

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in uni-directional and bi-directional
- 400 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 % (300 W above 78 V)
- 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

### MECHANICAL DATA

**Case:** DO-214AC (SMA)

Molding compound meets UL 94 V-0 flammability rating

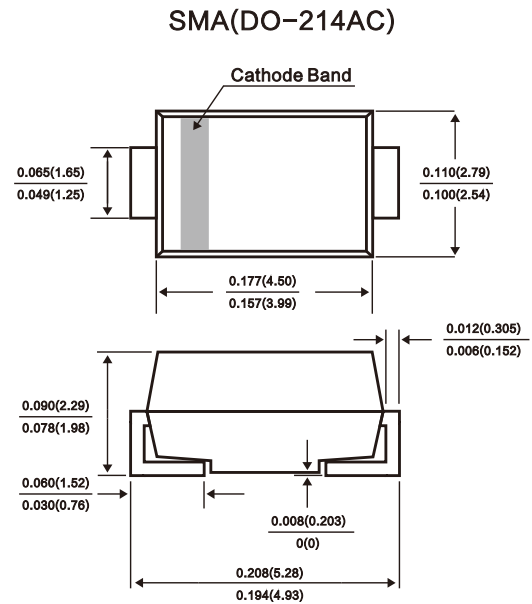
Base P/N-E3 - RoHS compliant, commercial grade

Base P/NHE3 - RoHS compliant, AEC-Q101 qualified

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types



Dimensions in inches and (millimeters)

| <b>MAXIMUM RATINGS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)           |                |                |                  |
|---|----------------|----------------|------------------|
| PARAMETER   | SYMBOL         | VALUE          | UNIT             |
| Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (fig. 1)     | $P_{PPM}$      | 400            | W                |
| Peak pulse current with a waveform <sup>(1)</sup>   | $I_{PPM}$      | See next table | A                |
| Peak forward surge current 8.3 ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$      | 40             | A                |
| Operating junction and storage temperature range  | $T_J, T_{STG}$ | - 55 to + 150  | $^\circ\text{C}$ |

#### Notes

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25\text{ }^\circ\text{C}$  per fig. 2. Rating is 300 W above 78 V

<sup>(2)</sup> 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  | DEVICE MARKING CODE |    | BREAKDOWN VOLTAGE $V_{BR}$ AT $I_T$ <sup>(1)</sup> (V) |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) <sup>(3)</sup> | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A) <sup>(2)</sup> | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) |
|--------------|---------------------|----|--|------|-------------------------|--------------------------------|--|---|---|
|              | UNI                 | BI | MIN.   | MAX. |                         |                                |  |   |   |
| SMAJ5.0A(CA) | AE                  | WE | 6.40   | 7.07 | 10                      | 5.0                            | 800  | 43.5  | 9.2   |
| SMAJ6.0A(CA) | AG                  | WG | 6.67   | 7.37 | 10                      | 6.0                            | 800  | 38.8  | 10.3  |
| SMAJ6.5A(CA) | AK                  | WK | 7.22   | 7.98 | 10                      | 6.5                            | 500  | 35.7  | 11.2  |
| SMAJ6.8A(CA) | 8A                  | 8C | 6.45   | 7.14 | 10                      | 5.80                           | 1000   | 38.1  | 10.5  |
| SMAJ7.0A(CA) | AM                  | WM | 7.78   | 8.60 | 10                      | 7.0                            | 200  | 33.3  | 12.0  |
| SMAJ7.5A(CA) | AP                  | WP | 8.33   | 9.21 | 1.0                     | 7.5                            | 100  | 31.0  | 12.9  |
| SMAJ8.0A(CA) | AR                  | WR | 8.89   | 9.83 | 1.0                     | 8.0                            | 50   | 29.4  | 13.6  |
| SMAJ8.5A(CA) | AT                  | WT | 9.44   | 10.4 | 1.0                     | 8.5                            | 10   | 27.8  | 14.4  |
| SMAJ9.0A(CA) | AV                  | WV | 10.0   | 11.1 | 1.0                     | 9.0                            | 5.0  | 26.0  | 15.4  |
| SMAJ10A(CA)  | AX                  | WX | 11.1   | 12.3 | 1.0                     | 10                             | 1.0  | 23.5  | 17.0  |
| SMAJ11A(CA)  | AZ                  | WZ | 12.2   | 13.5 | 1.0                     | 11                             | 1.0  | 22.0  | 18.2  |
| SMAJ12A(CA)  | BE                  | XE | 13.3   | 14.7 | 1.0                     | 12                             | 1.0  | 20.1  | 19.9  |
| SMAJ13A(CA)  | BG                  | XG | 14.4   | 15.9 | 1.0                     | 13                             | 1.0  | 18.6  | 21.5  |
| SMAJ14A(CA)  | BK                  | XK | 15.6   | 17.2 | 1.0                     | 14                             | 1.0  | 17.2  | 23.2  |
| SMAJ15A(CA)  | BM                  | XM | 16.7   | 18.5 | 1.0                     | 15                             | 1.0  | 16.4  | 24.4  |
| SMAJ16A(CA)  | BP                  | XP | 17.8   | 19.7 | 1.0                     | 16                             | 1.0  | 15.4  | 26.0  |
| SMAJ17A(CA)  | BR                  | XR | 18.9   | 20.9 | 1.0                     | 17                             | 1.0  | 14.5  | 27.6  |
| SMAJ18A(CA)  | BT                  | XT | 20.0   | 22.1 | 1.0                     | 18                             | 1.0  | 13.7  | 29.2  |
| SMAJ20A(CA)  | BV                  | XV | 22.2   | 24.5 | 1.0                     | 20                             | 1.0  | 12.3  | 32.4  |
| SMAJ22A(CA)  | BX                  | XX | 24.4   | 26.9 | 1.0                     | 22                             | 1.0  | 11.3  | 35.5  |
| SMAJ24A(CA)  | BZ                  | XZ | 26.7   | 29.5 | 1.0                     | 24                             | 1.0  | 10.3  | 38.9  |
| SMAJ26A(CA)  | CE                  | YE | 28.9   | 31.9 | 1.0                     | 26                             | 1.0  | 9.5   | 42.1  |
| SMAJ28A(CA)  | CG                  | YG | 31.1   | 34.4 | 1.0                     | 28                             | 1.0  | 8.8   | 45.4  |
| SMAJ30A(CA)  | CK                  | YK | 33.3   | 36.8 | 1.0                     | 30                             | 1.0  | 8.3   | 48.4  |
| SMAJ33A(CA)  | CM                  | YM | 36.7   | 40.6 | 1.0                     | 33                             | 1.0  | 7.5   | 53.3  |
| SMAJ36A(CA)  | CP                  | YP | 40.0   | 44.2 | 1.0                     | 36                             | 1.0  | 6.9   | 58.1  |
| SMAJ40A(CA)  | CR                  | YR | 44.4   | 49.1 | 1.0                     | 40                             | 1.0  | 6.2   | 64.5  |
| SMAJ43A(CA)  | CT                  | YT | 47.8   | 52.8 | 1.0                     | 43                             | 1.0  | 5.8   | 69.4  |
| SMAJ45A(CA)  | CV                  | YV | 50.0   | 55.3 | 1.0                     | 45                             | 1.0  | 5.5   | 72.7  |
| SMAJ48A(CA)  | CX                  | YX | 53.3   | 58.9 | 1.0                     | 48                             | 1.0  | 5.2   | 77.4  |
| SMAJ51A(CA)  | CZ                  | YZ | 56.7   | 62.7 | 1.0                     | 51                             | 1.0  | 4.9   | 82.4  |
| SMAJ54A(CA)  | RE                  | ZE | 60.0   | 66.3 | 1.0                     | 54                             | 1.0  | 4.6   | 87.1  |
| SMAJ58A(CA)  | RG                  | ZG | 64.4   | 71.2 | 1.0                     | 58                             | 1.0  | 4.3   | 93.6  |
| SMAJ60A(CA)  | RK                  | ZK | 66.7   | 73.7 | 1.0                     | 60                             | 1.0  | 4.1   | 96.8  |
| SMAJ64A(CA)  | RM                  | ZM | 71.1   | 78.6 | 1.0                     | 64                             | 1.0  | 3.9   | 103   |
| SMAJ70A(CA)  | RP                  | ZP | 77.8   | 86.0 | 1.0                     | 70                             | 1.0  | 3.5   | 113   |
| SMAJ75A(CA)  | RR                  | ZR | 83.3   | 92.1 | 1.0                     | 75                             | 1.0  | 3.3   | 121   |
| SMAJ78A(CA)  | RT                  | ZT | 86.7   | 95.8 | 1.0                     | 78                             | 1.0  | 3.2   | 126   |
| SMAJ85A(CA)  | RV                  | ZV | 94.4   | 104  | 1.0                     | 85                             | 1.0  | 2.2   | 137   |
| SMAJ90A(CA)  | RX                  | ZX | 100  | 111  | 1.0                     | 90                             | 1.0  | 2.1   | 146   |
| SMAJ100A(CA) | RZ                  | ZZ | 111  | 123  | 1.0                     | 100                            | 1.0  | 1.9   | 162   |
| SMAJ110A(CA) | SE                  | VE | 122  | 135  | 1.0                     | 110                            | 1.0  | 1.7   | 177   |
| SMAJ120A(CA) | VG                  | VG | 133  | 147  | 1.0                     | 120                            | 1.0  | 1.6   | 193   |
| SMAJ130A(CA) | VK                  | VK | 144  | 159  | 1.0                     | 130                            | 1.0  | 1.4   | 209   |
| SMAJ150A(CA) | VM                  | VM | 167  | 185  | 1.0                     | 150                            | 1.0  | 1.2   | 243   |
| SMAJ160A(CA) | SP                  | VP | 178  | 197  | 1.0                     | 160                            | 1.0  | 1.2   | 259   |
| SMAJ170A(CA) | SR                  | VR | 189  | 209  | 1.0                     | 170                            | 1.0  | 1.09  | 275   |
| SMAJ188A(CA) | SS                  | VS | 209  | 231  | 1.0                     | 188                            | 1.0  | 0.91  | 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 SMAJ5.0CA, the maximum  $V_{BR}$  is 7.25 V
- (6)  $V_F = 3.5\text{ V}$  at  $I_F = 25\text{ A}$  (uni-directional only)

### RATINGS AND CHARACTERISTICS CURVES

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

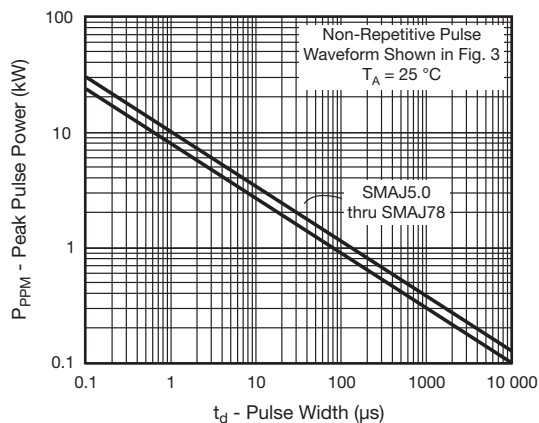


Fig. 1 - Peak Pulse Power Rating Curve

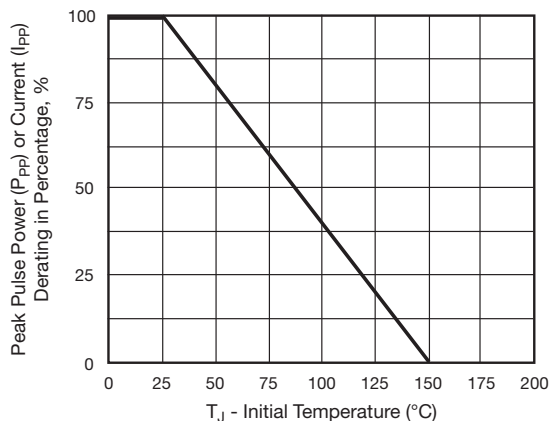


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

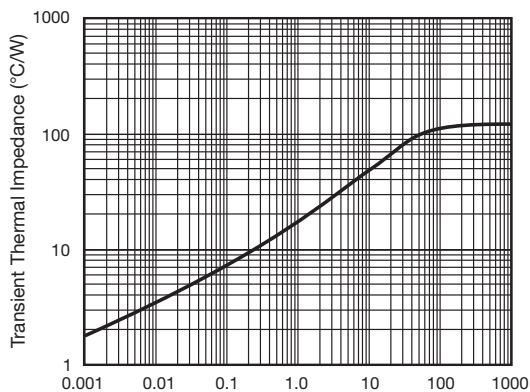


Fig. 5 - Typical Transient Thermal Impedance

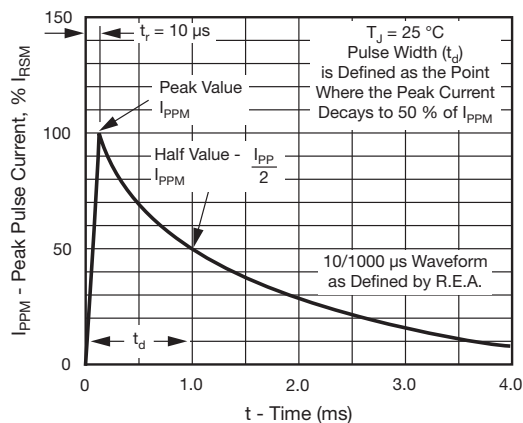


Fig. 3 - Pulse Waveform

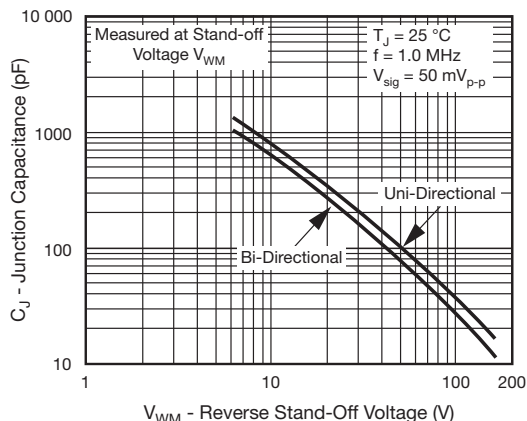


Fig. 4 - Typical Junction Capacitance

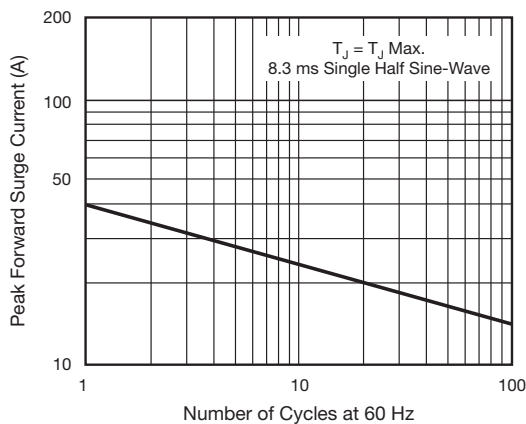


Fig. 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

## ORDERING INFORMATION

| Order Code | Package | Baseqty | Deliverymode  |
|------------|---------|---------|---------------|
| SMAJxxA    | SMA     | 1800    | Tape and reel |
| SMAJxxCA   | SMA     | 1800    | Tape and reel |