

## 3000W Transient Voltage Suppressor

### DESCRIPTION:

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

### FEATURES:

- ✧ Glass passivated or planar junction.
- ✧ Excellent clamping capability.
- ✧ Repetition rate (duty cycle): 0.01%.
- ✧ Typical  $I_R$  less than  $1\mu A$  above 10V.
- ✧ Low profile package and low inductance.
- ✧ 3000W peak pulse power capability at  $10 \times 1000\mu s$  waveform.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature soldering:  $260^\circ C/10s$  at terminals.
- ✧ Plastic package has Underwriters Laboratory Flammability 94V-0.
- ✧ For surface mounted applications in order to optimize board space.
- ✧ AEC-Q101 qualified.



SMC



Bi-directional



Uni-direction

Symbol

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ , RH=45%-75%, unless otherwise noted)

| Parameter                                                | Symbol      | Value       | Unit       |
|----------------------------------------------------------|-------------|-------------|------------|
| Storage temperature range                                | $T_{stg}$   | -55 to +150 | $^\circ C$ |
| Operating junction temperature range                     | $T_j$       | -55 to +150 | $^\circ C$ |
| Steady state power dissipation at $T_L=75^\circ C$       | $P_{M(AV)}$ | 8.0         | W          |
| Peak pulse power dissipation on 10/1000 $\mu s$ waveform | $P_{PP}$    | 3000        | W          |

**ELECTRICAL CHARACTERISTICS** (T =25°C)

| Part Number |             | V <sub>R</sub> | I <sub>R</sub> @V <sub>R</sub> | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub> <sup>①</sup> |
|-------------|-------------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar    | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                            |
| S-SMDJ5.0A  | S-SMDJ5.0CA | 5.0            | 800                            | 6.40                            | 7.00   | 10             | 9.2                             | 326.1                        |
| S-SMDJ6.0A  | S-SMDJ6.0CA | 6.0            | 800                            | 6.67                            | 7.37   | 10             | 10.3                            | 291.3                        |
| S-SMDJ6.5A  | S-SMDJ6.5CA | 6.5            | 500                            | 7.22                            | 7.98   | 10             | 11.2                            | 267.9                        |
| S-SMDJ7.0A  | S-SMDJ7.0CA | 7.0            | 200                            | 7.78                            | 8.60   | 10             | 12.0                            | 250.0                        |
| S-SMDJ7.5A  | S-SMDJ7.5CA | 7.5            | 100                            | 8.33                            | 9.21   | 1              | 12.9                            | 232.6                        |
| S-SMDJ8.0A  | S-SMDJ8.0CA | 8.0            | 50                             | 8.89                            | 9.83   | 1              | 13.6                            | 220.6                        |
| S-SMDJ8.5A  | S-SMDJ8.5CA | 8.5            | 20                             | 9.44                            | 10.40  | 1              | 14.4                            | 208.3                        |
| S-SMDJ9.0A  | S-SMDJ9.0CA | 9.0            | 10                             | 10.00                           | 11.10  | 1              | 15.4                            | 194.8                        |
| S-SMDJ10A   | S-SMDJ10CA  | 10             | 5                              | 11.10                           | 12.30  | 1              | 17.0                            | 176.5                        |
| S-SMDJ11A   | S-SMDJ11CA  | 11             | 1                              | 12.20                           | 13.50  | 1              | 18.2                            | 164.8                        |
| S-SMDJ12A   | S-SMDJ12CA  | 12             | 1                              | 13.30                           | 14.70  | 1              | 19.9                            | 150.8                        |
| S-SMDJ13A   | S-SMDJ13CA  | 13             | 1                              | 14.40                           | 15.90  | 1              | 21.5                            | 139.5                        |
| S-SMDJ14A   | S-SMDJ14CA  | 14             | 1                              | 15.60                           | 17.20  | 1              | 23.2                            | 129.3                        |
| S-SMDJ15A   | S-SMDJ15CA  | 15             | 1                              | 16.70                           | 18.50  | 1              | 24.4                            | 123.0                        |
| S-SMDJ16A   | S-SMDJ16CA  | 16             | 1                              | 17.80                           | 19.70  | 1              | 26.0                            | 115.4                        |
| S-SMDJ17A   | S-SMDJ17CA  | 17             | 1                              | 18.90                           | 20.90  | 1              | 27.6                            | 108.7                        |
| S-SMDJ18A   | S-SMDJ18CA  | 18             | 1                              | 20.00                           | 22.10  | 1              | 29.2                            | 102.7                        |
| S-SMDJ20A   | S-SMDJ20CA  | 20             | 1                              | 22.20                           | 24.50  | 1              | 32.4                            | 92.6                         |
| S-SMDJ22A   | S-SMDJ22CA  | 22             | 1                              | 24.40                           | 26.90  | 1              | 35.5                            | 84.5                         |
| S-SMDJ24A   | S-SMDJ24CA  | 24             | 1                              | 26.70                           | 29.50  | 1              | 38.9                            | 77.1                         |
| S-SMDJ26A   | S-SMDJ26CA  | 26             | 1                              | 28.90                           | 31.90  | 1              | 42.1                            | 71.3                         |
| S-SMDJ28A   | S-SMDJ28CA  | 28             | 1                              | 31.10                           | 34.40  | 1              | 45.4                            | 66.1                         |
| S-SMDJ30A   | S-SMDJ30CA  | 30             | 1                              | 33.30                           | 36.80  | 1              | 48.4                            | 62.0                         |
| S-SMDJ33A   | S-SMDJ33CA  | 33             | 1                              | 36.70                           | 40.60  | 1              | 53.3                            | 56.3                         |
| S-SMDJ36A   | S-SMDJ36CA  | 36             | 1                              | 40.00                           | 44.20  | 1              | 58.1                            | 51.6                         |
| S-SMDJ40A   | S-SMDJ40CA  | 40             | 1                              | 44.40                           | 49.10  | 1              | 64.5                            | 46.5                         |
| S-SMDJ43A   | S-SMDJ43CA  | 43             | 1                              | 47.80                           | 52.80  | 1              | 69.4                            | 43.2                         |
| S-SMDJ45A   | S-SMDJ45CA  | 45             | 1                              | 50.00                           | 55.30  | 1              | 72.7                            | 41.3                         |
| S-SMDJ48A   | S-SMDJ48CA  | 48             | 1                              | 53.30                           | 58.90  | 1              | 77.4                            | 38.8                         |
| S-SMDJ51A   | S-SMDJ51CA  | 51             | 1                              | 56.70                           | 62.70  | 1              | 82.4                            | 36.4                         |

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$ , continued)

| Part Number |             | $V_R$ | $I_R@V_R$     | $V_{BR}@I_T$ |        | $I_T$ | $V_C@I_{PP}$ | $I_{PP}^{①}$ |
|-------------|-------------|-------|---------------|--------------|--------|-------|--------------|--------------|
| Uni-Polar   | Bi-Polar    | V     | $\mu\text{A}$ | min(V)       | max(V) | mA    | max(V)       | A            |
| S-SMDJ54A   | S-SMDJ54CA  | 54    | 1             | 60.00        | 66.30  | 1     | 87.1         | 34.4         |
| S-SMDJ58A   | S-SMDJ58CA  | 58    | 1             | 64.40        | 71.20  | 1     | 93.6         | 32.1         |
| S-SMDJ60A   | S-SMDJ60CA  | 60    | 1             | 66.70        | 73.70  | 1     | 96.8         | 31.0         |
| S-SMDJ64A   | S-SMDJ64CA  | 64    | 1             | 71.10        | 78.60  | 1     | 103.0        | 29.1         |
| S-SMDJ70A   | S-SMDJ70CA  | 70    | 1             | 77.80        | 86.00  | 1     | 113.0        | 26.5         |
| S-SMDJ75A   | S-SMDJ75CA  | 75    | 1             | 83.30        | 92.10  | 1     | 121.0        | 24.8         |
| S-SMDJ78A   | S-SMDJ78CA  | 78    | 1             | 86.70        | 95.80  | 1     | 126.0        | 23.8         |
| S-SMDJ85A   | S-SMDJ85CA  | 85    | 1             | 94.40        | 104.0  | 1     | 137.0        | 21.9         |
| S-SMDJ90A   | S-SMDJ90CA  | 90    | 1             | 100.0        | 111.0  | 1     | 146.0        | 20.5         |
| S-SMDJ100A  | S-SMDJ100CA | 100   | 1             | 111.0        | 123.0  | 1     | 162.0        | 18.5         |
| S-SMDJ110A  | S-SMDJ110CA | 110   | 1             | 122.0        | 135.0  | 1     | 177.0        | 16.9         |
| S-SMDJ120A  | S-SMDJ120CA | 120   | 1             | 133.0        | 147.0  | 1     | 193.0        | 15.5         |
| S-SMDJ130A  | S-SMDJ130CA | 130   | 1             | 144.0        | 159.0  | 1     | 209.0        | 14.4         |
| S-SMDJ150A  | S-SMDJ150CA | 150   | 1             | 167.0        | 185.0  | 1     | 243.0        | 12.3         |
| S-SMDJ160A  | S-SMDJ160CA | 160   | 1             | 178.0        | 197.0  | 1     | 259.0        | 11.6         |
| S-SMDJ170A  | S-SMDJ170CA | 170   | 1             | 189.0        | 209.0  | 1     | 275.0        | 10.9         |
| S-SMDJ180A  | S-SMDJ180CA | 180   | 1             | 201.0        | 222.0  | 1     | 292.0        | 10.3         |
| S-SMDJ190A  | S-SMDJ190CA | 190   | 1             | 211.0        | 234.0  | 1     | 307.0        | 9.7          |
| S-SMDJ200A  | S-SMDJ200CA | 200   | 1             | 224.0        | 247.0  | 1     | 324.0        | 9.3          |
| S-SMDJ210A  | S-SMDJ210CA | 210   | 1             | 233.0        | 258.0  | 1     | 337.0        | 8.8          |
| S-SMDJ220A  | S-SMDJ220CA | 220   | 1             | 246.0        | 272.0  | 1     | 356.0        | 8.4          |

① Surge waveform: 10/1000 $\mu\text{s}$

$V_R$ : Stand-off voltage -- Maximum voltage that can be applied

$V_{BR}$ : Breakdown voltage

$V_C$ : Clamping voltage -- Peak voltage measured across the suppressor at a specified  $I_{PP}$

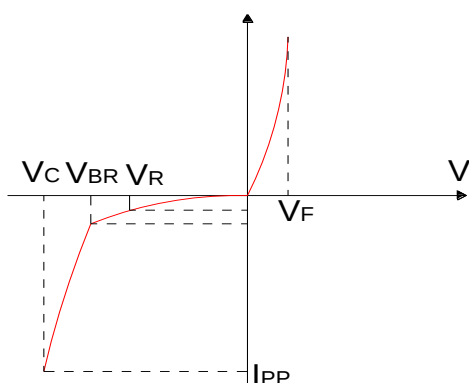
$I_R$ : Reverse leakage current

## ORDERING INFORMATION

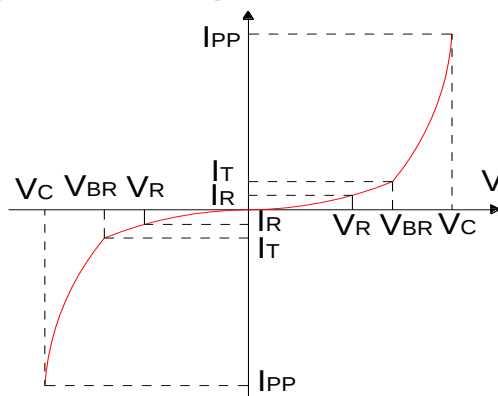
|                  |               |                   |                               |
|------------------|---------------|-------------------|-------------------------------|
| <b>S-SMDJ</b>    | <b>XX</b>     | <b>C</b>          | <b>A</b>                      |
| 3000W SMC Series | $V_R$ Voltage | C: Bi-directional | 5% $V_{BR}$ Voltage tolerance |

## RATINGS AND V-I CHARACTERISTICS CURVES ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

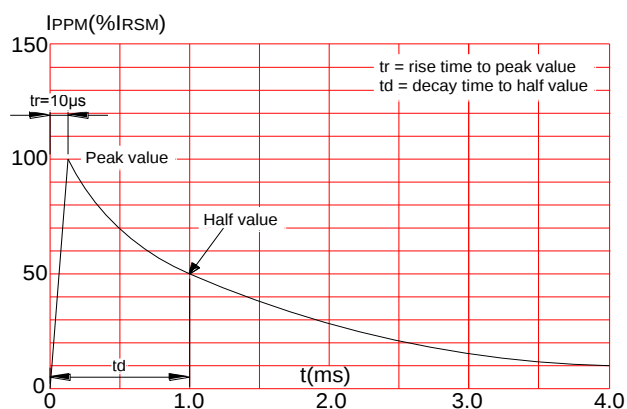
**FIG.1: V- I curve characteristics (Uni-directional)**



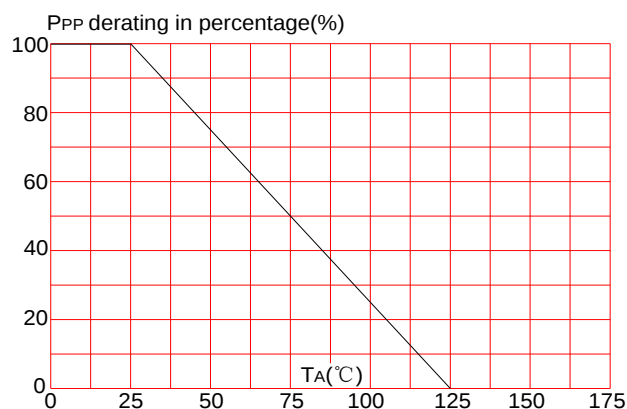
**FIG.2: V- I curve characteristics (Bi-directional)**



**FIG.3: Pulse waveform**

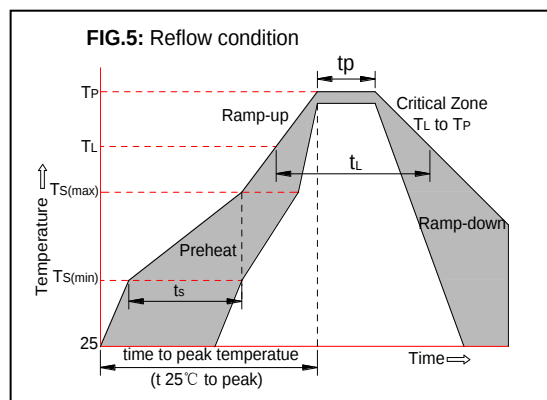


**FIG.4: Pulse derating curve**

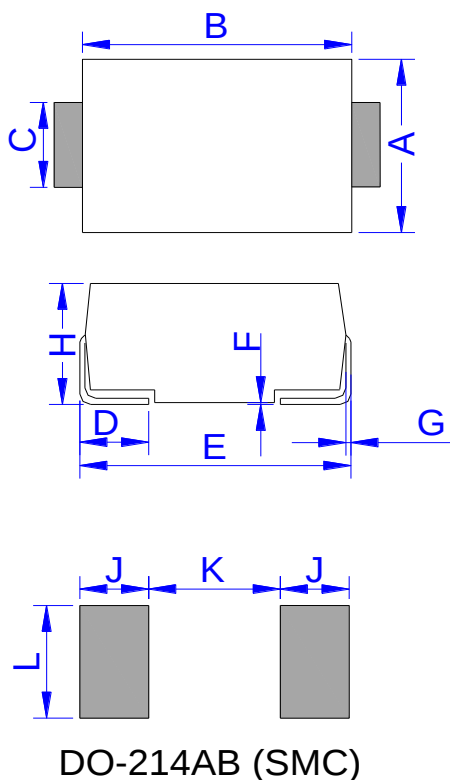


## SOLDERING PARAMETERS

| Reflow Condition                                        |                                   | Pb-Free assembly<br>(see FIG.5) |
|---------------------------------------------------------|-----------------------------------|---------------------------------|
| Pre Heat                                                | -Temperature Min ( $T_{s(min)}$ ) | +150°C                          |
|                                                         | -Temperature Max( $T_{s(max)}$ )  | +200°C                          |
|                                                         | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.                    |
| Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max                    |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                    |                                   | 3°C/sec. Max                    |
| Reflow                                                  | -Temperature( $T_L$ )(Liquid us)  | +217°C                          |
|                                                         | -Temperature( $t_L$ )             | 60-150 secs.                    |
| Peak Temp ( $T_p$ )                                     |                                   | +260(+0/-5)°C                   |
| Time within 5°C of actual Peak Temp ( $t_p$ )           |                                   | 30 secs. Max                    |
| Ramp-down Rate                                          |                                   | 6°C/sec. Max                    |
| Time 25°C to Peak Temp ( $T_p$ )                        |                                   | 8 min. Max                      |
| Do not exceed                                           |                                   | +260°C                          |

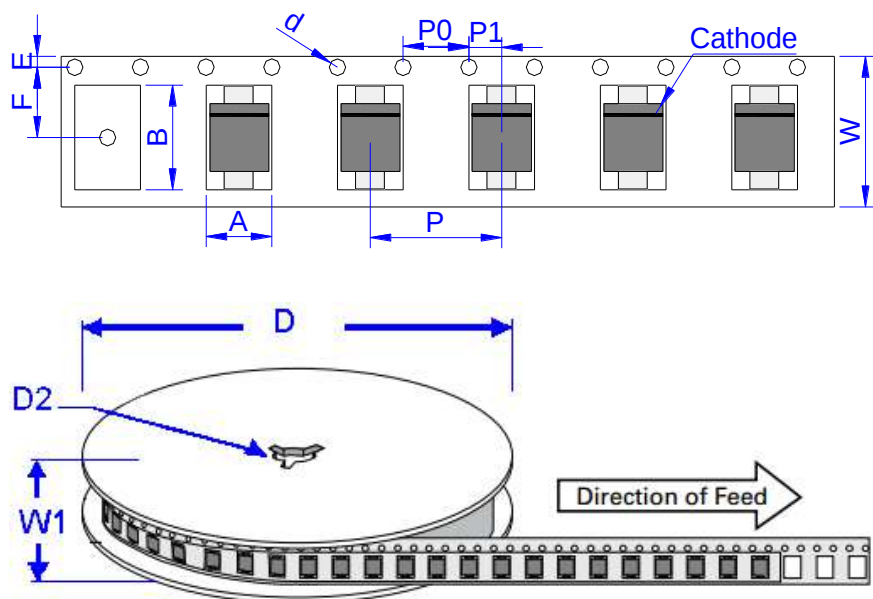


## PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |       |        |       |
|------|-------------|-------|--------|-------|
|      | Millimeters |       | Inches |       |
|      | Min.        | Max.  | Min.   | Max.  |
| A    | 5.75        | 6.25  | 0.226  | 0.246 |
| B    | 6.90        | 7.40  | 0.272  | 0.291 |
| C    | 2.75        | 3.25  | 0.108  | 0.128 |
| D    | 0.95        | 1.52  | 0.037  | 0.060 |
| E    | 7.70        | 8.20  | 0.303  | 0.323 |
| F    | 0.051       | 0.203 | 0.002  | 0.008 |
| G    | 0.15        | 0.31  | 0.006  | 0.012 |
| H    | 2.15        | 2.62  | 0.085  | 0.103 |
| J    | 2.40        |       | 0.094  |       |
| K    |             | 4.20  |        | 0.165 |
| L    | 3.30        |       | 0.130  |       |

## TAPE AND REEL SPECIFICATION-SMC



| Ref. | Dimensions  |                |
|------|-------------|----------------|
|      | Millimeters | Inches         |
| A    | 6.05 ± 0.3  | 0.238 ± 0.012  |
| B    | 8.31 ± 0.3  | 0.327 ± 0.012  |
| d    | 1.55 ± 0.1  | 0.061 ± 0.004  |
| D    | 330.0       | 13.0           |
| D2   | 13.3 ± 0.3  | 0.524 ± 0.012  |
| E    | 1.75 ± 0.2  | 0.069 ± 0.008  |
| F    | 7.50 ± 0.2  | 0.295 ± 0.008  |
| P    | 8.00 ± 0.2  | 0.3145 ± 0.008 |
| P0   | 4.00 ± 0.2  | 0.157 ± 0.008  |
| P1   | 2.00 ± 0.2  | 0.079 ± 0.008  |
| W    | 16.0 ± 0.2  | 0.630 ± 0.008  |
| W1   | 19.7 ± 2.0  | 0.776 ± 0.079  |

| PART No.     | PACKAGE       | QUANTITY | TAPE & REEL |
|--------------|---------------|----------|-------------|
| S-SMDJxxCA/A | SMC(DO-214AB) | 3,000    | 13 inch     |