


| | |
|---|----------------|
|  | E480232 |
|---|----------------|

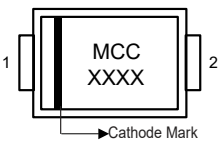
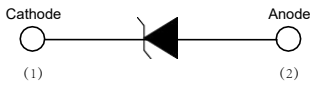

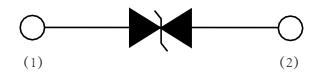
Features

- For Surface Mount Applications
- Excellent Clamping Capability
- High Temp Soldering: 260°C / 10 Seconds At Terminals
- Halogen Free. "Green" Device (Note 1)
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)
- ESD protection of data lines in accordance with IEC 61000-4-2, ±30kV(Air), ±30kV (Contact)

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|------------------|----------------|------|
| Peak Pulse Power Surge Current with a 10/1000µs Waveform (Note 3) | I _{PPM} | See Next Table | A |
| Peak Pulse Power Dissipation (Note 3) | P _{PPM} | 400 | W |
| Power Dissipation on Infinite Heatsink at T _L = 75°C | P _D | 1.5 | W |
| Peak Forward Surge Current Unidirectional Only (Note 4) | I _{FSM} | 40 | A |
| Operating Junction Temperature Range | T _J | -55 to +175 | °C |
| Storage Temperature Range | T _{STG} | -55 to +175 | °C |

Internal Structure

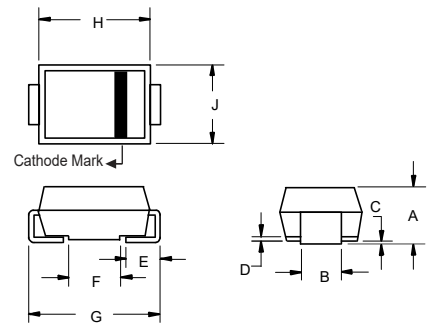
| Description | Simplified outline | Graphic symbol |
|-----------------|---|---|
| Uni-directional |  |  |
| Bi-directional |  |  |

XXXX = Marking code

■ : The locations of the dots represent different product lines

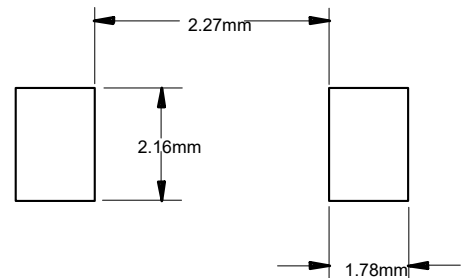
400Watt TVS
5.0 to 440
Volts

SMA (DO-214AC)
LEAD FRAME



| DIM | INCHES | | MM | | NOTE |
|-----|--------|-------|-------|-------|------|
| | MIN | MAX | MIN | MAX | |
| A | 0.075 | 0.090 | 1.90 | 2.30 | |
| B | 0.050 | 0.064 | 1.27 | 1.63 | |
| C | 0.002 | 0.008 | 0.051 | 0.203 | |
| D | --- | 0.020 | --- | 0.51 | |
| E | 0.030 | 0.060 | 0.76 | 1.52 | |
| F | 0.065 | 0.091 | 1.65 | 2.32 | |
| G | 0.189 | 0.220 | 4.80 | 5.59 | |
| H | 0.157 | 0.187 | 4.00 | 4.75 | |
| J | 0.090 | 0.115 | 2.25 | 2.92 | |

SUGGESTED SOLDER PAD LAYOUT



Electrical Characteristics and Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|--|-----------------|---------|----------------------|
| Forward Voltage (Note 5D) | V_F | 3.5/5.0 | V |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 30 | $^{\circ}\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 120 | $^{\circ}\text{C/W}$ |
| Typical Thermal Resistance Junction to Case | $R_{\theta JC}$ | 20 | $^{\circ}\text{C/W}$ |

Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^{\circ}\text{C}$ per Fig.4.
4. 8.3ms, single half sine wave duty cycle = 4 pulses per Minutes maximum, for unidirectional device only.
5. $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$.
6. Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal.

Electrical Characteristics @ 25°C Unless Otherwise Specified

| MCC Part Number | | Working Peak Reverse Voltage $V_{RWM}(V)$ | Breakdown Voltage V_{BR} @ I_T | | | Maximum Clamping Voltage @ I_{PP} $V_C(V)$ | Maximum Reverse Surge Current $I_{PP}(A)$ | Maximum Reverse Leakage @ V_{RWM} $I_R(\mu A)$ | Device Marking Code | |
|-----------------|-----------|--|------------------------------------|---------|------------|---|--|---|---------------------|----|
| (Uni) | (Bi) | | Min (V) | Max (V) | I_T (mA) | | | | Uni | Bi |
| SMAJ5.0A | SMAJ5.0CA | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 43.5 | 800 | AE | WE |
| SMAJ6.0A | SMAJ6.0CA | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 800 | AG | WG |
| SMAJ6.5A | SMAJ6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 500 | AK | WK |
| SMAJ7.0A | SMAJ7.0CA | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 33.3 | 200 | AM | WM |
| SMAJ7.5A | SMAJ7.5CA | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 31.0 | 100 | AP | WP |
| SMAJ8.0A | SMAJ8.0CA | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 29.4 | 50 | AR | WR |
| SMAJ8.5A | SMAJ8.5CA | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 27.7 | 20 | AT | WT |
| SMAJ9.0A | SMAJ9.0CA | 9.0 | 10.00 | 11.10 | 1 | 15.4 | 26.0 | 10 | AV | WV |
| SMAJ10A | SMAJ10CA | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 23.5 | 5 | AX | WX |
| SMAJ11A | SMAJ11CA | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 22.0 | 1 | AZ | WZ |
| SMAJ12A | SMAJ12CA | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 20.1 | 1 | BE | XE |
| SMAJ13A | SMAJ13CA | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 18.6 | 1 | BG | XG |
| SMAJ14A | SMAJ14CA | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 17.2 | 1 | BK | XK |
| SMAJ15A | SMAJ15CA | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 16.4 | 1 | BM | XM |
| SMAJ16A | SMAJ16CA | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 15.3 | 1 | BP | XP |
| SMAJ17A | SMAJ17CA | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 14.5 | 1 | BR | XR |
| SMAJ18A | SMAJ18CA | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 13.7 | 1 | BT | XT |
| SMAJ19A | SMAJ19CA | 19.0 | 21.10 | 23.30 | 1 | 30.8 | 13.0 | 1 | BU | XU |
| SMAJ20A | SMAJ20CA | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 12.3 | 1 | BV | XV |
| SMAJ22A | SMAJ22CA | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 11.2 | 1 | BX | XX |
| SMAJ24A | SMAJ24CA | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 10.3 | 1 | BZ | XZ |
| SMAJ26A | SMAJ26CA | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 9.5 | 1 | CE | YE |
| SMAJ28A | SMAJ28CA | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 8.8 | 1 | CG | YG |
| SMAJ30A | SMAJ30CA | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 8.3 | 1 | CK | YK |
| SMAJ33A | SMAJ33CA | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 7.5 | 1 | CM | YM |
| SMAJ36A | SMAJ36CA | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 6.9 | 1 | CP | YP |
| SMAJ40A | SMAJ40CA | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 6.2 | 1 | CR | YR |
| SMAJ43A | SMAJ43CA | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 5.7 | 1 | CT | YT |
| SMAJ45A | SMAJ45CA | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 5.5 | 1 | CV | YV |
| SMAJ48A | SMAJ48CA | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 5.2 | 1 | CX | YX |
| SMAJ51A | SMAJ51CA | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 4.9 | 1 | CZ | YZ |
| SMAJ54A | SMAJ54CA | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 4.6 | 1 | RE | ZE |
| SMAJ58A | SMAJ58CA | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 4.3 | 1 | RG | ZG |
| SMAJ60A | SMAJ60CA | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 4.1 | 1 | RK | ZK |
| SMAJ64A | SMAJ64CA | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 3.9 | 1 | RM | ZM |
| SMAJ70A | SMAJ70CA | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 3.5 | 1 | RP | ZP |
| SMAJ75A | SMAJ75CA | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 3.3 | 1 | RR | ZR |
| SMAJ78A | SMAJ78CA | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 3.2 | 1 | RT | ZT |
| SMAJ80A | SMAJ80CA | 80.0 | 88.80 | 97.60 | 1 | 129.0 | 3.1 | 1 | RB | ZB |
| SMAJ85A | SMAJ85CA | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 2.9 | 1 | RV | ZV |
| SMAJ90A | SMAJ90CA | 90.0 | 100.00 | 111.00 | 1 | 146.0 | 2.7 | 1 | RX | ZX |
| SMAJ100A | SMAJ100CA | 100.0 | 111.00 | 123.00 | 1 | 162.0 | 2.5 | 1 | RZ | ZZ |
| SMAJ110A | SMAJ110CA | 110.0 | 122.00 | 135.00 | 1 | 177.0 | 2.3 | 1 | SE | VE |
| SMAJ120A | SMAJ120CA | 120.0 | 133.00 | 147.00 | 1 | 193.0 | 2.1 | 1 | SG | VG |
| SMAJ130A | SMAJ130CA | 130.0 | 144.00 | 159.00 | 1 | 209.0 | 1.9 | 1 | SK | VK |
| SMAJ140A | SMAJ140CA | 140.0 | 155.00 | 171.00 | 1 | 226.8 | 1.8 | 1 | SL | VL |
| SMAJ150A | SMAJ150CA | 150.0 | 167.00 | 185.00 | 1 | 243.0 | 1.6 | 1 | SM | VM |
| SMAJ160A | SMAJ160CA | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 1.5 | 1 | SP | VP |
| SMAJ170A | SMAJ170CA | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 1.5 | 1 | SR | VR |
| SMAJ180A | SMAJ180CA | 180.0 | 201.00 | 222.00 | 1 | 292.0 | 1.4 | 1 | ST | VT |
| SMAJ190A | SMAJ190CA | 190.0 | 211.00 | 232.00 | 1 | 307.8 | 1.3 | 1 | SU | VU |
| SMAJ200A | SMAJ200CA | 200.0 | 224.00 | 247.00 | 1 | 324.0 | 1.2 | 1 | SV | VV |
| SMAJ220A | SMAJ220CA | 220.0 | 246.00 | 272.00 | 1 | 356.0 | 1.1 | 1 | SX | VX |
| SMAJ250A | SMAJ250CA | 250.0 | 279.00 | 309.00 | 1 | 405.0 | 1.0 | 1 | SZ | VZ |
| SMAJ300A | SMAJ300CA | 300.0 | 335.00 | 371.00 | 1 | 486.0 | 0.8 | 1 | TE | UE |
| SMAJ350A | SMAJ350CA | 350.0 | 391.00 | 432.00 | 1 | 567.0 | 0.7 | 1 | TG | UG |
| SMAJ400A | SMAJ400CA | 400.0 | 447.00 | 494.00 | 1 | 648.0 | 0.6 | 1 | TK | UK |
| SMAJ440A | SMAJ440CA | 440.0 | 492.00 | 543.00 | 1 | 713.0 | 0.6 | 1 | TM | UM |

For bi-directional type having V_{RWM} of 10 Volts and less, the I_R limit is double

Curve Characteristics

Fig. 1 - Peak Pulse Power Rating Curve

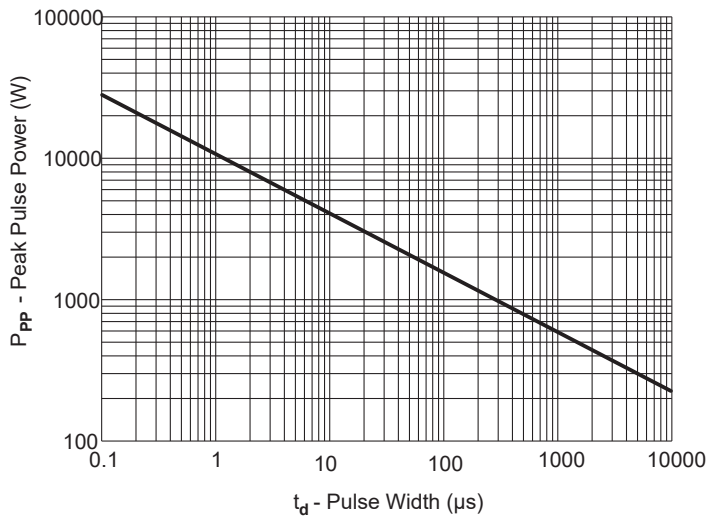


Fig. 2 - Typical Junction Capacitance

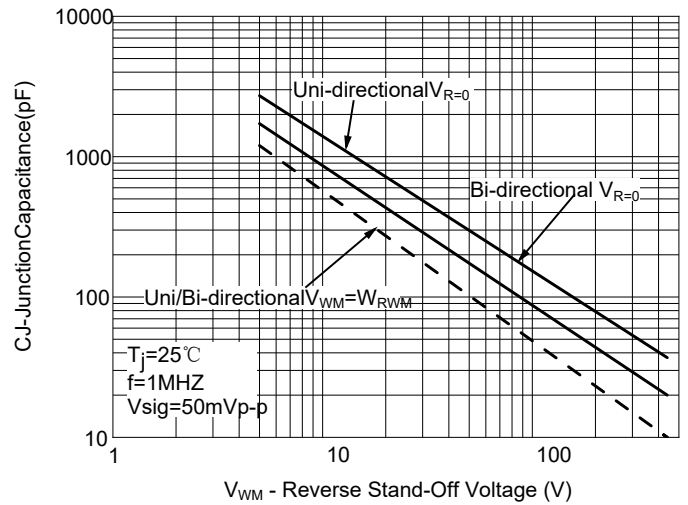


Fig. 3 - Pulse Waveform

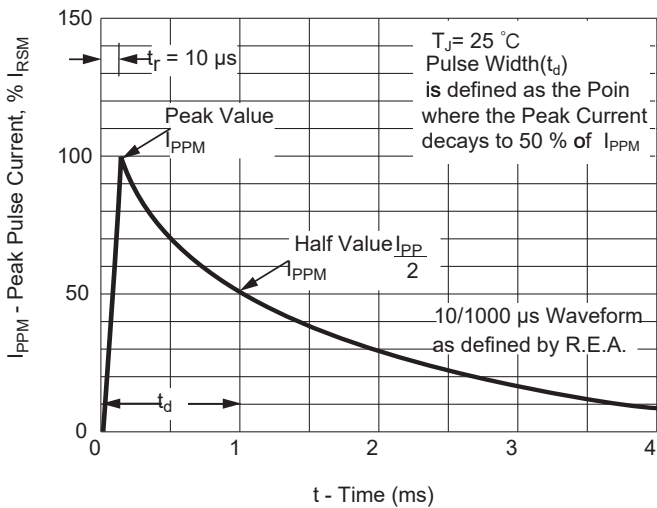


Fig. 4 - Pulse Derating Curve

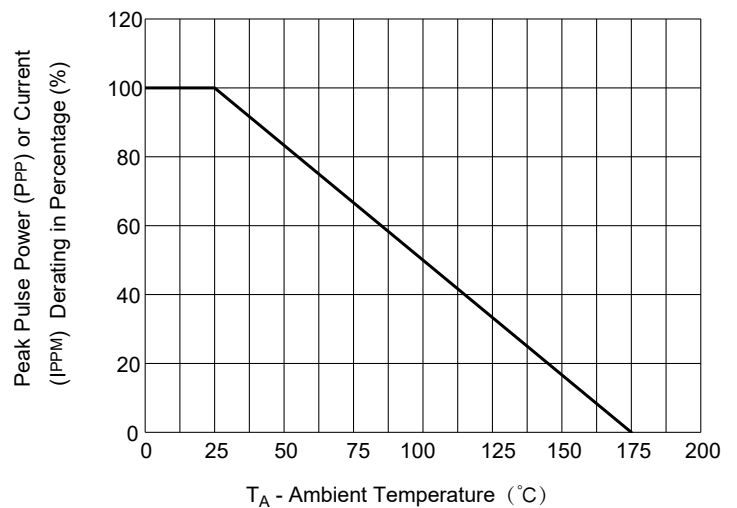
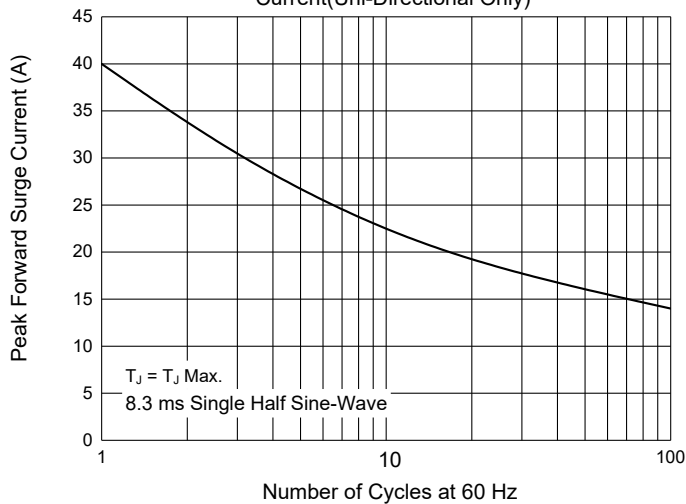


Fig. 5 - Maximum Non-Repetitive Peak Forward Surge Current (Uni-Directional Only)



Ordering Information

| Device | Packing |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:5Kpcs/Reel |

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