

# SMAJ SERIES



SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS



## FEATURES

- \* For surface mount application
- \* Built-in strain relief
- \* Excellent clamping capability
- \* Low profile package
- \* Fast response time: Typically less than 1.0ps from 0 volt to BV min.
- \* Typical  $I_R$  less than  $1\mu A$  above 10V
- \* High temperature soldering guaranteed:  $260^{\circ}C$  / 10 seconds at terminals

## MECHANICAL DATA

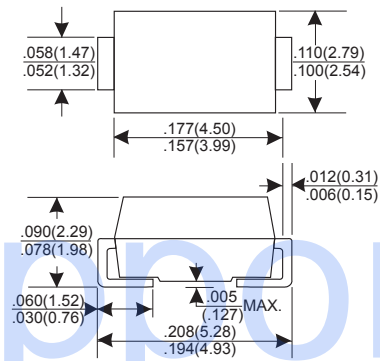
- \* Case: Molded plastic
- \* Epoxy: UL 94V-0 rate flame retardant
- \* Lead: Solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity: Color band denotes cathode end except Bidirectional
- \* Mounting position: Any
- \* Weight: 0.063 grams

## VOLTAGE RANGE

5.0 to 170 Volts

400 Watts Peak Power

### DO-214AC(SMA)



Dimensions in inches and (millimeters)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Rating  $25^{\circ}C$  ambient temperature unless otherwise specified.  
Single phase half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

| RATINGS  | SYMBOL         | VALUE       | UNITS       |
|--|----------------|-------------|-------------|
| Peak Power Dissipation at $T_A=25^{\circ}C$ , $T_P=1ms$ (NOTE 1)   | $P_{PK}$       | Minimum 400 | Watts       |
| Peak Forward Surge Current at 8.3ms Single Half Sine-Wave superimposed on rated load (JEDEC method) (NOTE 3) | $I_{FSM}$      | 40          | Amps        |
| Maximum Instantaneous Forward Voltage at 25.0A for Unidirectional only                                       | $V_F$          | 3.5         | Volts       |
| Operating and Storage Temperature Range  | $T_J, T_{STG}$ | -55 to +150 | $^{\circ}C$ |

### NOTES:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^{\circ}C$  per Fig. 2.
2. Mounted on Copper Pad area of  $5.0mm^2$  (.013mm Thick) to each terminal.
3. 8.3ms single half sine-wave, duty cycle = 4 pulses per minute maximum.

## DEVICES FOR BIPOLAR APPLICATIONS

1. For Bidirectional use C or CA Suffix for types SMAJ5.0 thru SMAJ170.
2. Electrical characteristics apply in both directions.

## RATING AND CHARACTERISTIC CURVES (SMAJ SERIES)

FIG.1-PEAK PULSE POWER DERATING CURVE

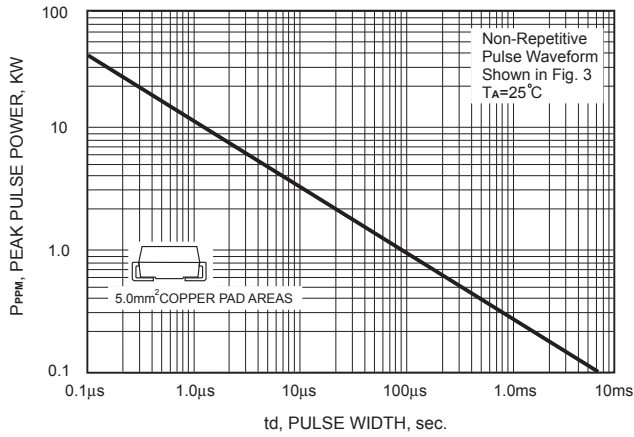


FIG.2-PULSE DERATING CURVE

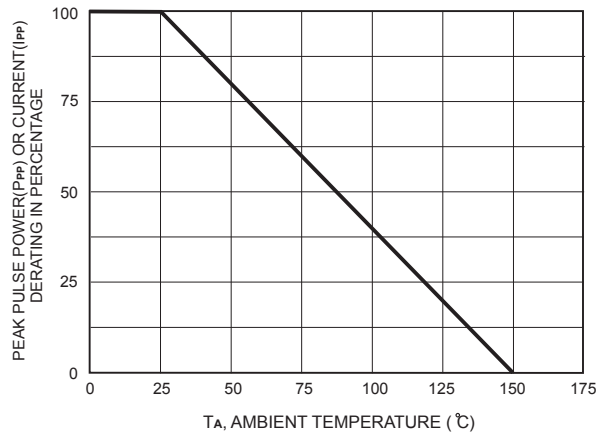


FIG.3-PULSE WAVE FORM



FIG.4-TYPICAL JUNCTION CAPACITANCE

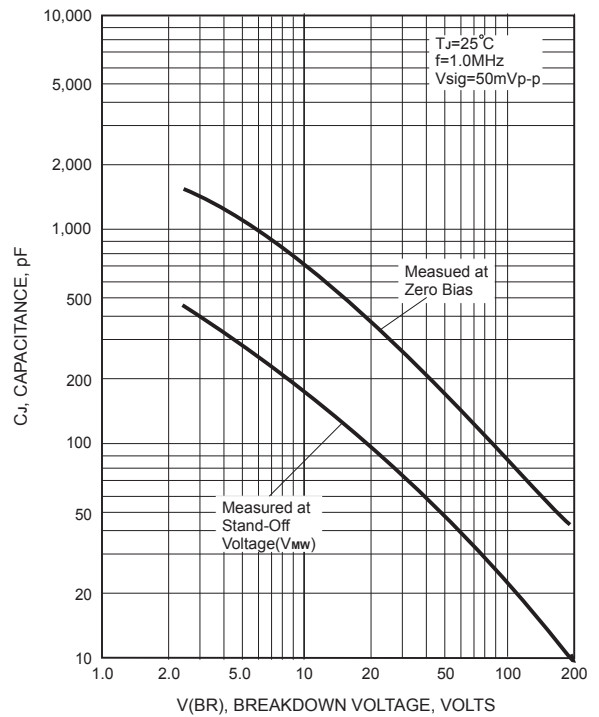
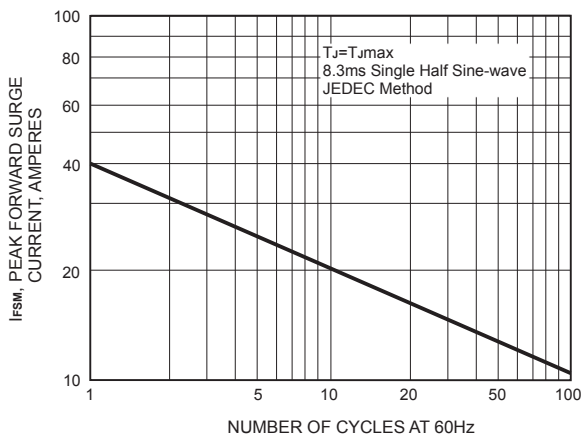


FIG.5-MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT



# 400 Watt Surface Mount TVS

| PART NUMBER<br>ADD C FOR BI-DIRECTIONAL | REVERSE STAND-OFF VOLTAGE<br>VRWM (V) | BREAKDOWN VOLTAGE VBR (V)<br>MIN. @IT | BREAKDOWN VOLTAGE VBR (V)<br>MAX. @IT | TEST CURRENT IT (mA) | MAXIMUM CLAMPING VOLTAGE @Ipp Vc (V) | PEAK PULSE CURRENT Ipp (A) | REVERSE LEAKAGE @ VRWM IR(μA) | MARKING CODE |     |
|---|---------------------------------------|---------------------------------------|---------------------------------------|----------------------|--------------------------------------|----------------------------|-------------------------------|--------------|-----|
|   |                                       |                                       |                                       |                      |                                      |                            |                               | UNI          | BI  |
| See Note 1                              |                                       |                                       |                                       |                      |                                      |                            |                               |              |     |
| SMAJ5.0(C)                              | 5.0                                   | 6.40                                  | 7.30                                  | 10                   | 9.6                                  | 41.6                       | 800                           | AD           | ADP |
| SMAJ5.0(C)A                             | 5.0                                   | 6.40                                  | 7.00                                  | 10                   | 9.2                                  | 43.5                       | 800                           | AE           | AEP |
| SMAJ6.0(C)                              | 6.0                                   | 6.67                                  | 8.15                                  | 10                   | 11.4                                 | 35.1                       | 800                           | AF           | AFP |
| SMAJ6.0(C)A                             | 6.0                                   | 6.67                                  | 7.37                                  | 10                   | 10.3                                 | 38.8                       | 800                           | AG           | AGP |
| SMAJ6.5(C)                              | 6.5                                   | 7.22                                  | 8.82                                  | 10                   | 12.3                                 | 32.5                       | 500                           | AH           | AHP |
| SMAJ6.5(C)A                             | 6.5                                   | 7.22                                  | 7.98                                  | 10                   | 11.2                                 | 35.7                       | 500                           | AK           | AKP |
| SMAJ7.0(C)                              | 7.0                                   | 7.78                                  | 9.51                                  | 10                   | 13.3                                 | 30.1                       | 200                           | AL           | ALP |
| SMAJ7.0(C)A                             | 7.0                                   | 7.78                                  | 8.60                                  | 10                   | 12.0                                 | 33.3                       | 200                           | AM           | AMP |
| SMAJ7.5(C)                              | 7.5                                   | 8.33                                  | 10.3                                  | 1                    | 14.3                                 | 28.0                       | 100                           | AN           | ANP |
| SMAJ5.0(C)A                             | 7.5                                   | 8.33                                  | 8.21                                  | 1                    | 12.9                                 | 31.0                       | 100                           | AP           | APP |
| SMAJ8.0(C)                              | 8.0                                   | 8.89                                  | 10.9                                  | 1                    | 15.0                                 | 26.5                       | 50                            | AQ           | AQP |
| SMAJ8.0(C)A                             | 8.0                                   | 8.89                                  | 9.83                                  | 1                    | 13.6                                 | 29.4                       | 50                            | AR           | ARP |
| SMAJ8.5(C)                              | 8.5                                   | 9.44                                  | 11.5                                  | 1                    | 15.9                                 | 25.1                       | 10                            | AS           | ASP |
| SMAJ8.5(C)A                             | 8.5                                   | 9.44                                  | 10.4                                  | 1                    | 14.4                                 | 27.7                       | 10                            | AT           | ATP |
| SMAJ9.0(C)                              | 9.0                                   | 10.0                                  | 12.2                                  | 1                    | 16.9                                 | 23.6                       | 5                             | AU           | AUP |
| SMAJ9.0(C)A                             | 9.0                                   | 10.0                                  | 11.1                                  | 1                    | 15.4                                 | 26.0                       | 5                             | AV           | AVP |
| SMAJ10(C)                               | 10                                    | 11.1                                  | 13.6                                  | 1                    | 18.8                                 | 21.1                       | 5                             | AW           | AWP |
| SMAJ10(C)A                              | 10                                    | 11.1                                  | 12.3                                  | 1                    | 17.0                                 | 23.5                       | 5                             | AX           | AXP |
| SMAJ11(C)                               | 11                                    | 12.2                                  | 14.9                                  | 1                    | 20.1                                 | 20.0                       | 5                             | AY           | AYP |
| SMAJ11(C)A                              | 11                                    | 12.2                                  | 13.5                                  | 1                    | 18.2                                 | 22.0                       | 5                             | AZ           | AZP |
| SMAJ12(C)                               | 12                                    | 13.3                                  | 16.3                                  | 1                    | 22.0                                 | 18.1                       | 5                             | BD           | BDP |
| SMAJ12(C)A                              | 12                                    | 13.3                                  | 14.7                                  | 1                    | 19.9                                 | 20.1                       | 5                             | BE           | BEP |
| SMAJ13(C)                               | 13                                    | 14.4                                  | 17.6                                  | 1                    | 23.8                                 | 16.8                       | 5                             | BF           | BFP |
| SMAJ13(C)A                              | 13                                    | 14.4                                  | 15.9                                  | 1                    | 21.5                                 | 18.6                       | 5                             | BG           | BGP |
| SMAJ14(C)                               | 14                                    | 15.6                                  | 19.1                                  | 1                    | 25.8                                 | 15.5                       | 5                             | BH           | BHP |
| SMAJ14(C)A                              | 14                                    | 15.6                                  | 17.2                                  | 1                    | 23.2                                 | 17.2                       | 5                             | BK           | BKP |
| SMAJ15(C)                               | 15                                    | 16.7                                  | 20.4                                  | 1                    | 26.9                                 | 14.8                       | 5                             | BL           | BLP |
| SMAJ15(C)A                              | 15                                    | 16.7                                  | 18.5                                  | 1                    | 24.4                                 | 16.4                       | 5                             | BM           | BMP |
| SMAJ16(C)                               | 16                                    | 17.8                                  | 21.8                                  | 1                    | 28.8                                 | 13.8                       | 5                             | BN           | BNP |
| SMAJ16(C)A                              | 16                                    | 17.8                                  | 19.7                                  | 1                    | 26.0                                 | 15.3                       | 5                             | BP           | BPP |
| SMAJ17(C)                               | 17                                    | 18.9                                  | 23.1                                  | 1                    | 30.5                                 | 13.1                       | 5                             | BQ           | BQP |
| SMAJ17(C)A                              | 17                                    | 18.9                                  | 20.9                                  | 1                    | 27.6                                 | 14.5                       | 5                             | BR           | BRP |
| SMAJ18(C)                               | 18                                    | 20.0                                  | 24.4                                  | 1                    | 32.2                                 | 12.4                       | 5                             | BS           | BSP |
| SMAJ18(C)A                              | 18                                    | 20.0                                  | 22.1                                  | 1                    | 29.2                                 | 13.7                       | 5                             | BT           | BTP |
| SMAJ20(C)                               | 20                                    | 22.2                                  | 27.1                                  | 1                    | 35.8                                 | 11.1                       | 5                             | BU           | BUP |
| SMAJ20(C)A                              | 20                                    | 22.2                                  | 24.5                                  | 1                    | 32.4                                 | 12.3                       | 5                             | BV           | BVP |
| SMAJ22(C)                               | 22                                    | 24.4                                  | 29.8                                  | 1                    | 39.4                                 | 10.1                       | 5                             | BW           | BWP |
| SMAJ22(C)A                              | 22                                    | 24.4                                  | 26.9                                  | 1                    | 35.5                                 | 11.2                       | 5                             | BX           | BXP |
| SMAJ24(C)                               | 24                                    | 26.7                                  | 32.6                                  | 1                    | 43.0                                 | 9.3                        | 5                             | BY           | BYP |
| SMAJ24(C)A                              | 24                                    | 26.7                                  | 29.5                                  | 1                    | 38.9                                 | 10.3                       | 5                             | BZ           | BZP |
| SMAJ26(C)                               | 26                                    | 28.9                                  | 35.3                                  | 1                    | 46.6                                 | 8.6                        | 5                             | CD           | CDP |
| SMAJ26(C)A                              | 26                                    | 28.9                                  | 31.9                                  | 1                    | 42.1                                 | 9.5                        | 5                             | CE           | CEP |
| SMAJ28(C)                               | 28                                    | 31.1                                  | 38.0                                  | 1                    | 50.0                                 | 8.0                        | 5                             | CF           | CFP |
| SMAJ28(C)A                              | 28                                    | 31.1                                  | 34.4                                  | 1                    | 45.4                                 | 8.8                        | 5                             | CG           | CGP |
| SMAJ30(C)                               | 30                                    | 33.3                                  | 40.7                                  | 1                    | 53.5                                 | 7.5                        | 5                             | CH           | CHP |
| SMAJ30(C)A                              | 30                                    | 33.3                                  | 36.8                                  | 1                    | 48.4                                 | 8.3                        | 5                             | CK           | CKP |
| SMAJ33(C)                               | 33                                    | 36.7                                  | 44.9                                  | 1                    | 59.0                                 | 6.8                        | 5                             | CL           | CLP |
| SMAJ33(C)A                              | 33                                    | 36.7                                  | 40.6                                  | 1                    | 53.3                                 | 7.5                        | 5                             | CM           | CMP |
| SMAJ36(C)                               | 36                                    | 40.0                                  | 48.9                                  | 1                    | 64.3                                 | 6.2                        | 5                             | CN           | CNP |
| SMAJ36(C)A                              | 36                                    | 40.0                                  | 44.2                                  | 1                    | 58.1                                 | 6.9                        | 5                             | CP           | CPP |
| SMAJ40(C)                               | 40                                    | 44.4                                  | 54.3                                  | 1                    | 71.4                                 | 5.6                        | 5                             | CQ           | CQP |
| SMAJ40(C)A                              | 40                                    | 44.4                                  | 49.1                                  | 1                    | 64.5                                 | 6.2                        | 5                             | CR           | CRP |
| SMAJ43(C)                               | 43                                    | 47.8                                  | 58.4                                  | 1                    | 76.7                                 | 5.2                        | 5                             | CS           | CSP |
| SMAJ43(C)A                              | 43                                    | 47.8                                  | 52.8                                  | 1                    | 69.4                                 | 5.7                        | 5                             | CT           | CTP |
| SMAJ45(C)                               | 45                                    | 50.0                                  | 61.1                                  | 1                    | 80.3                                 | 5.0                        | 5                             | CU           | CUP |
| SMAJ45(C)A                              | 45                                    | 50.0                                  | 55.3                                  | 1                    | 72.7                                 | 5.5                        | 5                             | CV           | CVP |
| SMAJ48(C)                               | 48                                    | 53.3                                  | 65.1                                  | 1                    | 85.5                                 | 4.7                        | 5                             | CW           | CWP |
| SMAJ48(C)A                              | 48                                    | 53.3                                  | 58.9                                  | 1                    | 77.4                                 | 5.2                        | 5                             | CX           | CXP |
| SMAJ51(C)                               | 51                                    | 56.7                                  | 69.3                                  | 1                    | 91.1                                 | 4.4                        | 5                             | CY           | CYP |
| SMAJ51(C)A                              | 51                                    | 56.7                                  | 62.7                                  | 1                    | 82.4                                 | 4.9                        | 5                             | CZ           | CZP |
| SMAJ54(C)                               | 54                                    | 60.0                                  | 73.3                                  | 1                    | 96.3                                 | 4.2                        | 5                             | RD           | RDP |
| SMAJ54(C)A                              | 54                                    | 60.0                                  | 66.3                                  | 1                    | 87.1                                 | 4.6                        | 5                             | RE           | REP |
| SMAJ58(C)                               | 58                                    | 64.4                                  | 78.7                                  | 1                    | 103                                  | 3.9                        | 5                             | RF           | RFP |
| SMAJ58(C)A                              | 58                                    | 64.4                                  | 71.2                                  | 1                    | 93.6                                 | 4.3                        | 5                             | RG           | RGP |

# 400 Watt Surface Mount TVS

| PART NUMBER<br>ADD C FOR BI-<br>DIRECTIONAL | REVERSE<br>STAND-OFF<br>VOLTAGE<br>VRWM (V) | BREAKDOWN<br>VOLTAGE<br>VBR (V) |          | TEST<br>CURRENT<br>IT<br>(mA) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>@Ipp Vc (V) | PEAK<br>PULSE<br>CURRENT<br>Ipp (A) | REVERSE<br>LEAKAGE<br>@ VRWM<br>IR(μA) | MARKING<br>CODE |     |
|---|---|---------------------------------|----------|-------------------------------|---|-------------------------------------|--|-----------------|-----|
|   |   | MIN. @IT                        | MAX. @IT |                               |   |                                     |  | UNI             | BI  |
| See Note 1                                  |   |                                 |          |                               |   |                                     |  |                 |     |
| SMAJ60(C)                                   | 60  | 66.7                            | 81.5     | 1                             | 107   | 3.7                                 | 5                                      | RH              | RHP |
| SMAJ60(C)A                                  | 60  | 66.7                            | 73.7     | 1                             | 96.8  | 4.1                                 | 5                                      | RK              | RKP |
| SMAJ64(C)                                   | 64  | 71.1                            | 86.4     | 1                             | 114   | 4.5                                 | 5                                      | RL              | RLP |
| SMAJ64(C)A                                  | 64  | 71.1                            | 78.6     | 1                             | 103   | 3.9                                 | 5                                      | RM              | RMP |
| SMAJ70(C)                                   | 70  | 77.8                            | 95.1     | 1                             | 125   | 3.2                                 | 5                                      | RN              | RNP |
| SMAJ70(C)A                                  | 70  | 77.8                            | 86.0     | 1                             | 113   | 3.5                                 | 5                                      | RP              | RPP |
| SMAJ75(C)                                   | 75  | 83.3                            | 102      | 1                             | 134   | 3.0                                 | 5                                      | RQ              | RQP |
| SMAJ75(C)A                                  | 75  | 83.3                            | 92.1     | 1                             | 121   | 3.3                                 | 5                                      | RR              | RRP |
| SMAJ78(C)                                   | 78  | 86.7                            | 106      | 1                             | 139   | 2.9                                 | 5                                      | RS              | RSP |
| SMAJ78(C)A                                  | 78  | 86.7                            | 95.8     | 1                             | 126   | 3.2                                 | 5                                      | RT              | RTP |
| SMAJ85(C)                                   | 85  | 94.4                            | 115      | 1                             | 151   | 2.6                                 | 5                                      | RU              | RUP |
| SMAJ85(C)A                                  | 85  | 94.4                            | 104      | 1                             | 137   | 2.9                                 | 5                                      | RV              | RVP |
| SMAJ90(C)                                   | 90  | 100                             | 122      | 1                             | 160   | 2.5                                 | 5                                      | RW              | RWP |
| SMAJ90(C)A                                  | 90  | 100                             | 111      | 1                             | 146   | 2.7                                 | 5                                      | RX              | RXP |
| SMAJ100(C)                                  | 100   | 111                             | 136      | 1                             | 179   | 2.2                                 | 5                                      | RY              | RYP |
| SMAJ100(C)A                                 | 100   | 111                             | 123      | 1                             | 162   | 2.5                                 | 5                                      | RZ              | RZP |
| SMAJ110(C)                                  | 110   | 122                             | 149      | 1                             | 196   | 2.0                                 | 5                                      | SD              | SDP |
| SMAJ110(C)A                                 | 110   | 122                             | 135      | 1                             | 177   | 2.3                                 | 5                                      | SE              | SEP |
| SMAJ120(C)                                  | 120   | 133                             | 163      | 1                             | 214   | 1.9                                 | 5                                      | SF              | SFP |
| SMAJ120(C)A                                 | 120   | 133                             | 147      | 1                             | 193   | 2.0                                 | 5                                      | SG              | SGP |
| SMAJ130(C)                                  | 130   | 144                             | 176      | 1                             | 231   | 1.7                                 | 5                                      | SH              | SHP |
| SMAJ130(C)A                                 | 130   | 144                             | 159      | 1                             | 209   | 1.9                                 | 5                                      | SK              | SKP |
| SMAJ150(C)                                  | 150   | 167                             | 204      | 1                             | 268   | 1.5                                 | 5                                      | SL              | SLP |
| SMAJ150(C)A                                 | 150   | 167                             | 185      | 1                             | 243   | 1.6                                 | 5                                      | SM              | SMP |
| SMAJ160(C)                                  | 160   | 178                             | 218      | 1                             | 287   | 1.4                                 | 5                                      | SN              | SNP |
| SMAJ160(C)A                                 | 160   | 178                             | 197      | 1                             | 259   | 1.5                                 | 5                                      | SP              | SPP |
| SMAJ170(C)                                  | 160   | 189                             | 231      | 1                             | 304   | 1.3                                 | 5                                      | SQ              | SQP |
| SMAJ170(C)A                                 | 170   | 189                             | 209      | 1                             | 275   | 1.4                                 | 5                                      | SR              | SRP |