# SMBJ SERIES

**TECHNICAL SPECIFICATIONS OF SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR**

REVERSE VOLTAGE - **5.0** to **440**Volts
POWER DISSIPATIO - **600** Watts

## FEATURES

- For surface mounted applications in order to optimize board space
- Low profile space
- Glass passivated chip
- Low inductance
- Excellent clamping capability
- Very fast response time
- Typical $I_D$ less than 1μA at $V_{WM}$
- 600 W peak pulse power capability with a 10/1000 μs waveform
- Component in accordance to RoHS 2002/95/1 and WEEE 2002/96/EC

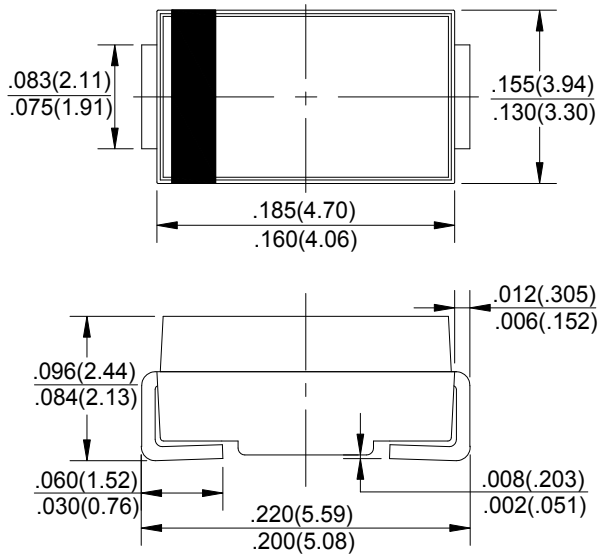
## MECHANICAL DATA

- Case : JEDEC DO-214AA molded plastic body over glass passivated chip
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Solder plated,solderable per MIL-STD-750,Method 2026
- Polarity:For uni-directional types the band by laser denotes the cathode, which is positive with respect to the anode under normal TVS operation

DEVICES FOR BIDIRECTIONAL APPLICATIONS

- For bi-directional devices, use suffix C or CA (e.g.SMBJ10C, SMBJ10CA).Electrical characteristics apply in both directions.

**SMB(DO-214AA)**




Dimensions in inches and(millimeters)

## MAXIMUM RATINGS AND THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted)

| CHARACTERISTICS | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Peak pulse power dissipation with a 10/1000μs waveform (see fig. 1) | $P_{PPM}$ | 600 | W |
| Peak pulse current with a waveform (see fig. 3 , single pulse) | $I_{PPM}$ | See Next Table | A |
| Peak forward surge current 8.3ms single half sine-wave uni-directional only | $I_{FSM}$ | 100 | A |
| Typical thermal resistance, junction to ambient(1) | $R_{\theta JA}$ | 100 | ℃/W |
| Typical thermal resistance, junction to lead(1) | $R_{\theta JL}$ | 20 | ℃/W |
| Operating Temperature Range | $T_J$ | -55 to + 150 | ℃ |
| Storage Temperature Range | $T_{STG}$ | -55 to + 150 | ℃ |

NOTES:1. Mounted on P.C.B. with 0.28 x 0.28” (7.0 x 7.0mm) copper pad areas.

**Fig. 1 -- Peak Pulse Power Rating Cure**

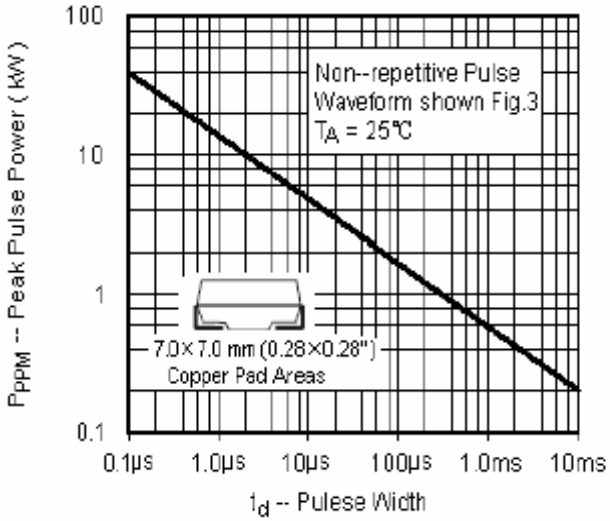



**Fig.2 -- Pulse Derating Cure**

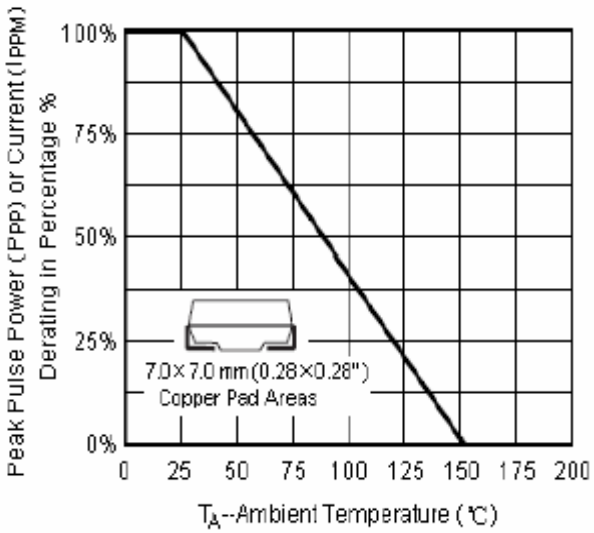



**Fig. 3 -- Pulse Waveform**

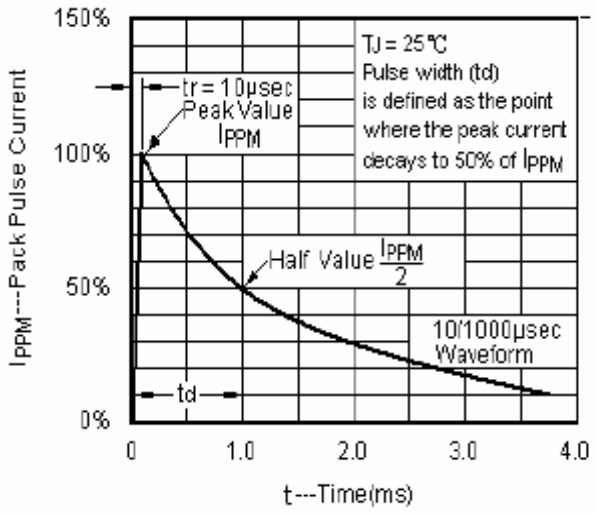



**Fig. 4 -- Typical Junction Capacitance**

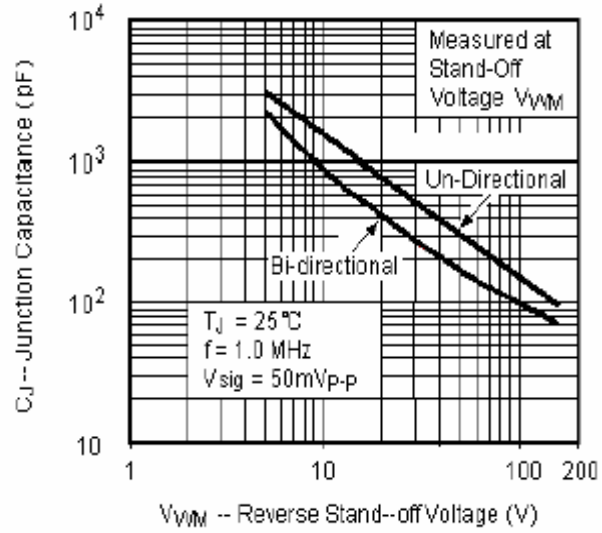



**Fig. 5 – Typical Tansient Thermal Impedance**

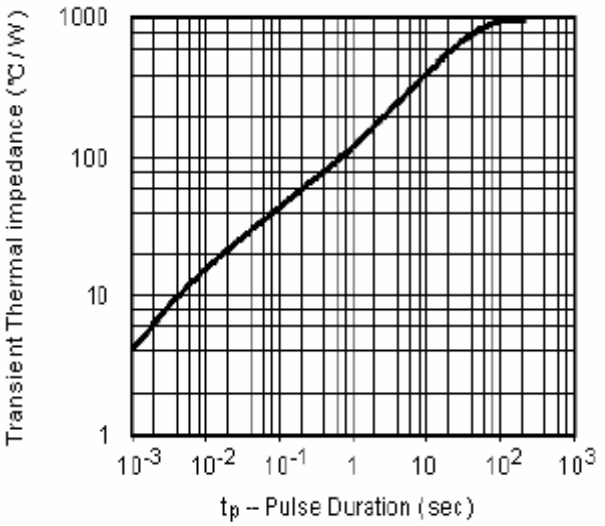
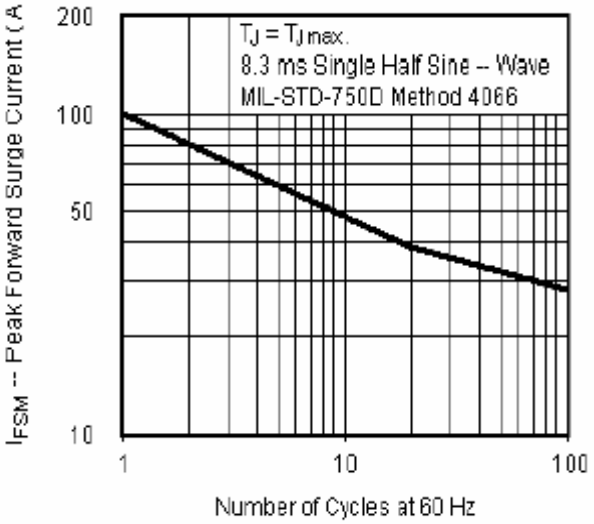



**Fig. 6 -- Maximum Non-Repetitive Forward Surge Current (Uni-Diretional Only)**



# SMBJ SERIES

| Device Type | STAND-OFF VOLTAGE | BREAKDOWN VOLTAGE at $I_T$(2) $V_{(BR)}$ (V) | | TEST CURRENT | MAXIMUM CLAMPING VOLTAGE at $I_{PPM}$ | Maximum Peak Pulse Surge Current (3) | Maximum Reverse Leakage at $V_{WM}$(4) | MARKING CODE | |
|---|---|---|---|---|---|---|---|---|---|
| UNI | $V_{WM}$(V) | MIN. | MAX. | IT（mA) | $V_C$ (V) | $I_{PPM}$ (A) | $I_D$ (μA) | UNI | BI |
| SMBJ5.0 | 5.0 | 6.40 | 7.82 | 10 | 9.6 | 62.5 | 800 | KD | AD |
| SMBJ5.0A | 5.0 | 6.40 | 7.07 | 10 | 9.2 | 65.2 | 800 | KE | AE |
| SMBJ6.0 | 6.0 | 6.67 | 8.15 | 10 | 11.4 | 52.6 | 800 | KF | AF |
| SMBJ6.0A | 6.0 | 6.70 | 7.37 | 10 | 10.3 | 58.3 | 800 | KG | AG |
| SMBJ6.5 | 6.5 | 7.22 | 8.82 | 10 | 12.3 | 48.7 | 500 | KH | AH |
| SMBJ6.5A | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 53.6 | 500 | KK | AK |
| SMBJ7.0 | 7.0 | 7.78 | 9.51 | 10 | 13.3 | 45.1 | 200 | KL | AL |
| SMBJ7.0A | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 50.0 | 200 | KM | AM |
| SMBJ7.5 | 7.5 | 8.33 | 10.2 | 1 | 14.3 | 42.0 | 100 | KN | AN |
| SMBJ7.5A | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 46.5 | 100 | KP | AP |
| SMBJ8.0 | 8.0 | 8.89 | 10.9 | 1 | 15.0 | 40.0 | 50 | KQ | AQ |
| SMBJ8.0A | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 44.1 | 50 | KR | AR |
| SMBJ8.5 | 8.5 | 9.44 | 11.5 | 1 | 15.9 | 37.7 | 10 | KS | AS |
| SMBJ8.5A | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 41.7 | 10 | KT | AT |
| SMBJ9.0 | 9.0 | 10.0 | 12.2 | 1 | 16.9 | 35.5 | 1 | KU | AU |
| SMBJ9.0A | 9.0 | 10.0 | 11.1 | 1 | 15.4 | 39.0 | 1 | KV | AV |
| SMBJ10 | 10 | 11.1 | 13.6 | 1 | 18.8 | 31.9 | 1 | KW | AW |
| SMBJ10A | 10 | 11.1 | 12.3 | 1 | 17.0 | 35.3 | 1 | KX | AX |
| SMBJ11 | 11 | 12.2 | 14.9 | 1 | 20.1 | 29.9 | 1 | KY | AY |
| SMBJ11A | 11 | 12.2 | 13.5 | 1 | 18.2 | 33.0 | 1 | KZ | AZ |
| SMBJ12 | 12 | 13.3 | 16.3 | 1 | 22.0 | 27.3 | 1 | LD | BD |
| SMBJ12A | 12 | 13.3 | 14.7 | 1 | 19.9 | 30.2 | 1 | LE | BE |
| SMBJ13 | 13 | 14.4 | 17.6 | 1 | 23.8 | 25.2 | 1 | LF | BF |
| SMBJ13A | 13 | 14.4 | 15.9 | 1 | 21.5 | 27.9 | 1 | LG | BG |
| SMBJ14 | 14 | 15.6 | 19.1 | 1 | 25.8 | 23.3 | 1 | LH | BH |
| SMBJ14A | 14 | 15.6 | 17.2 | 1 | 23.2 | 25.8 | 1 | LK | BK |
| SMBJ15 | 15 | 16.7 | 20.4 | 1 | 26.9 | 22.3 | 1 | LL | BL |
| SMBJ15A | 15 | 16.7 | 18.5 | 1 | 24.4 | 24.0 | 1 | LM | BM |
| SMBJ16 | 16 | 17.8 | 21.8 | 1 | 28.8 | 20.8 | 1 | LN | BN |
| SMBJ16A | 16 | 17.8 | 19.7 | 1 | 26.0 | 23.1 | 1 | LP | BP |
| SMBJ17 | 17 | 18.9 | 23.1 | 1 | 30.5 | 19.7 | 1 | LQ | BQ |
| SMBJ17A | 17 | 18.9 | 20.9 | 1 | 27.6 | 21.7 | 1 | LR | BR |
| SMBJ18 | 18 | 20.0 | 24.4 | 1 | 32.2 | 18.6 | 1 | LS | BS |
| SMBJ18A | 18 | 20.0 | 22.1 | 1 | 29.2 | 20.5 | 1 | LT | BT |
| SMBJ20 | 20 | 22.2 | 27.1 | 1 | 35.8 | 16.7 | 1 | LU | BU |
| SMBJ20A | 20 | 22.2 | 24.5 | 1 | 32.4 | 18.5 | 1 | LV | BV |
| SMBJ22 | 22 | 24.4 | 29.8 | 1 | 39.4 | 15.2 | 1 | LW | BW |
| SMBJ22A | 22 | 24.4 | 26.9 | 1 | 35.5 | 16.9 | 1 | LX | BX |
| SMBJ24 | 24 | 26.7 | 32.6 | 1 | 43.0 | 14.0 | 1 | LY | BY |
| SMBJ24A | 24 | 26.7 | 29.5 | 1 | 38.9 | 15.4 | 1 | LZ | BZ |
| SMBJ26 | 26 | 28.9 | 35.3 | 1 | 46.6 | 12.4 | 1 | MD | CD |
| SMBJ26A | 26 | 28.9 | 31.9 | 1 | 42.1 | 14.2 | 1 | ME | CE |
| SMBJ28 | 28 | 31.1 | 38.0 | 1 | 50.0 | 12.0 | 1 | MF | CF |
| SMBJ28A | 28 | 31.1 | 34.4 | 1 | 45.4 | 13.2 | 1 | MG | CG |
| SMBJ30 | 30 | 33.3 | 40.7 | 1 | 53.5 | 11.2 | 1 | MH | CH |
| SMBJ30A | 30 | 33.3 | 36.8 | 1 | 48.4 | 12.4 | 1 | MK | CK |
| SMBJ33 | 33 | 36.7 | 44.9 | 1 | 59.0 | 10.2 | 1 | ML | CL |
| SMBJ33A | 33 | 36.7 | 40.6 | 1 | 53.3 | 11.3 | 1 | MM | CM |
| SMBJ36 | 36 | 40.0 | 48.9 | 1 | 64.3 | 9.3 | 1 | MN | CN |
| SMBJ36A | 36 | 40.0 | 44.2 | 1 | 58.1 | 10.3 | 1 | MP | CP |

| Device Type | STAND-OFF VOLTAGE | BREAKDOWN VOLTAGE at $I_T$[2] $V_{(BR)}$ (V) | | TEST CURRENT | MAXIMUM CLAMPING VOLTAGE at $I_{PPM}$ | Maximum Peak Pulse Surge Current[3] | Maximum Reverse Leakage at $V_{WM}$[4] | MARKING CODE | |
|---|---|---|---|---|---|---|---|---|---|
| UNI | $V_{WM}$(V) | MIN. | MAX. | $I_T$ （mA) | $V_C$ (V) | $I_{PPM}$ (A) | $I_D$ (μA) | UNI | BI |
| SMBJ40 | 40 | 44.40 | 54.3 | 1 | 71.4 | 8.4 | 1 | MQ | CQ |
| SMBJ40A | 40 | 44.40 | 49.1 | 1 | 64.5 | 9.3 | 1 | MR | CR |
| SMBJ43 | 43 | 47.80 | 58.4 | 1 | 76.7 | 7.8 | 1 | MS | CS |
| SMBJ43A | 43 | 47.80 | 52.8 | 1 | 69.4 | 8.6 | 1 | MT | CT |
| SMBJ45 | 45 | 50.00 | 61.1 | 1 | 80.3 | 7.5 | 1 | MU | CU |
| SMBJ45A | 45 | 50.00 | 55.3 | 1 | 72.7 | 8.3 | 1 | MV | CV |
| SMBJ48 | 48 | 53.30 | 65.1 | 1 | 85.5 | 7.0 | 1 | MW | CW |
| SMBJ48A | 48 | 53.30 | 58.9 | 1 | 77.4 | 7.7 | 1 | MX | CX |
| SMBJ51 | 51 | 56.70 | 69.3 | 1 | 91.1 | 6.6 | 1 | MY | CY |
| SMBJ51A | 51 | 56.70 | 62.7 | 1 | 82.4 | 7.3 | 1 | MZ | CZ |
| SMBJ54 | 54 | 60.00 | 73.3 | 1 | 96.3 | 6.2 | 1 | ND | DD |
| SMBJ54A | 54 | 60.00 | 66.3 | 1 | 87.1 | 6.9 | 1 | NE | DE |
| SMBJ58 | 58 | 64.40 | 78.7 | 1 | 103 | 5.8 | 1 | NF | DF |
| SMBJ58A | 58 | 64.40 | 71.2 | 1 | 93.6 | 6.4 | 1 | NG | DG |
| SMBJ60 | 60 | 66.7 | 81.5 | 1 | 107 | 5.6 | 1 | NH | DH |
| SMBJ60A | 60 | 66.7 | 73.7 | 1 | 96.8 | 6.2 | 1 | NK | DK |
| SMBJ64 | 64 | 71.1 | 86.9 | 1 | 114 | 5.3 | 1 | NL | DL |
| SMBJ64A | 64 | 71.1 | 78.6 | 1 | 103 | 5.8 | 1 | NM | DM |
| SMBJ70 | 70 | 77.8 | 95.1 | 1 | 125 | 4.8 | 1 | NN | DN |
| SMBJ70A | 70 | 77.8 | 86.0 | 1 | 113 | 5.3 | 1 | NP | DP |
| SMBJ75 | 75 | 83.3 | 102 | 1 | 134 | 4.5 | 1 | NQ | DQ |
| SMBJ75A | 75 | 83.3 | 92.1 | 1 | 121 | 4.9 | 1 | NR | DR |
| SMBJ78 | 78 | 86.7 | 106 | 1 | 139 | 4.3 | 1 | NS | DS |
| SMBJ78A | 78 | 86.7 | 95.8 | 1 | 126 | 4.7 | 1 | NT | DT |
| SMBJ85 | 85 | 94.4 | 115 | 1 | 151 | 3.9 | 1 | NU | DU |
| SMBJ85A | 85 | 94.4 | 104 | 1 | 137 | 4.4 | 1 | NV | DV |
| SMBJ90 | 90 | 100 | 122 | 1 | 160 | 3.8 | 1 | NW | DW |
| SMBJ90A | 90 | 100 | 111 | 1 | 146 | 4.1 | 1 | NX | DX |
| SMBJ100 | 100 | 111 | 136 | 1 | 179 | 3.4 | 1 | NY | DY |
| SMBJ100A | 100 | 111 | 123 | 1 | 162 | 3.7 | 1 | NZ | DZ |
| SMBJ110 | 110 | 122 | 149 | 1 | 196 | 3.0 | 1 | PD | ED |
| SMBJ110A | 110 | 122 | 135 | 1 | 177 | 3.4 | 1 | PE | EE |
| SMBJ120 | 120 | 133 | 163 | 1 | 214 | 2.8 | 1 | PF | EF |
| SMBJ120A | 120 | 133 | 147 | 1 | 193 | 3.1 | 1 | PG | EG |
| SMBJ130 | 130 | 144 | 176 | 1 | 231 | 2.6 | 1 | PH | EH |
| SMBJ130A | 130 | 144 | 159 | 1 | 209 | 2.9 | 1 | PK | EK |
| SMBJ150 | 150 | 167 | 204 | 1 | 268 | 2.2 | 1 | PL | EL |
| SMBJ150A | 150 | 167 | 185 | 1 | 243 | 2.5 | 1 | PM | EM |
| SMBJ160 | 160 | 178 | 218 | 1 | 287 | 2.1 | 1 | PN | EN |
| SMBJ160A | 160 | 178 | 197 | 1 | 259 | 2.3 | 1 | PP | EP |
| SMBJ170 | 170 | 189 | 231 | 1 | 304 | 2.0 | 1 | PQ | EQ |
| SMBJ170A | 170 | 189 | 209 | 1 | 275 | 2.2 | 1 | PR | ER |
| SMBJ188 | 188 | 209 | 255 | 1 | 344 | 1.7 | 1 | PS | ES |
| SMBJ188A | 188 | 209 | 231 | 1 | 328 | 2.0 | 1 | PT | ET |
| SMBJ200A | 200 | 224 | 247 | 1 | 324 | 1.9 | 1 | PV | EV |
| SMBJ220A | 220 | 246 | 272 | 1 | 356 | 1.7 | 1 | PX | EX |
| SMBJ250A | 250 | 279 | 309 | 1 | 405 | 1.5 | 1 | PZ | EZ |
| SMBJ300A | 300 | 335 | 371 | 1 | 486 | 1.3 | 1 | QE | FE |
| SMBJ350A | 350 | 391 | 432 | 1 | 567 | 1.1 | 1 | QG | FG |
| SMBJ400A | 400 | 447 | 494 | 1 | 648 | 0.9 | 1 | QK | FK |
| SMBJ440A | 440 | 492 | 543 | 1 | 713 | 0.9 | 1 | QM | FM |

Note 2: Pulse test : Tp ≦ 50ms.

Note 3: Surge current waveform Per Fig. 3 and derate Per Fig. 2.

Note 4: For bi-directional types with $V_{WM}$ of 10 V and less, the $I_D$ limit is doubled

Note 5: $V_F$ = 3.5 V at $I_F$ = 25 A (uni-directional only)