

SuperTVS – 600W Transient Voltage Suppressor

1. Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Meets MSL level 1, per J-STD-020
- 600W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical IR less than 1 μ A above 10V
- Plastic package has underwriters laboratory flammability 94V-0
- High Temperature soldering: 260 $^{\circ}$ C/10 seconds at terminals

2. Mechanical Data

- Case: JEDEC DO-214AA. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 12mm tape
- Weight: 0.10g

3. Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ ambient temperature unless otherwise specified

| Rating | Symbol | Value | Units |
|--|------------------------------------|------------|----------------|
| Peak pulse power dissipation at 10/1000us waveform(Note1,2) | P _{PPM} | 600 | W |
| Peak pulse current of at 10/1000us waveform(Note1) | I _{PPM} | See Table | A |
| Steady state power dissipation at TA=50 $^{\circ}$ C | P _{M(AV)} | 5.0 | W |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load (JEDEC Method)(Note3) | I _{FSM} | 100 | A |
| Operating junction and Storage Temperature Range | T _J , T _{STG} | -65 to 150 | $^{\circ}$ C |
| Typical thermal resistance junction to lead | R _{θJL} | 20 | $^{\circ}$ C/W |
| Typical thermal resistance junction to ambient | R _{θJA} | 100 | $^{\circ}$ C/W |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above TA=25°C per Fig.2.
2. Mounted on 5.0mm×5.0mm copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

4. Electrical Characteristics (TA=25°C)

| Part Number | Part Number | Marking | | Reverse Stand off Voltage V _R (V) | Breakdown Voltage V _{BR} (Volts) @ I _T | | Test Current I _T (mA) | Maximum Clamping Voltage V _C @ I _{PP} (V) | Maximum Peak Pulse Current I _{PP} (A) | Maximum Reverse Leakage I _R @ V _R (μA) | ROHS2.0 |
|-------------|-------------|---------|----|--|--|------|----------------------------------|---|--|--|---------|
| | | | | | MIN | MAX | | | | | |
| UNI | BI | UNI | BI | (V) | MIN | MAX | (mA) | (V) | (A) | (μA) | |
| SMBJ5.0A | SMBJ5.0CA | KE | AE | 5 | 6.4 | 7 | 10 | 9.2 | 65.3 | 400 | y |
| SMBJ6.0A | SMBJ6.0CA | KG | AG | 6 | 6.67 | 7.37 | 10 | 10.3 | 58.3 | 400 | y |
| SMBJ6.5A | SMBJ6.5CA | KK | AK | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 53.6 | 250 | y |
| SMBJ7.0A | SMBJ7.0CA | KM | AM | 7 | 7.78 | 8.6 | 10 | 12 | 50 | 100 | y |
| SMBJ7.5A | SMBJ7.5CA | KP | AP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 46.6 | 80 | y |
| SMBJ8.0A | SMBJ8.0CA | KR | AR | 8 | 8.89 | 9.83 | 1 | 13.6 | 44.2 | 50 | y |
| SMBJ8.5A | SMBJ8.5CA | KT | AT | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 41.7 | 20 | y |
| SMBJ9.0A | SMBJ9.0CA | KV | AV | 9 | 10 | 11.1 | 1 | 15.4 | 39 | 10 | y |
| SMBJ10A | SMBJ10CA | KX | AX | 10 | 11.1 | 12.3 | 1 | 17 | 35.3 | 5 | y |
| SMBJ11A | SMBJ11CA | KZ | AZ | 11 | 12.2 | 13.5 | 1 | 18.2 | 33 | 1 | y |
| SMBJ12A | SMBJ12CA | LE | BE | 12 | 13.3 | 14.7 | 1 | 19.9 | 30.2 | 1 | y |
| SMBJ13A | SMBJ13CA | LG | BG | 13 | 14.4 | 15.9 | 1 | 21.5 | 28 | 1 | y |
| SMBJ14A | SMBJ14CA | LK | BK | 14 | 15.6 | 17.2 | 1 | 23.2 | 25.9 | 1 | y |
| SMBJ15A | SMBJ15CA | LM | BM | 15 | 16.7 | 18.5 | 1 | 24.4 | 24.6 | 1 | y |
| SMBJ16A | SMBJ16CA | LP | BP | 16 | 17.8 | 19.7 | 1 | 26 | 23.1 | 1 | y |
| SMBJ17A | SMBJ17CA | LR | BR | 17 | 18.9 | 20.9 | 1 | 27.6 | 21.8 | 1 | y |
| SMBJ18A | SMBJ18CA | LT | BT | 18 | 20 | 22.1 | 1 | 29.2 | 20.6 | 1 | y |
| SMBJ20A | SMBJ20CA | LV | BV | 20 | 22.2 | 24.5 | 1 | 32.4 | 18.6 | 1 | y |
| SMBJ22A | SMBJ22CA | LX | BX | 22 | 24.4 | 26.9 | 1 | 35.5 | 16.9 | 1 | y |
| SMBJ24A | SMBJ24CA | LZ | BZ | 24 | 26.7 | 29.5 | 1 | 38.9 | 15.5 | 1 | y |
| SMBJ26A | SMBJ26CA | ME | CE | 26 | 28.9 | 31.9 | 1 | 42.1 | 14.3 | 1 | y |
| SMBJ28A | SMBJ28CA | MG | CG | 28 | 31.1 | 34.4 | 1 | 45.4 | 13.3 | 1 | y |
| SMBJ30A | SMBJ30CA | MK | CK | 30 | 33.3 | 36.8 | 1 | 48.4 | 12.4 | 1 | y |
| SMBJ33A | SMBJ33CA | MM | CM | 33 | 36.7 | 40.6 | 1 | 53.3 | 11.3 | 1 | y |
| SMBJ36A | SMBJ36CA | MP | CP | 36 | 40 | 44.2 | 1 | 58.1 | 10.4 | 1 | y |
| SMBJ40A | SMBJ40CA | MR | CR | 40 | 44.4 | 49.1 | 1 | 64.5 | 9.3 | 1 | y |
| SMBJ43A | SMBJ43CA | MT | CT | 43 | 47.8 | 52.8 | 1 | 69.4 | 8.7 | 1 | y |

SMBJ SERIES

Rev-1.1

| Part Number | Part Number | Marking | | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ I_R | | Test Current I_R (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current I_{PP} (A) | Maximum Reverse Leakage $I_R @ V_R$ (μA) | ROHS2.0 |
|-------------|-------------|---------|----|---|--|------|-------------------------|---|---|---|---------|
| | | | | | MIN | MAX | | | | | |
| SMBJ45A | SMBJ45CA | MV | CV | 45 | 50 | 55.3 | 1 | 72.7 | 8.3 | 1 | y |
| SMBJ48A | SMBJ48CA | MX | CX | 48 | 53.3 | 58.9 | 1 | 77.4 | 7.8 | 1 | y |
| SMBJ51A | SMBJ51CA | MZ | CZ | 51 | 56.7 | 62.7 | 1 | 82.4 | 7.3 | 1 | y |
| SMBJ54A | SMBJ54CA | NE | DE | 54 | 60 | 66.3 | 1 | 87.1 | 6.9 | 1 | y |
| SMBJ58A | SMBJ58CA | NG | DG | 58 | 64.4 | 71.2 | 1 | 93.6 | 6.5 | 1 | y |
| SMBJ60A | SMBJ60CA | NK | DK | 60 | 66.7 | 73.7 | 1 | 96.8 | 6.2 | 1 | y |
| SMBJ64A | SMBJ64CA | NM | DM | 64 | 71.1 | 78.6 | 1 | 103 | 5.9 | 1 | y |
| SMBJ70A | SMBJ70CA | NP | DP | 70 | 77.8 | 86 | 1 | 113 | 5.3 | 1 | y |
| SMBJ75A | SMBJ75CA | NR | DR | 75 | 83.3 | 92.1 | 1 | 121 | 5 | 1 | y |
| SMBJ78A | SMBJ78CA | NT | DT | 78 | 86.7 | 95.8 | 1 | 126 | 4.8 | 1 | y |
| SMBJ85A | SMBJ85CA | NV | DV | 85 | 94.4 | 104 | 1 | 137 | 4.4 | 1 | y |
| SMBJ90A | SMBJ90CA | NX | DX | 90 | 100 | 111 | 1 | 146 | 4.1 | 1 | y |
| SMBJ100A | SMBJ100CA | NZ | DZ | 100 | 111 | 123 | 1 | 162 | 3.7 | 1 | y |
| SMBJ110A | SMBJ110CA | PE | EE | 110 | 122 | 135 | 1 | 177 | 3.4 | 1 | y |
| SMBJ120A | SMBJ120CA | PG | EG | 120 | 133 | 147 | 1 | 193 | 3.1 | 1 | y |
| SMBJ130A | SMBJ130CA | PK | EK | 130 | 144 | 159 | 1 | 209 | 2.9 | 1 | y |
| SMBJ150A | SMBJ150CA | PM | EM | 150 | 167 | 185 | 1 | 243 | 2.5 | 1 | y |
| SMBJ160A | SMBJ160CA | PP | EP | 160 | 178 | 197 | 1 | 259 | 2.3 | 1 | y |
| SMBJ170A | SMBJ170CA | PR | ER | 170 | 189 | 209 | 1 | 275 | 2.2 | 1 | y |
| SMBJ180A | SMBJ180CA | PT | ET | 180 | 201 | 222 | 1 | 292 | 2.1 | 1 | y |
| SMBJ200A | SMBJ200CA | PV | EV | 200 | 224 | 247 | 1 | 324 | 1.9 | 1 | y |
| SMBJ220A | SMBJ220CA | PX | EX | 220 | 246 | 272 | 1 | 356 | 1.7 | 1 | y |
| SMBJ250A | SMBJ250CA | PZ | EZ | 250 | 279 | 309 | 1 | 405 | 1.5 | 1 | y |
| SMBJ300A | SMBJ300CA | QE | FE | 300 | 335 | 371 | 1 | 486 | 1.3 | 1 | y |
| SMBJ350A | SMBJ350CA | QG | FG | 350 | 391 | 432 | 1 | 567 | 1.1 | 1 | y |
| SMBJ400A | SMBJ400CA | QK | FK | 400 | 447 | 494 | 1 | 648 | 0.9 | 1 | y |
| SMBJ440A | SMBJ440CA | QM | FM | 440 | 492 | 543 | 1 | 713 | 0.9 | 1 | y |

For bidirectional type having V_{RWM} of 10 volts and less, the IR limit is double.

5. Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

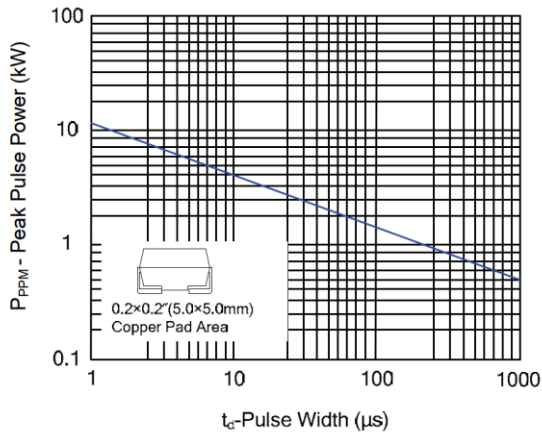


Figure 2 Pulse Derating Curve

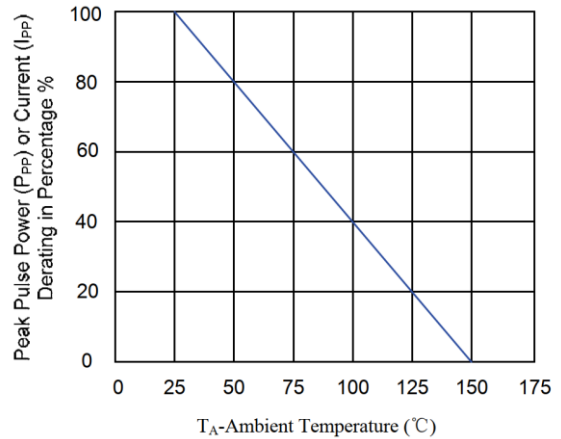


Figure 3 Pulse Waveform

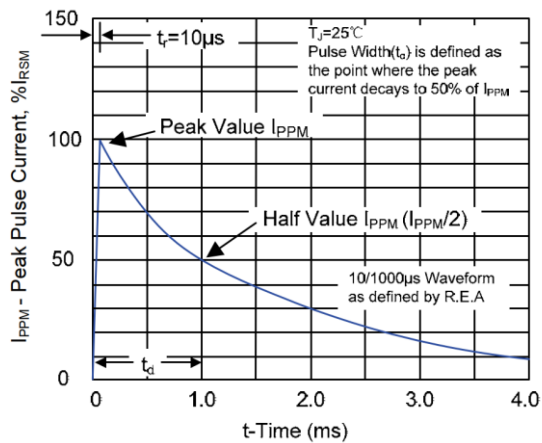


Figure 4 Typical Junction Capacitance

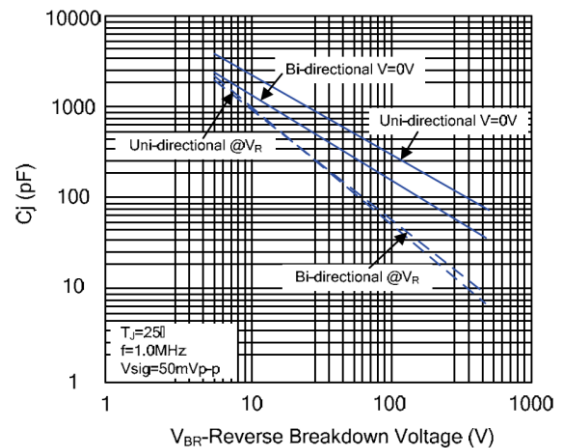


Figure 5 Steady State Power Dissipation Derating Curve

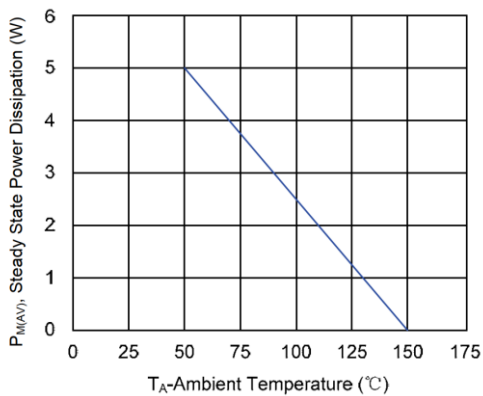
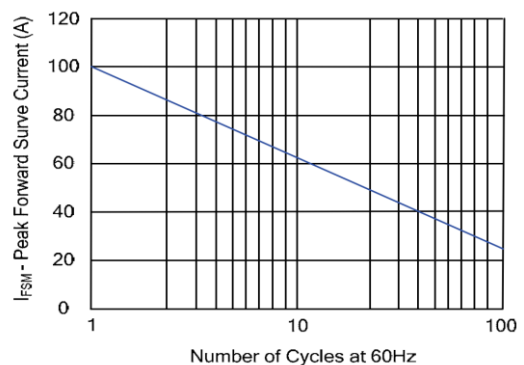


Figure 6 Maximum Non-Repetitive Forward Surge Current
Uni-Directional Only

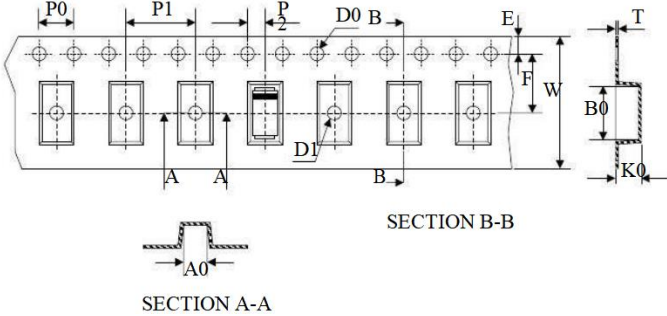
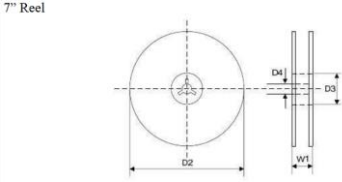
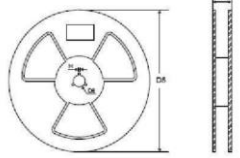


6. Dimension (SMB/DO-214AA)



| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.077 | 0.086 | 1.95 | 2.2 |
| B | 0.16 | 0.18 | 4.06 | 4.57 |
| C | 0.13 | 0.155 | 3.3 | 3.94 |
| D | 0.084 | 0.096 | 2.13 | 2.44 |
| E | 0.03 | 0.06 | 0.76 | 1.52 |
| F | - | 0.008 | - | 0.203 |
| G | 0.205 | 0.22 | 5.21 | 5.59 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.089 | - | 2.26 | - |
| J | 0.085 | - | 2.16 | - |
| K | - | 0.107 | - | 2.74 |
| L | 0.085 | - | 2.16 | - |

7. Packaging

|  | Symbol | Dimension |
|---|--------|-------------------|
| | W | 12.0±0.20 |
| | P0 | 4.0±0.10 |
| | P1 | 8.00±0.10 |
| | P2 | 2.0±0.10 |
| | D0 | φ1.55±0.10 |
| | D1 | φ1.5±0.10 |
| | E | 1.75±0.10 |
| | F | 5.50±0.10 |
| | A0 | 3.86±0.15 |
| | B0 | 5.65±0.10 |
| | K0 | 2.75±0.15 |
| | T | 0.25±0.05 |
|  | D2 | φ178.0±2.0 |
| | D3 | φ50.0min. |
| | D4 | φ13.0±0.5 |
| | W1 | 16.0±2.0 |
| | | Quantity: 500PCS |
|  | D5 | 330.0±2.0 |
| | D6 | 13.5±0.5 |
| | H | 2.5±1.0 |
| | W2 | 16.0±2.0 |
| | | Quantity: 3000PCS |

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