# TP8.0SMDJ Series

## Surface Mount – 8000 W

AUTOMOTIVE GRADE HF RoHS


## Description

The TP8.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

## Features and Benefits

- High reliability application and automotive grade AEC-Q101 qualified
- For surface mounted applications 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
- IEC-61000-4-2 ESD 30 kV(Air), 30 kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- 8 kW peak pulse power capability at 10/1000 µs waveform
- Fast response time: typically less than 1.0 ps from 0 V to $V_{BR}$ min
- Excellent clamping capability
- Compact size with high power density in DO-214AB Package
- Low incremental surge resistance
- $V_{BR}$ @ $T_J$= $V_{BR}$@25 °C x (1+αT x ($T_J$ - 25))(αT:Temperature Coefficient, typical value is 0.1 %)
- UL recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, LF maximum 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 tin(Sn) (IPC/JEDEC J-STD-609A.01)

### Maximum Ratings and Thermal Characteristics

($T_A$ = 25 °C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak Pulse Power Dissipation at $T_L$ = 25 °C by 10/1000 µs Waveform (Fig.2) (Note 1), (Note 2) | $P_{PPM}$ | 8000 | W |
| Power Dissipation on Infinite Heat Sink at $T_L$ = 50 °C | $P_D$ | 6.5 | W |
| Operating Temperature Range | $T_J$ | -65 to 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -65 to 150 | °C |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | °C/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | °C/W |

**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 8.0 mm) to each terminal.

### Functional Diagram

Bi-directional

## Applications

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


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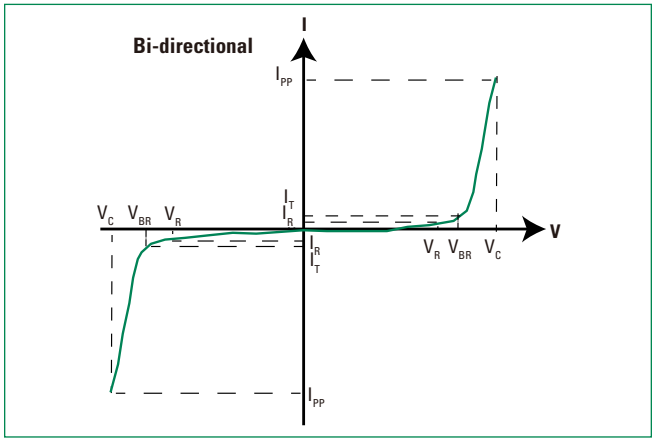
### Electrical Characteristics ($T_A$ = 25 °C unless otherwise noted)

| Part Number (Bi) | Marking | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ | | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (10/1000 µs) (V) | Maximum Peak Pulse Current $I_{PP}$ (10/1000 µs) (A) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (8/20 µs) (V) | Maximum Peak Pulse Current $I_{PP}$ (8/20 µs) (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ (µA) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | | | | | | |
| TP8.0SMDJ24CA | T8BEZ | 24 | 26.7 | 29.5 | 1 | 38.90 | 205.7 | 50.3 | 1336.8 | 5 |
| TP8.0SMDJ26CA | T8BFE | 26 | 28.9 | 31.9 | 1 | 42.10 | 190.0 | 54.4 | 1235.2 | 5 |
| TP8.0SMDJ28CA | T8BFG | 28 | 31.1 | 34.4 | 1 | 45.40 | 176.2 | 58.7 | 1145.4 | 5 |
| TP8.0SMDJ30CA | T8BFK | 30 | 33.3 | 36.8 | 1 | 48.40 | 165.3 | 62.5 | 1074.4 | 5 |
| TP 8.0SMDJ33CA | T8BFM | 33 | 36.7 | 40.6 | 1 | 53.30 | 150.1 | 64.5 | 975.6 | 5 |
| TP8.0SMDJ36CA | T8BFP | 36 | 40.0 | 44.2 | 1 | 58.10 | 137.7 | 66.3 | 895.0 | 5 |
| TP8.0SMDJ40CA | T8BFR | 40 | 44.4 | 49.1 | 1 | 64.50 | 124.0 | 73.7 | 806.2 | 5 |
| TP8.0SMDJ43CA | T8BFT | 43 | 47.8 | 52.8 | 1 | 69.40 | 115.3 | 79.2 | 749.3 | 5 |
| TP8.0SMDJ45CA | T8BFV | 45 | 50.0 | 55.3 | 1 | 72.70 | 110.0 | 83.0 | 715.3 | 5 |
| TP8.0SMDJ48CA | T8BFX | 48 | 53.3 | 58.9 | 1 | 77.40 | 103.4 | 88.4 | 671.8 | 5 |
| TP 8.0SMDJ51CA | T8BFZ | 51 | 56.7 | 62.7 | 1 | 82.40 | 97.1 | 94.1 | 631.1 | 5 |
| TP8.0SMDJ54CA | T8BGE | 54 | 60.0 | 66.3 | 1 | 87.10 | 91.8 | 99.5 | 597.0 | 5 |
| TP 8.0SMDJ58CA | T8BGG | 58 | 64.4 | 71.2 | 1 | 93.60 | 85.5 | 106.8 | 555.6 | 5 |
| TP 8.0SMDJ60CA | T8BGK | 60 | 66.7 | 73.7 | 1 | 96.80 | 82.6 | 110.6 | 537.2 | 5 |
| TP8.0SMDJ64CA | T8BGM | 64 | 71.1 | 78.6 | 1 | 103.00 | 77.7 | 117.9 | 504.9 | 5 |
| TP8.0SMDJ70CA | T8BGB | 70 | 77.8 | 86.0 | 1 | 113.00 | 70.8 | 120.4 | 460.2 | 5 |
| TP8.0SMDJ75CA | T8BGR | 75 | 83.3 | 92.1 | 1 | 121.00 | 66.1 | 121.0 | 429.8 | 5 |
| TP8.0SMDJ78CA | T8BGT | 78 | 86.7 | 95.8 | 1 | 126.00 | 63.5 | 126.0 | 412.7 | 5 |
| TP8.0SMDJ85CA | T8BGV | 85 | 94.4 | 104 | 1 | 137.00 | 58.4 | 137.0 | 379.6 | 5 |
| TP8.0SMDJ90CA | T8BGX | 90 | 100 | 111 | 1 | 146.00 | 54.8 | 146.0 | 356.2 | 5 |
| TP8.0SMDJ100CA | T8BGZ | 100 | 111 | 123 | 1 | 162.00 | 49.4 | 162.0 | 321.0 | 5 |
| TP8.0SMDJ110CA | T8BHE | 110 | 122 | 135 | 1 | 177.00 | 45.2 | 177.0 | 293.8 | 5 |

### I-V Curve Characteristics




**$P_{PPM}$ Peak Pulse Power Dissipation $I_{PP}$x$V_C$** -- Max power dissipation
**$V_R$ Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation
**$V_{BR}$ Breakdown Voltage** -- Maximum voltage that flows though the TVS at a specified test current ($I_T$)
**$V_C$ Clamping Voltage** -- Peak voltage measured across the TVS at a specified $I_{PPM}$ (peak impulse current)
**$I_R$ Reverse Leakage Current** -- Current measured at $V_R$

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**Ratings and Characteristic Curves** ($T_A$ =2 5 °C unless otherwise noted)

**Figure 1:**
TVS Transients Clamping Waveform

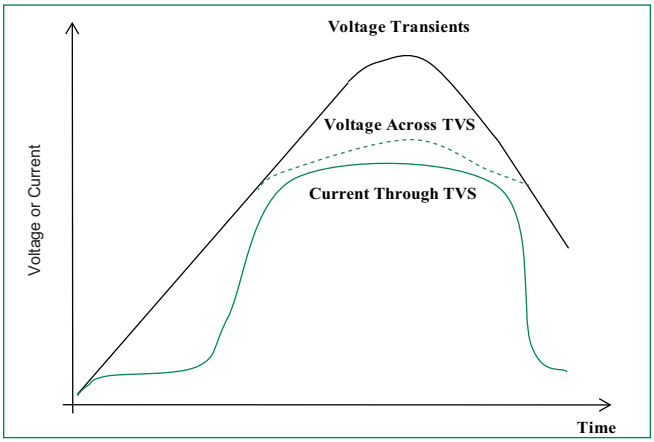



**Figure 2:**
Peak Pulse Power Rating

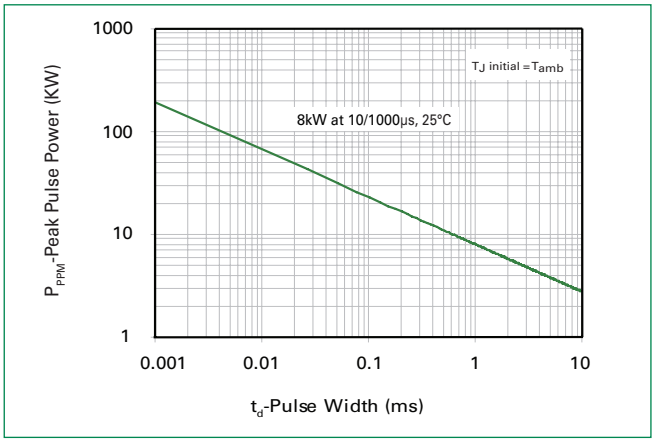



**Figure 3:**
Peak Pulse Power Derating Curve

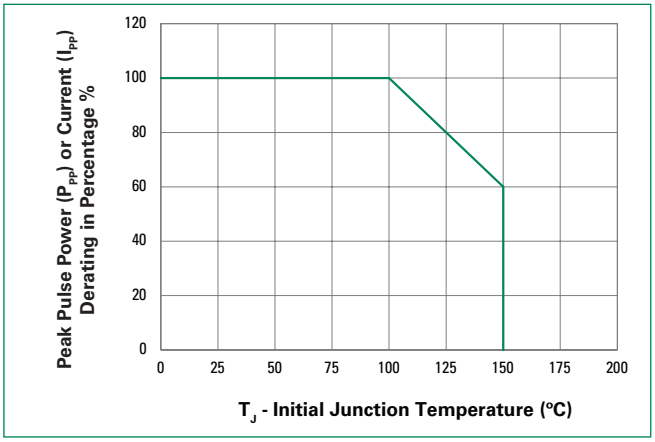



**Figure 4:**
Pulse Waveform

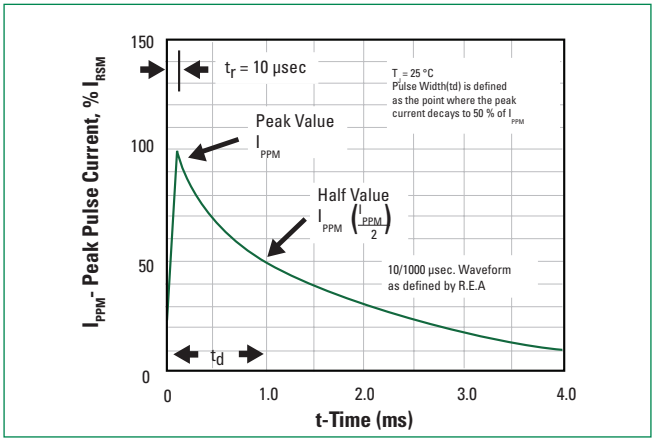
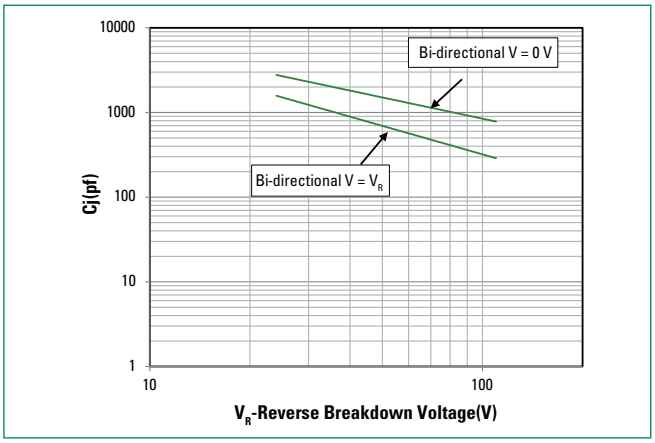



**Figure 5:**
Typical Junction Capacitance





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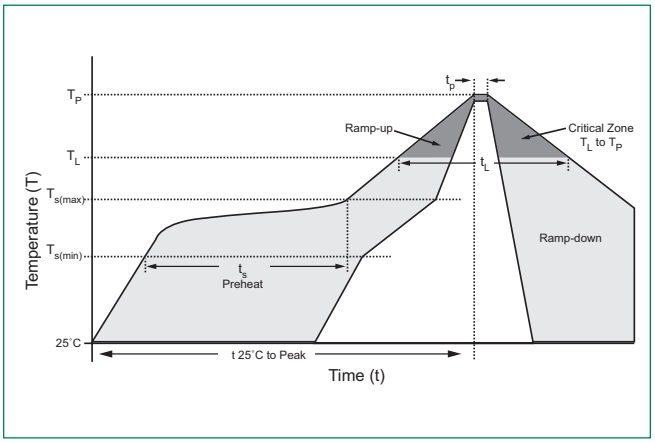
### Soldering Parameters

| | | |
|---|---|---|
| **Reflow Condition** | | Lead–free assembly |
| **Pre Heat** | **- Temperature Min ($T_{s(min)}$)** | 150 °C |
| | **- Temperature Max ($T_{s(max)}$)** | 200 °C |
| | **- Time (min to max) ($t_s$)** | 60 – 120 seconds |
| **Average Ramp Up Rate (Liquidus Temp ($T_A$) to Peak** | | 3 °C/second max |
| **$T_{S(max)}$ to $T_A$ - 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 ($T_P$)** | | $260^{+0/-5}$ °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

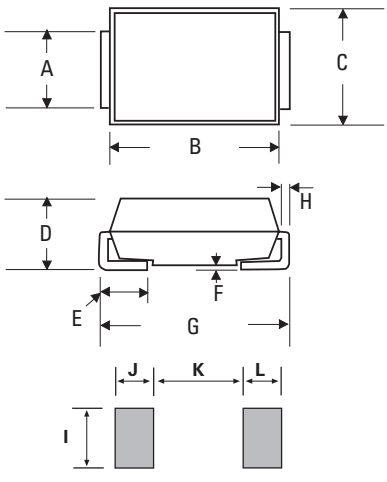
| | |
|---|---|
| **Weight** | 0.011 ounce ,0.3 grams |
| **Case** | JEDEC DO-214AB. Molded plastic body over glass passivated junction |
| **Polarity** | Color band denotes positive end (cathode) except Bidirectional. |
| **Terminal** | Matte Tin-plated leads, solderable per JESD22-B102 |

### 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

**DO-214AB (SMC J-Bend)**




**Recommended Soldering Pad Layout**

| Dimensions | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.305 | 0.320 | 7.750 | 8.130 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.129 | - | 3.300 | - |
| J | 0.094 | - | 2.400 | - |
| K | - | 0.165 | - | 4.200 |
| L | 0.094 | - | 2.400 | - |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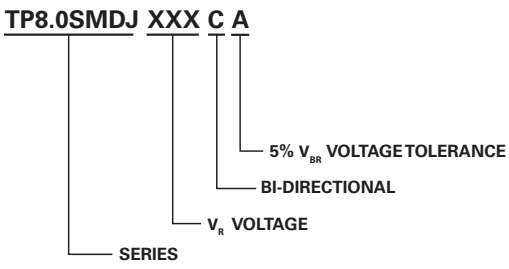
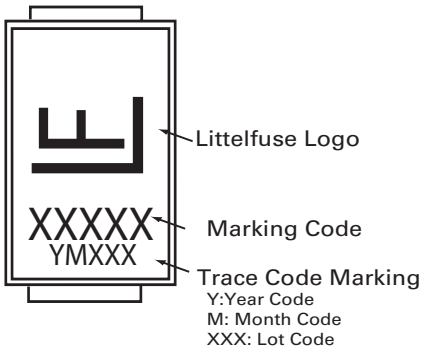
### Part Numbering System



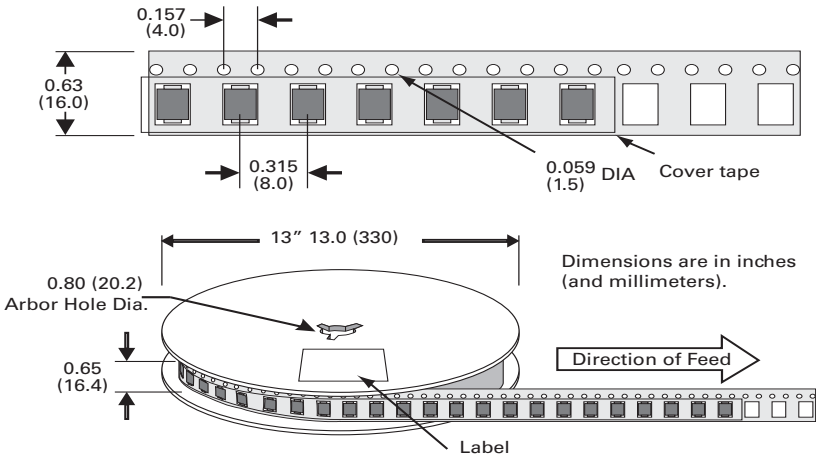

### Part Marking System




### Packaging Options

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|---|---|---|---|---|
| TP8.0SMDJxxxCA | DO-214AB | 3000 | Tape & Reel - 16 mm tape/13" reel | EIA STD RS-481 |

### Tape and Reel Specification





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