**Description**

The 3.0SMCJ Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

**Features & Benefits**

- 3000W $P_{PPM}$ peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- For surface mounted applications in order to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2,30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- Fast response time: typically less than 1.0ps from 0V to $BV_{min}$
- Excellent clamping capability
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: 260°C/40sec
- $V_{BR} @ T_J = V_{BR} @ 25°C x (1 + \alpha T \times (T_J - 25))$ ($\alpha T$:Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0.
- Meet MSL level1, per J-STD-020, LF maximun peak of 260°C
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin5Sn (IPC/JEDEC J-STD-609A.01)

**Maximum Ratings and Thermal Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Pulse Power Dissipation by 10/1000μs Waveform (Fig.4)(Note 1), (Note 2)</td>
<td>$P_{PPM}$</td>
<td>3000</td>
<td>W</td>
</tr>
<tr>
<td>Power dissipation on infinite heatsink at $T_C = 25 , ^\circ\text{C}$</td>
<td>$P_D$</td>
<td>6.5</td>
<td>W</td>
</tr>
<tr>
<td>Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)</td>
<td>$I_{FSM}$</td>
<td>300</td>
<td>A</td>
</tr>
<tr>
<td>Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only</td>
<td>$V_F$</td>
<td>3.5</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>$T_J$</td>
<td>-65 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>$T_{STG}$</td>
<td>-65 to 175</td>
<td>°C</td>
</tr>
<tr>
<td>Typical Thermal Resistance Junction to Lead</td>
<td>$R_{JUL}$</td>
<td>15</td>
<td>°C/W</td>
</tr>
<tr>
<td>Typical Thermal Resistance Junction to Ambient</td>
<td>$R_{JUA}$</td>
<td>75</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

**Applications**

TVS components are ideal for the protection of I/O Interfaces, $V_{CC}$ bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

**Functional Diagram**

![Functional Diagram](image)

- Bi-directional
- Uni-directional

**Notes:**

1. Non-repetitive current pulse, per Fig. 4 and derated above $T_J$ (initial) >25°C per Fig. 3.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.
### Electrical Characteristics (T_{j}=25^\circ C unless otherwise noted)

<table>
<thead>
<tr>
<th>Part Number (Uni)</th>
<th>Part Number (Bi)</th>
<th>Marking</th>
<th>Reverse Stand off Voltage V_{RS} (Volts)</th>
<th>Breakdown Voltage V_{BR} (Volts)</th>
<th>Test Current I_{T} (mA)</th>
<th>Maximum Clamping Voltage V_{C} @ I_{pp} (10/1000μs) (V)</th>
<th>Maximum Peak Pulse Current I_{pp} (10/1000μs) (A)</th>
<th>Maximum Clamping Voltage V_{C} @ I_{pp} (8/20μs) (V)</th>
<th>Maximum Peak Pulse Current I_{pp} (8/20μs) (A)</th>
<th>Maximum Reverse Leakage I_{R} (Volts)</th>
<th>Maximum Temperature coefficient of V_{BR} (%/°C)</th>
<th>Agency Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 3.0SMCJ5.0CA</td>
<td>- 3DDE</td>
<td>5.00</td>
<td>6.40</td>
<td>7.00</td>
<td>10</td>
<td>9.2</td>
<td>326.1</td>
<td>11.89</td>
<td>1630.5</td>
<td>800.0</td>
<td>0.041</td>
<td>X</td>
</tr>
<tr>
<td>- 3.0SMCJ6.0CA</td>
<td>- 3DDG</td>
<td>6.00</td>
<td>6.67</td>
<td>7.37</td>
<td>10</td>
<td>10.3</td>
<td>291.3</td>
<td>13.31</td>
<td>1456.5</td>
<td>800.0</td>
<td>0.046</td>
<td>X</td>
</tr>
<tr>
<td>- 3.0SMCJ6.5CA</td>
<td>- 3DKK</td>
<td>6.50</td>
<td>7.22</td>
<td>7.98</td>
<td>10</td>
<td>11.2</td>
<td>267.9</td>
<td>14.47</td>
<td>1339.5</td>
<td>500.0</td>
<td>0.052</td>
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</tr>
<tr>
<td>- 3.0SMCJ7.0CA</td>
<td>- 3DMM</td>
<td>7.00</td>
<td>7.78</td>
<td>8.60</td>
<td>10</td>
<td>12.0</td>
<td>250.0</td>
<td>15.50</td>
<td>1250.0</td>
<td>200.0</td>
<td>0.058</td>
<td>X</td>
</tr>
<tr>
<td>- 3.0SMCJ7.5CA</td>
<td>- 3DDP</td>
<td>7.50</td>
<td>8.33</td>
<td>9.21</td>
<td>1</td>
<td>12.9</td>
<td>232.6</td>
<td>16.67</td>
<td>1163.0</td>
<td>100.0</td>
<td>0.062</td>
<td>X</td>
</tr>
<tr>
<td>- 3.0SMCJ8.0CA</td>
<td>- 3DDR</td>
<td>8.00</td>
<td>8.89</td>
<td>9.83</td>
<td>1</td>
<td>13.6</td>
<td>220.6</td>
<td>17.57</td>
<td>1103.0</td>
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<td>0.064</td>
<td>X</td>
</tr>
<tr>
<td>- 3.0SMCJ8.5CA</td>
<td>- 3DDT</td>
<td>8.50</td>
<td>9.44</td>
<td>10.40</td>
<td>1</td>
<td>14.4</td>
<td>208.3</td>
<td>18.60</td>
<td>1041.5</td>
<td>20.0</td>
<td>0.066</td>
<td>X</td>
</tr>
</tbody>
</table>

#### Notes:
1. $V_{RS}$ measured after $I_{T}$ applied for 300μs, $I_{T}$ = square wave pulse or equivalent.
2. Surge current waveform per 10μs/1000μs exponential wave and derated per Fig. 2.
3. All terms and symbols are consistent with ANSI/IEEE C62.35.
3.0SMCJ Series
Surface Mount – 3000W – DO-214AB

I-V Curve Characteristics

Figure 1:
TVS Transients Clamping Waveform

Figure 2:
Peak Pulse Power Rating

Ratings and Characteristic Curves (T_a=25°C unless otherwise noted)

- Peak Pulse Power Dissipation – Max power dissipation
- Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
- Breakdown Voltage – Maximum voltage that flows through the TVS at a specified test current (I_t)
- Clamping Voltage – Peak voltage measured across the TVS at a specified I_ppm (peak impulse current)
- Reverse Leakage Current – Current measured at V_r
- Forward Voltage Drop for Uni-directional

List of Symbols:
- P_{ppm} – Peak Pulse Power Dissipation
- V_r – Stand-off Voltage
- V_{br} – Breakdown Voltage
- V_c – Clamping Voltage
- I_r – Reverse Leakage Current
- V_f – Forward Voltage Drop for Uni-directional
3.0SMCJ Series
Surface Mount – 3000W – DO-214AB

Figure 3:
Peak Pulse Power Derating Curve

Figure 4:
Pulse Waveform

Figure 5:
Typical Junction Capacitance

Figure 6:
Typical Transient Thermal Impedance

Figure 7:
Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

Figure 8:
Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)
3.0SMCJ Series
Surface Mount – 3000W – DO-214AB

Soldering Parameters

Reflow Condition
- Lead-free assembly

Pre Heat
- Temperature Min \((T_{\text{min}})\)
  150°C
- Temperature Max \((T_{\text{max}})\)
  200°C
- Time (min to max) \((t_s)\)
  60-120 secs

Average ramp up rate (Liquidus Temp \((T_L)\) to peak)
3°C/second max

\(T_{\text{L}}\) to \(T_{P}\) - Ramp-up Rate
3°C/second max

Reflow
- Temperature \((T_L)\) (Liquidus)
  217°C
- Time (min to max) \((t_L)\)
  60 – 150 seconds

Peak Temperature \((T_P)\)
260°C to 265°C

Time within 5°C of actual peak Temperature \((t_P)\)
30 seconds

Ramp-down Rate
6°C/second max

Time 25°C to peak Temperature \((T_P)\)
8 minutes Max.

Do not exceed
260°C

Physical Specifications

Weight
0.007 ounce, 0.21 grams

Case
JEDEC DO214AB. Molded plastic body over glass passivated junction

Terminal
Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage
JESD22-A103

HTRB
JESD22-A108

Temperature Cycling
JESD22-A104

MSL
JEDEC-J-STD-020, LEVEL 1

H3TRB
JESD22-A101

RSH
JESD22-A111

Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Inches</th>
<th>Millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>A</td>
<td>0.114</td>
<td>0.126</td>
</tr>
<tr>
<td>B</td>
<td>0.260</td>
<td>0.280</td>
</tr>
<tr>
<td>C</td>
<td>0.220</td>
<td>0.245</td>
</tr>
<tr>
<td>D</td>
<td>0.079</td>
<td>0.103</td>
</tr>
<tr>
<td>E</td>
<td>0.030</td>
<td>0.060</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>0.008</td>
</tr>
<tr>
<td>G</td>
<td>0.305</td>
<td>0.320</td>
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<td>H</td>
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<td>0.012</td>
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<tr>
<td>I</td>
<td>0.129</td>
<td>-</td>
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<tr>
<td>J</td>
<td>0.094</td>
<td>-</td>
</tr>
<tr>
<td>K</td>
<td>-</td>
<td>0.165</td>
</tr>
<tr>
<td>L</td>
<td>0.094</td>
<td>-</td>
</tr>
</tbody>
</table>
3.0SMCJ Series
Surface Mount – 3000W – DO-214AB

Part Marking System

<table>
<thead>
<tr>
<th>Part Marking System</th>
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</thead>
<tbody>
<tr>
<td>3.0SMCJ xx CA</td>
</tr>
<tr>
<td>5% V&lt;sub&gt;Bi&lt;/sub&gt; VOLTAGE TOLERANCE</td>
</tr>
<tr>
<td>BI-DIRECTIONAL</td>
</tr>
<tr>
<td>V&lt;sub&gt;Bi&lt;/sub&gt; VOLTAGE</td>
</tr>
<tr>
<td>SERIES</td>
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</table>

Packing Options

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Component Package</th>
<th>Quantity</th>
<th>Packaging Option</th>
<th>Packaging Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0SMCJxxXX</td>
<td>DO-214AB</td>
<td>3000</td>
<td>Tape &amp; Reel - 16mm tape/13” reel</td>
<td>EIA-481</td>
</tr>
</tbody>
</table>

Tape and Reel Specification

Dimensions are in inches (and millimeters).