

## SMCJ 5.0 ~ 188A

**Stand-off Voltage : 5.0 to 188V**

**Peak Pulse Power : 1500 W**

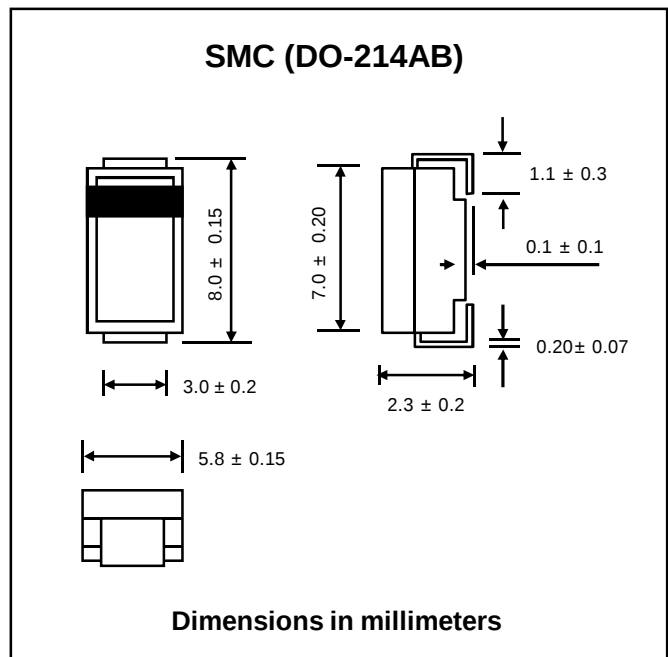
### FEATURES :

- \* 1500W peak pulse power capability with a 10/1000μs waveform
- \* Excellent clamping capability
- \* Very fast response time
- \* Pb / RoHS Free

### MECHANICAL DATA

- \* Case : SMC Molded plastic
- \* Epoxy : UL94V-0 rate flame retardant
- \* Lead : Lead Formed for Surface Mount
- \* Polarity : Color band denotes cathode end
- \* Mounting position : Any
- \* Weight : 0.26 gram

## SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR



### DEVICES FOR BIPOLAR APPLICATIONS

For Bi-directional use C or CA Suffix

Electrical characteristics apply in both directions

### MAXIMUM RATINGS

Rating at 25°C ambient temperature unless otherwise specified

| Rating                                                                | Symbol                            | Value          | Unit |
|-----------------------------------------------------------------------|-----------------------------------|----------------|------|
| Peak Pulse Power Dissipation on 10/1000μs waveform <sup>(1) (2)</sup> | P <sub>PPM</sub>                  | 1500           | W    |
| Peak Forward Surge Current per Fig. 5 <sup>(2)</sup>                  | I <sub>FSM</sub>                  | 200            | A    |
| Peak Pulse Current on 10/1000μs waveform <sup>(1)</sup>               | I <sub>PPM</sub>                  | See Next Table | A    |
| Maximum Instantaneous Forward Voltage at I <sub>F</sub> = 100A        | V <sub>FM</sub>                   | 3.5            | V    |
| Typical Thermal Resistance , Junction to Ambient <sup>(3)</sup>       | R <sub>θJA</sub>                  | 75             | °C/W |
| Operating Junction and Storage Temperature Range                      | T <sub>J</sub> , T <sub>STG</sub> | - 55 to + 150  | °C   |

### Notes :

- (1) Non-repetitive Current pulse per Fig. 3 and derated above T<sub>a</sub> = 25 °C per Fig. 1
- (2) Mounted on 0.31x 0.31" (8.0 x 8.0mm) copper pads to each terminal.
- (3) Mounted on minimum recommended pad layout

# ELECTRICAL CHARACTERISTICS Rating at 25°C ambient temperature unless otherwise specified

| Type     | Breakdown Voltage @ $I_T^{(1)}$ |      |       | Working Peak Reverse Voltage | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Pulse Surge Current | Maximum Clamping Voltage @ $I_{PPM}$ |
|----------|---------------------------------|------|-------|------------------------------|------------------------------------|----------------------------------|--------------------------------------|
|          | $V_{BR}$ (V)                    |      | $I_T$ | $V_{WM}$                     | $I_R$                              | $I_{PPM}$                        | $V_C$                                |
|          | Min.                            | Max. | (mA)  | (V)                          | ( $\mu A$ )                        | (A)                              | (V)                                  |
| SMCJ5.0  | 6.40                            | 7.82 | 10    | 5.0                          | 1000                               | 156.3                            | 9.6                                  |
| SMCJ5.0A | 6.40                            | 7.25 | 10    | 5.0                          | 1000                               | 163.0                            | 9.2                                  |
| SMCJ6.0  | 6.67                            | 8.15 | 10    | 6.0                          | 1000                               | 131.6                            | 11.4                                 |
| SMCJ6.0A | 6.67                            | 7.37 | 10    | 6.0                          | 1000                               | 145.6                            | 10.3                                 |
| SMCJ6.5  | 7.22                            | 8.82 | 10    | 6.5                          | 500                                | 122.0                            | 12.3                                 |
| SMCJ6.5A | 7.22                            | 7.98 | 10    | 6.5                          | 500                                | 133.9                            | 11.2                                 |
| SMCJ7.0  | 7.78                            | 9.51 | 10    | 7.0                          | 200                                | 112.8                            | 13.3                                 |
| SMCJ7.0A | 7.78                            | 8.6  | 10    | 7.0                          | 200                                | 125.0                            | 12.0                                 |
| SMCJ7.5  | 8.33                            | 10.2 | 1.0   | 7.5                          | 100                                | 104.9                            | 14.3                                 |
| SMCJ7.5A | 8.33                            | 9.21 | 1.0   | 7.5                          | 100                                | 116.3                            | 12.9                                 |
| SMCJ8.0  | 8.89                            | 10.9 | 1.0   | 8.0                          | 50                                 | 100.0                            | 15.0                                 |
| SMCJ8.0A | 8.89                            | 9.83 | 1.0   | 8.0                          | 50                                 | 110.3                            | 13.6                                 |
| SMCJ8.5  | 9.44                            | 11.5 | 1.0   | 8.5                          | 20                                 | 94.3                             | 15.9                                 |
| SMCJ8.5A | 9.44                            | 10.4 | 1.0   | 8.5                          | 20                                 | 104.2                            | 14.4                                 |
| SMCJ9.0  | 10.0                            | 12.2 | 1.0   | 9.0                          | 10                                 | 88.8                             | 16.9                                 |
| SMCJ9.0A | 10.0                            | 11.1 | 1.0   | 9.0                          | 10                                 | 97.4                             | 15.4                                 |
| SMCJ10   | 11.1                            | 13.6 | 1.0   | 10                           | 5.0                                | 79.8                             | 18.8                                 |
| SMCJ10A  | 11.1                            | 12.3 | 1.0   | 10                           | 5.0                                | 88.2                             | 17.0                                 |
| SMCJ11   | 12.2                            | 14.9 | 1.0   | 11                           | 5.0                                | 74.6                             | 20.1                                 |
| SMCJ11A  | 12.2                            | 13.5 | 1.0   | 11                           | 5.0                                | 82.4                             | 18.2                                 |
| SMCJ12   | 13.3                            | 16.3 | 1.0   | 12                           | 5.0                                | 68.2                             | 22.0                                 |
| SMCJ12A  | 13.3                            | 14.7 | 1.0   | 12                           | 5.0                                | 75.4                             | 19.9                                 |
| SMCJ13   | 14.4                            | 17.6 | 1.0   | 13                           | 1.0                                | 63.0                             | 23.8                                 |
| SMCJ13A  | 14.4                            | 15.9 | 1.0   | 13                           | 1.0                                | 69.8                             | 21.5                                 |
| SMCJ14   | 15.6                            | 19.1 | 1.0   | 14                           | 1.0                                | 58.1                             | 25.8                                 |
| SMCJ14A  | 15.6                            | 17.2 | 1.0   | 14                           | 1.0                                | 64.7                             | 23.2                                 |
| SMCJ15   | 16.7                            | 20.4 | 1.0   | 15                           | 1.0                                | 55.8                             | 26.9                                 |
| SMCJ15A  | 16.7                            | 18.5 | 1.0   | 15                           | 1.0                                | 61.5                             | 24.4                                 |
| SMCJ16   | 17.8                            | 21.8 | 1.0   | 16                           | 1.0                                | 52.1                             | 28.8                                 |
| SMCJ16A  | 17.8                            | 19.7 | 1.0   | 16                           | 1.0                                | 57.7                             | 26.0                                 |
| SMCJ17   | 18.9                            | 23.1 | 1.0   | 17                           | 1.0                                | 49.2                             | 30.5                                 |
| SMCJ17A  | 18.9                            | 20.9 | 1.0   | 17                           | 1.0                                | 54.3                             | 27.6                                 |
| SMCJ18   | 20.0                            | 24.4 | 1.0   | 18                           | 1.0                                | 46.6                             | 32.2                                 |
| SMCJ18A  | 20.0                            | 22.1 | 1.0   | 18                           | 1.0                                | 51.4                             | 29.2                                 |
| SMCJ20   | 22.2                            | 27.1 | 1.0   | 20                           | 1.0                                | 41.9                             | 35.8                                 |
| SMCJ20A  | 22.2                            | 24.5 | 1.0   | 20                           | 1.0                                | 46.3                             | 32.4                                 |
| SMCJ22   | 24.4                            | 29.8 | 1.0   | 22                           | 1.0                                | 38.1                             | 39.4                                 |
| SMCJ22A  | 24.4                            | 26.9 | 1.0   | 22                           | 1.0                                | 42.3                             | 35.5                                 |
| SMCJ24   | 26.7                            | 32.6 | 1.0   | 24                           | 1.0                                | 34.9                             | 43.0                                 |
| SMCJ24A  | 26.7                            | 29.5 | 1.0   | 24                           | 1.0                                | 38.6                             | 38.9                                 |
| SMCJ26   | 28.9                            | 35.3 | 1.0   | 26                           | 1.0                                | 32.2                             | 46.6                                 |
| SMCJ26A  | 28.9                            | 31.9 | 1.0   | 26                           | 1.0                                | 35.6                             | 42.1                                 |
| SMCJ28   | 31.1                            | 38.0 | 1.0   | 28                           | 1.0                                | 30.0                             | 50.0                                 |
| SMCJ28A  | 31.1                            | 34.4 | 1.0   | 28                           | 1.0                                | 33.0                             | 45.4                                 |
| SMCJ30   | 33.3                            | 40.7 | 1.0   | 30                           | 1.0                                | 28.0                             | 53.5                                 |
| SMCJ30A  | 33.3                            | 36.8 | 1.0   | 30                           | 1.0                                | 31.0                             | 48.4                                 |
| SMCJ33   | 36.7                            | 44.9 | 1.0   | 33                           | 1.0                                | 25.4                             | 59.0                                 |
| SMCJ33A  | 36.7                            | 40.6 | 1.0   | 33                           | 1.0                                | 28.1                             | 53.3                                 |
| SMCJ36   | 40.0                            | 48.9 | 1.0   | 36                           | 1.0                                | 23.3                             | 64.3                                 |
| SMCJ36A  | 40.0                            | 44.2 | 1.0   | 36                           | 1.0                                | 25.8                             | 58.1                                 |

## ELECTRICAL CHARACTERISTICS Rating at 25°C ambient temperature unless otherwise specified

| Type     | Breakdown Voltage @ $I_T^{(1)}$ |      |       | Working Peak Reverse Voltage | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Pulse Surge Current | Maximum Clamping Voltage @ $I_{PPM}$ |
|----------|---------------------------------|------|-------|------------------------------|------------------------------------|----------------------------------|--------------------------------------|
|          | $V_{BR}$ (V)                    |      | $I_T$ | $V_{WM}$                     | $I_R$                              | $I_{PPM}$                        | $V_C$                                |
|          | Min.                            | Max. | (mA)  | (V)                          | ( $\mu A$ )                        | (A)                              | (V)                                  |
| SMCJ40   | 44.4                            | 54.3 | 1.0   | 40                           | 1.0                                | 21.0                             | 71.4                                 |
| SMCJ40A  | 44.4                            | 49.1 | 1.0   | 40                           | 1.0                                | 23.3                             | 64.5                                 |
| SMCJ43   | 47.8                            | 58.4 | 1.0   | 43                           | 1.0                                | 19.6                             | 76.7                                 |
| SMCJ43A  | 47.8                            | 52.8 | 1.0   | 43                           | 1.0                                | 21.6                             | 69.4                                 |
| SMCJ45   | 50.0                            | 61.1 | 1.0   | 45                           | 1.0                                | 18.7                             | 80.3                                 |
| SMCJ45A  | 50.0                            | 55.3 | 1.0   | 45                           | 1.0                                | 20.6                             | 72.7                                 |
| SMCJ48   | 53.3                            | 65.1 | 1.0   | 48                           | 1.0                                | 17.5                             | 85.5                                 |
| SMCJ48A  | 53.3                            | 58.9 | 1.0   | 48                           | 1.0                                | 19.4                             | 77.4                                 |
| SMCJ51   | 56.7                            | 69.3 | 1.0   | 51                           | 1.0                                | 16.5                             | 91.1                                 |
| SMCJ51A  | 56.7                            | 62.7 | 1.0   | 51                           | 1.0                                | 18.2                             | 82.4                                 |
| SMCJ54   | 60.0                            | 73.3 | 1.0   | 54                           | 1.0                                | 15.6                             | 96.3                                 |
| SMCJ54A  | 60.0                            | 66.3 | 1.0   | 54                           | 1.0                                | 17.2                             | 87.1                                 |
| SMCJ58   | 64.4                            | 78.7 | 1.0   | 58                           | 1.0                                | 14.6                             | 103                                  |
| SMCJ58A  | 64.4                            | 71.2 | 1.0   | 58                           | 1.0                                | 16.0                             | 93.6                                 |
| SMCJ60   | 66.7                            | 81.5 | 1.0   | 60                           | 1.0                                | 14.0                             | 107                                  |
| SMCJ60A  | 66.7                            | 73.7 | 1.0   | 60                           | 1.0                                | 15.5                             | 96                                   |
| SMCJ64   | 71.1                            | 86.4 | 1.0   | 64                           | 1.0                                | 13.2                             | 114                                  |
| SMCJ64A  | 71.1                            | 78.6 | 1.0   | 64                           | 1.0                                | 14.6                             | 103                                  |
| SMCJ70   | 77.8                            | 95.1 | 1.0   | 70                           | 1.0                                | 12.0                             | 125                                  |
| SMCJ70A  | 77.8                            | 86   | 1.0   | 70                           | 1.0                                | 13.3                             | 113                                  |
| SMCJ75   | 83.3                            | 102  | 1.0   | 75                           | 1.0                                | 11.2                             | 134                                  |
| SMCJ75A  | 83.3                            | 92.1 | 1.0   | 75                           | 1.0                                | 12.4                             | 121                                  |
| SMCJ78   | 86.7                            | 106  | 1.0   | 78                           | 1.0                                | 10.8                             | 139                                  |
| SMCJ78A  | 86.7                            | 95.8 | 1.0   | 78                           | 1.0                                | 11.9                             | 126                                  |
| SMCJ85   | 94.4                            | 115  | 1.0   | 85                           | 1.0                                | 9.9                              | 151                                  |
| SMCJ85A  | 94.4                            | 104  | 1.0   | 85                           | 1.0                                | 10.9                             | 137                                  |
| SMCJ90   | 100                             | 122  | 1.0   | 90                           | 1.0                                | 9.4                              | 160                                  |
| SMCJ90A  | 100                             | 111  | 1.0   | 90                           | 1.0                                | 10.3                             | 146                                  |
| SMCJ100  | 111                             | 136  | 1.0   | 100                          | 1.0                                | 8.4                              | 179                                  |
| SMCJ100A | 111                             | 123  | 1.0   | 100                          | 1.0                                | 9.3                              | 162                                  |
| SMCJ110  | 122                             | 149  | 1.0   | 110                          | 1.0                                | 7.7                              | 196                                  |
| SMCJ110A | 122                             | 135  | 1.0   | 110                          | 1.0                                | 8.5                              | 177                                  |
| SMCJ120  | 133                             | 163  | 1.0   | 120                          | 1.0                                | 7.0                              | 214                                  |
| SMCJ120A | 133                             | 147  | 1.0   | 120                          | 1.0                                | 7.8                              | 193                                  |
| SMCJ130  | 144                             | 176  | 1.0   | 130                          | 1.0                                | 6.5                              | 231                                  |
| SMCJ130A | 144                             | 159  | 1.0   | 130                          | 1.0                                | 7.2                              | 209                                  |
| SMCJ150  | 167                             | 204  | 1.0   | 150                          | 1.0                                | 5.6                              | 268                                  |
| SMCJ150A | 167                             | 185  | 1.0   | 150                          | 1.0                                | 6.2                              | 243                                  |
| SMCJ160  | 178                             | 218  | 1.0   | 160                          | 1.0                                | 5.2                              | 287                                  |
| SMCJ160A | 178                             | 197  | 1.0   | 160                          | 1.0                                | 5.8                              | 259                                  |
| SMCJ170  | 189                             | 231  | 1.0   | 170                          | 1.0                                | 4.90                             | 304                                  |
| SMCJ170A | 189                             | 209  | 1.0   | 170                          | 1.0                                | 5.50                             | 275                                  |
| SMCJ188  | 209                             | 255  | 1.0   | 188                          | 1.0                                | 4.40                             | 344                                  |
| SMCJ188A | 209                             | 231  | 1.0   | 188                          | 1.0                                | 4.60                             | 328                                  |

### Notes :

- (1) Pulse test :  $t_p \leq 50ms$ .
- (2) Surge Current Waveform per Figure 5 and Derate per Figure 1
- (3) For bi-directional types have  $V_{WM}$  of 10 Volts and less , the  $I_R$  limit is doubled
- (4) For the bi-directional SMBJ5.0CA, the maximum  $V_{BR}$  is 7.25V
- (5) "SMCJ" will be omitted in marking on the diode.

## RATING AND CHARACTERISTIC CURVES ( SMCJ5.0 - SMCJ188A )

FIG.1 - PULSE DERATING CURVE

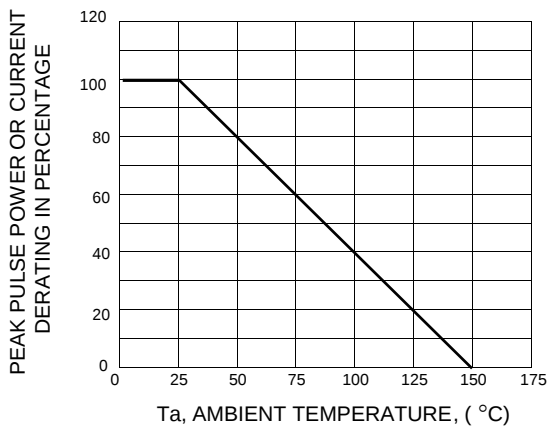


FIG.2 - TYPICAL JUNCTION CAPACITANCE

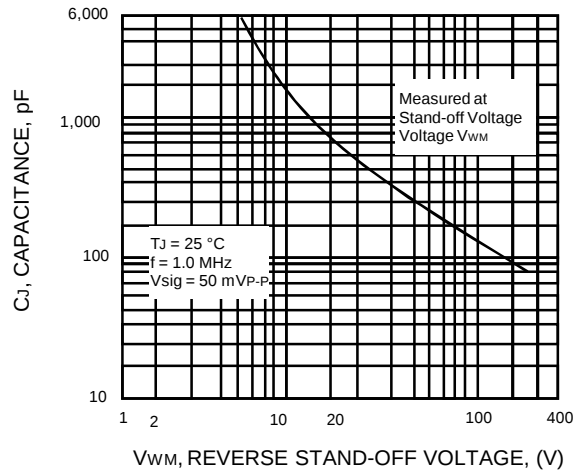


FIG.3 - PULSE WAVEFORM

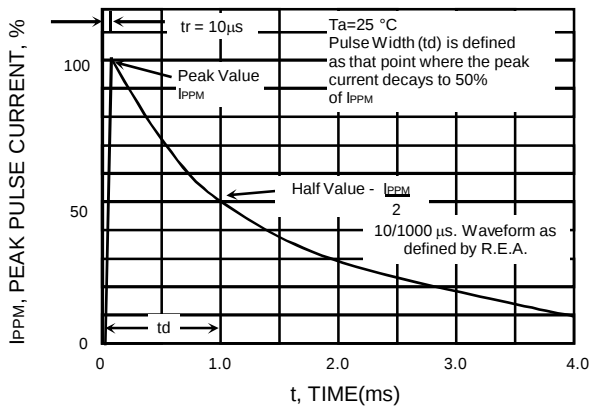


FIG.4 - PEAK PULSE POWER RATING CURVE

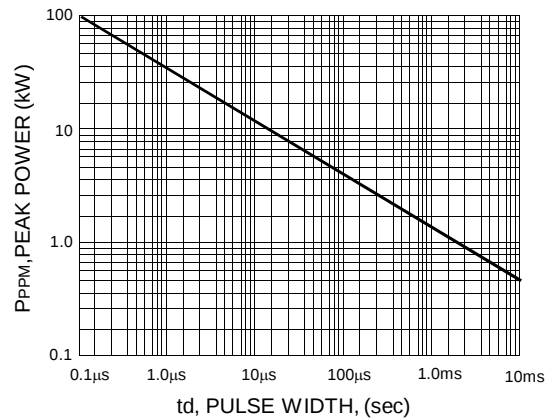


FIG.5 - MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT

