# TVS Diodes

**Transient Voltage Suppression Diodes**

**3.0SMCJ Series**

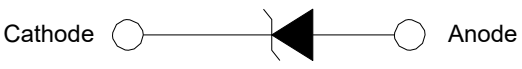

## Description

Transient Voltage Suppressor (TVS) is a circuit protection component that either attenuates (reduces) or filters a transient voltage spike (overvoltage), TVS diodes provide critical protection by going into avalanche breakdown within no more than a few nanoseconds after a strike, clamping the transient voltage, and routing its current to the ground.

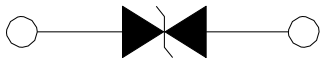
## Applications

- Communication Equipment
- Security & Protection
- Industrial Control Equipment
- Power Supply
- Automotive Electronics
- New Energy
- Surge Protection

## Functional Diagram




Uni-Directional

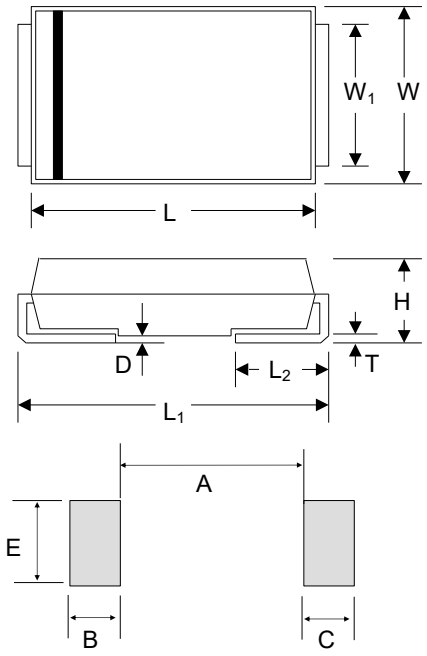


Bi-Directional

## Features

- Low incremental surge resistance
- Excellent clamping capability
- Low profile package with built-in strain relief
- 3000 W peak pulse power capability with a 10/1000 μs Waveform, repetition rate (duty cycle): 0.01%
- For surface mounted applications to optimize board space
- Typical failure mode is short from over-specified voltage or current
- IEC 61000-4-2 ESD 30 kV (Air), 30 kV (Contact)
- EFT protection of data lines in accordance with IEC 61000 -4-4
- Very fast response time
- Glass passivated chip junction
- High temperature to reflow soldering guaranteed: 260 °C/30sec
- $V_{BR}$ @ $T_J$= $V_{BR}$@25 °C x (1+αT x ($T_J$ - 25)) (αT:Temperature Coefficient, typical value is 0.1%)
- Plastic package is flammability rated V-0 per Underwriters Laboratories
- Meet MSL level1, per J-STD-020
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

## Package Outline Dimensions (DO-214AB)




Mounting Pad Layout

| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| L | 6.60 | 7.11 | 0.260 | 0.280 |
| W | 5.59 | 6.22 | 0.220 | 0.245 |
| $W_1$ | 2.90 | 3.20 | 0.114 | 0.126 |
| H | 2.06 | 2.62 | 0.079 | 0.103 |
| T | 0.152 | 0.305 | 0.006 | 0.012 |
| $L_1$ | 7.75 | 8.13 | 0.305 | 0.320 |
| $L_2$ | 0.76 | 1.52 | 0.030 | 0.060 |
| D | - | 0.203 | - | 0.008 |
| A | - | 4.20 | - | 0.165 |
| B | 2.40 | - | 0.094 | - |
| C | 2.40 | - | 0.094 | - |
| E | 3.30 | - | 0.129 | - |

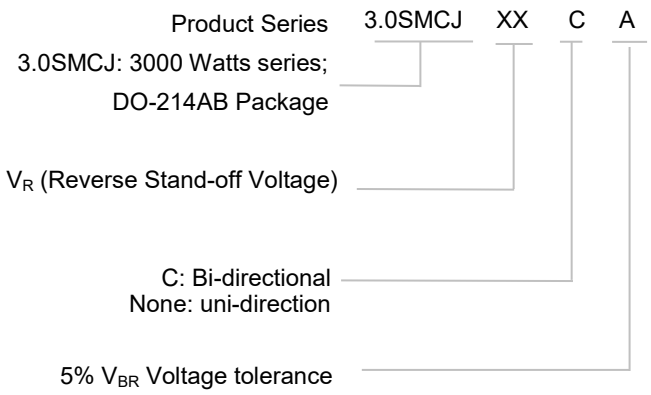
## Maximum Ratings and Characteristics

(Ratings at 25 °C ambient temperature unless otherwise specified.)

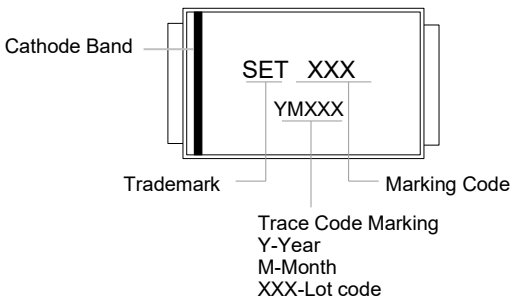
| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak Pulse Power Dissipation by 10/1000μs Waveform (Fig.4) (1)(2) | $P_{PPM}$ | 3000 | W |
| Power Dissipation on Infinite Heatsink at $T_C$=25°C | $P_D$ | 6.5 | W |
| Peak Forward Surge Current,8.3 ms single half sinewave superimposed on rated load (JEDEC Method)(3) | $I_{FSM}$ | 200 | A |
| Maximum Instantaneous Forward Voltage at 100 A for Unidirectional Only | $V_F$ | 3.5 | V |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 to +150 | °C |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | °C / W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | °C / W |

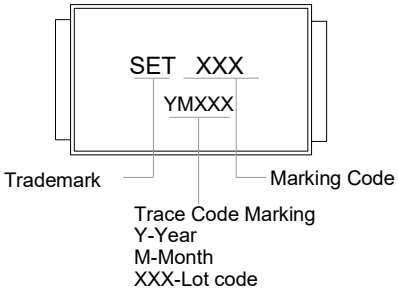
Note
1. Non-repetitive current pulse , per Fig. 4 and derated above TJ (initial) =25OC per Fig. 3 .
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.

## Part Numbering System




## Marking



## Electrical Characteristics ($T_A$=25 °C unless otherwise noted )

| Part Number | | Device Marking Code | | Breakdown Voltage $V_{BR}@I_T$ | | Test Current $I_T$ | Reverse Stand-off Voltage $V_R$ | Max. Reverse Leakage $I_R@V_R$ | Max. Peak Pulse Current $I_{PPM}$ | Max. Clamping Voltage $V_C@I_{PPM}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | | | | |
| Uni | Bi | Uni | Bi | (V) | | (mA) | (V) | (μA) | (A) | (V) |
| 3.0SMCJ5.0 | 3.0SMCJ5.0C | 3CAD | 3CWD | 6.40 | 7.82 | 10 | 5.00 | 800.00 | 312.50 | 9.60 |
| 3.0SMCJ5.0A | 3.0SMCJ5.0CA | 3CAE | 3CWE | 6.40 | 7.07 | 10 | 5.00 | 800.00 | 326.10 | 9.20 |
| 3.0SMCJ6.0 | 3.0SMCJ6.0C | 3CAF | 3CWF | 6.67 | 8.15 | 10 | 6.00 | 800.00 | 263.20 | 11.40 |
| 3.0SMCJ6.0A | 3.0SMCJ6.0CA | 3CAG | 3CWG | 6.67 | 7.37 | 10 | 6.00 | 800.00 | 291.30 | 10.30 |
| 3.0SMCJ6.5 | 3.0SMCJ6.5C | 3CAH | 3CWH | 7.22 | 8.82 | 10 | 6.50 | 500.00 | 243.90 | 12.30 |
| 3.0SMCJ6.5A | 3.0SMCJ6.5CA | 3CAK | 3CWK | 7.22 | 7.98 | 10 | 6.50 | 500.00 | 267.90 | 11.20 |
| 3.0SMCJ6.8 | 3.0SMCJ6.8C | 3CED | 3CFD | 7.56 | 9.22 | 10 | 6.80 | 500.00 | 247.90 | 12.10 |
| 3.0SMCJ6.8A | 3.0SMCJ6.8CA | 3CEE | 3CFE | 7.56 | 8.35 | 10 | 6.80 | 500.00 | 250.00 | 12.00 |
| 3.0SMCJ7.0 | 3.0SMCJ7.0C | 3CAL | 3CWL | 7.78 | 9.51 | 10 | 7.00 | 200.00 | 225.60 | 13.30 |
| 3.0SMCJ7.0A | 3.0SMCJ7.0CA | 3CAM | 3CWM | 7.78 | 8.60 | 10 | 7.00 | 200.00 | 250.00 | 12.00 |
| 3.0SMCJ7.5 | 3.0SMCJ7.5C | 3CAN | 3CWN | 8.33 | 10.20 | 1 | 7.50 | 100.00 | 209.80 | 14.30 |
| 3.0SMCJ7.5A | 3.0SMCJ7.5CA | 3CAP | 3CWP | 8.33 | 9.21 | 1 | 7.50 | 100.00 | 232.60 | 12.90 |
| 3.0SMCJ8.0 | 3.0SMCJ8.0C | 3CAQ | 3CWQ | 8.89 | 10.90 | 1 | 8.00 | 50.00 | 200.00 | 15.00 |
| 3.0SMCJ8.0A | 3.0SMCJ8.0CA | 3CAR | 3CWR | 8.89 | 9.83 | 1 | 8.00 | 50.00 | 220.60 | 13.60 |
| 3.0SMCJ8.5 | 3.0SMCJ8.5C | 3CAS | 3CWS | 9.44 | 11.50 | 1 | 8.50 | 10.00 | 188.70 | 15.90 |
| 3.0SMCJ8.5A | 3.0SMCJ8.5CA | 3CAT | 3CWT | 9.44 | 10.40 | 1 | 8.50 | 10.00 | 208.30 | 14.40 |
| 3.0SMCJ9.0 | 3.0SMCJ9.0C | 3CAU | 3CWU | 10.00 | 12.20 | 1 | 9.00 | 10.00 | 177.50 | 16.90 |
| 3.0SMCJ9.0A | 3.0SMCJ9.0CA | 3CAV | 3CWV | 10.00 | 11.10 | 1 | 9.00 | 10.00 | 194.80 | 15.40 |
| 3.0SMCJ10 | 3.0SMCJ10C | 3CAW | 3CWW | 11.10 | 13.60 | 1 | 10.00 | 2.00 | 159.60 | 18.80 |
| 3.0SMCJ10A | 3.0SMCJ10CA | 3CAX | 3CWX | 11.10 | 12.30 | 1 | 10.00 | 2.00 | 176.50 | 17.00 |
| 3.0SMCJ11 | 3.0SMCJ11C | 3CAY | 3CWY | 12.20 | 14.90 | 1 | 11.00 | 2.00 | 149.30 | 20.10 |
| 3.0SMCJ11A | 3.0SMCJ11CA | 3CAZ | 3CWZ | 12.20 | 13.50 | 1 | 11.00 | 2.00 | 164.80 | 18.20 |
| 3.0SMCJ12 | 3.0SMCJ12C | 3CBD | 3CXD | 13.30 | 16.30 | 1 | 12.00 | 2.00 | 136.40 | 22.00 |
| 3.0SMCJ12A | 3.0SMCJ12CA | 3CBE | 3CXE | 13.30 | 14.70 | 1 | 12.00 | 2.00 | 150.80 | 19.90 |
| 3.0SMCJ13 | 3.0SMCJ13C | 3CBF | 3CXF | 14.40 | 17.60 | 1 | 13.00 | 2.00 | 126.10 | 23.80 |
| 3.0SMCJ13A | 3.0SMCJ13CA | 3CBG | 3CXG | 14.40 | 15.90 | 1 | 13.00 | 2.00 | 139.50 | 21.50 |
| 3.0SMCJ14 | 3.0SMCJ14C | 3CBH | 3CXH | 15.60 | 19.10 | 1 | 14.00 | 2.00 | 116.30 | 25.80 |
| 3.0SMCJ14A | 3.0SMCJ14CA | 3CBK | 3CXK | 15.60 | 17.20 | 1 | 14.00 | 2.00 | 129.30 | 23.20 |
| 3.0SMCJ15 | 3.0SMCJ15C | 3CBL | 3CXL | 16.70 | 20.40 | 1 | 15.00 | 2.00 | 111.50 | 26.90 |
| 3.0SMCJ15A | 3.0SMCJ15CA | 3CBM | 3CXM | 16.70 | 18.50 | 1 | 15.00 | 2.00 | 123.00 | 24.40 |
| 3.0SMCJ16 | 3.0SMCJ16C | 3CBN | 3CXN | 17.80 | 21.80 | 1 | 16.00 | 2.00 | 104.20 | 28.80 |
| 3.0SMCJ16A | 3.0SMCJ16CA | 3CBP | 3CXP | 17.80 | 19.70 | 1 | 16.00 | 2.00 | 115.40 | 26.00 |

| Part Number | | Device Marking Code | | Breakdown Voltage $V_{BR}@I_T$ | | Test Current $I_T$ | Reverse Stand-off Voltage $V_R$ | Max. Reverse Leakage $I_R@V_R$ | Max. Peak Pulse Current $I_{PPM}$ | Max. Clamping Voltage $V_C@I_{PPM}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | | | | |
| Uni | Bi | Uni | Bi | (V) | | (mA) | (V) | (μA) | (A) | (V) |
| 3.0SMCJ17 | 3.0SMCJ17C | 3CBQ | 3CXQ | 18.90 | 23.10 | 1 | 17.00 | 2.00 | 98.40 | 30.50 |
| 3.0SMCJ17A | 3.0SMCJ17CA | 3CBR | 3CXR | 18.90 | 20.90 | 1 | 17.00 | 2.00 | 108.70 | 27.60 |
| 3.0SMCJ18 | 3.0SMCJ18C | 3CBS | 3CXS | 20.00 | 24.40 | 1 | 18.00 | 2.00 | 93.20 | 32.20 |
| 3.0SMCJ18A | 3.0SMCJ18CA | 3CBT | 3CXT | 20.00 | 22.10 | 1 | 18.00 | 2.00 | 102.70 | 29.20 |
| 3.0SMCJ20 | 3.0SMCJ20C | 3CBU | 3CXU | 22.20 | 27.10 | 1 | 20.00 | 2.00 | 83.80 | 35.80 |
| 3.0SMCJ20A | 3.0SMCJ20CA | 3CBV | 3CXV | 22.20 | 24.50 | 1 | 20.00 | 2.00 | 92.60 | 32.40 |
| 3.0SMCJ22 | 3.0SMCJ22C | 3CBW | 3CXW | 24.40 | 29.80 | 1 | 22.00 | 2.00 | 76.10 | 39.40 |
| 3.0SMCJ22A | 3.0SMCJ22CA | 3CBX | 3CXX | 24.40 | 26.90 | 1 | 22.00 | 2.00 | 84.50 | 35.50 |
| 3.0SMCJ24 | 3.0SMCJ24C | 3CBY | 3CXY | 26.70 | 32.60 | 1 | 24.00 | 2.00 | 69.80 | 43.00 |
| 3.0SMCJ24A | 3.0SMCJ24CA | 3CBZ | 3CXZ | 26.70 | 29.50 | 1 | 24.00 | 2.00 | 77.10 | 38.90 |
| 3.0SMCJ26 | 3.0SMCJ26C | 3CCD | 3CYD | 28.90 | 35.30 | 1 | 26.00 | 2.00 | 64.40 | 46.60 |
| 3.0SMCJ26A | 3.0SMCJ26CA | 3CCE | 3CYE | 28.90 | 31.90 | 1 | 26.00 | 2.00 | 71.30 | 42.10 |
| 3.0SMCJ28 | 3.0SMCJ28C | 3CCF | 3CYF | 31.10 | 38.00 | 1 | 28.00 | 2.00 | 60.00 | 50.00 |
| 3.0SMCJ28A | 3.0SMCJ28CA | 3CCG | 3CYG | 31.10 | 34.40 | 1 | 28.00 | 2.00 | 66.10 | 45.40 |
| 3.0SMCJ30 | 3.0SMCJ30C | 3CCH | 3CYH | 33.30 | 40.70 | 1 | 30.00 | 2.00 | 56.10 | 53.50 |
| 3.0SMCJ30A | 3.0SMCJ30CA | 3CCK | 3CYK | 33.30 | 36.80 | 1 | 30.00 | 2.00 | 62.00 | 48.40 |
| 3.0SMCJ33 | 3.0SMCJ33C | 3CCL | 3CYL | 36.70 | 44.90 | 1 | 33.00 | 2.00 | 50.80 | 59.00 |
| 3.0SMCJ33A | 3.0SMCJ33CA | 3CCM | 3CYM | 36.70 | 40.60 | 1 | 33.00 | 2.00 | 56.30 | 53.30 |
| 3.0SMCJ36 | 3.0SMCJ36C | 3CCN | 3CYN | 40.00 | 48.90 | 1 | 36.00 | 2.00 | 46.70 | 64.30 |
| 3.0SMCJ36A | 3.0SMCJ36CA | 3CCP | 3CYP | 40.00 | 44.20 | 1 | 36.00 | 2.00 | 51.60 | 58.10 |
| 3.0SMCJ40 | 3.0SMCJ40C | 3CCQ | 3CYQ | 44.40 | 54.30 | 1 | 40.00 | 2.00 | 42.00 | 71.40 |
| 3.0SMCJ40A | 3.0SMCJ40CA | 3CCR | 3CYR | 44.40 | 49.10 | 1 | 40.00 | 2.00 | 46.50 | 64.50 |
| 3.0SMCJ43 | 3.0SMCJ43C | 3CCS | 3CYS | 47.80 | 58.40 | 1 | 43.00 | 2.00 | 39.10 | 76.70 |
| 3.0SMCJ43A | 3.0SMCJ43CA | 3CCT | 3CYT | 47.80 | 52.80 | 1 | 43.00 | 2.00 | 43.20 | 69.40 |
| 3.0SMCJ45 | 3.0SMCJ45C | 3CCU | 3CYU | 50.00 | 61.10 | 1 | 45.00 | 2.00 | 37.40 | 80.30 |
| 3.0SMCJ45A | 3.0SMCJ45CA | 3CCV | 3CYV | 50.00 | 55.30 | 1 | 45.00 | 2.00 | 41.30 | 72.70 |
| 3.0SMCJ48 | 3.0SMCJ48C | 3CCW | 3CYW | 53.30 | 65.10 | 1 | 48.00 | 2.00 | 35.10 | 85.50 |
| 3.0SMCJ48A | 3.0SMCJ48CA | 3CCX | 3CYX | 53.30 | 58.90 | 1 | 48.00 | 2.00 | 38.80 | 77.40 |
| 3.0SMCJ51 | 3.0SMCJ51C | 3CCY | 3CYY | 56.70 | 69.30 | 1 | 51.00 | 2.00 | 32.90 | 91.10 |
| 3.0SMCJ51A | 3.0SMCJ51CA | 3CCZ | 3CYZ | 56.70 | 62.70 | 1 | 51.00 | 2.00 | 36.40 | 82.40 |
| 3.0SMCJ54 | 3.0SMCJ54C | 3CRD | 3CZD | 60.00 | 73.30 | 1 | 54.00 | 2.00 | 31.20 | 96.30 |
| 3.0SMCJ54A | 3.0SMCJ54CA | 3CRE | 3CZE | 60.00 | 66.30 | 1 | 54.00 | 2.00 | 34.40 | 87.10 |

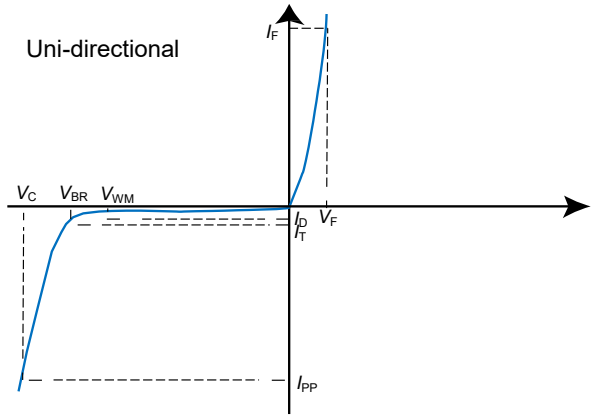
| Part Number | | Device Marking Code | | Breakdown Voltage $V_{BR}@I_T$ | | Test Current $I_T$ | Reverse Stand-off Voltage $V_R$ | Max. Reverse Leakage $I_R@V_R$ | Max. Peak Pulse Current $I_{PPM}$ | Max. Clamping Voltage $V_C@I_{PPM}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | | | | |
| Uni | Bi | Uni | Bi | (V) | | (mA) | (V) | (μA) | (A) | (V) |
| 3.0SMCJ58 | 3.0SMCJ58C | 3CRF | 3CZF | 64.40 | 78.70 | 1 | 58.00 | 2.00 | 29.10 | 103.00 |
| 3.0SMCJ58A | 3.0SMCJ58CA | 3CRG | 3CZG | 64.40 | 71.20 | 1 | 58.00 | 2.00 | 32.10 | 93.60 |
| 3.0SMCJ60 | 3.0SMCJ60C | 3CRH | 3CZH | 66.70 | 81.50 | 1 | 60.00 | 2.00 | 28.00 | 107.00 |
| 3.0SMCJ60A | 3.0SMCJ60CA | 3CRK | 3CZK | 66.70 | 73.70 | 1 | 60.00 | 2.00 | 31.00 | 96.80 |
| 3.0SMCJ64 | 3.0SMCJ64C | 3CRN | 3CZN | 71.10 | 86.90 | 1 | 64.00 | 2.00 | 26.30 | 114.00 |
| 3.0SMCJ64A | 3.0SMCJ64CA | 3CRP | 3CZP | 71.10 | 78.60 | 1 | 64.00 | 2.00 | 29.10 | 103.00 |
| 3.0SMCJ68 | 3.0SMCJ68C | 3CRB | 3CZB | 75.50 | 92.30 | 1 | 68.00 | 2.00 | 24.80 | 121.00 |
| 3.0SMCJ68A | 3.0SMCJ68CA | 3CRC | 3CZC | 75.50 | 83.50 | 1 | 68.00 | 2.00 | 27.50 | 109.00 |
| 3.0SMCJ70 | 3.0SMCJ70C | 3CEH | 3CFH | 77.80 | 95.10 | 1 | 70.00 | 2.00 | 24.00 | 125.00 |
| 3.0SMCJ70A | 3.0SMCJ70CA | 3CEK | 3CFK | 77.80 | 86.00 | 1 | 70.00 | 2.00 | 26.50 | 113.00 |
| 3.0SMCJ75 | 3.0SMCJ75C | 3CRQ | 3CZQ | 83.30 | 102.00 | 1 | 75.00 | 2.00 | 22.40 | 134.00 |
| 3.0SMCJ75A | 3.0SMCJ75CA | 3CRR | 3CZR | 83.30 | 92.10 | 1 | 75.00 | 2.00 | 24.80 | 121.00 |
| 3.0SMCJ78 | 3.0SMCJ78C | 3CRS | 3CZS | 86.70 | 106.00 | 1 | 78.00 | 2.00 | 21.60 | 139.00 |
| 3.0SMCJ78A | 3.0SMCJ78CA | 3CRT | 3CZT | 86.70 | 95.80 | 1 | 78.00 | 2.00 | 23.80 | 126.00 |
| 3.0SMCJ85 | 3.0SMCJ85C | 3CRU | 3CZU | 94.40 | 115.00 | 1 | 85.00 | 2.00 | 19.90 | 151.00 |
| 3.0SMCJ85A | 3.0SMCJ85CA | 3CRV | 3CZV | 94.40 | 104.00 | 1 | 85.00 | 2.00 | 21.90 | 137.00 |
| 3.0SMCJ90 | 3.0SMCJ90C | 3CRW | 3CZW | 100.00 | 122.00 | 1 | 90.00 | 2.00 | 18.80 | 160.00 |
| 3.0SMCJ90A | 3.0SMCJ90CA | 3CRX | 3CZX | 100.00 | 111.00 | 1 | 90.00 | 2.00 | 20.50 | 146.00 |
| 3.0SMCJ100 | 3.0SMCJ100C | 3CRY | 3CZY | 111.00 | 136.00 | 1 | 100.00 | 2.00 | 16.80 | 179.00 |
| 3.0SMCJ100A | 3.0SMCJ100CA | 3CRZ | 3CZZ | 111.00 | 123.00 | 1 | 100.00 | 2.00 | 18.50 | 162.00 |
| 3.0SMCJ110 | 3.0SMCJ110C | 3CSD | 3CVD | 122.00 | 149.00 | 1 | 110.00 | 2.00 | 15.30 | 196.00 |
| 3.0SMCJ110A | 3.0SMCJ110CA | 3CSE | 3CVE | 122.00 | 135.00 | 1 | 110.00 | 2.00 | 16.90 | 177.00 |
| 3.0SMCJ120 | 3.0SMCJ120C | 3CSF | 3CVF | 133.00 | 163.00 | 1 | 120.00 | 2.00 | 14.00 | 214.00 |
| 3.0SMCJ120A | 3.0SMCJ120CA | 3CSG | 3CVG | 133.00 | 147.00 | 1 | 120.00 | 2.00 | 15.50 | 193.00 |
| 3.0SMCJ130 | 3.0SMCJ130C | 3CSH | 3CVH | 144.00 | 176.00 | 1 | 130.00 | 2.00 | 13.00 | 231.00 |
| 3.0SMCJ130A | 3.0SMCJ130CA | 3CSK | 3CVK | 144.00 | 159.00 | 1 | 130.00 | 2.00 | 14.40 | 209.00 |
| 3.0SMCJ150 | 3.0SMCJ150C | 3CSL | 3CVL | 167.00 | 204.00 | 1 | 150.00 | 2.00 | 11.20 | 268.00 |
| 3.0SMCJ150A | 3.0SMCJ150CA | 3CSM | 3CVM | 167.00 | 185.00 | 1 | 150.00 | 2.00 | 12.30 | 243.00 |
| 3.0SMCJ160 | 3.0SMCJ160C | 3CSN | 3CVN | 178.00 | 218.00 | 1 | 160.00 | 2.00 | 10.50 | 287.00 |
| 3.0SMCJ160A | 3.0SMCJ160CA | 3CSP | 3CVP | 178.00 | 197.00 | 1 | 160.00 | 2.00 | 11.60 | 259.00 |
| 3.0SMCJ170 | 3.0SMCJ170C | 3CSQ | 3CVQ | 189.00 | 231.00 | 1 | 170.00 | 2.00 | 9.90 | 304.00 |
| 3.0SMCJ170A | 3.0SMCJ170CA | 3CSR | 3CVR | 189.00 | 209.00 | 1 | 170.00 | 2.00 | 10.90 | 275.00 |

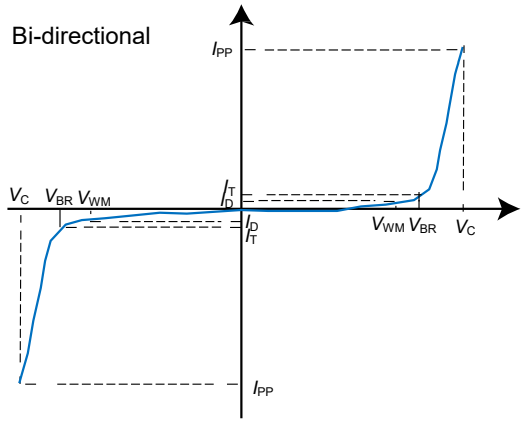
| Part Number | | Device Marking Code | | Breakdown Voltage $V_{BR}$@$I_T$ | | Test Current $I_T$ | Reverse Stand-off Voltage $V_R$ | Max. Reverse Leakage $I_R$@$V_R$ | Max. Peak Pulse Current $I_{PPM}$ | Max. Clamping Voltage $V_C$@$I_{PPM}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | | | | |
| Uni | Bi | Uni | Bi | (V) | | (mA) | (V) | (μA) | (A) | (V) |
| 3.0SMCJ188 | 3.0SMCJ188C | 3CST | 3CVT | 209.00 | 255.00 | 1 | 188.00 | 2.00 | 8.70 | 344.00 |
| 3.0SMCJ188A | 3.0SMCJ188CA | 3CSS | 3CVS | 209.00 | 231.00 | 1 | 188.00 | 2.00 | 9.10 | 328.00 |
| 3.0SMCJ200 | 3.0SMCJ200C | 3CSU | 3CVU | 222.00 | 272.00 | 1 | 200.00 | 2.00 | 8.40 | 356.00 |
| 3.0SMCJ200A | 3.0SMCJ200CA | 3CSV | 3CVV | 222.00 | 246.00 | 1 | 200.00 | 2.00 | 9.30 | 323.00 |
| 3.0SMCJ220 | 3.0SMCJ220C | 3CSW | 3CVW | 245.00 | 299.00 | 1 | 220.00 | 2.00 | 7.70 | 392.00 |
| 3.0SMCJ220A | 3.0SMCJ220CA | 3CSX | 3CVX | 245.00 | 270.00 | 1 | 220.00 | 2.00 | 8.50 | 355.00 |
| 3.0SMCJ240 | 3.0SMCJ240C | 3CSY | 3CVY | 267.00 | 326.00 | 1 | 240.00 | 2.00 | 7.00 | 428.00 |
| 3.0SMCJ240A | 3.0SMCJ240CA | 3CSZ | 3CVZ | 267.00 | 295.00 | 1 | 240.00 | 2.00 | 7.70 | 388.00 |
| 3.0SMCJ250 | 3.0SMCJ250C | 3CTS | 3CUS | 278.00 | 340.00 | 1 | 250.00 | 2.00 | 6.70 | 446.00 |
| 3.0SMCJ250A | 3.0SMCJ250CA | 3CTT | 3CUT | 278.00 | 307.00 | 1 | 250.00 | 2.00 | 7.40 | 404.00 |
| 3.0SMCJ300 | 3.0SMCJ300C | 3CTF | 3CUF | 333.00 | 408.00 | 1 | 300.00 | 2.00 | 5.60 | 535.00 |
| 3.0SMCJ300A | 3.0SMCJ300CA | 3CTG | 3CUG | 333.00 | 368.00 | 1 | 300.00 | 2.00 | 6.20 | 485.00 |
| 3.0SMCJ350 | 3.0SMCJ350C | 3CTQ | 3CUQ | 389.00 | 476.00 | 1 | 350.00 | 2.00 | 4.80 | 624.00 |
| 3.0SMCJ350A | 3.0SMCJ350CA | 3CTR | 3CUR | 389.00 | 429.00 | 1 | 350.00 | 2.00 | 5.30 | 566.00 |
| 3.0SMCJ360 | 3.0SMCJ360C | 3CTH | 3CUH | 400.00 | 489.00 | 1 | 360.00 | 2.00 | 4.60 | 652.00 |
| 3.0SMCJ360A | 3.0SMCJ360CA | 3CTK | 3CUK | 400.00 | 442.00 | 1 | 360.00 | 2.00 | 5.20 | 582.00 |
| 3.0SMCJ400 | 3.0SMCJ400C | 3CTL | 3CUL | 445.00 | 544.00 | 1 | 400.00 | 2.00 | 4.20 | 713.00 |
| 3.0SMCJ400A | 3.0SMCJ400CA | 3CTM | 3CUM | 445.00 | 491.00 | 1 | 400.00 | 2.00 | 4.60 | 646.00 |
| 3.0SMCJ440 | 3.0SMCJ440C | 3CTN | 3CUN | 489.00 | 598.00 | 1 | 440.00 | 2.00 | 3.80 | 784.00 |
| 3.0SMCJ440A | 3.0SMCJ440CA | 3CTP | 3CUP | 489.00 | 540.00 | 1 | 440.00 | 2.00 | 4.20 | 711.00 |

Notes:

1. For bidirectional type having $V_R$ of 10 volts and less, the $I_R$ should be doubled.
2. For parts without A in the PN, the $V_{BR}$ tolerance is ± 10% and $V_C$ is 5% higher than parts with A .The parts without A are currently available, but not recommended for new designs. The parts with A are preferred.

## I-V Curve Characteristics




## Performance Curve for Reference ($T_A$=25 °C unless otherwise noted)

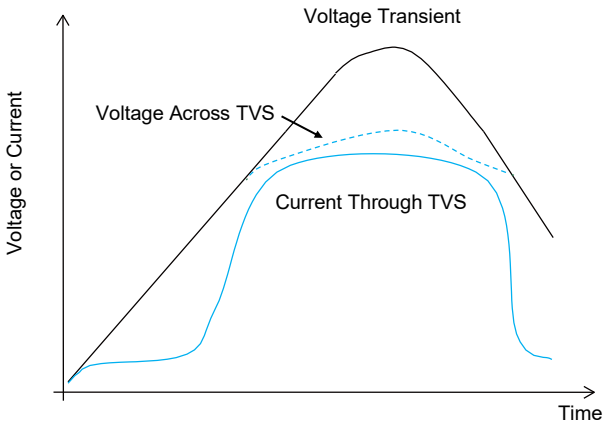



FIGURE 1 TVS Transients Clamping Waveform

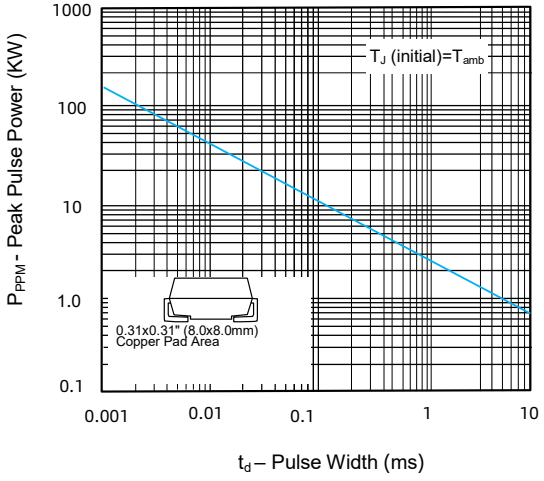



FIGURE 2 Peak Pulse Power Rating Curve

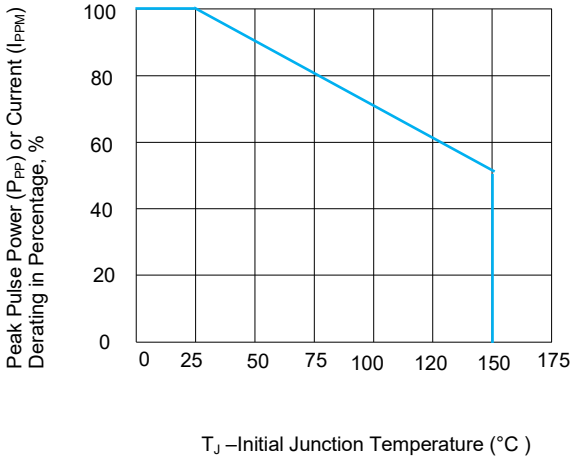



FIGURE 3 Peak Pulse Power Derating Curve

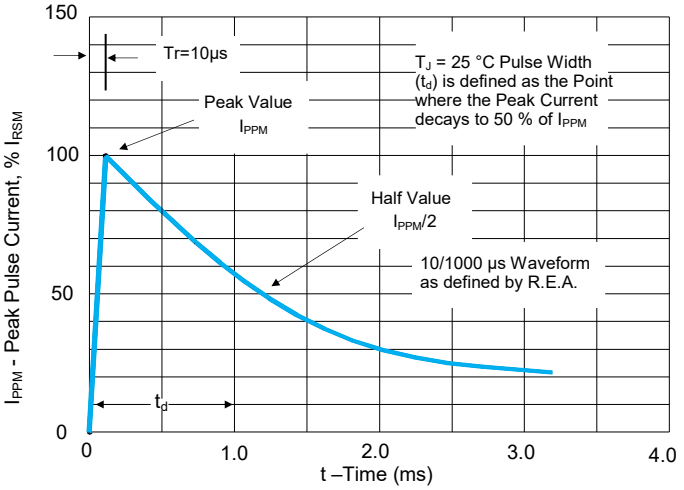



FIGURE 4 Pulse Waveform

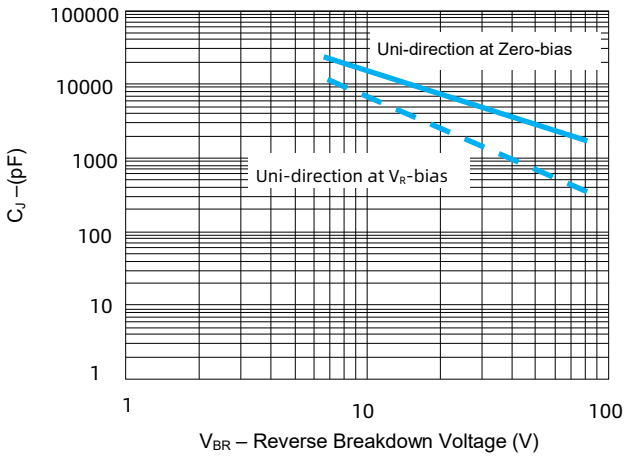



FIGURE 5 Typical Junction Capacitance

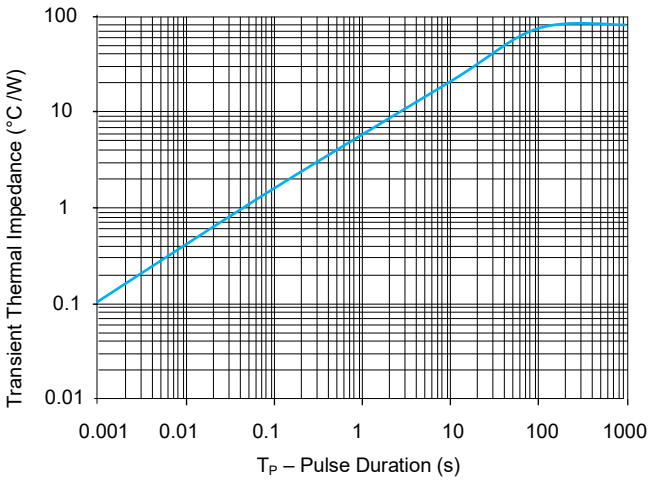



FIGURE 6 Typical Transient Thermal Impedance

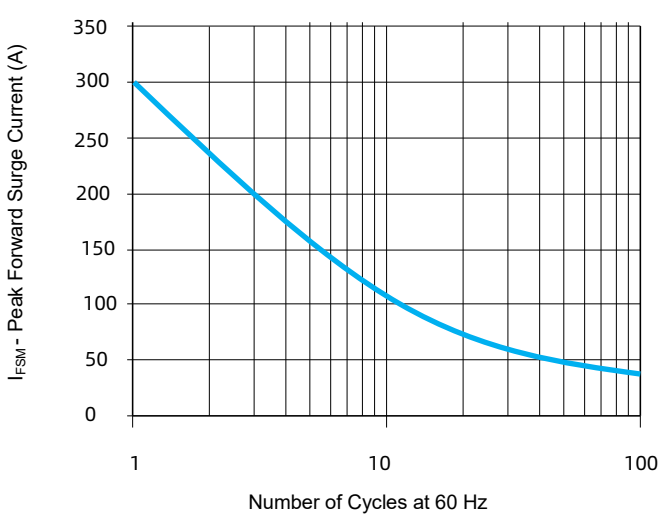



FIGURE 7 Maximum Non-Repetitive Forward Surge Current Uni-Directional only

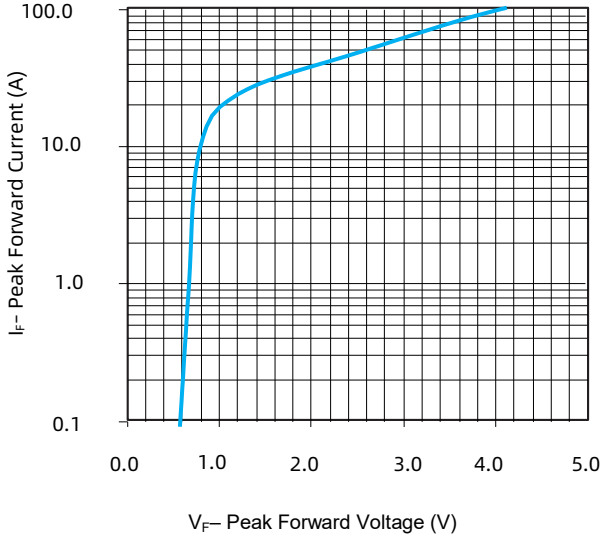



FIGURE 8 Peak Forward Drop vs Peak Forward Current (Typical Values)

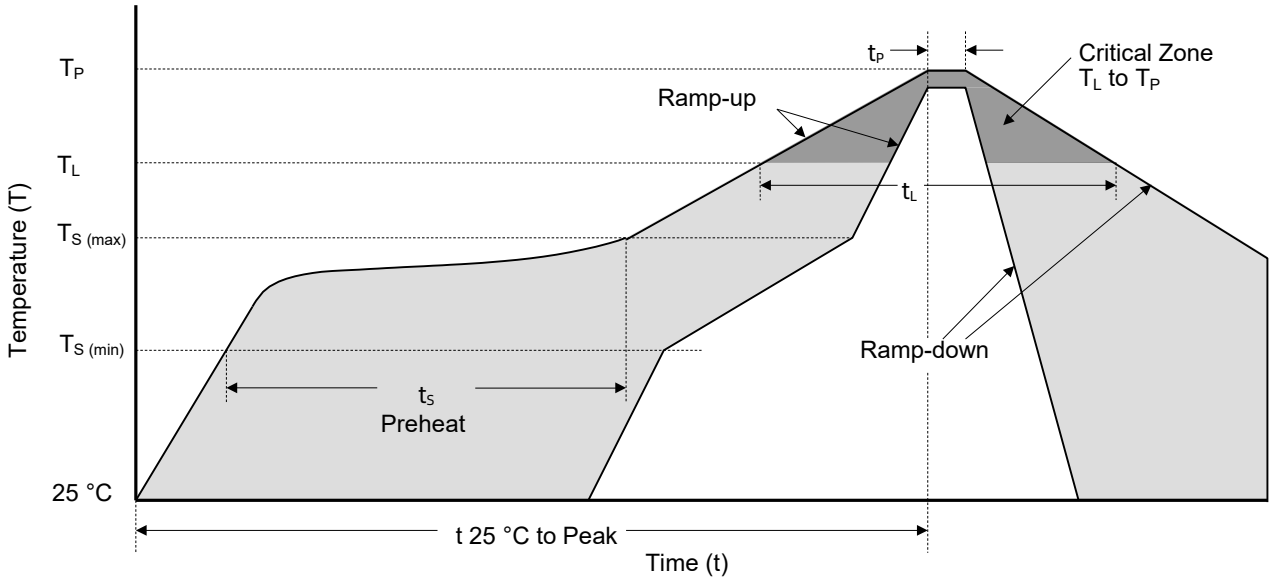
## Environmental Specifications

| | |
|---|---|
| **High Temp. Storage** | JESD22-A103 |
| **HTRB** | JESD22-A108 |
| **Temperature Cycling** | JESD22-A104 |
| **MSL** | JESDEC-J-STD-020, Level 1 |
| **H3TRB** | JESD22-A101 |
| **RSH** | JESD22-A111 |

## Physical Specifications

| | |
|---|---|
| **Weight** | 0.007 ounce,0.21 grams |
| **Case** | JESD22DO214AB. Molded plastic body over glass passivated junction |
| **Polarity** | Color band denotes positive end (cathode) except Bidirectional |
| **Terminal** | Matte Tin-plated leads, Solderability per JESD22-B102 |

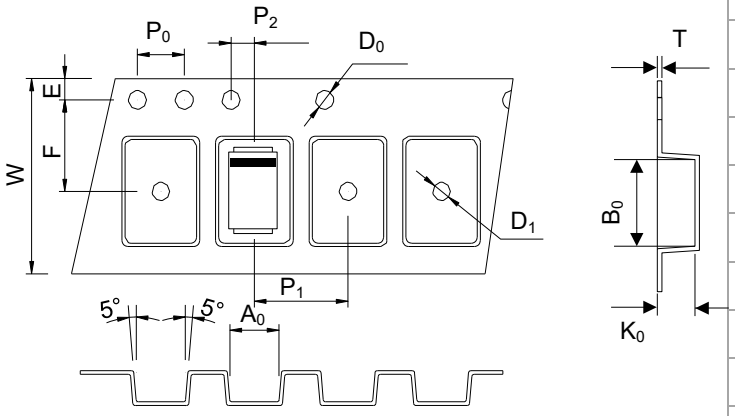
## Soldering Parameters



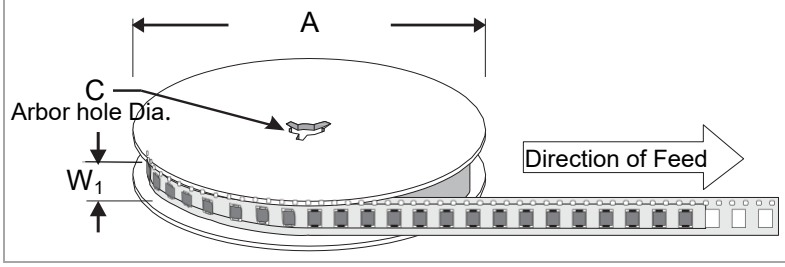

Reflowing Condition

| Reflow Soldering Parameters | | Lead-Free Assembly |
|---|---|---|
| Pre-heat | Temperature Min ($T_{S\ (min)}$) | 150 °C |
| | Temperature Max ($T_{S\ (max)}$) | 200 °C |
| | Time (min to max) ($t_S$) | 60 ~ 120 seconds |
| Average Ramp Up Rate (Liquidus Temp (TL) to Peak | | 3 °C / second max. |
| $T_S$ (max) to $T_L$ Ramp-up Rate | | 3 °C / second max. |
| Reflow | Temperature ($T_L$) (Liquidus) | 217 °C |
| | Time (min to max) ($t_L$) | 60 ~ 150 seconds |
| Peak Temperature ($T_P$) | | $260^{+0/-5}$ °C |
| Time of within 5 °C of Actual Peak Temperature ($t_P$) | | 20 ~ 40 seconds |
| Ramp-down Rate | | 6 °C / second max. |
| Time from 25 °C to Peak Temperature | | 8 Minutes max. |
| Do Not Exceed | | 260 °C |

## Packaging Information

| Tape | Symbol | Dimension (mm) |
|---|---|---|
|  | W | 16.00 + 0.3 / - 0.1 |
| | $P_0$ | 4.00 ± 0.10 |
| | $P_1$ | 8.00 ± 0.10 |
| | $P_2$ | 2.00 ± 0.10 |
| | $D_0$ | 1.55 ± 0.05 |
| | $D_1$ | 1.55 ± 0.05 |
| | E | 1.75 ± 0.10 |
| | F | 7.50 ± 0.10 |
| | $A_0$ | 6.15 ± 0.10 |
| | $B_0$ | 8.30 ± 0.10 |
| | $K_0$ | 2.48 ± 0.10 |
| | T | 0.30 ± 0.05 |



| Reel Size | 13” Reel | |
|---|---|---|
|  | A | 330 mm |
| | C | 13.2 mm |
| | $W_1$ | 16.4 mm |



| Part Number | Package | QTY (Reel) | Packaging Option | Packaging Specification |
|---|---|---|---|---|
| 3.0SMCJ××× | DO-214AB | 3000 PCS | Tape & Reel – 16 mm tape/13” reel | EIA STD RS-481 |

## Glossary

| Item | Description |
|---|---|
| $V_C$ | **Clamping Voltage**<br>Voltage across TVS in a region of low differential resistance that serves to limit the voltage across the device terminals. |
| $V_R$ | **Reverse Stand-off Voltage**<br>Maximum voltage that can be applied to the TVS without operation.<br>NOTE : It is also shown as $V_{WM}$ (maximum working voltage (maximum d.c. voltage)) and known as rated stand-off voltage ($V_{so}$). |
| $I_R$ | **Reverse Leakage Current**<br>Current measured at $V_R$.<br>NOTE : Also shown as $I_D$ for stand-by current. |
| $V_{BR}$ | **Breakdown Voltage**<br>Voltage across TVS at a specified current $I_T$ in the breakdown region. |
| $I_{PPM}$ | **Rated Random Recurring Peak Impulse Current**<br>Maximum-rated value of random recurring peak impulse current that may be applied to a device. |
| $P_{M(AV)}$ | **Rated Average Power Dissipation**<br>Maximum-rated value of power dissipation resulting from all sources, including transients and standby current, averaged over a short period of time. |
| $P_{PPM}$ | **Rated Random Recurring Peak Impulse Power Dissipation**<br>Maximum-rated value of the product of rated random recurring peak impulse current ($I_{PPM}$) multiplies by specified maximum clamping voltage ($V_C$). |
| $C_J$ | **Capacitance**<br>Capacitance across the TVS measured at a specified frequency and voltage. |
| $V_{FS}$ | **Peak Forward Surge Voltage**<br>Peak voltage across an TVS for a specified forward surge current ($I_{FS}$) and time duration.<br>NOTE : Also shown as $V_F$. |
| $I_{FS}$ | **Forward Surge Current**<br>Pulsed current through TVS in the forward conducting region.<br>NOTE : Also shown as $I_F$. |
| $\alpha_{V(BR)}$ | **Temperature Coefficient of Breakdown Voltage**<br>The change of breakdown voltage divided by the change of temperature. |
| $I_{PP}$ | **Peak pulse Current**<br>Peak pulse current value applied across the TVS to determine the clamping voltage $V_C$ for a specified wave shape. |
| $I_T$ | **Pulsed D.C. Test Current**<br>Test current for measurement of the breakdown voltage $V_{BR}$. This is defined by the manufacturer and usually given in milliamperes with a pulse duration of less than 40 ms.<br>NOTE : Also shown as $I_{BR}$ . |

—(GB-T 18802.321 / IEC 61643-321 / JESD210A)

# ATTENTION

## Usage

1. TVS must be operated in the specified ambient temp.
2. Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

## Replacement

1. If TVS is visually damaged, please replace it.
2. TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

## Storage

1. Storage Temp. Range: (-55 to 150) °C.
2. Do not store the TVS at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder- ability of the lead wires. The product shall be used up within 1 year after receiving the goods.

## Environmental Conditions

1. TVS should not be exposed to the open air, nor direct sunshine.
2. TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. TVS should avoid sand dust, salt mist, or other harmful gases.

## Max. Typical Capacitance of TVS

The typical capacitance of TVS is listed in the specifications. Designers may refer to it when designing TVS in High frequency circuit.

## Installation Mechanical Stress

1. Do not knock TVS when installing, to avoid mechanical damage.
2. Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.