

FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in uni-directional and bi-directional
- 600 W peak pulse power capability with a 10/1000 μ s 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 P/NHM3

MECHANICAL DATA

Case: SMB (DO-214AA)

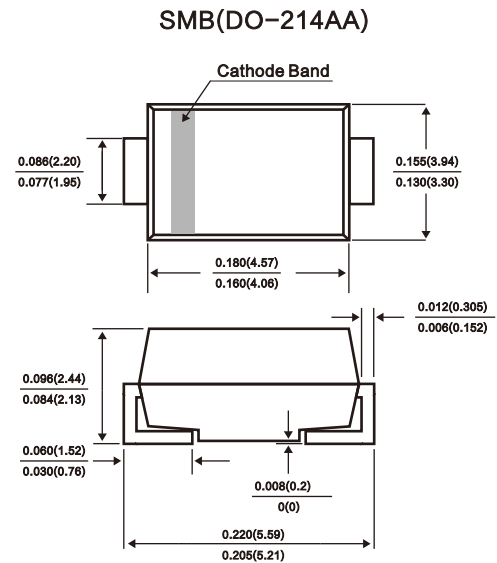
Molding compound meets UL 94 V-0 flammability rating
 Base P/N-E3 - RoHS-compliant, commercial grade
 Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade
 Base P/NHE3 - RoHS-compliant and AEC-Q101 qualified
 Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

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 uni-directional types the band denotes cathode end, no marking on bi-directional types

DEVICES FOR BI-DIRECTION APPLICATIONS

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



Dimensions in inches and (millimeters)

| PRIMARY CHARACTERISTICS | |
|----------------------------------|---------------------------------|
| V_{BR} (bi-directional) | 6.4 V to 231 V |
| V_{BR} (uni-directional) | 6.4 V to 231 V |
| V_{WM} | 5.0 V to 188 V |
| P_{PPM} | 600 W |
| I_{FSM} (uni-directional only) | 100 A |
| T_J max. | 150 °C |
| Polarity | Uni-directional, bi-directional |
| Package | SMB (DO-214AA) |

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

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000 μ s waveform ⁽¹⁾⁽²⁾ (fig. 1) | P_{PPM} | 600 | W |
| Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾ | I_{PPM} | See next table | A |
| Peak forward surge current 8.3 ms single half sine-wave uni-directional only ⁽²⁾ | I_{FSM} | 100 | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +150 | °C |

Notes

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

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

| DEVICE TYPE MODIFIED "J" BEND LEAD | DEVICE MARKING CODE | | BREAKDOWN VOLTAGE V_{BR} AT I_T ⁽¹⁾ (V) | | TEST CURRENT I_T (mA) | STAND-OFF VOLTAGE V_{WM} (V) | MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (μA) ⁽³⁾ | MAXIMUM PEAK PULSE SURGE CURRENT I_{PPM} (A) ⁽²⁾ | MAXIMUM CLAMPING VOLTAGE AT I_{PPM} (V) |
|---------------------------------------|---------------------|----|--|------|-------------------------|--------------------------------|--|---|---|
| | UNI | BI | MIN. | MAX. | | | | | |
| SMBJ5.0A(CA) | KE | KE | 6.40 | 7.07 | 10 | 5.0 | 800 | 65.2 | 9.2 |
| SMBJ6.0A(CA) | KG | KG | 6.67 | 7.37 | 10 | 6.0 | 800 | 58.3 | 10.3 |
| SMBJ6.5A(CA) | KK | AK | 7.22 | 7.98 | 10 | 6.5 | 500 | 53.6 | 11.2 |
| SMBJ6.8A(CA) | 8A | 8C | 6.45 | 7.14 | 10 | 5.80 | 1000 | 57.1 | 10.5 |
| SMBJ7.0A(CA) | KM | KM | 7.78 | 8.60 | 10 | 7.0 | 200 | 50.0 | 12.0 |
| SMBJ7.5A(CA) | KP | AP | 8.33 | 9.21 | 1.0 | 7.5 | 100 | 46.5 | 12.9 |
| SMBJ8.0A(CA) | KR | AR | 8.89 | 9.83 | 1.0 | 8.0 | 50 | 44.1 | 13.6 |
| SMBJ8.5A(CA) | KT | AT | 9.44 | 10.4 | 1.0 | 8.5 | 20 | 41.7 | 14.4 |
| SMBJ9.0A(CA) | KV | AV | 10.0 | 11.1 | 1.0 | 9.0 | 10 | 39.0 | 15.4 |
| SMBJ10A(CA) | KX | AX | 11.1 | 12.3 | 1.0 | 10 | 5.0 | 35.3 | 17.0 |
| SMBJ11A(CA) | KZ | KZ | 12.2 | 13.5 | 1.0 | 11 | 5.0 | 33.0 | 18.2 |
| SMBJ12A(CA) | LE | BE | 13.3 | 14.7 | 1.0 | 12 | 5.0 | 30.2 | 19.9 |
| SMBJ13A(CA) | LG | LG | 14.4 | 15.9 | 1.0 | 13 | 1.0 | 27.9 | 21.5 |
| SMBJ14A(CA) | LK | BK | 15.6 | 17.2 | 1.0 | 14 | 1.0 | 25.9 | 23.2 |
| SMBJ15A(CA) | LM | BM | 16.7 | 18.5 | 1.0 | 15 | 1.0 | 24.6 | 24.4 |
| SMBJ16A(CA) | LP | LM | 17.8 | 19.7 | 1.0 | 16 | 1.0 | 23.1 | 26.0 |
| SMBJ17A(CA) | LR | LR | 18.9 | 20.9 | 1.0 | 17 | 1.0 | 21.7 | 27.6 |
| SMBJ18A(CA) | LT | BT | 20.0 | 22.1 | 1.0 | 18 | 1.0 | 20.5 | 29.2 |
| SMBJ20A(CA) | LV | LV | 22.2 | 24.5 | 1.0 | 20 | 1.0 | 18.5 | 32.4 |
| SMBJ22A(CA) | LX | BX | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 16.9 | 35.5 |
| SMBJ24A(CA) | LZ | BZ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 15.4 | 38.9 |
| SMBJ26A(CA) | ME | CE | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 14.3 | 42.1 |
| SMBJ28A(CA) | MG | MG | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 13.2 | 45.4 |
| SMBJ30A(CA) | MK | CK | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 12.4 | 48.4 |
| SMBJ33A(CA) | MM | CM | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 11.3 | 53.3 |
| SMBJ36A(CA) | MP | CP | 40.0 | 44.2 | 1.0 | 36 | 1.0 | 10.3 | 58.1 |
| SMBJ40A(CA) | MR | CR | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 9.3 | 64.5 |
| SMBJ43A(CA) | MT | CT | 47.8 | 52.8 | 1.0 | 43 | 1.0 | 8.6 | 69.4 |
| SMBJ45A(CA) | MV | MV | 50.0 | 55.3 | 1.0 | 45 | 1.0 | 8.3 | 72.7 |
| SMBJ48A(CA) | MX | MX | 53.3 | 58.9 | 1.0 | 48 | 1.0 | 7.8 | 77.4 |
| SMBJ51A(CA) | MZ | MZ | 56.7 | 62.7 | 1.0 | 51 | 1.0 | 7.3 | 82.4 |
| SMBJ54A(CA) | NE | NE | 60.0 | 66.3 | 1.0 | 54 | 1.0 | 6.9 | 87.1 |
| SMBJ58A(CA) | NG | NG | 64.4 | 71.2 | 1.0 | 58 | 1.0 | 6.4 | 93.6 |
| SMBJ60A(CA) | NK | NK | 66.7 | 73.7 | 1.0 | 60 | 1.0 | 6.2 | 96.8 |
| SMBJ64A(CA) | NM | NM | 71.1 | 78.6 | 1.0 | 64 | 1.0 | 5.8 | 103 |
| SMBJ70A(CA) | NP | NP | 77.8 | 86.0 | 1.0 | 70 | 1.0 | 5.3 | 113 |
| SMBJ75A(CA) | NR | NR | 83.3 | 92.1 | 1.0 | 75 | 1.0 | 5.0 | 121 |
| SMBJ78A(CA) | NT | NT | 86.7 | 95.8 | 1.0 | 78 | 1.0 | 4.8 | 126 |
| SMBJ85A(CA) | NV | NV | 94.4 | 104 | 1.0 | 85 | 1.0 | 4.4 | 137 |
| SMBJ90A(CA) | NX | NX | 100 | 111 | 1.0 | 90 | 1.0 | 4.1 | 146 |
| SMBJ100A(CA) | NZ | NZ | 111 | 123 | 1.0 | 100 | 1.0 | 3.7 | 162 |
| SMBJ110A(CA) | PE | PE | 122 | 135 | 1.0 | 110 | 1.0 | 3.4 | 177 |
| SMBJ120A(CA) | PG | PG | 133 | 147 | 1.0 | 120 | 1.0 | 3.1 | 193 |
| SMBJ130A(CA) | PK | PK | 144 | 159 | 1.0 | 130 | 1.0 | 2.9 | 209 |
| SMBJ150A(CA) | PM | PM | 167 | 185 | 1.0 | 150 | 1.0 | 2.5 | 243 |
| SMBJ160A(CA) | PP | PP | 178 | 197 | 1.0 | 160 | 1.0 | 2.3 | 259 |
| SMBJ170A(CA) | PR | PR | 189 | 209 | 1.0 | 170 | 1.0 | 2.2 | 275 |
| SMBJ188A(CA) | PS | PS | 209 | 231 | 1.0 | 188 | 1.0 | 2.0 | 328 |

Notes

- (1) Pulse test: $t_p \leq 50\text{ ms}$
- (2) Surge current waveform per fig. 3 and derate per fig. 2
- (3) For bi-directional types having V_{WM} of 10 V and less, the I_D limit is doubled
- (4) All terms and symbols are consistent with ANSI/IEEE C62.35
- (5) For the bi-directional SMBJ5.0CA, the maximum V_{BR} is 7.25 V
- (6) $V_F = 3.5\text{ V}$ max. at $I_F = 50\text{ A}$ (uni-directional only)
- (*) Underwriters laboratory recognition for the classification of protectors (QVGG2) under the UL standard for safety 497B and file number E136766 for both uni-directional and bi-directional devices

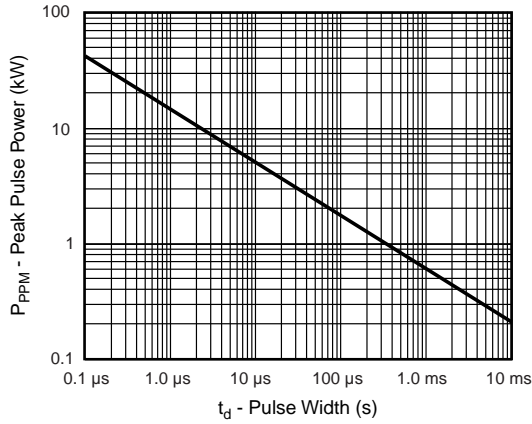


Fig. 1 - Peak Pulse Power Rating Curve

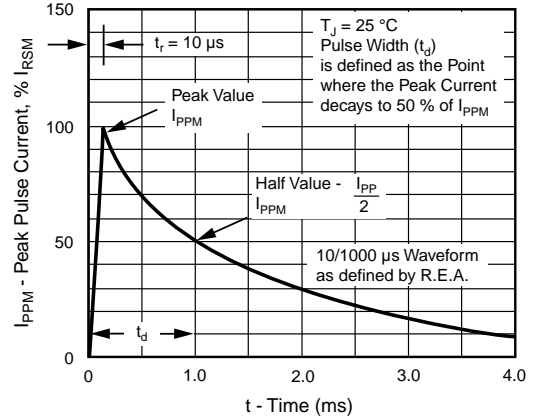


Fig. 3 - Pulse Waveform

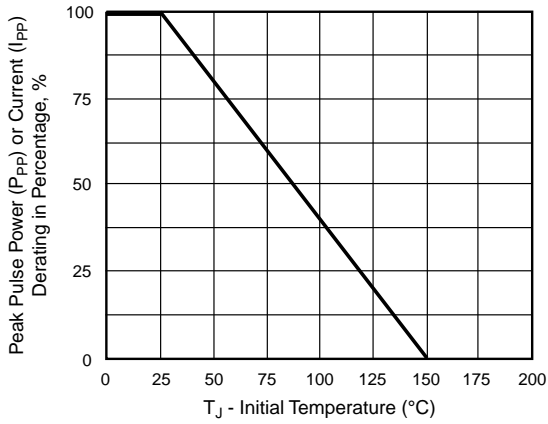


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

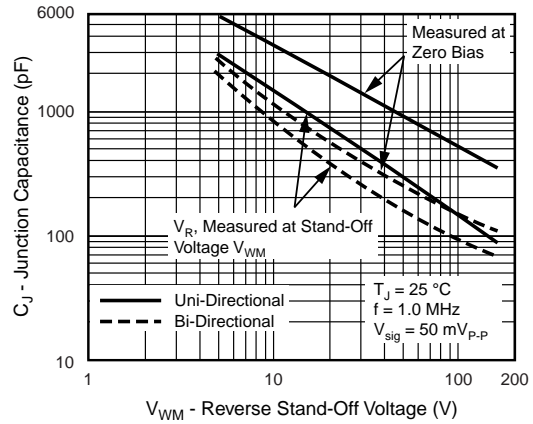


Fig. 4 - Typical Junction Capacitance

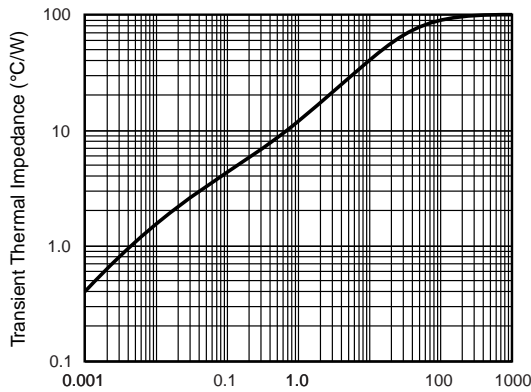


Fig. 5 - Typical Transient Thermal Impedance

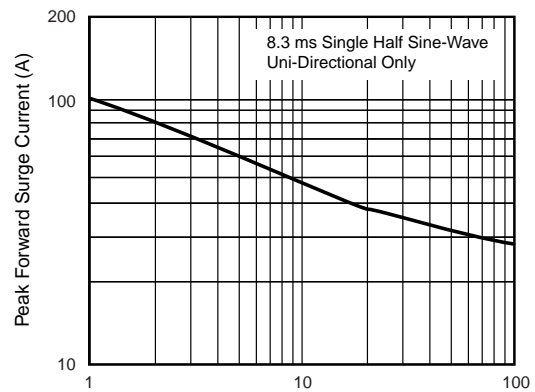


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current

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