

# Transient Voltage Suppressor



## Features:

- Optimized for LAN Protection Applications
- Low Profile Package With Built-In Strain Relief For Surface Mounted Applications
- Low Incremental Surge Resistance, Excellent Clamping Capability
- 400W Peak Pulse Power Capability with a 10/1,000 $\mu$ s Wave Form, Repetition Rate (duty cycle): 0.01% (300W above 78V)
- Very Fast Response Time
- High Temperature Soldering Guaranteed : 260°C/10 seconds at Terminals

## Mechanical Data

- Case : JEDEC DO-214AC molded plastic over passivated chip
- Terminals : solder plated, solderable per MIL-STD-750, method 2026
- Polarity : for front-directional types the colour band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Mounting position: any Weight : 0.002oz, 0.064g

## Devices for Bidirectional Applications

For Bi-directional devices, use suffix C or CA (e.g. SMAJ10C, SMAJ10CA). Electrical characteristics apply in both directions.

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

| Characteristic                                                                        | Symbol          | Value          | Unit               |
|---------------------------------------------------------------------------------------|-----------------|----------------|--------------------|
| Peak power dissipation with a 10/1,000 $\mu$ s waveform (Note 1,2, Fig.1)             | $P_{PPM}$       | Min. 400       | W                  |
| Peak pulse current with a 10/1,000 $\mu$ s waveform (Note 1)                          | $I_{PPM}$       | See Next Table | A                  |
| Typical thermal resistance, junction to ambient (Note 3)                              | $R_{\theta JA}$ | 120            | $^\circ\text{C/W}$ |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only (Note 2) | $I_{FSM}$       | 40             | A                  |
| Typical thermal resistance, junction to ambient (Note 3)                              | $R_{\theta JL}$ | 30             | $^\circ\text{C/W}$ |
| Operating junction and storage temperature range                                      | $T_J, T_{STG}$  | -55 to +150    | $^\circ\text{C}$   |

### Note:

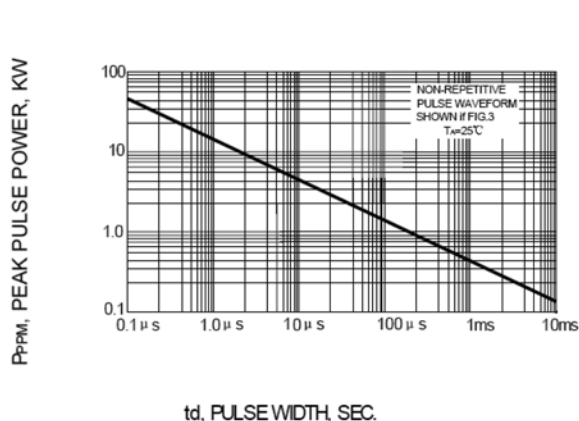
- (1) Non-repetitive current pulses, per Fig. 3 and derate above  $T_A=25^\circ\text{C}$  per Fig. 2. Rating is 300W above 78V.
- (2) Mounted on 0.2"  $\times$  0.2" (5mm  $\times$  5mm) copper pads to each terminal.
- (3) Mounted on minimum recommended pad layout

# Transient Voltage Suppressor

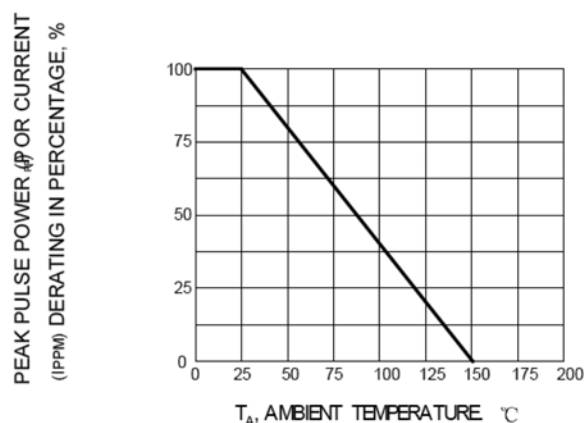
## Electrical Characteristics (T<sub>A</sub> = 25°C)

| Part Number    | Device Marking code |     | Dynamic |      |                 | V <sub>WM</sub> | I <sub>RM</sub> | IPPM | V <sub>C</sub> |
|----------------|---------------------|-----|---------|------|-----------------|-----------------|-----------------|------|----------------|
|                | UNI                 | BI  | V       |      | @I <sub>T</sub> |                 |                 |      |                |
|                |                     |     | Min.    | Max. | mA              | V               | uA              | A    | V              |
| SMAJ6.5A-13-F  | AAH                 | AWH | 7.22    | 8.82 | 10              | 6.5             | 500             | 32.5 | 12.3           |
| SMAJ6.5CA-13-F | AAK                 | AWK | 7.22    | 7.98 | 10              | 6.5             | 500             | 35.7 | 11.2           |
| SMAJ10A-13-F   | AAX                 | AWX | 11.1    | 12.3 | 1               | 10              | 5               | 23.5 | 17             |
| SMAJ11CA-13-F  | AAZ                 | AWZ | 12.2    | 13.5 | 1               | 11              | 5               | 22   | 18.2           |
| SMAJ15CA-13-F  | ABM                 | AXM | 16.7    | 18.5 | 1               | 15              | 5               | 16.4 | 24.4           |
| SMAJ16A-13-F   | ABP                 | AXP | 17.8    | 19.7 | 1               | 16              | 5               | 15.4 | 26             |
| SMAJ17A-13-F   | ABR                 | AXR | 18.9    | 20.9 | 1               | 17              | 5               | 14.5 | 27.6           |
| SMAJ20A-13-F   | ABV                 | AXV | 22.2    | 24.5 | 1               | 20              | 5               | 12.3 | 32.4           |
| SMAJ22A-13-F   | ABX                 | AXX | 24.4    | 26.9 | 1               | 22              | 5               | 11.3 | 35.5           |
| SMAJ24CA-13-F  | ABZ                 | AXZ | 26.7    | 29.5 | 1               | 24              | 5               | 10.3 | 38.9           |
| SMAJ33A-13-F   | ACM                 | AYM | 36.7    | 40.6 | 1               | 33              | 5               | 5.6  | 53.3           |
| SMAJ43CA-13-F  | ACT                 | AYT | 47.8    | 52.8 | 1               | 43              | 5               | 4.3  | 69.4           |
| SMAJ60A-13-F   | ARK                 | AZK | 66.7    | 73.7 | 1               | 60              | 5               | 3.1  | 96.8           |
| SMAJ60A-13-F   | ART                 | AZT | 86.7    | 95.8 | 1               | 78              | 5               | 2.4  | 126            |
| SMAJ78CA-13-F  | ART                 | AZT | 86.7    | 95.8 | 1               | 78              | 5               | 2.4  | 126            |
| SMAJ160A-13-F  | ASP                 | AVP | 178     | 197  | 1               | 160             | 5               | 1.2  | 259            |

**FIG.1 – PEAK PULSE POWER RATING CURVE**

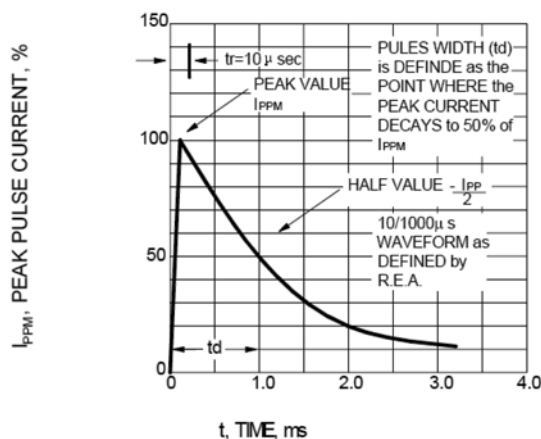


**FIG.2 – PULSE DERATING CURVE**

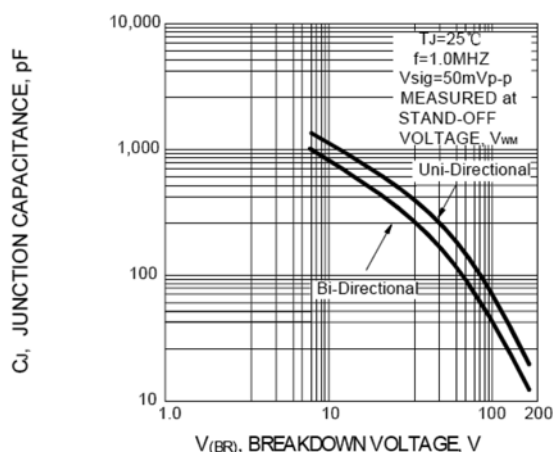


# Transient Voltage Suppressor

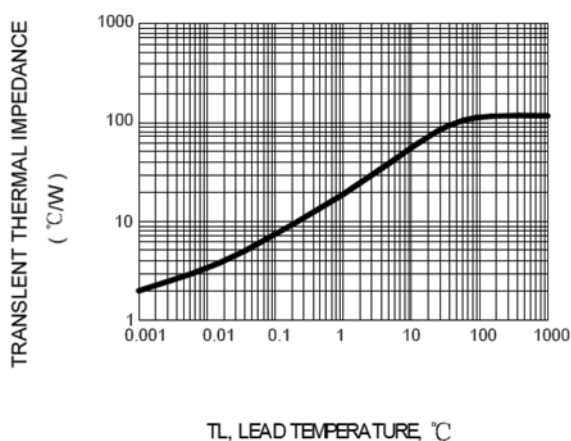
**FIG.3 – PULSE WAVEFORM**



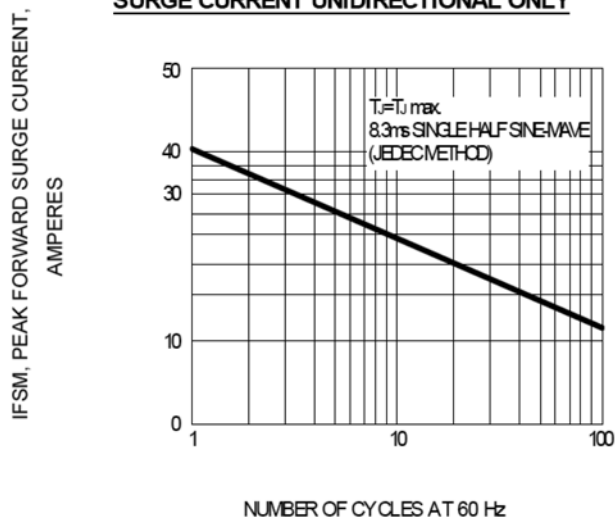
**FIG.4 – TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL**



**FIG.5 – TYPICAL TRANSIENT THERMAL IMPEDANCE**

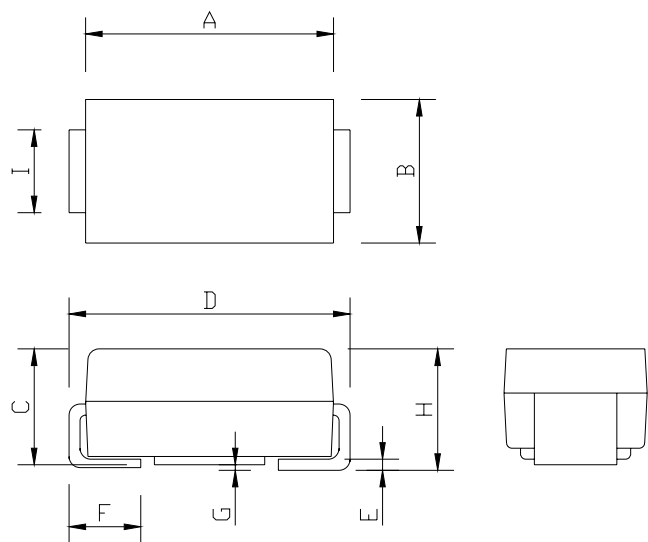


**FIG.6 – MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY**



# Transient Voltage Suppressor

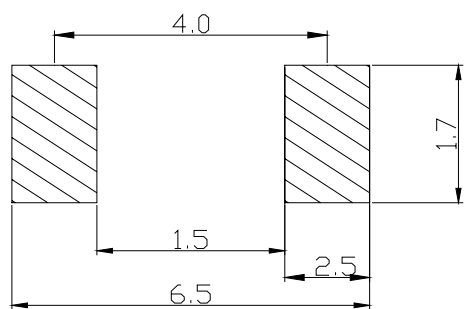
## Package Outline Dimensions



| DO-214AC(SMA) |          |      |
|---------------|----------|------|
| Dim.          | Min.     | Max. |
| A             | 4.25     | 4.65 |
| B             | 2.4      | 2.8  |
| C             | 1.85     | 2.15 |
| D             | 4.85     | 5.35 |
| E             | 0.2 Typ. |      |
| F             | 0.9      | 1.5  |
| G             | 0.2 Max. |      |
| H             | 1.9      | 2.3  |
| I             | 1.35     | 1.65 |

Dimensions : Millimetres

## Soldering Footprint



Dimensions : Millimetres

## Package Information

| Device                                                                                                                                                                                                                                                                | Package       | Shipping            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|
| SMAJ6.5A-13-F<br>SMAJ6.5CA-13-F<br>SMAJ10A-13-F<br>SMAJ11CA-13-F<br>SMAJ15CA-13-F<br>SMAJ16A-13-F<br>SMAJ17A-13-F<br>SMAJ20A-13-F<br>SMAJ22A-13-F<br>SMAJ24CA-13-F<br>SMAJ33A-13-F<br>SMAJ43CA-13-F<br>SMAJ60A-13-F<br>SMAJ60A-13-F<br>SMAJ78CA-13-F<br>SMAJ160A-13-F | DO-214AC(SMA) | 5,000 / Tape & Reel |

# Transient Voltage Suppressor

Part Number Table

| Description                  | Part Number    |
|------------------------------|----------------|
| Transient Voltage Suppressor | SMAJ6.5A-13-F  |
|                              | SMAJ6.5CA-13-F |
|                              | SMAJ10A-13-F   |
|                              | SMAJ11CA-13-F  |
|                              | SMAJ15CA-13-F  |
|                              | SMAJ16A-13-F   |
|                              | SMAJ17A-13-F   |
|                              | SMAJ20A-13-F   |
|                              | SMAJ22A-13-F   |
|                              | SMAJ24CA-13-F  |
|                              | SMAJ33A-13-F   |
|                              | SMAJ43CA-13-F  |
|                              | SMAJ60A-13-F   |
|                              | SMAJ60A-13-F   |
|                              | SMAJ78CA-13-F  |
|                              | SMAJ160A-13-F  |

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