



Surface Mount TRANSZORB® Transient Voltage Suppressors



DO-214AC (SMA)

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 μ 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
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

| PRIMARY CHARACTERISTICS | |
|---------------------------------|---------------------------------|
| V _{BR} uni-directional | 6.40 V to 231 V |
| V _{BR} bi-directional | 6.40 V to 231 V |
| V _{WM} | 5.0 V to 188 V |
| P _{PPM} | 400 W, 300 W |
| I _{FSM} | 40 A |
| T _J max. | 150 °C |
| Polarity | Uni-directional, bi-directional |
| Package | DO-214AC (SMA) |

DEVICES FOR BI-DIRECTION APPLICATIONS

For bi-directional use CA suffix (e.g. SMAJ10CA).
Electrical characteristics apply in both directions.

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

| 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} | 400 | W |
| Peak pulse current with a 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} | 40 | 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. Rating is 300 W above 78 V
- ⁽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 °C unless otherwise noted) | | | | | | | | | |
|--|---------------------|----|--|------|----------------------------------|---------------------------------------|---|---|---|
| DEVICE TYPE | 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 PULSE SURGE CURRENT I _{PPM} (A) ⁽²⁾ | MAXIMUM CLAMPING VOLTAGE AT I _{PPM} V _C (V) |
| | UNI | BI | MIN. | MAX. | | | | | |
| SMAJ5.0A ⁽⁵⁾ | AE | WE | 6.40 | 7.07 | 10 | 5.0 | 800 | 43.5 | 9.2 |
| SMAJ6.0A | AG | WG | 6.67 | 7.37 | 10 | 6.0 | 800 | 38.8 | 10.3 |
| SMAJ6.5A | AK | WK | 7.22 | 7.98 | 10 | 6.5 | 500 | 35.7 | 11.2 |
| SMAJ7.0A | AM | WM | 7.78 | 8.60 | 10 | 7.0 | 200 | 33.3 | 12.0 |
| SMAJ7.5A | AP | WP | 8.33 | 9.21 | 1.0 | 7.5 | 100 | 31.0 | 12.9 |
| SMAJ8.0A | AR | WR | 8.89 | 9.83 | 1.0 | 8.0 | 50 | 29.4 | 13.6 |
| SMAJ8.5A | AT | WT | 9.44 | 10.4 | 1.0 | 8.5 | 10 | 27.8 | 14.4 |
| SMAJ9.0A | AV | WV | 10.0 | 11.1 | 1.0 | 9.0 | 5.0 | 26.0 | 15.4 |
| SMAJ10A | AX | WX | 11.1 | 12.3 | 1.0 | 10 | 1.0 | 23.5 | 17.0 |
| SMAJ11A | AZ | WZ | 12.2 | 13.5 | 1.0 | 11 | 1.0 | 22.0 | 18.2 |
| SMAJ12A | BE | XE | 13.3 | 14.7 | 1.0 | 12 | 1.0 | 20.1 | 19.9 |
| SMAJ13A | BG | XG | 14.4 | 15.9 | 1.0 | 13 | 1.0 | 18.6 | 21.5 |
| SMAJ14A | BK | XK | 15.6 | 17.2 | 1.0 | 14 | 1.0 | 17.2 | 23.2 |
| SMAJ15A | BM | XM | 16.7 | 18.5 | 1.0 | 15 | 1.0 | 16.4 | 24.4 |
| SMAJ16A | BP | XP | 17.8 | 19.7 | 1.0 | 16 | 1.0 | 15.4 | 26.0 |
| SMAJ17A | BR | XR | 18.9 | 20.9 | 1.0 | 17 | 1.0 | 14.5 | 27.6 |
| SMAJ18A | BT | XT | 20.0 | 22.1 | 1.0 | 18 | 1.0 | 13.7 | 29.2 |
| SMAJ20A | BV | XV | 22.2 | 24.5 | 1.0 | 20 | 1.0 | 12.3 | 32.4 |
| SMAJ22A | BX | XX | 24.4 | 26.9 | 1.0 | 22 | 1.0 | 11.3 | 35.5 |
| SMAJ24A | BZ | XZ | 26.7 | 29.5 | 1.0 | 24 | 1.0 | 10.3 | 38.9 |
| SMAJ26A | CE | YE | 28.9 | 31.9 | 1.0 | 26 | 1.0 | 9.5 | 42.1 |
| SMAJ28A | CG | YG | 31.1 | 34.4 | 1.0 | 28 | 1.0 | 8.8 | 45.4 |
| SMAJ30A | CK | YK | 33.3 | 36.8 | 1.0 | 30 | 1.0 | 8.3 | 48.4 |
| SMAJ33A | CM | YM | 36.7 | 40.6 | 1.0 | 33 | 1.0 | 7.5 | 53.3 |
| SMAJ36A | CP | YP | 40.0 | 44.2 | 1.0 | 36 | 1.0 | 6.9 | 58.1 |
| SMAJ40A | CR | YR | 44.4 | 49.1 | 1.0 | 40 | 1.0 | 6.2 | 64.5 |
| SMAJ43A | CT | YT | 47.8 | 52.8 | 1.0 | 43 | 1.0 | 5.8 | 69.4 |
| SMAJ45A | CV | YV | 50.0 | 55.3 | 1.0 | 45 | 1.0 | 5.5 | 72.7 |
| SMAJ48A | CX | YX | 53.3 | 58.9 | 1.0 | 48 | 1.0 | 5.2 | 77.4 |
| SMAJ51A | CZ | YZ | 56.7 | 62.7 | 1.0 | 51 | 1.0 | 4.9 | 82.4 |
| SMAJ54A | RE | ZE | 60.0 | 66.3 | 1.0 | 54 | 1.0 | 4.6 | 87.1 |
| SMAJ58A | RG | ZG | 64.4 | 71.2 | 1.0 | 58 | 1.0 | 4.3 | 93.6 |
| SMAJ60A | RK | ZK | 66.7 | 73.7 | 1.0 | 60 | 1.0 | 4.1 | 96.8 |
| SMAJ64A | RM | ZM | 71.1 | 78.6 | 1.0 | 64 | 1.0 | 3.9 | 103 |
| SMAJ70A | RP | ZP | 77.8 | 86.0 | 1.0 | 70 | 1.0 | 3.5 | 113 |
| SMAJ75A | RR | ZR | 83.3 | 92.1 | 1.0 | 75 | 1.0 | 3.3 | 121 |
| SMAJ78A | RT | ZT | 86.7 | 95.8 | 1.0 | 78 | 1.0 | 3.2 | 126 |
| SMAJ85A | RV | ZV | 94.4 | 104 | 1.0 | 85 | 1.0 | 2.2 | 137 |
| SMAJ90A | RX | ZX | 100 | 111 | 1.0 | 90 | 1.0 | 2.1 | 146 |
| SMAJ100A | RZ | ZZ | 111 | 123 | 1.0 | 100 | 1.0 | 1.9 | 162 |
| SMAJ110A | SE | VE | 122 | 135 | 1.0 | 110 | 1.0 | 1.7 | 177 |
| SMAJ120A | VG | VG | 133 | 147 | 1.0 | 120 | 1.0 | 1.6 | 193 |
| SMAJ130A | VK | VK | 144 | 159 | 1.0 | 130 | 1.0 | 1.4 | 209 |
| SMAJ150A | VM | VM | 167 | 185 | 1.0 | 150 | 1.0 | 1.2 | 243 |
| SMAJ160A | SP | VP | 178 | 197 | 1.0 | 160 | 1.0 | 1.2 | 259 |
| SMAJ170A | SR | VR | 189 | 209 | 1.0 | 170 | 1.0 | 1.09 | 275 |
| SMAJ188A | SS | VS | 209 | 231 | 1.0 | 188 | 1.0 | 0.91 | 328 |

Notes

- (1) Pulse test: t_p ≤ 50 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 V at I_F = 25 A (uni-directional only)

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

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|-----------------|-------|--------------------|
| Typical thermal resistance, junction to ambient ⁽¹⁾ | $R_{\theta JA}$ | 120 | $^\circ\text{C/W}$ |
| Typical thermal resistance, junction to lead | $R_{\theta JL}$ | 30 | $^\circ\text{C/W}$ |

Note

(1) Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-------------------------------|-----------------|------------------------|---------------|------------------------------------|
| SMAJ5.0A-E3/61 | 0.064 | 61 | 1800 | 7" diameter plastic tape and reel |
| SMAJ5.0A-E3/5A | 0.064 | 5A | 7500 | 13" diameter plastic tape and reel |
| SMAJ5.0AHE3/61 ⁽¹⁾ | 0.064 | 61 | 1800 | 7" diameter plastic tape and reel |
| SMAJ5.0AHE3/5A ⁽¹⁾ | 0.064 | 5A | 7500 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

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

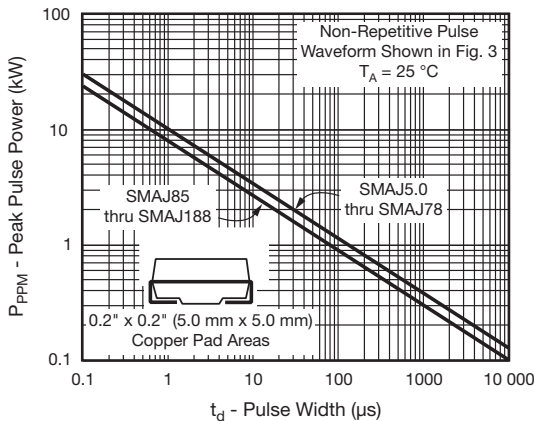


Fig. 1 - Peak Pulse Power Rating Curve

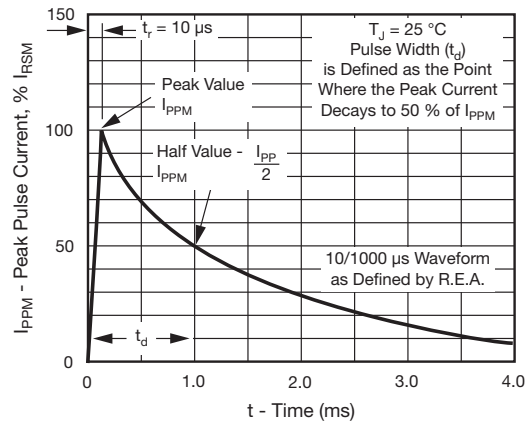


Fig. 3 - Pulse Waveform

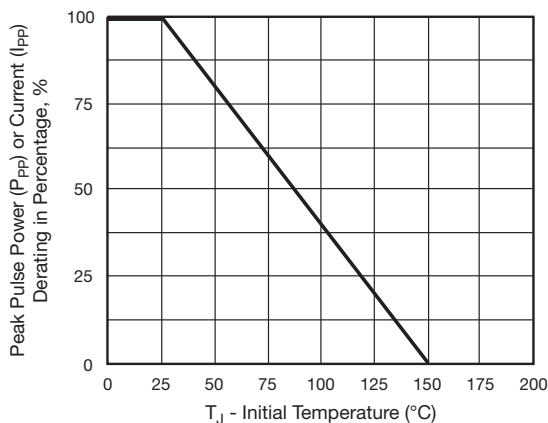


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

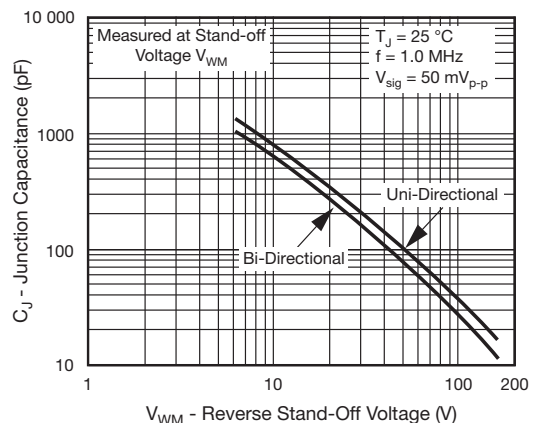


Fig. 4 - Typical Junction Capacitance

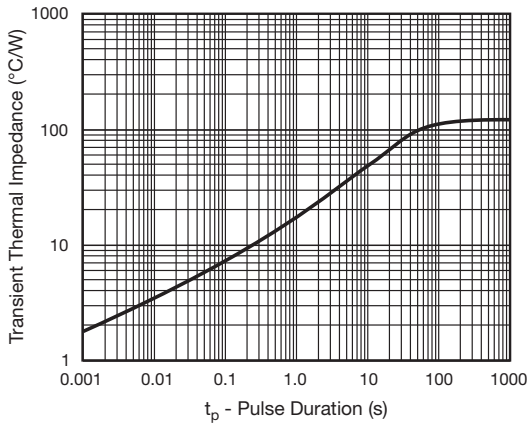


Fig. 5 - Typical Transient Thermal Impedance

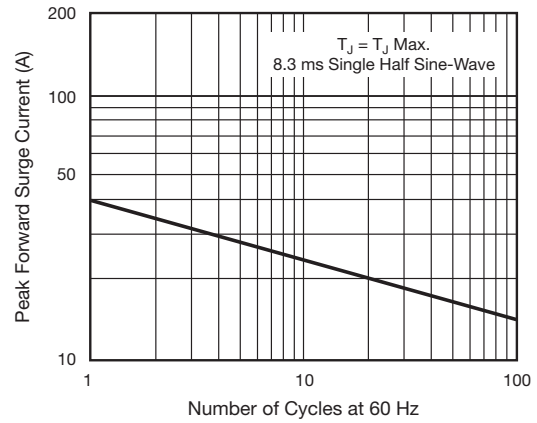
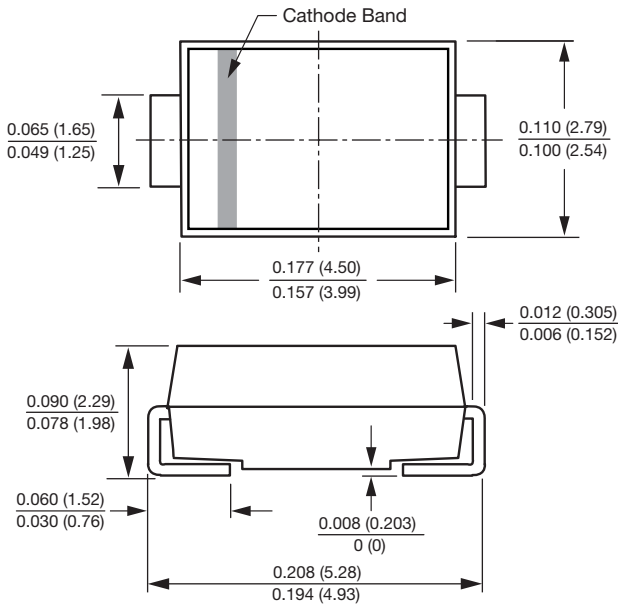


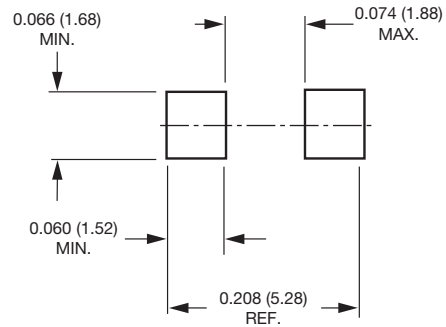
Fig. 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-214AC (SMA)



Mounting Pad Layout





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