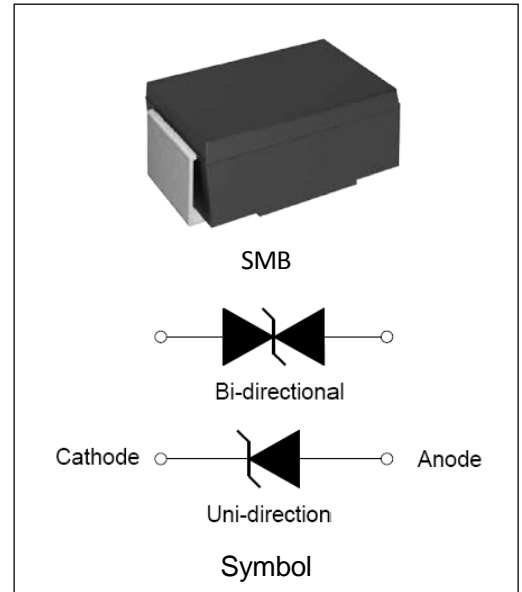


**DESCRIPTION:**

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<sub>R</sub> less than 1µA above 10V.
- ✧ Low profile package and low inductance
- ✧ 1000W Peak Pulse power capability at 10×1000µs waveform.
- ✧ Fast response time: typically less than 1.0ps from 0V to V<sub>BRmin</sub>.
- ✧ High temperature soldering: 260°C/10s at terminals.
- ✧ Plastic package has Underwriters Laboratory Flammability 94V-0.
- ✧ For surface mounted applications in order to optimize board space



**ABSOLUTE MAXIMUM RATINGS** (T<sub>A</sub>=25°C, RH=45%-75%, unless otherwise noted)

| Parameter   | Symbol             | Value       | Unit |
|---|--------------------|-------------|------|
| Storage temperature range                                       | T <sub>stg</sub>   | -55 to +150 | °C   |
| Operating junction temperature range                            | T <sub>j</sub>     | -55 to +150 | °C   |
| Steady state power dissipation at T <sub>L</sub> =75°C          | P <sub>M(AV)</sub> | 5.0         | W    |
| Peak pulse power dissipation on 10/1000µs waveform              | P <sub>PP</sub>    | 1000        | W    |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional | V <sub>F</sub>     | 5.0         | V    |

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

| Part        | Number       | $V_R$ | $I_R@V_R$     | $V_{BR}@I_T$ |        | $I_T$ | $V_C@I_{PP}$ | $I_{PP}^{\text{①}}$ |
|-------------|--------------|-------|---------------|--------------|--------|-------|--------------|---------------------|
| Uni-Polar   | Bi-Polar     | V     | $\mu\text{A}$ | min(V)       | max(V) | mA    | max(V)       | A                   |
| 1.0SMBJ5.0A | 1.0SMBJ5.0CA | 5.0   | 200           | 6.40         | 7.00   | 10    | 9.2          | 108.7               |
| 1.0SMBJ6.0A | 1.0SMBJ6.0CA | 6.0   | 200           | 6.67         | 7.37   | 10    | 10.3         | 97.1                |
| 1.0SMBJ6.5A | 1.0SMBJ6.5CA | 6.5   | 100           | 7.22         | 7.98   | 10    | 11.2         | 89.3                |
| 1.0SMBJ7.0A | 1.0SMBJ7.0CA | 7.0   | 80            | 7.78         | 8.60   | 10    | 12.0         | 83.4                |
| 1.0SMBJ7.5A | 1.0SMBJ7.5CA | 7.5   | 50            | 8.33         | 9.21   | 1     | 12.9         | 77.6                |
| 1.0SMBJ8.0A | 1.0SMBJ8.0CA | 8.0   | 20            | 8.89         | 9.83   | 1     | 13.6         | 73.6                |
| 1.0SMBJ8.5A | 1.0SMBJ8.5CA | 8.5   | 10            | 9.44         | 10.40  | 1     | 14.4         | 69.5                |
| 1.0SMBJ9.0A | 1.0SMBJ9.0CA | 9.0   | 5             | 10.00        | 11.10  | 1     | 15.4         | 65.0                |
| 1.0SMBJ10A  | 1.0SMBJ10CA  | 10    | 2             | 11.10        | 12.30  | 1     | 17.0         | 58.9                |
| 1.0SMBJ11A  | 1.0SMBJ11CA  | 11    | 1             | 12.20        | 13.50  | 1     | 18.2         | 55.0                |
| 1.0SMBJ12A  | 1.0SMBJ12CA  | 12    | 1             | 13.30        | 14.70  | 1     | 19.9         | 50.3                |
| 1.0SMBJ13A  | 1.0SMBJ13CA  | 13    | 1             | 14.40        | 15.90  | 1     | 21.5         | 46.6                |
| 1.0SMBJ14A  | 1.0SMBJ14CA  | 14    | 1             | 15.60        | 17.20  | 1     | 23.2         | 43.1                |
| 1.0SMBJ15A  | 1.0SMBJ15CA  | 15    | 1             | 16.70        | 18.50  | 1     | 24.4         | 41.0                |
| 1.0SMBJ16A  | 1.0SMBJ16CA  | 16    | 1             | 17.80        | 19.70  | 1     | 26.0         | 38.5                |
| 1.0SMBJ17A  | 1.0SMBJ17CA  | 17    | 1             | 18.90        | 20.90  | 1     | 27.6         | 36.3                |
| 1.0SMBJ18A  | 1.0SMBJ18CA  | 18    | 1             | 20.00        | 22.10  | 1     | 29.2         | 34.3                |
| 1.0SMBJ20A  | 1.0SMBJ20CA  | 20    | 1             | 22.20        | 24.50  | 1     | 32.4         | 30.9                |
| 1.0SMBJ22A  | 1.0SMBJ22CA  | 22    | 1             | 24.40        | 26.90  | 1     | 35.5         | 28.2                |
| 1.0SMBJ24A  | 1.0SMBJ24CA  | 24    | 1             | 26.70        | 29.50  | 1     | 38.9         | 25.7                |
| 1.0SMBJ26A  | 1.0SMBJ26CA  | 26    | 1             | 28.90        | 31.90  | 1     | 42.1         | 23.8                |
| 1.0SMBJ28A  | 1.0SMBJ28CA  | 28    | 1             | 31.10        | 34.40  | 1     | 45.4         | 22.1                |
| 1.0SMBJ30A  | 1.0SMBJ30CA  | 30    | 1             | 33.30        | 36.80  | 1     | 48.4         | 20.7                |
| 1.0SMBJ33A  | 1.0SMBJ33CA  | 33    | 1             | 36.70        | 40.60  | 1     | 53.3         | 18.8                |
| 1.0SMBJ36A  | 1.0SMBJ36CA  | 36    | 1             | 40.00        | 44.20  | 1     | 58.1         | 17.3                |
| 1.0SMBJ40A  | 1.0SMBJ40CA  | 40    | 1             | 44.40        | 49.10  | 1     | 64.5         | 15.5                |
| 1.0SMBJ43A  | 1.0SMBJ43CA  | 43    | 1             | 47.80        | 52.80  | 1     | 69.4         | 14.4                |
| 1.0SMBJ45A  | 1.0SMBJ45CA  | 45    | 1             | 50.00        | 55.30  | 1     | 72.7         | 13.8                |
| 1.0SMBJ48A  | 1.0SMBJ48CA  | 48    | 1             | 53.30        | 58.90  | 1     | 77.4         | 13.0                |
| 1.0SMBJ51A  | 1.0SMBJ51CA  | 51    | 1             | 56.70        | 62.70  | 1     | 82.4         | 12.2                |

**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            |
| 1.0SMBJ54A  | 1.0SMBJ54CA  | 54    | 1             | 60.00        | 66.30  | 1     | 87.1         | 11.5         |
| 1.0SMBJ58A  | 1.0SMBJ58CA  | 58    | 1             | 64.40        | 71.20  | 1     | 93.6         | 10.7         |
| 1.0SMBJ60A  | 1.0SMBJ60CA  | 60    | 1             | 66.70        | 73.70  | 1     | 96.8         | 10.4         |
| 1.0SMBJ64A  | 1.0SMBJ64CA  | 64    | 1             | 71.10        | 78.60  | 1     | 103.0        | 9.7          |
| 1.0SMBJ70A  | 1.0SMBJ70CA  | 70    | 1             | 77.80        | 86.00  | 1     | 113.0        | 8.9          |
| 1.0SMBJ75A  | 1.0SMBJ75CA  | 75    | 1             | 83.30        | 92.10  | 1     | 121.0        | 8.3          |
| 1.0SMBJ78A  | 1.0SMBJ78CA  | 78    | 1             | 86.70        | 95.80  | 1     | 126.0        | 8.0          |
| 1.0SMBJ85A  | 1.0SMBJ85CA  | 85    | 1             | 94.40        | 104.0  | 1     | 137.0        | 7.3          |
| 1.0SMBJ90A  | 1.0SMBJ90CA  | 90    | 1             | 100.0        | 111.0  | 1     | 146.0        | 6.9          |
| 1.0SMBJ100A | 1.0SMBJ100CA | 100   | 1             | 111.0        | 123.0  | 1     | 162.0        | 6.2          |
| 1.0SMBJ110A | 1.0SMBJ110CA | 110   | 1             | 122.0        | 135.0  | 1     | 177.0        | 5.7          |
| 1.0SMBJ120A | 1.0SMBJ120CA | 120   | 1             | 133.0        | 147.0  | 1     | 193.0        | 5.2          |
| 1.0SMBJ130A | 1.0SMBJ130CA | 130   | 1             | 144.0        | 159.0  | 1     | 209.0        | 4.8          |
| 1.0SMBJ150A | 1.0SMBJ150CA | 150   | 1             | 167.0        | 185.0  | 1     | 243.0        | 4.2          |
| 1.0SMBJ160A | 1.0SMBJ160CA | 160   | 1             | 178.0        | 197.0  | 1     | 259.0        | 3.9          |
| 1.0SMBJ170A | 1.0SMBJ170CA | 170   | 1             | 189.0        | 209.0  | 1     | 275.0        | 3.7          |
| 1.0SMBJ180A | 1.0SMBJ180CA | 180   | 1             | 201.0        | 222.0  | 1     | 292.0        | 3.5          |
| 1.0SMBJ190A | 1.0SMBJ190CA | 190   | 1             | 211.0        | 234.0  | 1     | 307.0        | 3.3          |
| 1.0SMBJ200A | 1.0SMBJ200CA | 200   | 1             | 224.0        | 247.0  | 1     | 324.0        | 3.1          |

① Surge waveform: 10/1000 $\mu$

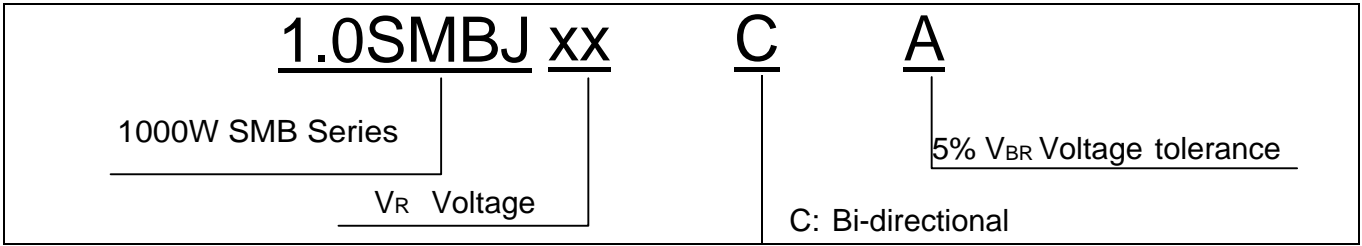
$V_R$ : Stand-off Voltage -- Maximum voltage that can be applied  $V_{BR}$ :

Breakdown Voltage

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

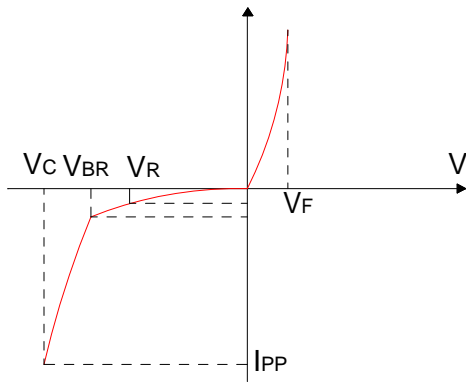
Reverse Leakage Current

**ORDERING INFORMATION**

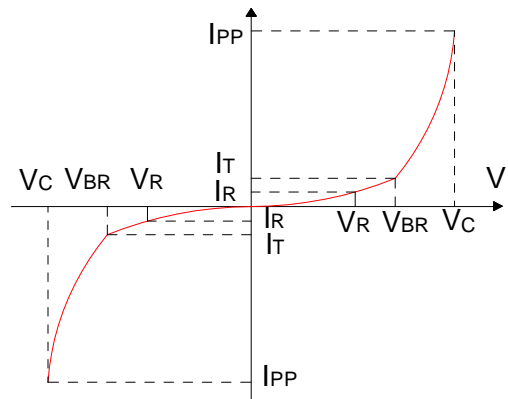


**RATINGS AND V-I CHARACTERISTICS CURVES** ( $T_A=25^\circ C$ , unless otherwise noted)

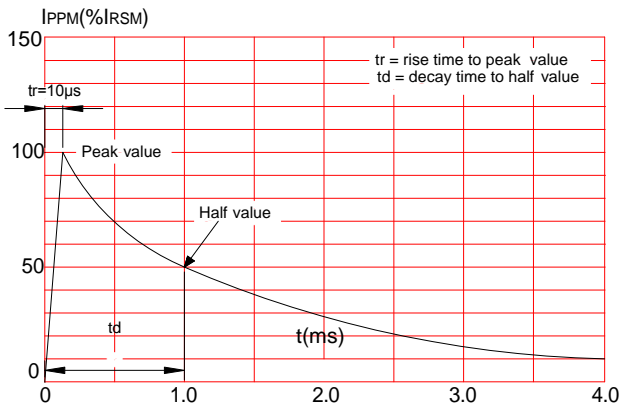
**FIG.1:V- I curve characteristics (Uni-directional)**



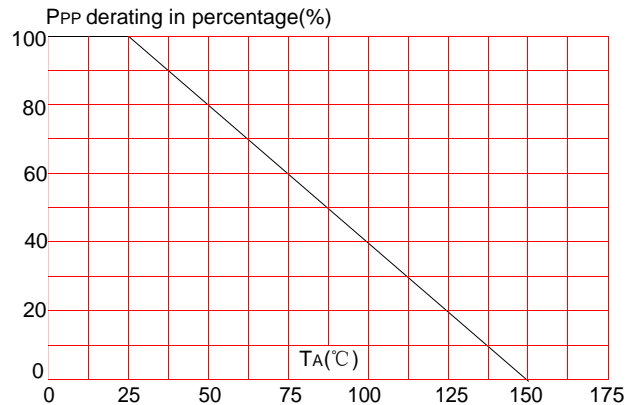
**FIG.2:V- I curve characteristics (Bi-directional)**



**FIG.3: Pulse waveform**

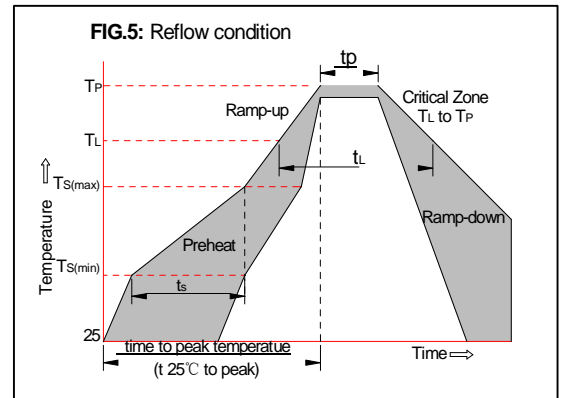
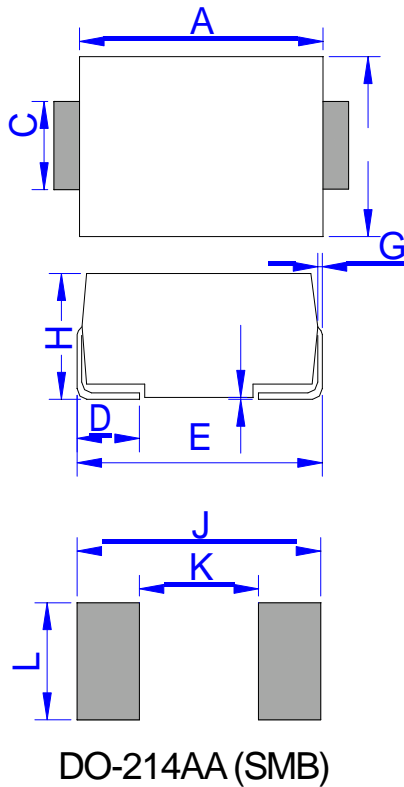


**FIG.4: Pulse derating curve**



**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    | 4.25        | 4.75  | 0.167  | 0.187 |
| B    | 3.30        | 3.94  | 0.130  | 0.155 |
| C    | 1.85        | 2.21  | 0.073  | 0.087 |
| D    | 0.76        | 1.52  | 0.030  | 0.060 |
| E    | 5.08        | 5.59  | 0.200  | 0.220 |
| F    | 0.051       | 0.203 | 0.002  | 0.008 |
| G    | 0.15        | 0.31  | 0.006  | 0.012 |
| H    | 2.11        | 2.44  | 0.083  | 0.096 |
| J    | 6.80        |       | 0.270  |       |
| K    |             | 2.60  |        | 0.100 |
| L    | 2.40        |       | 0.090  |       |