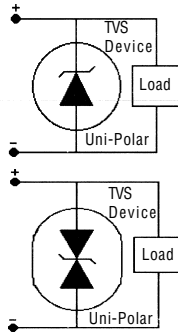


# 5.0V to 170V SMD TRANSIENT VOLTAGE SUPPRESSORS

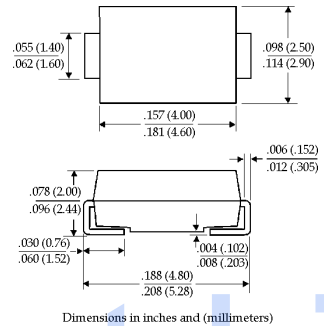
**SMAJ5.0...170**

## Description



## Mechanical Dimensions

Package  
"SMA"



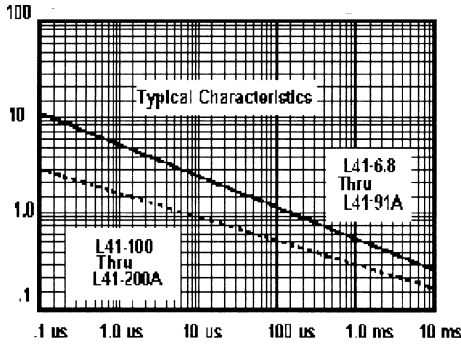
## Features

- 400 WATT PEAK POWER PROTECTION
- EXCELLENT CLAMPING CAPABILITY
- FAST RESPONSE TIME
- TYPICAL  $I_R < 1\mu A$  ABOVE 10V
- GLASS PASSIVATED CHIP CONSTRUCTION
- MEETS UL SPECIFICATION 94V-0

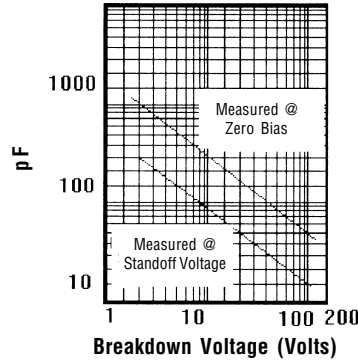
| Electrical Characteristics @ 25°C.   | SMAJ5.0...170 | Units          |
|--|---------------|----------------|
| <b>Maximum Ratings</b>   |               |                |
| Peak Power Dissipation... $P_{PK}$<br>$T_p = 1mS$ (Note 5)   | 400 Min.      | Watts          |
| Steady State Power Dissipation... $P_D$<br>@ $T_T = 75^\circ C$ (Note 2)   | 1             | Watts          |
| Non-Repetitive Peak Forward Surge Current... $I_{FSM}$<br>@ Rated Load Conditions, 8.3 mS, ½ Sine Wave, Single Phase<br>(Note 3) | 40            | Amps           |
| Weight... $G_{RM}$   | 0.12          | Grams          |
| Soldering Requirements (Time & Temp)... $S_T$<br>@ 250°C   | 10 Sec.       | Min. to Solder |
| Operating & Storage Temperature Range... $T_J, T_{STRG}$   | -65 to 175    | °C             |

- NOTES:**
1. For Bi-Directional Applications, Use C or CA. Electrical Characteristics Apply in Both Directions.
  2. Mounted on 8mm Copper Pads to Each Terminal.
  3. 8.3 mS, ½ Sine Wave, Single Phase Duty Cycle, @ 4 Pulses Per Minute Maximum.
  4.  $V_{BR}$  Measured After It Applies for 300  $\mu S$ .  $I_T$  = Square Wave Pulse or Equivalent.
  5. Non-Repetitive Current Pulse. Per Fig. 3 and Derated Above  $T_A = 25^\circ C$  per Fig. 2.

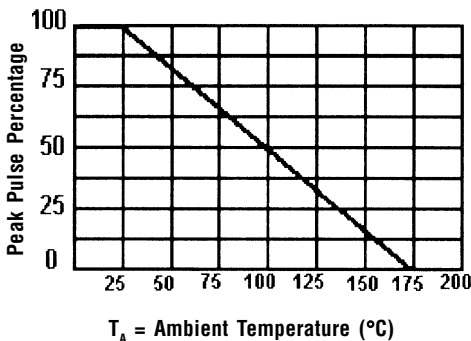
**Fig. 1 Pulse Rating Curve**



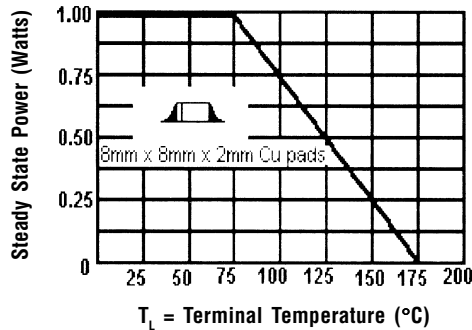
**Fig. 4 Typical Junction Capacitance**



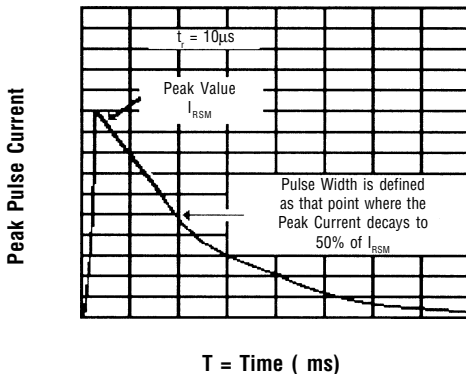
**Fig. 2 Pulse Derating Curve**



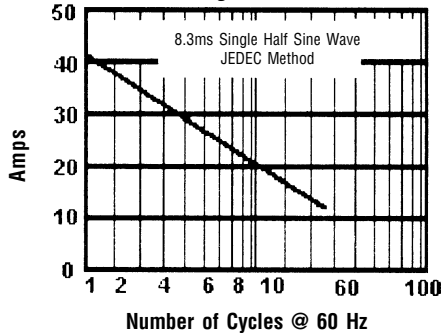
**Fig. 5 Steady State Power Derating**



**Fig. 3 Pulse Waveform**



**Fig. 6 Maximum Non-Repetitive Surge Current**



Ratings at 25 Deg. C ambient temperature unless otherwise specified.

Single Phase Half Wave, 60 HZ Resistive or Inductive Load.

For Capacitive Load, Derate Current by 20%.

- NOTES:**
1. For Bi-Directional Applications, Use C or CA. Electrical Characteristics Apply in Both Directions.
  2. Mounted on 8mm Copper Pads to Each Terminal.
  3. 8.3 mS, 1/2 Sine Wave, Single Phase Duty Cycle, @ 4 Pulses Per Minute Maximum.
  4.  $V_{BR}$  Measured After It Applies for 300  $\mu$ S.  $I_T$  = Square Wave Pulse or Equivalent.
  5. Non-Repetitive Current Pulse. Per Fig. 3 and Derated Above  $T_A = 25^\circ\text{C}$  per Fig. 2.

# 5.0V to 170V SMD TRANSIENT VOLTAGE SUPPRESSORS

**SMAJ5.0...170**

| DEVICE   | Breakdown Voltage          |       |                 | Working Peak Reverse Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Leakage<br>@ $V_{RWM}$<br>$I_R$ ( $\mu$ A) | Peak Pulse Current<br>$I_{PP}$ (A)<br>(Note 2) | Maximum Clamping Voltage<br>@ $I_{PP}$<br>$V_C$ (V) | Maximum Temperature Coefficient<br>of $V_{BR}$<br>% / $^{\circ}$ C | Case Marking |
|----------|----------------------------|-------|-----------------|---|--|--|---|--|--------------|
|          | $V_{BR}$<br>Volts (Note 1) |       | @ $I_T$<br>(mA) |   |  |  |   |  |              |
|          | Min.                       | Max.  |                 |   |  |  |   |  |              |
| SMAJ5.0  | 6.40                       | 7.30  | 10.00           | 5.00  | 800  | 41.6   | 9.60  | 0.061  | AD           |
| SMAJ5.0A | 6.40                       | 7.00  | 10.00           | 5.00  | 800  | 43.5   | 9.20  | 0.061  | AE           |
| SMAJ6.0  | 6.67                       | 8.15  | 10.00           | 6.00  | 800  | 35.1   | 11.40   | 0.065  | AF           |
| SMAJ6.0A | 6.67                       | 7.37  | 10.00           | 6.00  | 800  | 38.8   | 10.30   | 0.065  | AG           |
| SMAJ6.5  | 7.22                       | 8.82  | 10.00           | 6.50  | 500  | 32.5   | 12.30   | 0.068  | AH           |
| SMAJ6.5A | 7.22                       | 7.98  | 10.00           | 6.50  | 500  | 35.7   | 11.20   | 0.068  | AK           |
| SMAJ7.0  | 7.78                       | 9.51  | 10.00           | 7.00  | 200  | 30.1   | 13.30   | 0.073  | AL           |
| SMAJ7.0A | 7.78                       | 8.60  | 10.00           | 7.00  | 200  | 33.3   | 12.00   | 0.073  | AM           |
| SMAJ7.5  | 8.33                       | 10.20 | 1.00            | 7.50  | 100  | 28.0   | 14.30   | 0.075  | AN           |
| SMAJ7.5A | 8.33                       | 9.21  | 1.00            | 7.50  | 100  | 31.0   | 12.90   | 0.075  | AP           |
| SMAJ8.0  | 8.89                       | 10.90 | 1.00            | 8.00  | 50.00  | 26.5   | 15.00   | 0.076  | AQ           |
| SMAJ8.0A | 8.89                       | 9.83  | 1.00            | 8.00  | 50.00  | 29.4   | 13.60   | 0.078  | AR           |
| SMAJ8.5  | 9.44                       | 11.50 | 1.00            | 8.50  | 20.00  | 25.1   | 15.90   | 0.081  | AS           |
| SMAJ8.5A | 9.44                       | 10.40 | 1.00            | 8.50  | 20.00  | 27.7   | 14.40   | 0.081  | AT           |
| SMAJ9.0  | 10.00                      | 12.20 | 1.00            | 9.00  | 10.00  | 23.6   | 16.90   | 0.084  | AU           |
| SMAJ9.0A | 10.00                      | 11.10 | 1.00            | 9.00  | 10.00  | 26.0   | 15.40   | 0.084  | AV           |
| SMAJ10   | 11.10                      | 13.60 | 1.00            | 10.00   | 5.00   | 21.2   | 18.80   | 0.086  | AW           |
| SMAJ10A  | 11.10                      | 12.30 | 1.00            | 10.00   | 5.00   | 23.5   | 17.00   | 0.086  | AX           |
| SMAJ11   | 12.20                      | 14.90 | 1.00            | 11.00   | 5.00   | 20.0   | 20.10   | 0.088  | AY           |
| SMAJ11A  | 12.20                      | 13.50 | 1.00            | 11.00   | 5.00   | 22.0   | 18.20   | 0.088  | AZ           |
| SMAJ12   | 13.30                      | 16.30 | 1.00            | 12.00   | 5.00   | 18.1   | 22.00   | 0.090  | BD           |
| SMAJ12A  | 13.30                      | 14.70 | 1.00            | 12.00   | 5.00   | 20.1   | 19.90   | 0.090  | BE           |
| SMAJ13   | 14.40                      | 17.60 | 1.00            | 13.00   | 5.00   | 16.8   | 23.80   | 0.092  | BF           |
| SMAJ13A  | 14.40                      | 15.90 | 1.00            | 13.00   | 5.00   | 18.6   | 21.50   | 0.092  | BG           |
| SMAJ14   | 15.60                      | 19.10 | 1.00            | 14.00   | 5.00   | 15.5   | 25.80   | 0.094  | BH           |
| SMAJ14A  | 15.60                      | 17.20 | 1.00            | 14.00   | 5.00   | 17.2   | 23.20   | 0.094  | BK           |
| SMAJ15   | 16.70                      | 20.40 | 1.00            | 15.00   | 5.00   | 14.8   | 26.90   | 0.096  | BL           |
| SMAJ15A  | 16.70                      | 18.50 | 1.00            | 15.00   | 5.00   | 16.4   | 24.40   | 0.096  | BM           |
| SMAJ16   | 17.80                      | 21.80 | 1.00            | 16.00   | 5.00   | 13.8   | 28.80   | 0.097  | BN           |
| SMAJ16A  | 17.80                      | 19.70 | 1.00            | 16.00   | 5.00   | 15.3   | 26.00   | 0.097  | BP           |
| SMAJ17   | 18.90                      | 23.10 | 1.00            | 17.00   | 5.00   | 13.1   | 30.50   | 0.098  | BQ           |
| SMAJ17A  | 18.90                      | 20.90 | 1.00            | 17.00   | 5.00   | 14.5   | 27.60   | 0.098  | BR           |
| SMAJ18   | 20.00                      | 24.40 | 1.00            | 18.00   | 5.00   | 12.4   | 32.20   | 0.099  | BS           |
| SMAJ18A  | 20.00                      | 22.10 | 1.00            | 18.00   | 5.00   | 13.7   | 29.20   | 0.099  | BT           |
| SMAJ20   | 22.20                      | 27.10 | 1.00            | 20.00   | 5.00   | 11.1   | 35.80   | 0.100  | BU           |
| SMAJ20A  | 22.20                      | 24.50 | 1.00            | 20.00   | 5.00   | 12.3   | 32.40   | 0.100  | BV           |
| SMAJ22   | 24.40                      | 29.80 | 1.00            | 22.00   | 5.00   | 10.1   | 39.40   | 0.101  | BW           |
| SMAJ22A  | 24.40                      | 26.90 | 1.00            | 22.00   | 5.00   | 11.2   | 35.50   | 0.101  | BX           |
| SMAJ24   | 26.70                      | 32.60 | 1.00            | 24.00   | 5.00   | 9.3  | 43.00   | 0.101  | BY           |
| SMAJ24A  | 26.70                      | 29.50 | 1.00            | 24.00   | 5.00   | 10.3   | 38.90   | 0.101  | BZ           |
| SMAJ26   | 28.90                      | 35.30 | 1.00            | 26.00   | 5.00   | 8.6  | 46.60   | 0.102  | CD           |
| SMAJ26A  | 28.90                      | 31.90 | 1.00            | 26.00   | 5.00   | 9.5  | 42.10   | 0.102  | CE           |



# 5.0V to 170V GPP TRANSIENT VOLTAGE SUPPRESSORS

**SMAJ5.0...170**

| DEVICE   | Breakdown Voltage          |        |                 | Working Peak Reverse Voltage<br>$V_{RWM}$ (V) | Maximum Reverse Leakage<br>@ $V_{RWM}$<br>$I_R$ ( $\mu$ A) | Peak Pulse Current<br>$I_{PP}$ (A)<br>(Note 2) | Maximum Clamping Voltage<br>@ $I_{PP}$<br>$V_C$ (V) | Maximum Temperature Coefficient<br>of $V_{BR}$<br>% / °C | Case Marking |
|----------|----------------------------|--------|-----------------|---|--|--|---|--|--------------|
|          | $V_{BR}$<br>Volts (Note 1) |        | @ $I_T$<br>(mA) |   |  |  |   |  |              |
|          | Min.                       | Max.   |                 |   |  |  |   |  |              |
| SMAJ28   | 31.10                      | 38.00  | 1.00            | 28.00   | 5.00   | 8.0  | 50.10   | 0.104  | CF           |
| SMAJ28A  | 31.10                      | 34.40  | 1.00            | 28.00   | 5.00   | 8.8  | 45.40   | 0.104  | CG           |
| SMAJ30   | 33.30                      | 40.70  | 1.00            | 30.00   | 5.00   | 7.5  | 53.50   | 0.104  | CH           |
| SMAJ30A  | 33.30                      | 36.80  | 1.00            | 30.00   | 5.00   | 8.3  | 48.40   | 0.104  | CK           |
| SMAJ33   | 36.70                      | 44.90  | 1.00            | 33.00   | 5.00   | 6.8  | 59.00   | 0.104  | CL           |
| SMAJ33A  | 36.70                      | 40.60  | 1.00            | 33.00   | 5.00   | 7.5  | 53.30   | 0.104  | CM           |
| SMAJ36   | 40.00                      | 49.90  | 1.00            | 36.00   | 5.00   | 6.2  | 64.30   | 0.104  | CN           |
| SMAJ36A  | 40.00                      | 44.20  | 1.00            | 36.00   | 5.00   | 6.9  | 58.10   | 0.104  | CP           |
| SMAJ40   | 44.40                      | 54.30  | 1.00            | 40.00   | 5.00   | 5.6  | 71.40   | 0.104  | CQ           |
| SMAJ40A  | 44.40                      | 49.10  | 1.00            | 40.00   | 5.00   | 6.2  | 64.50   | 0.104  | CR           |
| SMAJ43   | 47.80                      | 58.40  | 1.00            | 43.00   | 5.00   | 5.2  | 76.70   | 0.104  | CS           |
| SMAJ43A  | 47.80                      | 52.80  | 1.00            | 43.00   | 5.00   | 5.7  | 69.40   | 0.104  | CT           |
| SMAJ45   | 50.00                      | 61.10  | 1.00            | 45.00   | 5.00   | 5.0  | 80.30   | 0.104  | CU           |
| SMAJ45A  | 50.00                      | 55.30  | 1.00            | 45.00   | 5.00   | 5.5  | 72.70   | 0.104  | CV           |
| SMAJ48   | 53.30                      | 65.10  | 1.00            | 48.00   | 5.00   | 4.7  | 85.50   | 0.104  | CW           |
| SMAJ48A  | 53.30                      | 58.90  | 1.00            | 48.00   | 5.00   | 5.2  | 77.40   | 0.104  | CX           |
| SMAJ51   | 56.70                      | 69.30  | 1.00            | 51.00   | 5.00   | 4.4  | 91.10   | 0.104  | CY           |
| SMAJ51A  | 56.70                      | 62.70  | 1.00            | 51.00   | 5.00   | 4.9  | 82.40   | 0.104  | CZ           |
| SMAJ54   | 60.00                      | 73.30  | 1.00            | 54.00   | 5.00   | 4.2  | 96.30   | 0.104  | RD           |
| SMAJ54A  | 60.00                      | 66.30  | 1.00            | 54.00   | 5.00   | 4.6  | 87.10   | 0.104  | RE           |
| SMAJ58   | 64.40                      | 78.70  | 1.00            | 58.00   | 5.00   | 3.9  | 103.00  | 0.104  | RF           |
| SMAJ58A  | 64.40                      | 71.20  | 1.00            | 58.00   | 5.00   | 4.3  | 93.60   | 0.104  | RG           |
| SMAJ60   | 66.70                      | 81.50  | 1.00            | 60.00   | 5.00   | 3.7  | 107.00  | 0.104  | RH           |
| SMAJ60A  | 66.70                      | 73.70  | 1.00            | 60.00   | 5.00   | 4.1  | 96.80   | 0.104  | RK           |
| SMAJ64   | 71.10                      | 86.90  | 1.00            | 64.00   | 5.00   | 3.5  | 114.00  | 0.104  | RL           |
| SMAJ64A  | 71.10                      | 78.60  | 1.00            | 64.00   | 5.00   | 3.9  | 103.00  | 0.104  | RM           |
| SMAJ70   | 77.80                      | 95.00  | 1.00            | 70.00   | 5.00   | 3.2  | 125.00  | 0.104  | RN           |
| SMAJ70A  | 77.80                      | 86.00  | 1.00            | 70.00   | 5.00   | 3.5  | 113.00  | 0.104  | RP           |
| SMAJ75   | 83.30                      | 102.00 | 1.00            | 75.00   | 5.00   | 3.0  | 134.00  | 0.104  | RQ           |
| SMAJ75A  | 83.30                      | 92.10  | 1.00            | 75.00   | 5.00   | 3.3  | 121.00  | 0.104  | RR           |
| SMAJ78   | 86.70                      | 106.00 | 1.00            | 78.00   | 5.00   | 2.9  | 139.00  | 0.104  | RS           |
| SMAJ78A  | 86.70                      | 95.80  | 1.00            | 78.00   | 5.00   | 2.2  | 126.00  | 0.104  | RT           |
| SMAJ85   | 94.40                      | 115.00 | 1.00            | 85.00   | 5.00   | 2.6  | 151.00  | 0.104  | RU           |
| SMAJ85A  | 94.40                      | 104.00 | 1.00            | 85.00   | 5.00   | 2.9  | 137.00  | 0.104  | RV           |
| SMAJ90   | 100.00                     | 122.00 | 1.00            | 90.00   | 5.00   | 2.5  | 160.00  | 0.104  | RW           |
| SMAJ90A  | 100.00                     | 111.00 | 1.00            | 90.00   | 5.00   | 2.7  | 146.00  | 0.104  | RX           |
| SMAJ100  | 111.00                     | 136.00 | 1.00            | 100.00  | 5.00   | 2.2  | 179.00  | 0.104  | RY           |
| SMAJ100A | 111.00                     | 123.00 | 1.00            | 100.00  | 5.00   | 2.5  | 162.00  | 0.104  | RZ           |
| SMAJ110  | 122.00                     | 149.00 | 1.00            | 110.00  | 5.00   | 2.0  | 196.00  | 0.104  | SD           |
| SMAJ110A | 122.00                     | 135.00 | 1.00            | 110.00  | 5.00   | 2.3  | 177.00  | 0.104  | SE           |
| SMAJ120  | 133.00                     | 163.00 | 1.00            | 120.00  | 5.00   | 1.9  | 214.00  | 0.104  | SF           |
| SMAJ120A | 133.00                     | 147.00 | 1.00            | 120.00  | 5.00   | 2.0  | 193.00  | 0.104  | SG           |
| SMAJ130  | 144.00                     | 176.00 | 1.00            | 130.00  | 5.00   | 1.7  | 231.00  | 0.104  | SH           |
| SMAJ130A | 144.00                     | 159.00 | 1.00            | 130.00  | 5.00   | 1.9  | 209.00  | 0.104  | SK           |
| SMAJ150  | 167.00                     | 204.00 | 1.00            | 150.00  | 5.00   | 1.5  | 268.00  | 0.104  | SL           |
| SMAJ150A | 167.00                     | 185.00 | 1.00            | 150.00  | 5.00   | 1.6  | 243.00  | 0.104  | SM           |
| SMAJ160  | 178.00                     | 218.00 | 1.00            | 160.00  | 5.00   | 1.4  | 287.00  | 0.104  | SN           |
| SMAJ160A | 178.00                     | 197.00 | 1.00            | 160.00  | 5.00   | 1.5  | 259.00  | 0.104  | SP           |
| SMAJ170  | 189.00                     | 231.00 | 1.00            | 170.00  | 5.00   | 1.3  | 304.00  | 0.104  | SQ           |
| SMAJ170A | 189.00                     | 209.00 | 1.00            | 170.00  | 5.00   | 1.4  | 275.00  | 0.104  | SR           |