compliant and AEC-Q101 qualified
Base P/NHM3_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified
("_X" denotes revision code e.g. A, B, ...)

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

Polarity: for unidirectional types the band denotes cathode end, no marking on bidirectional types

MAXIMUM RATINGS (TA = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak pulse power dissipation with a 10/1000 μs waveform (1)(2) (fig. 1)</td>
<td>P_PPM</td>
<td>600</td>
<td>W</td>
</tr>
<tr>
<td>Peak pulse current with a 10/1000 μs waveform (1)</td>
<td>IPPM</td>
<td>See next table</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation on infinite heatsink at TA = 50 °C</td>
<td>P_D</td>
<td>5.0</td>
<td>W</td>
</tr>
<tr>
<td>Peak forward surge current 8.3 ms single half sine-wave unidirectional only (2)</td>
<td>I_FSM</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>T_J, T_STG</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes
(1) Non-repetitive current pulse, per fig. 3 and derated above TA = 25 °C per fig. 2
(2) Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

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### ELECTRICAL CHARACTERISTICS \( (T_A = 25 \degree C \text{ unless otherwise noted}) \)

<table>
<thead>
<tr>
<th>DEVICE TYPE</th>
<th>MODIFIED</th>
<th>&quot;J&quot; BEND LEAD</th>
<th>DEVICE MARKING CODE</th>
<th>BREAKDOWN VOLTAGE ( V_{BR} ) AT ( I_T )</th>
<th>CURRENT TEST</th>
<th>STAND-OFF VOLTAGE ( V_{WM} )</th>
<th>MAXIMUM REVERSE LEAKAGE AT ( V_{WM} )</th>
<th>MAXIMUM PEAK PULSE SURGE CURRENT</th>
<th>MAXIMUM CLAMPING VOLTAGE AT</th>
<th>MAXIMUM TEMPERATURE COEFFICIENT OF ( V_{BR} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMBJ5.0A A</td>
<td>KE</td>
<td>KE</td>
<td>6.40</td>
<td>7.07</td>
<td>10</td>
<td>5.0</td>
<td>800</td>
<td>65.2</td>
<td>9.2</td>
<td>0.057</td>
</tr>
<tr>
<td>SMBJ6.0A A</td>
<td>KG</td>
<td>KG</td>
<td>6.67</td>
<td>7.37</td>
<td>10</td>
<td>6.0</td>
<td>800</td>
<td>58.3</td>
<td>10.3</td>
<td>0.059</td>
</tr>
<tr>
<td>SMBJ6.5A A</td>
<td>KK</td>
<td>AK</td>
<td>7.22</td>
<td>7.98</td>
<td>10</td>
<td>6.5</td>
<td>500</td>
<td>53.6</td>
<td>11.2</td>
<td>0.065</td>
</tr>
<tr>
<td>SMBJ7.0A A</td>
<td>KM</td>
<td>KM</td>
<td>7.78</td>
<td>8.60</td>
<td>1.0</td>
<td>7.0</td>
<td>200</td>
<td>50.0</td>
<td>12.0</td>
<td>0.068</td>
</tr>
<tr>
<td>SMBJ7.5A A</td>
<td>KP</td>
<td>AP</td>
<td>8.33</td>
<td>9.21</td>
<td>1.0</td>
<td>7.5</td>
<td>100</td>
<td>46.5</td>
<td>12.9</td>
<td>0.067</td>
</tr>
</tbody>
</table>

Notes:
1. Pulse test: \( I_p \leq 50 \text{ ms} \)
2. Surge current waveform per fig. 3 and derate per fig. 2
3. For bidirectional types having \( V_{WM} \) of 10 V and less, the \( I_p \) limit is doubled
4. All terms and symbols are consistent with ANSI/IEEE C62.35
5. For the bidirectional SMBJ5.0CA, the maximum \( V_{BR} \) is 7.25 V
6. \( V_F \) = 3.5 V max. at \( I_T = 50 \text{ A} \) (unidirectional only)
7. Underwriters laboratory recognition for the classification of protectors (QVGQ2) under the UL standard for safety 497B and file number E136766 for both uni-directional and bi-directional devices.
THERMAL CHARACTERISTICS (\(T_A = 25 \, ^\circ\text{C}\) unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance, junction to ambient (^{(1)})</td>
<td>(R_{\text{JA}})</td>
<td>100</td>
<td>°C/W</td>
</tr>
<tr>
<td>Typical thermal resistance, junction to lead</td>
<td>(R_{\text{JL}})</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Note

\(^{(1)}\) Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)

<table>
<thead>
<tr>
<th>PREFERRED P/N</th>
<th>UNIT WEIGHT (g)</th>
<th>PREFERRED PACKAGE CODE</th>
<th>BASE QUANTITY</th>
<th>DELIVERY MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMBJ5.0A-E3/52</td>
<td>0.106</td>
<td>52</td>
<td>750</td>
<td>7” diameter plastic tape and reel</td>
</tr>
<tr>
<td>SMBJ5.0A-M3/52</td>
<td>0.106</td>
<td>5B</td>
<td>3200</td>
<td>13” diameter plastic tape and reel</td>
</tr>
<tr>
<td>SMBJ5.0A-M3/5B</td>
<td>0.106</td>
<td>H</td>
<td>750</td>
<td>7” diameter plastic tape and reel</td>
</tr>
<tr>
<td>SMBJ5.0AHE3_B/H (^{(1)})</td>
<td>0.106</td>
<td>I</td>
<td>3200</td>
<td>13” diameter plastic tape and reel</td>
</tr>
<tr>
<td>SMBJ5.0AHE3_B/I (^{(1)})</td>
<td>0.106</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

\(^{(1)}\) AEC-Q101 qualified
RATINGS AND CHARACTERISTICS CURVES \( (T_A = 25 \, ^\circ C \text{ unless otherwise noted}) \)

- **Fig. 1 - Peak Pulse Power Rating Curve**
  - \( P_{\text{PPM}} \), Peak Pulse Power (kW)
  - \( t_d \), Pulse Width (s)

- **Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature**
  - Peak Pulse Power or Current (\( I_{\text{PPM}} \)) in Percentage, %
  - \( T_J \), Initial Temperature (°C)

- **Fig. 3 - Pulse Waveform**
  - Peak Value \( I_{\text{PPM}} \)
  - Half Value \( I_{\text{PPM}} / 2 \)
  - 10/1000 µs Waveform as defined by R.E.A.
  - \( t_{\text{p}} \), Pulse Duration (s)

- **Fig. 4 - Typical Junction Capacitance**
  - \( C_J \), Junction Capacitance (pF)
  - \( V_{\text{VM}} \), Reverse Stand-Off Voltage (V)

- **Fig. 5 - Typical Transient Thermal Impedance**
  - Transient Thermal Impedance (°C/W)
  - \( t_r \), Pulse Duration (s)
  - \( f \), Frequency (MHz)

- **Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current**
  - Peak Forward Surge Current (A)
  - Number of Cycles at 60 Hz

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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMB (DO-214AA)

Cathode Band

Mounting Pad Layout

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