

## Transient Voltage Suppressor: SMCJ5.0 - SMCJ188CA

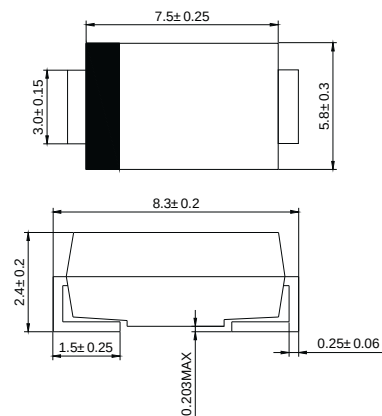
### Features:

- Glass passivated junction
- Low incremental surge resistance, excellent clamping capability
- 1500W peak pulse power capability with a 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Very fast response time
- High temperature soldering guaranteed: 250°C/10 secs at terminals

### Mechanical Data:

- Case: JEDEC DO-214AB moulded plastic over glass passivated junction
- Polarity: For uni-directional types the colour band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- Weight: 0.007 ounces, 0.21 grams
- Flammability: epoxy is rated UL 94V-0

### DO-214AB(SMC)



Dimensions in millimeters

### Devices for Bidirectional Applications:

For bi-directional devices, use suffix C or CA (eg SMCJ10C, SMCJ10CA). Electrical characteristics apply in both directions. No colour band on bi-directional devices.

Maximum Ratings & Characteristics: Tamb=25°C, unless otherwise specified.

|                                                                                      | Symbol:        | Value:          | Unit: |
|--------------------------------------------------------------------------------------|----------------|-----------------|-------|
| Peak power dissipation with a 10/1000 $\mu$ s waveform (NOTE1,2,FIG1)                | $P_{PPM}$      | Minimum 1500    | W     |
| Peak pulse current with a 10/1000 $\mu$ s waveform (NOTE1)                           | $I_{PPM}$      | See table below | A     |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only (NOTE2) | $I_{FSM}$      | 200.0           | A     |
| Typical thermal resistance, junction to ambient (NOTE3)                              | $R_{thJA}$     | 100.0           | °C/W  |
| Typical thermal resistance, junction to lead                                         | $R_{thJL}$     | 20              | °C/W  |
| Operational junction and storage temperature range                                   | $T_J, T_{STG}$ | -55 to +150     | °C    |

### Notes:

1. Non-repetitive current pulses, per fig.3 and derated above  $T_A=25^\circ\text{C}$  per fig.2
2. Mounted on 0.2 x 0.2" (5.0 x 5.0mm) copper pads to each terminal
3. Mounted on minimum recommended pad layout

## Electrical Characteristics: $T_{amb}=25^{\circ}\text{C}$ unless otherwise specified $V_F=3.5\text{V}$ @ $I_F=50\text{mA}$ (uni-directional only)

| Type: Part No add<br>C for Bi-directional | Device Marking<br>Code: |     | $V_{(BR)}$ |         |               | $V_{WM}$ | $I_{RM}$ @ $V_{WM}$ | $I_{PPM}$ | $V_c$ @ $I_{PPM}$ |
|-------------------------------------------|-------------------------|-----|------------|---------|---------------|----------|---------------------|-----------|-------------------|
|                                           | UNI                     | BI  | Min (V)    | Max (V) | mA (@ $I_r$ ) | V        | $\mu\text{A}$       | A         | V                 |
| SMCJ5.0 (C)                               | GDD                     | BDD | 6.40       | 7.82    | 10            | 5.0      | 800                 | 62.5      | 9.6               |
| SMCJ5.0 (C)A                              | DGE                     | BGE | 6.40       | 7.07    | 10            | 5.0      | 800                 | 65.2      | 9.2               |
| SMCJ6.0 (C)                               | GDF                     | BDF | 6.67       | 8.15    | 10            | 6.0      | 800                 | 52.6      | 11.4              |
| SMCJ6.0 (C)A                              | GDG                     | BDG | 6.67       | 8.15    | 10            | 6.0      | 800                 | 58.3      | 10.3              |
| SMCJ6.5 (C)                               | GDH                     | BDH | 7.22       | 8.82    | 10            | 6.5      | 500                 | 48.8      | 12.3              |
| SMCJ6.5 (C)A                              | GDK                     | BDK | 7.22       | 7.98    | 10            | 6.5      | 500                 | 53.6      | 11.2              |
| SMCJ7.0 (C)                               | GDL                     | BDL | 7.78       | 9.51    | 10            | 7.0      | 200                 | 45.1      | 13.3              |
| SMCJ7.0 (C)A                              | GDM                     | BDM | 7.78       | 8.60    | 10            | 7.0      | 200                 | 50.0      | 12.0              |
| SMCJ7.5 (C)                               | GDN                     | BDN | 8.33       | 10.2    | 1.0           | 7.5      | 100                 | 42.0      | 14.3              |
| SMCJ7.5 (C)A                              | GDP                     | BDP | 8.33       | 9.21    | 1.0           | .5       | 100                 | 46.5      | 12.9              |
| SMCJ8.0 (C)                               | GDQ                     | BDQ | 8.89       | 10.9    | 1.0           | 8.0      | 50                  | 40.0      | 15.0              |
| SMCJ8.0 (C)A                              | GDR                     | BDR | 8.89       | 9.83    | 1.0           | 8.0      | 50                  | 44.1      | 13.6              |
| SMCJ8.5 (C)                               | GDS                     | BDS | 9.44       | 11.5    | 1.0           | 8.5      | 20                  | 37.7      | 15.9              |
| SMCJ8.5 (C)A                              | GDT                     | BDT | 9.44       | 10.4    | 1.0           | 8.5      | 20                  | 41.7      | 14.4              |
| SMCJ9.0 (C)                               | GDU                     | BDU | 10.0       | 12.2    | 1.0           | 9.0      | 10                  | 35.5      | 16.9              |
| SMCJ9.0 (C)A                              | GDV                     | BDV | 10.0       | 11.1    | 1.0           | 9.0      | 10                  | 39.0      | 15.4              |
| SMCJ10 (C)                                | GDW                     | BDW | 11.1       | 13.6    | 1.0           | 10       | 5.0                 | 31.9      | 18.8              |
| SMCJ10 (C)A                               | GDX                     | BDX | 11.1       | 12.3    | 1.0           | 10       | 5.0                 | 35.3      | 17.0              |
| SMCJ11 (C)                                | GDY                     | BDY | 12.2       | 14.9    | 1.0           | 11       | 5.0                 | 29.9      | 20.1              |
| SMCJ11 (C)A                               | GDZ                     | BDZ | 12.2       | 13.5    | 1.0           | 11       | 5.0                 | 33.0      | 18.2              |
| SMCJ12 (C)                                | GED                     | BED | 13.3       | 16.2    | 1.0           | 12       | 5.0                 | 27.3      | 22.0              |
| SMCJ12 (C)A                               | GEE                     | BEE | 13.3       | 14.7    | 1.0           | 12       | 5.0                 | 30.2      | 19.9              |
| SMCJ13 (C)                                | GEF                     | BEF | 14.4       | 17.6    | 1.0           | 13       | 5.0                 | 25.2      | 23.8              |
| SMCJ13 (C)A                               | GEG                     | BEG | 14.4       | 15.9    | 1.0           | 13       | 5.0                 | 27.9      | 21.5              |
| SMCJ14 (C)                                | GEH                     | BEH | 15.6       | 19.1    | 1.0           | 14       | 5.0                 | 23.3      | 25.8              |
| SMCJ14 (C)A                               | GEK                     | BEK | 15.6       | 17.2    | 1.0           | 14       | 5.0                 | 25.9      | 23.2              |
| SMCJ15 (C)                                | GEL                     | BEL | 16.7       | 20.4    | 1.0           | 15       | 5.0                 | 22.3      | 26.9              |
| SMCJ15 (C)A                               | GEM                     | BEM | 16.7       | 18.5    | 1.0           | 15       | 5.0                 | 24.6      | 24.4              |
| SMCJ16 (C)                                | GEN                     | BEN | 17.8       | 21.8    | 1.0           | 16       | 5.0                 | 20.8      | 28.8              |
| SMCJ16 (C)A                               | GEP                     | BEP | 17.8       | 19.7    | 1.0           | 16       | 5.0                 | 23.1      | 26.0              |
| SMCJ17 (C)                                | GEQ                     | BEQ | 18.9       | 23.1    | 1.0           | 17       | 5.0                 | 19.7      | 30.5              |
| SMCJ17 (C)A                               | GER                     | BER | 18.9       | 20.9    | 1.0           | 17       | 5.0                 | 21.7      | 27.6              |
| SMCJ18 (C)                                | GES                     | BES | 20.0       | 24.4    | 1.0           | 18       | 5.0                 | 18.6      | 32.2              |
| SMCJ18 (C)A                               | GET                     | BET | 20.0       | 22.1    | 1.0           | 18       | 5.0                 | 20.5      | 29.2              |
| SMCJ20 (C)                                | GEU                     | BEU | 22.2       | 27.1    | 1.0           | 20       | 5.0                 | 16.8      | 35.8              |
| SMCJ20 (C)A                               | GEV                     | BEV | 22.2       | 24.5    | 1.0           | 20       | 5.0                 | 18.5      | 32.4              |

## Electrical Characteristics: $T_{amb}=25^{\circ}\text{C}$ unless otherwise specified $V_F=3.5\text{V}$ @ $I_F=50\text{A}$ (uni-directional only)

| Type: Part No add<br>C for Bi-directional | Device Marking Code: |     | $V_{(BR)}$ |         |               | $V_{WM}$ | $I_{RM}$ @ $V_{WM}$ | $I_{PPM}$ | $V_C$ @ $I_{PPM}$ |
|-------------------------------------------|----------------------|-----|------------|---------|---------------|----------|---------------------|-----------|-------------------|
|                                           | UNI                  | BI  | Min (V)    | Max (V) | mA (@ $I_F$ ) | V        | $\mu\text{A}$       | A         | V                 |
| SMCJ22 (C)                                | GEW                  | BEW | 24.4       | 29.8    | 1.0           | 22       | 5.0                 | 15.2      | 39.4              |
| SMCJ22 (C)A                               | GEX                  | BEX | 24.4       | 26.9    | 1.0           | 22       | 5.0                 | 16.9      | 35.5              |
| SMCJ24 (C)                                | GEY                  | BEY | 26.7       | 32.6    | 1.0           | 24       | 5.0                 | 14.0      | 43.0              |
| SMCJ24 (C)A                               | GEZ                  | BEZ | 26.7       | 29.5    | 1.0           | 24       | 5.0                 | 15.4      | 38.9              |
| SMCJ26 (C)                                | GFD                  | BFD | 28.9       | 35.3    | 1.0           | 26       | 5.0                 | 12.9      | 46.6              |
| SMCJ26 (C)A                               | GFE                  | BFE | 28.9       | 31.9    | 1.0           | 26       | 5.0                 | 14.3      | 42.1              |
| SMCJ28 (C)                                | GFF                  | BFF | 31.1       | 38.0    | 1.0           | 28       | 5.0                 | 12.0      | 50.0              |
| SMCJ28 (C)A                               | GFG                  | BFG | 31.1       | 34.4    | 1.0           | 28       | 5.0                 | 13.2      | 45.4              |
| SMCJ30 (C)                                | GFH                  | BFH | 33.3       | 40.7    | 1.0           | 30       | 5.0                 | 11.2      | 53.5              |
| SMCJ30 (C)A                               | GFK                  | BFK | 33.3       | 36.8    | 1.0           | 30       | 5.0                 | 12.4      | 48.4              |
| SMCJ33 (C)                                | GFL                  | BFL | 36.7       | 44.9    | 1.0           | 33       | 5.0                 | 10.2      | 59.0              |
| SMCJ33 (C)A                               | GFM                  | BFM | 36.7       | 40.6    | 1.0           | 33       | 5.0                 | 11.3      | 53.3              |
| SMCJ36 (C)                                | GFN                  | BFN | 40.0       | 48.9    | 1.0           | 36       | 5.0                 | 9.3       | 64.3              |
| SMCJ36 (C)A                               | GFP                  | BFP | 40.0       | 44.2    | 1.0           | 36       | 5.0                 | 10.3      | 58.1              |
| SMCJ40 (C)                                | GFQ                  | BFQ | 44.4       | 54.3    | 1.0           | 40       | 5.0                 | 8.4       | 71.4              |
| SMCJ40 (C)A                               | GFR                  | BFR | 44.4       | 49.1    | 1.0           | 40       | 5.0                 | 9.3       | 64.5              |
| SMCJ43 (C)                                | GFS                  | BFS | 47.8       | 58.4    | 1.0           | 43       | 5.0                 | 7.8       | 76.7              |
| SMCJ43 (C)A                               | GFT                  | BFT | 47.8       | 52.8    | 1.0           | 43       | 5.0                 | 8.6       | 69.4              |
| SMCJ45 (C)                                | GFU                  | BFU | 50.0       | 61.1    | 1.0           | 45       | 5.0                 | 7.5       | 80.3              |
| SMCJ45 (C)A                               | GFV                  | BFV | 50.0       | 55.3    | 1.0           | 45       | 5.0                 | 8.3       | 72.7              |
| SMCJ48 (C)                                | GEH                  | BEH | 53.3       | 65.1    | 1.0           | 48       | 5.0                 | 7.0       | 85.5              |
| SMCJ48 (C)A                               | GEK                  | BEK | 53.3       | 58.9    | 1.0           | 48       | 5.0                 | 7.8       | 77.4              |
| SMCJ51 (C)                                | GEL                  | BEL | 56.7       | 69.3    | 1.0           | 51       | 5.0                 | 6.6       | 91.1              |
| SMCJ51 (C)A                               | GEM                  | BEM | 56.7       | 62.7    | 1.0           | 51       | 5.0                 | 7.3       | 82.4              |
| SMCJ54 (C)                                | GFW                  | BFW | 60.0       | 73.3    | 1.0           | 54       | 5.0                 | 6.2       | 96.3              |
| SMCJ54 (C)A                               | GFX                  | BFX | 60.0       | 66.3    | 1.0           | 54       | 5.0                 | 6.9       | 87.1              |
| SMCJ58 (C)                                | GFY                  | BFY | 64.4       | 78.7    | 1.0           | 58       | 5.0                 | 5.8       | 103               |
| SMCJ58 (C)A                               | GFZ                  | BFZ | 64.4       | 71.2    | 1.0           | 58       | 5.0                 | 6.4       | 93.6              |
| SMCJ60 (C)                                | GGD                  | BGD | 66.7       | 81.5    | 1.0           | 60       | 5.0                 | 5.6       | 107               |
| SMCJ60 (C)A                               | GGE                  | BGE | 66.7       | 73.7    | 1.0           | 60       | 5.0                 | 6.2       | 96.8              |
| SMCJ64 (C)                                | GGF                  | BGF | 71.1       | 86.9    | 1.0           | 64       | 5.0                 | 5.3       | 114               |
| SMCJ64 (C)A                               | GGG                  | BGG | 71.1       | 78.6    | 1.0           | 64       | 5.0                 | 5.8       | 103               |
| SMCJ70 (C)                                | GGH                  | BGH | 77.8       | 95.1    | 1.0           | 70       | 5.0                 | 4.8       | 125               |
| SMCJ70 (C)A                               | GGK                  | BGK | 77.8       | 86.0    | 1.0           | 70       | 5.0                 | 5.3       | 113               |
| SMCJ75 (C)                                | GGL                  | BGL | 83.3       | 102     | 1.0           | 75       | 5.0                 | 4.5       | 134               |
| SMCJ75 (C)A                               | GGM                  | BGM | 83.3       | 92.1    | 1.0           | 75       | 5.0                 | 5.0       | 121               |

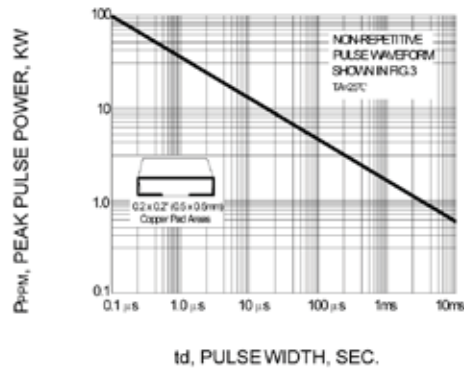
## Electrical Characteristics: Tamb=25°C unless otherwise specified V<sub>F</sub>=3.5V @ I<sub>F</sub>=50A (uni-directional only)

| Type: Part No add<br>C for Bi-directional | Device Marking<br>Code: |     | V <sub>(BR)</sub> |         |                       | V <sub>WM</sub> | I <sub>RM</sub> @ V <sub>WM</sub> | I <sub>PPM</sub> | V <sub>c</sub> @ I <sub>PPM</sub> |
|-------------------------------------------|-------------------------|-----|-------------------|---------|-----------------------|-----------------|-----------------------------------|------------------|-----------------------------------|
|                                           | UNI                     | BI  | Min (V)           | Max (V) | mA (@I <sub>T</sub> ) | V               | μA                                | A                | V                                 |
| SMCJ78 (C)                                | GGN                     | BGN | 86.7              | 106     | 1.0                   | 78              | 5.0                               | 4.3              | 139                               |
| SMCJ78 (C)A                               | GGP                     | BGP | 86.7              | 95.8    | 1.0                   | 78              | 5.0                               | 4.8              | 126                               |
| SMCJ85 (C)                                | GGQ                     | BGQ | 94.4              | 115     | 1.0                   | 85              | 5.0                               | 4.0              | 151                               |
| SMCJ85 (C)A                               | GGR                     | BGR | 94.4              | 104     | 1.0                   | 85              | 5.0                               | 4.4              | 137                               |
| SMCJ90 (C)                                | GGS                     | BGS | 100               | 122     | 1.0                   | 90              | 5.0                               | 3.8              | 160                               |
| SMCJ90 (C)A                               | GGT                     | BGT | 100               | 111     | 1.0                   | 90              | 5.0                               | 4.1              | 146                               |
| SMCJ100 (C)                               | GGU                     | BGU | 111               | 136     | 1.0                   | 100             | 5.0                               | 3.4              | 179                               |
| SMCJ100 (C)A                              | GGV                     | BGV | 111               | 123     | 1.0                   | 100             | 5.0                               | 3.7              | 162                               |
| SMCJ110 (C)                               | GGW                     | BGW | 122               | 149     | 1.0                   | 110             | 5.0                               | 3.1              | 196                               |
| SMCJ110 (C)A                              | GGX                     | BGX | 122               | 135     | 1.0                   | 110             | 5.0                               | 3.4              | 177                               |
| SMCJ120 (C)                               | GGY                     | BGY | 133               | 163     | 1.0                   | 120             | 5.0                               | 2.8              | 214                               |
| SMCJ120 (C)A                              | GGZ                     | BGZ | 133               | 147     | 1.0                   | 120             | 5.0                               | 3.1              | 193                               |
| SMCJ130 (C)                               | GHD                     | BHD | 144               | 176     | 1.0                   | 130             | 5.0                               | 2.6              | 231                               |
| SMCJ130 (C)A                              | GHE                     | BHE | 144               | 159     | 1.0                   | 130             | 5.0                               | 2.9              | 209                               |
| SMCJ150 (C)                               | GHF                     | BHF | 167               | 204     | 1.0                   | 150             | 5.0                               | 2.2              | 268                               |
| SMCJ150 (C)A                              | GHG                     | BHG | 167               | 185     | 1.0                   | 150             | 5.0                               | 2.5              | 243                               |
| SMCJ160 (C)                               | GHH                     | BHH | 178               | 218     | 1.0                   | 160             | 5.0                               | 2.1              | 287                               |
| SMCJ160 (C)A                              | GHK                     | BHK | 178               | 197     | 1.0                   | 160             | 5.0                               | 2.3              | 259                               |
| SMCJ170 (C)                               | GHL                     | BHL | 189               | 231     | 1.0                   | 170             | 5.0                               | 2.0              | 304                               |
| SMCJ170 (C)A                              | GHM                     | BHM | 189               | 209     | 1.0                   | 170             | 5.0                               | 2.2              | 275                               |
| SMCJ188 (C)                               | GHN                     | BHN | 209               | 255     | 1.0                   | 168             | 5.0                               | 1.7              | 344                               |
| SMCJ188 (C)A                              | GHP                     | BHP | 209               | 231     | 1.0                   | 188             | 5.0                               | 2.0              | 328                               |

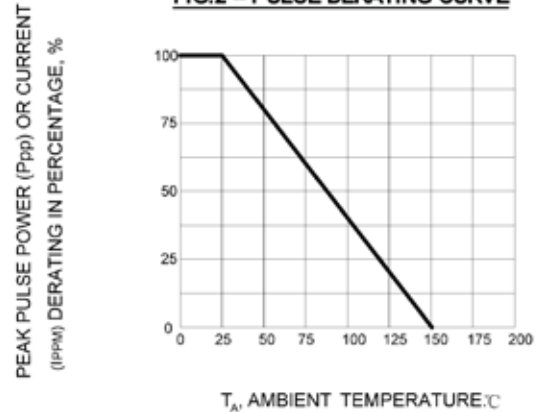
# Transient Voltage Suppressor: SMCJ5.0 - SMCJ188CA

## Ratings & Characteristic Curves

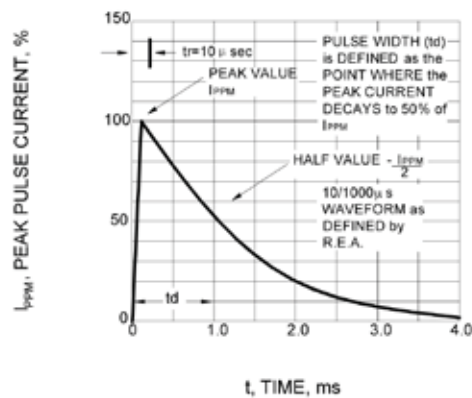
**FIG.1 – PEAK PULSE POWER RATING CURVE**



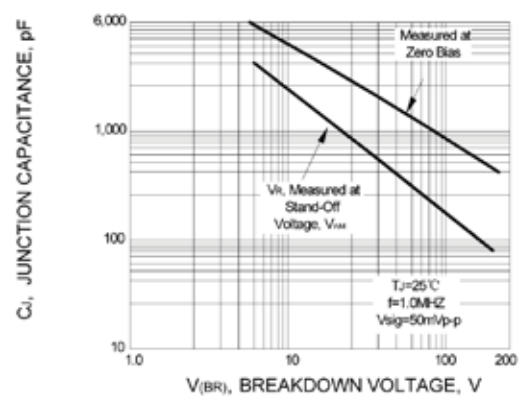
**FIG.2 – PULSE DERATING CURVE**



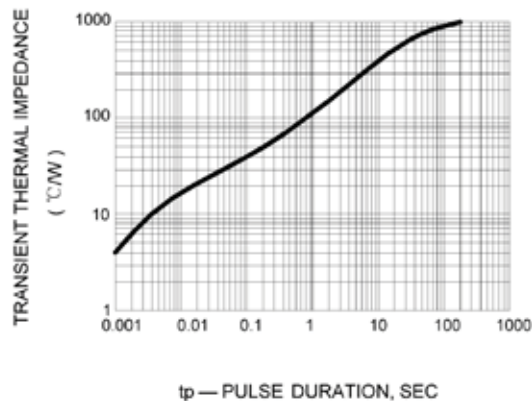
**FIG.3 – PULSE WAVEFORM**



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



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



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

