

## Surface Mount Transient Voltage Suppressors (TVS)

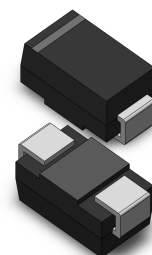
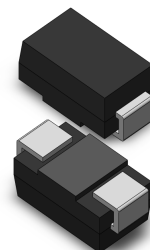
**SMAJ Series    5.0 To 440 V    400W**

### Description

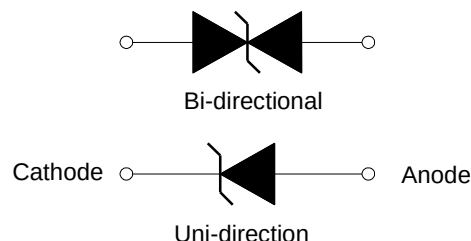
The SMAJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

### Features

- u For surface mounted applications in order to optimize board space
- u Low leakage
- u Uni and Bidirectional unit
- u Glass passivated junction
- u Low inductance
- u Excellent clamping capability
- u 400W Peak power capability at 10 × 1000μs waveform Repetition rate (duty cycle):0.01%
- u Fast response time: typically less than 1.0ps from 0 Volts to  $V_{BR}$  min
- u Typical  $I_R$  less than 5μA above 12V
- u High Temperature soldering: 260°C/40 seconds at terminals
- u Typical maximum temperature coefficient  $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- u Plastic package has Underwriters Laboratory Flammability 94V-0
- u Matte tin lead-free Plated
- u Halogen free and RoHS compliant
- u Typical failure mode is short from over-specified voltage or current
- u Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- u IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- u ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- u EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

**Uni-directional**

**Bi-directional**


### Functional Diagram



### Applications

TVS devices are ideal for the protection of I/O interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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

| Parameter                                                                        | Symbol         | Value          | Unit             |
|----------------------------------------------------------------------------------|----------------|----------------|------------------|
| Peak Pulse Power Dissipation with a 10/1000μs waveform (Fig.1)(Note 1), (Note 2) | $P_{PPM}$      | 400            | Watts            |
| Peak Pulse Current with a 10/1000μs waveform.(Note1, Fig.3)                      | $I_{PP}$       | See Next Table | Amps             |
| Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$                | $P_{M(AV)}$    | 1.0            | Watt             |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)                 | $I_{FSM}$      | 40             | Amps             |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)    | $V_F$          | 3.5/5.0        | Voltage          |
| Operating junction and Storage Temperature Range.                                | $T_J, T_{STG}$ | -55 to +150    | $^\circ\text{C}$ |

### Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2.
2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
4.  $V_F < 3.5\text{V}$  for  $V_{BR} < 200\text{V}$  and  $V_F < 6.5\text{V}$  for  $V_{BR} > 201\text{V}$ .

## Surface Mount Transient Voltage Suppressors (TVS)

**SMAJ Series 5.0 To 440 V 400W**
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

| Part Number |           | Marking |    | Reverse Stand-Off Voltage V <sub>RWM</sub> (V) | Breakdown Voltage V <sub>BR</sub> (V) @I <sub>T</sub> |       | Test Current I <sub>T</sub> (mA) | Maximum Clamping Voltage V <sub>C</sub> @I <sub>PP</sub> (V) | Maximum Peak Pulse Current I <sub>PP</sub> (A) | Maximum Reverse Leakage I <sub>R</sub> @V <sub>RWM</sub> (μA) |
|-------------|-----------|---------|----|------------------------------------------------|-------------------------------------------------------|-------|----------------------------------|--------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------|
| Uni         | Bi        | Uni     | Bi |                                                | MIN                                                   | MAX   |                                  |                                                              |                                                |                                                               |
| SMAJ5.0     | SMAJ5.0C  | AD      | WD | 5.0                                            | 6.40                                                  | 7.30  | 10                               | 9.6                                                          | 41.67                                          | 800                                                           |
| SMAJ5.0A    | SMAJ5.0CA | AE      | WE | 5.0                                            | 6.40                                                  | 7.00  | 10                               | 9.2                                                          | 43.48                                          | 800                                                           |
| SMAJ6.0     | SMAJ6.0C  | AF      | WF | 6.0                                            | 6.67                                                  | 8.15  | 10                               | 11.4                                                         | 35.09                                          | 800                                                           |
| SMAJ6.0A    | SMAJ6.0CA | AG      | WG | 6.0                                            | 6.67                                                  | 7.37  | 10                               | 10.3                                                         | 38.83                                          | 800                                                           |
| SMAJ6.5     | SMAJ6.5C  | AH      | WH | 6.5                                            | 7.22                                                  | 8.82  | 10                               | 12.3                                                         | 32.52                                          | 500                                                           |
| SMAJ6.5A    | SMAJ6.5CA | AK      | WK | 6.5                                            | 7.22                                                  | 7.98  | 10                               | 11.2                                                         | 35.71                                          | 500                                                           |
| SMAJ7.0     | SMAJ7.0C  | AL      | WL | 7.0                                            | 7.78                                                  | 9.51  | 10                               | 13.3                                                         | 30.08                                          | 200                                                           |
| SMAJ7.0A    | SMAJ7.0CA | AM      | WM | 7.0                                            | 7.78                                                  | 8.60  | 10                               | 12.0                                                         | 33.33                                          | 200                                                           |
| SMAJ7.5     | SMAJ7.5C  | AN      | WN | 7.5                                            | 8.33                                                  | 10.20 | 1                                | 14.3                                                         | 27.97                                          | 100                                                           |
| SMAJ7.5A    | SMAJ7.5CA | AP      | WP | 7.5                                            | 8.33                                                  | 9.21  | 1                                | 12.9                                                         | 31.01                                          | 100                                                           |
| SMAJ8.0     | SMAJ8.0C  | AQ      | WQ | 8.0                                            | 8.89                                                  | 10.90 | 1                                | 15.0                                                         | 26.67                                          | 50                                                            |
| SMAJ8.0A    | SMAJ8.0CA | AR      | WR | 8.0                                            | 8.89                                                  | 9.83  | 1                                | 13.6                                                         | 29.41                                          | 50                                                            |
| SMAJ8.5     | SMAJ8.5C  | AS      | WS | 8.5                                            | 9.44                                                  | 11.50 | 1                                | 15.9                                                         | 25.16                                          | 10                                                            |
| SMAJ8.5A    | SMAJ8.5CA | AT      | WT | 8.5                                            | 9.44                                                  | 10.40 | 1                                | 14.4                                                         | 27.78                                          | 10                                                            |
| SMAJ9.0     | SMAJ9.0C  | AU      | WU | 9.0                                            | 10.00                                                 | 12.20 | 1                                | 16.9                                                         | 23.67                                          | 5                                                             |
| SMAJ9.0A    | SMAJ9.0CA | AV      | WV | 9.0                                            | 10.00                                                 | 11.10 | 1                                | 15.4                                                         | 25.97                                          | 5                                                             |
| SMAJ10      | SMAJ10C   | AW      | WW | 10.0                                           | 11.10                                                 | 13.60 | 1                                | 18.8                                                         | 21.28                                          | 5                                                             |
| SMAJ10A     | SMAJ10CA  | AX      | WX | 10.0                                           | 11.10                                                 | 12.30 | 1                                | 17.0                                                         | 23.53                                          | 5                                                             |
| SMAJ11      | SMAJ11C   | AY      | WY | 11.0                                           | 12.20                                                 | 14.90 | 1                                | 20.1                                                         | 19.90                                          | 5                                                             |
| SMAJ11A     | SMAJ11CA  | AZ      | WZ | 11.0                                           | 12.20                                                 | 13.50 | 1                                | 18.2                                                         | 21.98                                          | 5                                                             |
| SMAJ12      | SMAJ12C   | BD      | XD | 12.0                                           | 13.30                                                 | 16.30 | 1                                | 22.0                                                         | 18.18                                          | 5                                                             |
| SMAJ12A     | SMAJ12CA  | BE      | XE | 12.0                                           | 13.30                                                 | 14.70 | 1                                | 19.9                                                         | 20.10                                          | 5                                                             |
| SMAJ13      | SMAJ13C   | BF      | XF | 13.0                                           | 14.40                                                 | 17.60 | 1                                | 23.8                                                         | 16.81                                          | 5                                                             |
| SMAJ13A     | SMAJ13CA  | BG      | XG | 13.0                                           | 14.40                                                 | 15.90 | 1                                | 21.5                                                         | 18.60                                          | 5                                                             |
| SMAJ14      | SMAJ14C   | BH      | XH | 14.0                                           | 15.60                                                 | 19.10 | 1                                | 25.8                                                         | 15.50                                          | 5                                                             |
| SMAJ14A     | SMAJ14CA  | BK      | XK | 14.0                                           | 15.60                                                 | 17.20 | 1                                | 23.2                                                         | 17.24                                          | 5                                                             |
| SMAJ15      | SMAJ15C   | BL      | XL | 15.0                                           | 16.70                                                 | 20.40 | 1                                | 26.9                                                         | 14.87                                          | 5                                                             |
| SMAJ15A     | SMAJ15CA  | BM      | XM | 15.0                                           | 16.70                                                 | 18.50 | 1                                | 24.4                                                         | 16.39                                          | 5                                                             |
| SMAJ16      | SMAJ16C   | BN      | XN | 16.0                                           | 17.80                                                 | 21.80 | 1                                | 28.8                                                         | 13.89                                          | 5                                                             |
| SMAJ16A     | SMAJ16CA  | BP      | XP | 16.0                                           | 17.80                                                 | 19.70 | 1                                | 26.0                                                         | 15.38                                          | 5                                                             |
| SMAJ17      | SMAJ17C   | BQ      | XQ | 17.0                                           | 18.90                                                 | 23.10 | 1                                | 30.5                                                         | 13.11                                          | 5                                                             |
| SMAJ17A     | SMAJ17CA  | BR      | XR | 17.0                                           | 18.90                                                 | 20.90 | 1                                | 27.6                                                         | 14.49                                          | 5                                                             |
| SMAJ18      | SMAJ18C   | BS      | XS | 18.0                                           | 20.00                                                 | 24.40 | 1                                | 32.2                                                         | 12.42                                          | 5                                                             |
| SMAJ18A     | SMAJ18CA  | BT      | XT | 18.0                                           | 20.00                                                 | 22.10 | 1                                | 29.2                                                         | 13.70                                          | 5                                                             |
| SMAJ19      | SMAJ19C   | BA      | XA | 19.0                                           | 21.13                                                 | 25.76 | 1                                | 34.0                                                         | 11.76                                          | 5                                                             |
| SMAJ19A     | SMAJ19CA  | BB      | XB | 19.0                                           | 21.10                                                 | 23.30 | 1                                | 30.8                                                         | 13.00                                          | 5                                                             |
| SMAJ20      | SMAJ20C   | BU      | XU | 20.0                                           | 22.20                                                 | 27.10 | 1                                | 35.8                                                         | 11.17                                          | 5                                                             |
| SMAJ20A     | SMAJ20CA  | BV      | XV | 20.0                                           | 22.20                                                 | 24.50 | 1                                | 32.4                                                         | 12.35                                          | 5                                                             |
| SMAJ22      | SMAJ22C   | BW      | XW | 22.0                                           | 24.40                                                 | 29.80 | 1                                | 39.4                                                         | 10.15                                          | 5                                                             |
| SMAJ22A     | SMAJ22CA  | BX      | XX | 22.0                                           | 24.40                                                 | 26.90 | 1                                | 35.5                                                         | 11.27                                          | 5                                                             |
| SMAJ24      | SMAJ24C   | BY      | XY | 24.0                                           | 26.70                                                 | 32.60 | 1                                | 43.0                                                         | 9.30                                           | 5                                                             |
| SMAJ24A     | SMAJ24CA  | BZ      | XZ | 24.0                                           | 26.70                                                 | 29.50 | 1                                | 38.9                                                         | 10.28                                          | 5                                                             |
| SMAJ26      | SMAJ26C   | CD      | YD | 26.0                                           | 28.90                                                 | 35.30 | 1                                | 46.6                                                         | 8.56                                           | 5                                                             |
| SMAJ26A     | SMAJ26CA  | CE      | YE | 26.0                                           | 28.90                                                 | 31.90 | 1                                | 42.1                                                         | 9.50                                           | 5                                                             |
| SMAJ28      | SMAJ28C   | CF      | YF | 28.0                                           | 31.10                                                 | 38.00 | 1                                | 50.0                                                         | 8.00                                           | 5                                                             |
| SMAJ28A     | SMAJ28CA  | CG      | YG | 28.0                                           | 31.10                                                 | 34.40 | 1                                | 45.4                                                         | 8.81                                           | 5                                                             |
| SMAJ30      | SMAJ30C   | CH      | YH | 30.0                                           | 33.30                                                 | 40.70 | 1                                | 53.5                                                         | 7.48                                           | 5                                                             |
| SMAJ30A     | SMAJ30CA  | CK      | YK | 30.0                                           | 33.30                                                 | 36.80 | 1                                | 48.4                                                         | 8.26                                           | 5                                                             |
| SMAJ33      | SMAJ33C   | CL      | YL | 33.0                                           | 36.70                                                 | 44.90 | 1                                | 59.0                                                         | 6.78                                           | 5                                                             |
| SMAJ33A     | SMAJ33CA  | CM      | YM | 33.0                                           | 36.70                                                 | 40.60 | 1                                | 53.3                                                         | 7.50                                           | 5                                                             |
| SMAJ36      | SMAJ36C   | CN      | YN | 36.0                                           | 40.00                                                 | 48.90 | 1                                | 64.3                                                         | 6.22                                           | 5                                                             |
| SMAJ36A     | SMAJ36CA  | CP      | YP | 36.0                                           | 40.00                                                 | 44.20 | 1                                | 58.1                                                         | 6.88                                           | 5                                                             |
| SMAJ40      | SMAJ40C   | CQ      | YQ | 40.0                                           | 44.40                                                 | 54.30 | 1                                | 71.4                                                         | 5.60                                           | 5                                                             |
| SMAJ40A     | SMAJ40CA  | CR      | YR | 40.0                                           | 44.40                                                 | 49.10 | 1                                | 64.5                                                         | 6.20                                           | 5                                                             |
| SMAJ43      | SMAJ43C   | CS      | YS | 43.0                                           | 47.80                                                 | 58.40 | 1                                | 76.7                                                         | 5.22                                           | 5                                                             |
| SMAJ43A     | SMAJ43CA  | CT      | YT | 43.0                                           | 47.80                                                 | 52.80 | 1                                | 69.4                                                         | 5.76                                           | 5                                                             |

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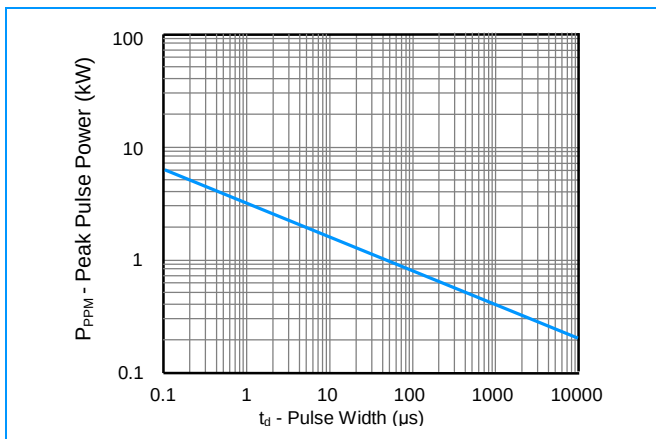
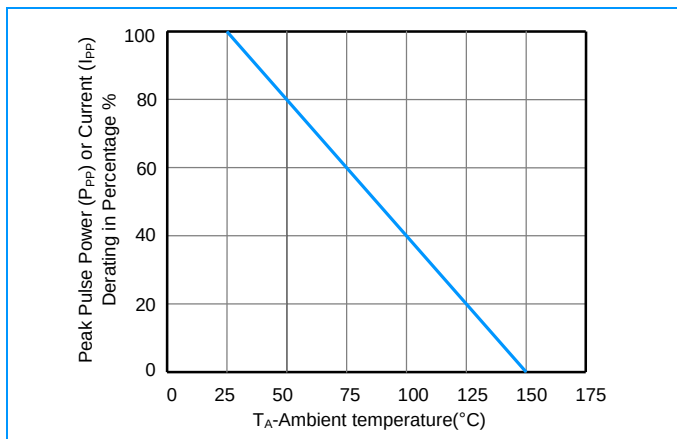
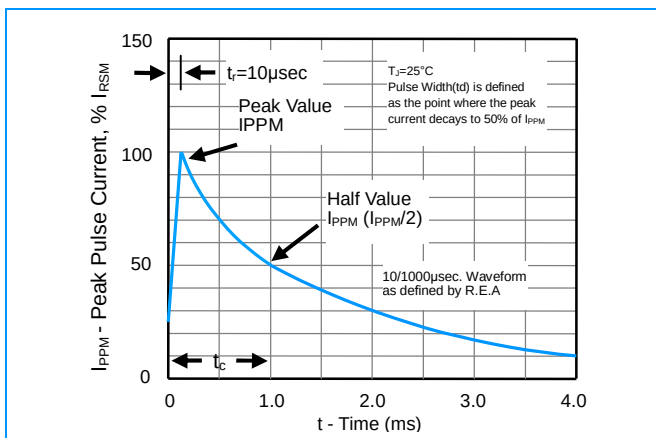
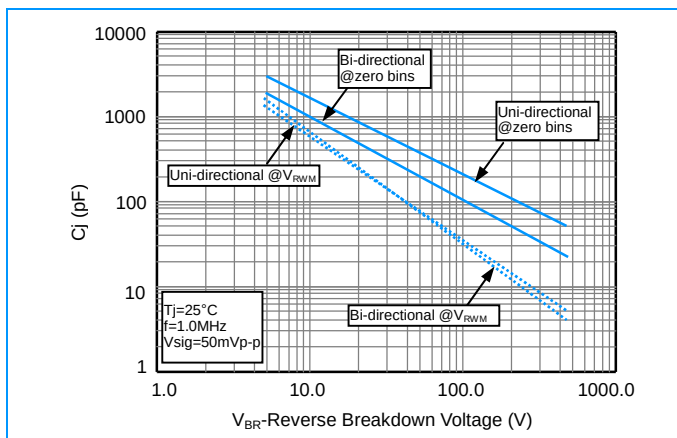
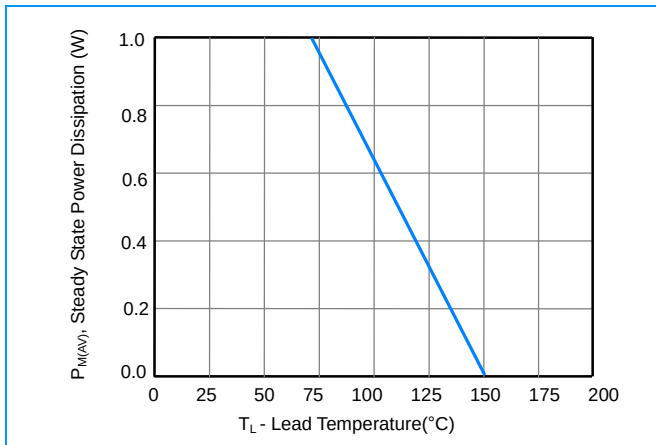
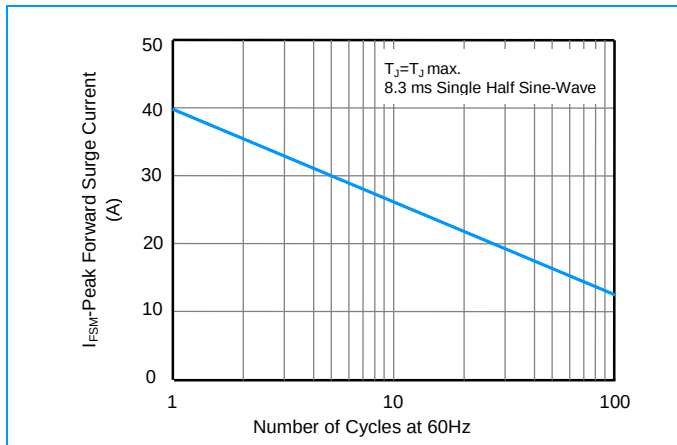
**SMAJ Series 5.0 To 440 V 400W**
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted) (Continue)**

| Part Number |           | Marking |    | Reverse Stand-Off Voltage V <sub>RWM</sub> (V) | Breakdown Voltage V <sub>BR</sub> (V) @I <sub>T</sub> |        | Test Current I <sub>T</sub> (mA) | Maximum Clamping Voltage V <sub>C</sub> @I <sub>PP</sub> (V) | Maximum Peak Pulse Current I <sub>PP</sub> (A) | Maximum Reverse Leakage I <sub>R</sub> @V <sub>RWM</sub> (μA) |
|-------------|-----------|---------|----|------------------------------------------------|-------------------------------------------------------|--------|----------------------------------|--------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------|
| Uni         | Bi        | Uni     | Bi |                                                | MIN                                                   | MAX    |                                  |                                                              |                                                |                                                               |
| SMAJ45      | SMAJ45C   | CU      | YU | 45.0                                           | 50.00                                                 | 61.10  | 1                                | 80.3                                                         | 4.98                                           | 5                                                             |
| SMAJ45A     | SMAJ45CA  | CV      | YV | 45.0                                           | 50.00                                                 | 55.30  | 1                                | 72.7                                                         | 5.50                                           | 5                                                             |
| SMAJ48      | SMAJ48C   | CW      | YW | 48.0                                           | 53.30                                                 | 65.10  | 1                                | 85.5                                                         | 4.68                                           | 5                                                             |
| SMAJ48A     | SMAJ48CA  | CX      | YX | 48.0                                           | 53.30                                                 | 58.90  | 1                                | 77.4                                                         | 5.17                                           | 5                                                             |
| SMAJ51      | SMAJ51C   | CY      | YY | 51.0                                           | 56.70                                                 | 69.30  | 1                                | 91.1                                                         | 4.39                                           | 5                                                             |
| SMAJ51A     | SMAJ51CA  | CZ      | YZ | 51.0                                           | 56.70                                                 | 62.70  | 1                                | 82.4                                                         | 4.85                                           | 5                                                             |
| SMAJ54      | SMAJ54C   | RD      | ZD | 54.0                                           | 60.00                                                 | 73.30  | 1                                | 96.3                                                         | 4.15                                           | 5                                                             |
| SMAJ54A     | SMAJ54CA  | RE      | ZE | 54.0                                           | 60.00                                                 | 66.30  | 1                                | 87.1                                                         | 4.59                                           | 5                                                             |
| SMAJ58      | SMAJ58C   | RF      | ZF | 58.0                                           | 64.40                                                 | 78.70  | 1                                | 103.0                                                        | 3.88                                           | 5                                                             |
| SMAJ58A     | SMAJ58CA  | RG      | ZG | 58.0                                           | 64.40                                                 | 71.20  | 1                                | 93.6                                                         | 4.27                                           | 5                                                             |
| SMAJ60      | SMAJ60C   | RH      | ZH | 60.0                                           | 66.70                                                 | 81.50  | 1                                | 107.0                                                        | 3.74                                           | 5                                                             |
| SMAJ60A     | SMAJ60CA  | RK      | ZK | 60.0                                           | 66.70                                                 | 73.70  | 1                                | 96.8                                                         | 4.13                                           | 5                                                             |
| SMAJ64      | SMAJ64C   | RL      | ZL | 64.0                                           | 71.10                                                 | 86.90  | 1                                | 114.0                                                        | 3.51                                           | 5                                                             |
| SMAJ64A     | SMAJ64CA  | RM      | ZM | 64.0                                           | 71.10                                                 | 78.60  | 1                                | 103.0                                                        | 3.88                                           | 5                                                             |
| SMAJ70      | SMAJ70C   | RN      | ZN | 70.0                                           | 77.80                                                 | 95.10  | 1                                | 125.0                                                        | 3.20                                           | 5                                                             |
| SMAJ70A     | SMAJ70CA  | RP      | ZP | 70.0                                           | 77.80                                                 | 86.00  | 1                                | 113.0                                                        | 3.54                                           | 5                                                             |
| SMAJ75      | SMAJ75C   | RQ      | ZQ | 75.0                                           | 83.30                                                 | 102.00 | 1                                | 134.0                                                        | 2.99                                           | 5                                                             |
| SMAJ75A     | SMAJ75CA  | RR      | ZR | 75.0                                           | 83.30                                                 | 92.10  | 1                                | 121.0                                                        | 3.31                                           | 5                                                             |
| SMAJ78      | SMAJ78C   | RS      | ZS | 78.0                                           | 86.70                                                 | 106.00 | 1                                | 139.0                                                        | 2.88                                           | 5                                                             |
| SMAJ78A     | SMAJ78CA  | RT      | ZT | 78.0                                           | 86.70                                                 | 95.80  | 1                                | 126.0                                                        | 3.17                                           | 5                                                             |
| SMAJ80      | SMAJ80C   | RA      | ZA | 80.0                                           | 88.96                                                 | 108.80 | 1                                | 143.2                                                        | 2.79                                           | 5                                                             |
| SMAJ80A     | SMAJ80CA  | RB      | ZB | 80.0                                           | 88.80                                                 | 97.60  | 1                                | 129.6                                                        | 3.09                                           | 5                                                             |
| SMAJ85      | SMAJ85C   | RU      | ZU | 85.0                                           | 94.40                                                 | 115.00 | 1                                | 151.0                                                        | 2.65                                           | 5                                                             |
| SMAJ85A     | SMAJ85CA  | RV      | ZV | 85.0                                           | 94.40                                                 | 104.00 | 1                                | 137.0                                                        | 2.92                                           | 5                                                             |
| SMAJ90      | SMAJ90C   | RW      | ZW | 90.0                                           | 100.00                                                | 122.00 | 1                                | 160.0                                                        | 2.50                                           | 5                                                             |
| SMAJ90A     | SMAJ90CA  | RX      | ZX | 90.0                                           | 100.00                                                | 111.00 | 1                                | 146.0                                                        | 2.74                                           | 5                                                             |
| SMAJ100     | SMAJ100C  | RY      | ZY | 100.0                                          | 111.00                                                | 136.00 | 1                                | 179.0                                                        | 2.23                                           | 5                                                             |
| SMAJ100A    | SMAJ100CA | RZ      | ZZ | 100.0                                          | 111.00                                                | 123.00 | 1                                | 162.0                                                        | 2.47                                           | 5                                                             |
| SMAJ110     | SMAJ110C  | SD      | VD | 110.0                                          | 122.00                                                | 149.00 | 1                                | 196.0                                                        | 2.04                                           | 5                                                             |
| SMAJ110A    | SMAJ110CA | SE      | VE | 110.0                                          | 122.00                                                | 135.00 | 1                                | 177.0                                                        | 2.26                                           | 5                                                             |
| SMAJ120     | SMAJ120C  | SF      | VF | 120.0                                          | 133.00                                                | 163.00 | 1                                | 214.0                                                        | 1.87                                           | 5                                                             |
| SMAJ120A    | SMAJ120CA | SG      | VG | 120.0                                          | 133.00                                                | 147.00 | 1                                | 193.0                                                        | 2.07                                           | 5                                                             |
| SMAJ130     | SMAJ130C  | SH      | VH | 130.0                                          | 144.00                                                | 176.00 | 1                                | 231.0                                                        | 1.73                                           | 5                                                             |
| SMAJ130A    | SMAJ130CA | SK      | VK | 130.0                                          | 144.00                                                | 159.00 | 1                                | 209.0                                                        | 1.91                                           | 5                                                             |
| SMAJ140     | SMAJ140C  | SA      | VA | 140.0                                          | 155.68                                                | 190.40 | 1                                | 250.6                                                        | 1.60                                           | 5                                                             |
| SMAJ140A    | SMAJ140CA | SB      | VB | 140.0                                          | 155.00                                                | 171.00 | 1                                | 226.8                                                        | 1.76                                           | 5                                                             |
| SMAJ150     | SMAJ150C  | SL      | VL | 150.0                                          | 167.00                                                | 204.00 | 1                                | 268.0                                                        | 1.49                                           | 5                                                             |
| SMAJ150A    | SMAJ150CA | SM      | VM | 150.0                                          | 167.00                                                | 185.00 | 1                                | 243.0                                                        | 1.65                                           | 5                                                             |
| SMAJ160     | SMAJ160C  | SN      | VN | 160.0                                          | 178.00                                                | 218.00 | 1                                | 287.0                                                        | 1.39                                           | 5                                                             |
| SMAJ160A    | SMAJ160CA | SP      | VP | 160.0                                          | 178.00                                                | 197.00 | 1                                | 259.0                                                        | 1.54                                           | 5                                                             |
| SMAJ170     | SMAJ170C  | SQ      | VQ | 170.0                                          | 189.00                                                | 231.00 | 1                                | 304.0                                                        | 1.32                                           | 5                                                             |
| SMAJ170A    | SMAJ170CA | SR      | VR | 170.0                                          | 189.00                                                | 209.00 | 1                                | 275.0                                                        | 1.45                                           | 5                                                             |
| SMAJ180     | SMAJ180C  | SS      | VS | 180.0                                          | 201.00                                                | 244.80 | 1                                | 322.2                                                        | 1.24                                           | 5                                                             |
| SMAJ180A    | SMAJ180CA | ST      | VT | 180.0                                          | 201.00                                                | 220.00 | 1                                | 291.6                                                        | 1.37                                           | 5                                                             |
| SMAJ190     | SMAJ190C  | SU      | VU | 190.0                                          | 211.21                                                | 258.40 | 1                                | 340.1                                                        | 1.18                                           | 5                                                             |
| SMAJ190A    | SMAJ190CA | SV      | VV | 190.0                                          | 211.00                                                | 232.00 | 1                                | 307.8                                                        | 1.30                                           | 5                                                             |
| SMAJ200A    | SMAJ200CA | SW      | VW | 200.0                                          | 224.00                                                | 247.00 | 1                                | 324.0                                                        | 1.23                                           | 5                                                             |
| SMAJ220A    | SMAJ220CA | SX      | VX | 220.0                                          | 246.00                                                | 272.00 | 1                                | 356.0                                                        | 1.12                                           | 5                                                             |
| SMAJ250A    | SMAJ250CA | SZ      | VZ | 250.0                                          | 279.00                                                | 309.00 | 1                                | 405.0                                                        | 0.99                                           | 5                                                             |
| SMAJ300A    | SMAJ300CA | DE      | HE | 300.0                                          | 335.00                                                | 371.00 | 1                                | 486.0                                                        | 0.82                                           | 5                                                             |
| SMAJ350A    | SMAJ350CA | DG      | HG | 350.0                                          | 391.00                                                | 432.00 | 1                                | 567.0                                                        | 0.71                                           | 5                                                             |
| SMAJ400A    | SMAJ400CA | DK      | HK | 400.0                                          | 447.00                                                | 494.00 | 1                                | 648.0                                                        | 0.62                                           | 5                                                             |
| SMAJ440A    | SMAJ440CA | DM      | HM | 440.0                                          | 492.00                                                | 543.00 | 1                                | 713.0                                                        | 0.56                                           | 5                                                             |

**Note:**

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V<sub>R</sub> of 10 volts and under, the I<sub>R</sub> limit is double

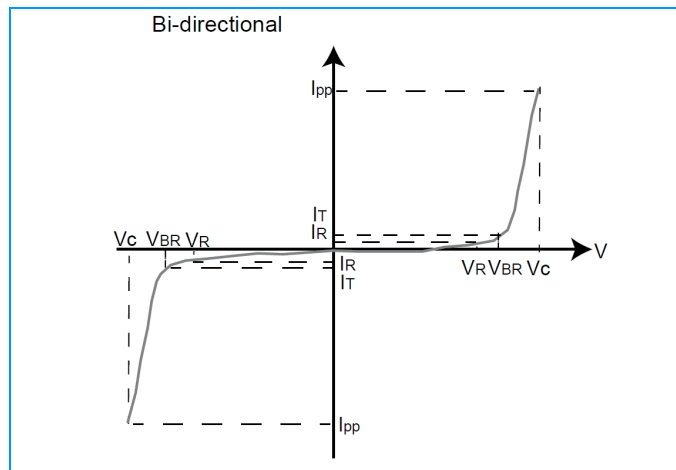
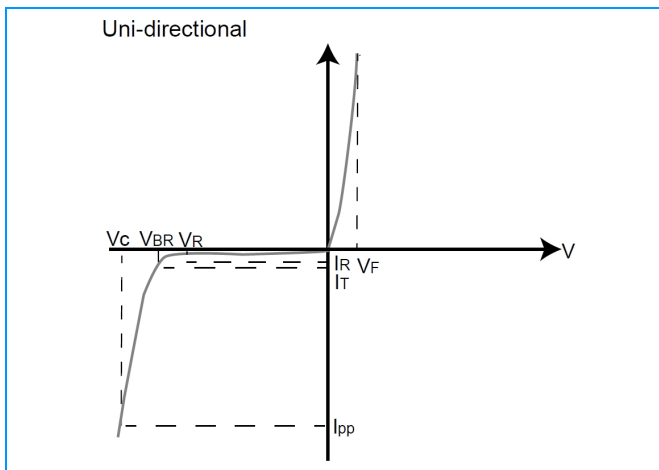
# Surface Mount Transient Voltage Suppressors (TVS)

**SMAJ Series 5.0 To 440 V 400W**
**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)**
**Figure 1 - Peak Pulse Power Rating Curve**

**Figure 2 - Pulse Derating Curve**

**Figure 3 - Pulse Waveform**

**Figure 4 - Typical Junction Capacitance**

**Figure 5 - Steady State Power Derating Curve**

**Figure 6 - Maximum Non-Repetitive Surge Current**


## Surface Mount Transient Voltage Suppressors (TVS)

**SMAJ Series 5.0 To 440 V 400W**

### I-V Curve Characteristics



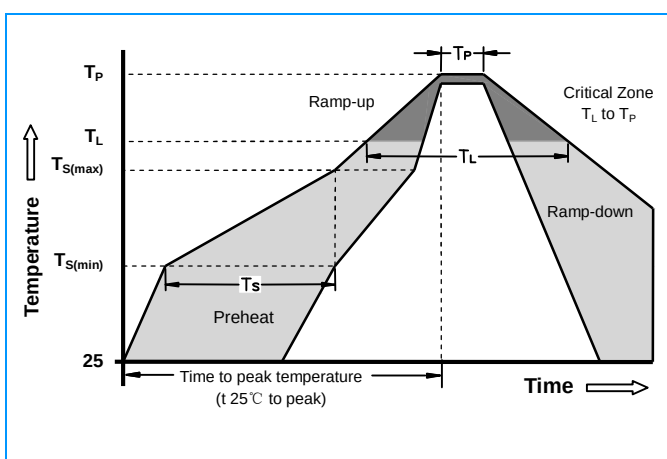
### Physical Specifications

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| <b>Weight</b>   | 0.002 ounce, 0.061 gram                                      |
| <b>Case</b>     | JEDEC DO-214AC Molded Plastic over glass passivated junction |
| <b>Polarity</b> | Color band denotes cathode except Bipolar                    |
| <b>Terminal</b> | Matte Tin-plated leads, Solderable per JESD22-B102D          |

### Environmental Specifications

|                           |             |
|---------------------------|-------------|
| <b>Temperature Cycle</b>  | JESD22-A104 |
| <b>Pressure Cooker</b>    | JESD22-A102 |
| <b>High Temp. Storage</b> | JESD22-A103 |
| <b>HTRB</b>               | JESD22-A108 |
| <b>Thermal Shock</b>      | JESD22-A106 |

### Soldering Parameters

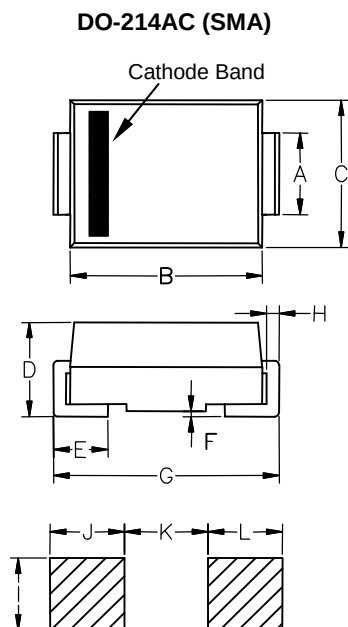


| Reflow Condition                                     |                                    | Lead-free assembly |
|------------------------------------------------------|------------------------------------|--------------------|
| Pre Heat                                             | -Temperature Min ( $T_{s(min)}$ )  | 150°C              |
|                                                      | -Temperature Max ( $T_{s(max)}$ )  | 200°C              |
|                                                      | - Time (min to max) ( $t_s$ )      | 60 -180 Seconds    |
| Average ramp up rate ( Liquidus Temp $T_L$ ) to peak |                                    | 3°C/second max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                 |                                    | 3°C/second max     |
| Reflow                                               | - Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | - Time (min to max) ( $t_s$ )      | 60 -150 Seconds    |
| Peak Temperature ( $T_P$ )                           |                                    | 260 +0/-5°C        |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                                    | 20 -40 Seconds     |
| Ramp-down Rate                                       |                                    | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )              |                                    | 8 minutes Max      |
| Do not exceed                                        |                                    | 280°C              |

## Surface Mount Transient Voltage Suppressors (TVS)

**SMAJ Series    5.0 To 440 V    400W**

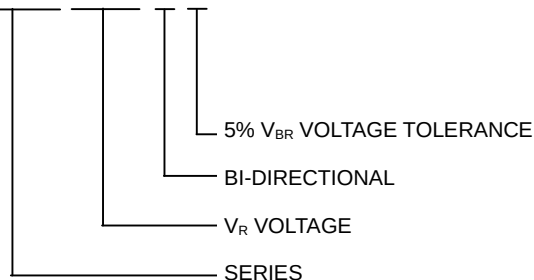
### Dimensions



| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| A          | 0.049  | 0.064 | 1.230       | 1.630 |
| B          | 0.162  | 0.179 | 4.10        | 4.550 |
| C          | 0.099  | 0.109 | 2.510       | 2.760 |
| D          | 0.077  | 0.089 | 1.960       | 2.260 |
| E          | 0.030  | 0.060 | 0.750       | 1.510 |
| F          | -      | 0.008 | -           | 0.203 |
| G          | 0.192  | 0.206 | 4.87        | 5.220 |
| H          | 0.006  | 0.012 | 0.152       | 0.305 |
| I          | 0.070  | -     | 1.800       | -     |
| J          | 0.082  | -     | 2.100       | -     |
| K          | -      | 0.090 | -           | 2.300 |
| L          | 0.082  | -     | 2.100       | -     |

### Part Numbering

**SMAJ × × × CA**



## Surface Mount Transient Voltage Suppressors (TVS)

**SMAJ Series    5.0 To 440 V    400W**

### Packaging

| Part Number | Component Package | Quantity | Packaging Option         | Packaging Specification |
|-------------|-------------------|----------|--------------------------|-------------------------|
| SMAJXXXXX   | DO-214AC (SMA)    | 1000     | Tape & Reel -12mm/7"tape | EIA STD RS-481          |

### Tape and Reel Specifications

