

## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 3000W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical  $I_R$  less than 1μA above 10V
- High Temperature soldering: 260°C/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E244458



### Mechanical Data

- Case: JEDEC DO-214AB. Molded plastic over glass passivated junction
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 16mm tape (EIA STD RS-481)
- Weight: 0.28g

### Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

### Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

| Rating  | Symbol          | Value        | Units |
|---|-----------------|--------------|-------|
| Peak pulse power dissipation at 10/1000μs waveform (Note1, Note2, Fig.1)  | $P_{PPM}$       | Minimum 3000 | Watts |
| Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3)   | $I_{PPM}$       | See Table    | Amps  |
| Steady state power dissipation at $T_A=50^\circ\text{C}$ (Fig.5)  | $P_{M(AV)}$     | 6.5          | Watts |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6) | $I_{FSM}$       | 300          | Amps  |
| 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  |

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^\circ\text{C}$  per Fig.2.

2. Mounted on 8.0mmx8.0mm copper pads to each terminal.

3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

### Dimensions (SMC/DO-214AB)

|  | Symbol | Millimeters |       | Inches |       |
|--|--------|-------------|-------|--------|-------|
|  |        | Min.        | Max.  | Min.   | Max.  |
|  | L      | 6.60        | 7.11  | 0.260  | 0.280 |
|  | D      | 5.59        | 6.22  | 0.220  | 0.245 |
|  | D1     | 2.90        | 3.20  | 0.114  | 0.126 |
|  | T      | 7.75        | 8.13  | 0.305  | 0.320 |
|  | T1     | 0.76        | 1.52  | 0.030  | 0.060 |
|  | d      | -           | 0.203 | -      | 0.008 |
|  | H      | 2.20        | 2.80  | 0.087  | 0.110 |
|  | H1     | 2.06        | 2.62  | 0.079  | 0.103 |

**Electrical Characteristics ( $T_A=25^\circ\text{C}$ )**

| Part Number    |               | Device Marking Code |     | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|----------------|---------------|---------------------|-----|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | UNI                 | BI  | $V_{RWM}(V)$              | $V_{BR}(V)$               | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| SMDJ5.0A       | SMDJ5.0CA     | RDE                 | DDE | 5.0                       | 6.40~7.00                 | 10           | 9.2                                 | 326.1              | 800                         |
| SMDJ6.0A       | SMDJ6.0CA     | RDG                 | DDG | 6.0                       | 6.67~7.37                 | 10           | 10.3                                | 291.3              | 800                         |
| SMDJ6.5A       | SMDJ6.5CA     | RDK                 | DDK | 6.5                       | 7.22~7.98                 | 10           | 11.2                                | 267.9              | 500                         |
| SMDJ7.0A       | SMDJ7.0CA     | PDM                 | DDM | 7.0                       | 7.78~8.60                 | 10           | 12.0                                | 250.0              | 200                         |
| SMDJ7.5A       | SMDJ7.5CA     | PDP                 | DDP | 7.5                       | 8.33~9.21                 | 1            | 12.9                                | 232.6              | 100                         |
| SMDJ8.0A       | SMDJ8.0CA     | PDR                 | DDR | 8.0                       | 8.89~9.83                 | 1            | 13.6                                | 220.6              | 50                          |
| SMDJ8.5A       | SMDJ8.5CA     | PDT                 | DDT | 8.5                       | 9.44~10.40                | 1            | 14.4                                | 208.3              | 20                          |
| SMDJ9.0A       | SMDJ9.0CA     | PDV                 | DDV | 9.0                       | 10.00~11.10               | 1            | 15.4                                | 194.8              | 10                          |
| SMDJ10A        | SMDJ10CA      | PDX                 | DDX | 10.0                      | 11.10~12.30               | 1            | 17.0                                | 176.5              | 5                           |
| SMDJ11A        | SMDJ11CA      | PDZ                 | DDZ | 11.0                      | 12.20~13.50               | 1            | 18.2                                | 164.8              | 2                           |
| SMDJ12A        | SMDJ12CA      | PEE                 | DEE | 12.0                      | 13.30~14.70               | 1            | 19.9                                | 150.8              | 2                           |
| SMDJ13A        | SMDJ13CA      | PEG                 | DEG | 13.0                      | 14.40~15.90               | 1            | 21.5                                | 139.5              | 2                           |
| SMDJ14A        | SMDJ14CA      | PEK                 | DEK | 14.0                      | 15.60~17.20               | 1            | 23.2                                | 129.3              | 2                           |
| SMDJ15A        | SMDJ15CA      | PEM                 | DEM | 15.0                      | 16.70~18.50               | 1            | 24.4                                | 123.0              | 2                           |
| SMDJ16A        | SMDJ16CA      | PEP                 | DEP | 16.0                      | 17.80~19.70               | 1            | 26.0                                | 115.4              | 2                           |
| SMDJ17A        | SMDJ17CA      | PER                 | DER | 17.0                      | 18.90~20.90               | 1            | 27.6                                | 108.7              | 2                           |
| SMDJ18A        | SMDJ18CA      | PET                 | DET | 18.0                      | 20.00~22.10               | 1            | 29.2                                | 102.7              | 2                           |
| SMDJ20A        | SMDJ20CA      | PEV                 | DEV | 20.0                      | 22.20~24.50               | 1            | 32.4                                | 92.6               | 2                           |

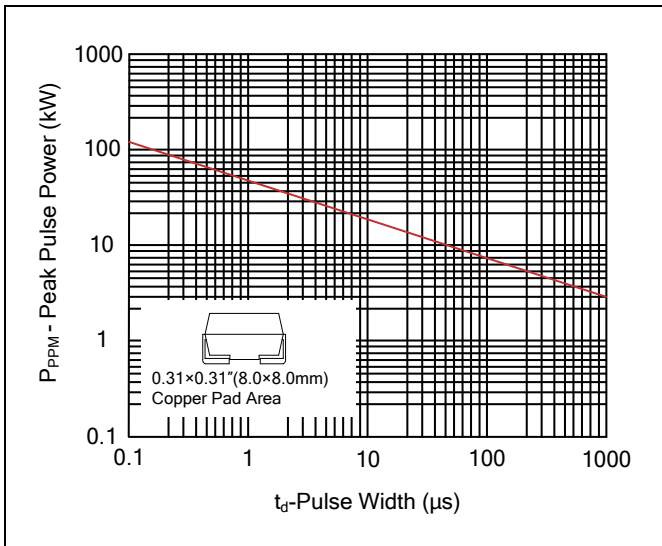
**Electrical Characteristics ( $T_A=25^\circ\text{C}$ )**

| Part Number    |               | Device Marking Code |     | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|----------------|---------------|---------------------|-----|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | UNI                 | BI  | $V_{RWM}(V)$              | $V_{BR}(V)$               | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| SMDJ22A        | SMDJ22CA      | PEX                 | DEX | 22.0                      | 24.40~26.90               | 1            | 35.5                                | 84.5               | 2                           |
| SMDJ24A        | SMDJ24CA      | PEZ                 | DEZ | 24.0                      | 26.70~29.50               | 1            | 38.9                                | 77.1               | 2                           |
| SMDJ26A        | SMDJ26CA      | PFE                 | DFE | 26.0                      | 28.90~31.90               | 1            | 42.1                                | 71.3               | 2                           |
| SMDJ28A        | SMDJ28CA      | PFG                 | DFG | 28.0                      | 31.10~34.40               | 1            | 45.4                                | 66.1               | 2                           |
| SMDJ30A        | SMDJ30CA      | PFK                 | DFK | 30.0                      | 33.30~36.80               | 1            | 48.4                                | 62.0               | 2                           |
| SMDJ33A        | SMDJ33CA      | PFM                 | DFM | 33.0                      | 36.70~40.60               | 1            | 53.3                                | 56.3               | 2                           |
| SMDJ36A        | SMDJ36CA      | PFP                 | DFP | 36.0                      | 40.00~44.20               | 1            | 58.1                                | 51.6               | 2                           |
| SMDJ40A        | SMDJ40CA      | PFR                 | DFR | 40.0                      | 44.40~49.10               | 1            | 64.5                                | 46.5               | 2                           |
| SMDJ43A        | SMDJ43CA      | PFT                 | DFT | 43.0                      | 47.80~52.80               | 1            | 69.4                                | 43.2               | 2                           |
| SMDJ45A        | SMDJ45CA      | PFV                 | DFV | 45.0                      | 50.00~55.30               | 1            | 72.7                                | 41.3               | 2                           |
| SMDJ48A        | SMDJ48CA      | PFX                 | DFX | 48.0                      | 53.30~58.90               | 1            | 77.4                                | 38.8               | 2                           |
| SMDJ51A        | SMDJ51CA      | PFZ                 | DFZ | 51.0                      | 56.70~62.70               | 1            | 82.4                                | 36.4               | 2                           |
| SMDJ54A        | SMDJ54CA      | PGE                 | DGE | 54.0                      | 60.00~66.30               | 1            | 87.1                                | 34.4               | 2                           |
| SMDJ58A        | SMDJ58CA      | PGG                 | DGG | 58.0                      | 64.40~71.20               | 1            | 93.6                                | 32.1               | 2                           |
| SMDJ60A        | SMDJ60CA      | PGK                 | DGK | 60.0                      | 66.70~73.70               | 1            | 96.8                                | 31.0               | 2                           |
| SMDJ64A        | SMDJ64CA      | PGM                 | DGM | 64.0                      | 71.10~78.60               | 1            | 103.0                               | 29.1               | 2                           |
| SMDJ70A        | SMDJ70CA      | PGP                 | DGP | 70.0                      | 77.80~86.00               | 1            | 113.0                               | 26.5               | 2                           |
| SMDJ75A        | SMDJ75CA      | PGR                 | DGR | 75.0                      | 83.30~92.10               | 1            | 121.0                               | 24.8               | 2                           |
| SMDJ78A        | SMDJ78CA      | PGT                 | DGT | 78.0                      | 86.70~95.80               | 1            | 126.0                               | 23.8               | 2                           |
| SMDJ85A        | SMDJ85CA      | PGV                 | DGV | 85.0                      | 94.40~104.00              | 1            | 137.0                               | 21.9               | 2                           |
| SMDJ90A        | SMDJ90CA      | PGX                 | DGX | 90.0                      | 100.00~111.00             | 1            | 146.0                               | 20.5               | 2                           |
| SMDJ100A       | SMDJ100CA     | PGZ                 | DGZ | 100.0                     | 111.00~123.00             | 1            | 162.0                               | 18.5               | 2                           |
| SMDJ110A       | SMDJ110CA     | PHE                 | DHE | 110.0                     | 122.00~135.00             | 1            | 177.0                               | 16.9               | 2                           |
| SMDJ120A       | SMDJ120CA     | PHG                 | DHG | 120.0                     | 133.00~147.00             | 1            | 193.0                               | 15.5               | 2                           |
| SMDJ130A       | SMDJ130CA     | PHK                 | DHK | 130.0                     | 144.00~159.00             | 1            | 209.0                               | 14.4               | 2                           |
| SMDJ150A       | SMDJ150CA     | PHM                 | DHM | 150.0                     | 167.00~185.00             | 1            | 243.0                               | 12.3               | 2                           |
| SMDJ160A       | SMDJ160CA     | PHP                 | DHP | 160.0                     | 178.00~197.00             | 1            | 259.0                               | 11.6               | 2                           |
| SMDJ170A       | SMDJ170CA     | PHR                 | DHR | 170.0                     | 189.00~209.00             | 1            | 275.0                               | 10.9               | 2                           |
| SMDJ180A       | SMDJ180CA     | HHT                 | IHT | 180.0                     | 201.00~222.00             | 1            | 292.0                               | 10.3               | 2                           |
| SMDJ190A       | SMDJ190CA     | HHV                 | IHV | 190.0                     | 211.00~233.00             | 1            | 308.0                               | 9.7                | 2                           |
| SMDJ200A       | SMDJ200CA     | HHX                 | IHX | 200.0                     | 224.00~247.00             | 1            | 324.0                               | 9.3                | 2                           |
| SMDJ210A       | SMDJ210CA     | HHZ                 | IHZ | 210.0                     | 237.00~263.00             | 1            | 340.0                               | 8.8                | 2                           |
| SMDJ220A       | SMDJ220CA     | HIE                 | IIE | 220.0                     | 246.00~272.00             | 1            | 356.0                               | 8.4                | 2                           |

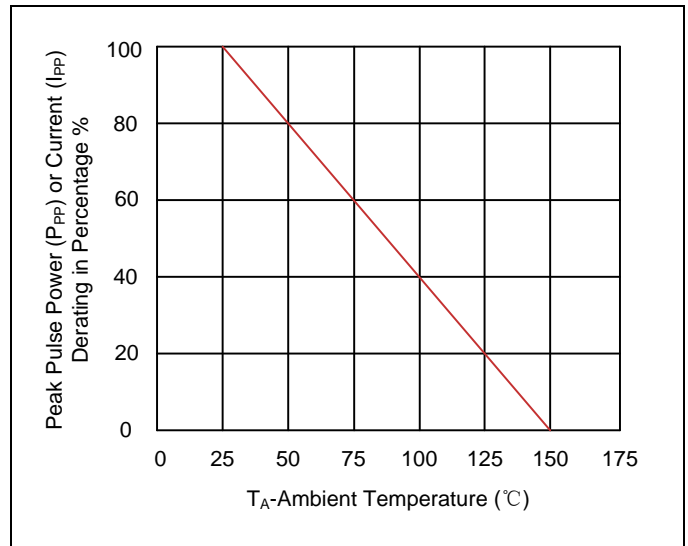
Notes: For bidirectional type having  $V_{RWM}$  of 10V and less, the  $I_R$  limit is double.

**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

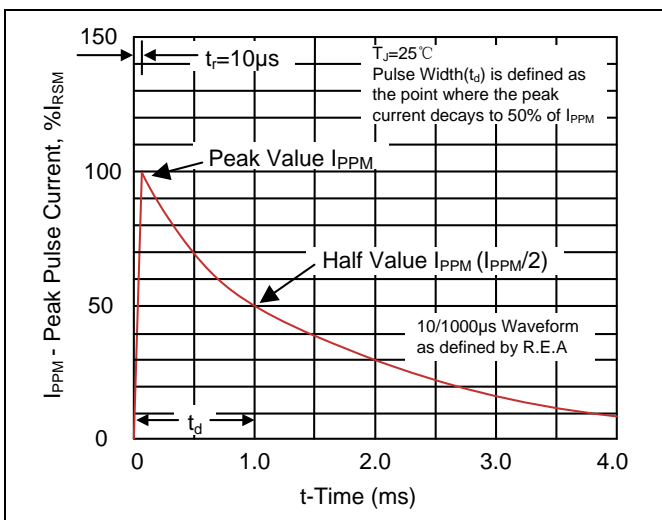
**Figure 1. Peak Pulse Power Rating Curve**



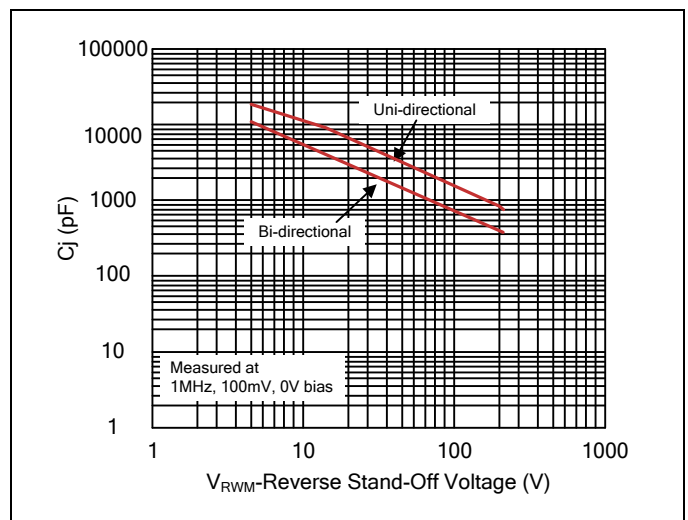
**Figure 2. Pulse Derating Curve**



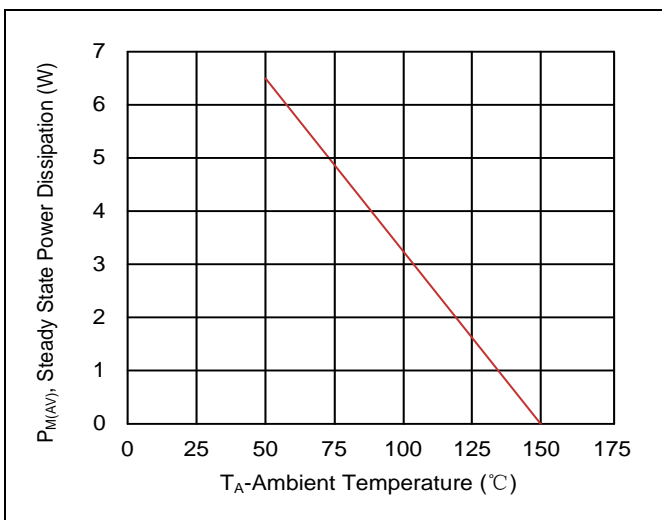
**Figure 3. Pulse Waveform**



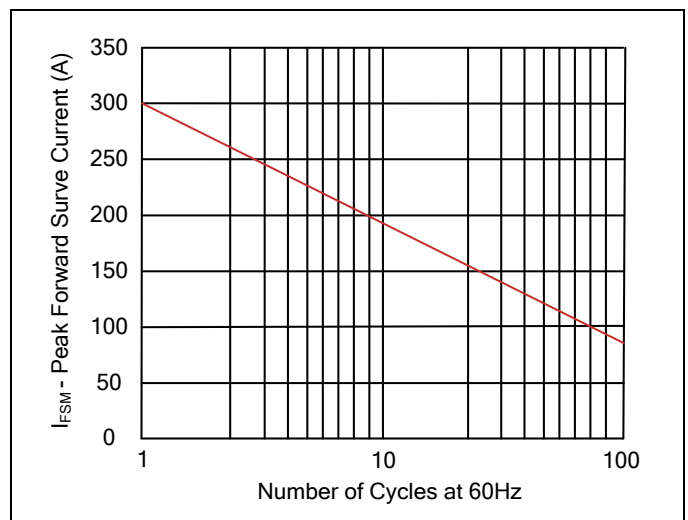
**Figure 4. Typical Junction Capacitance**



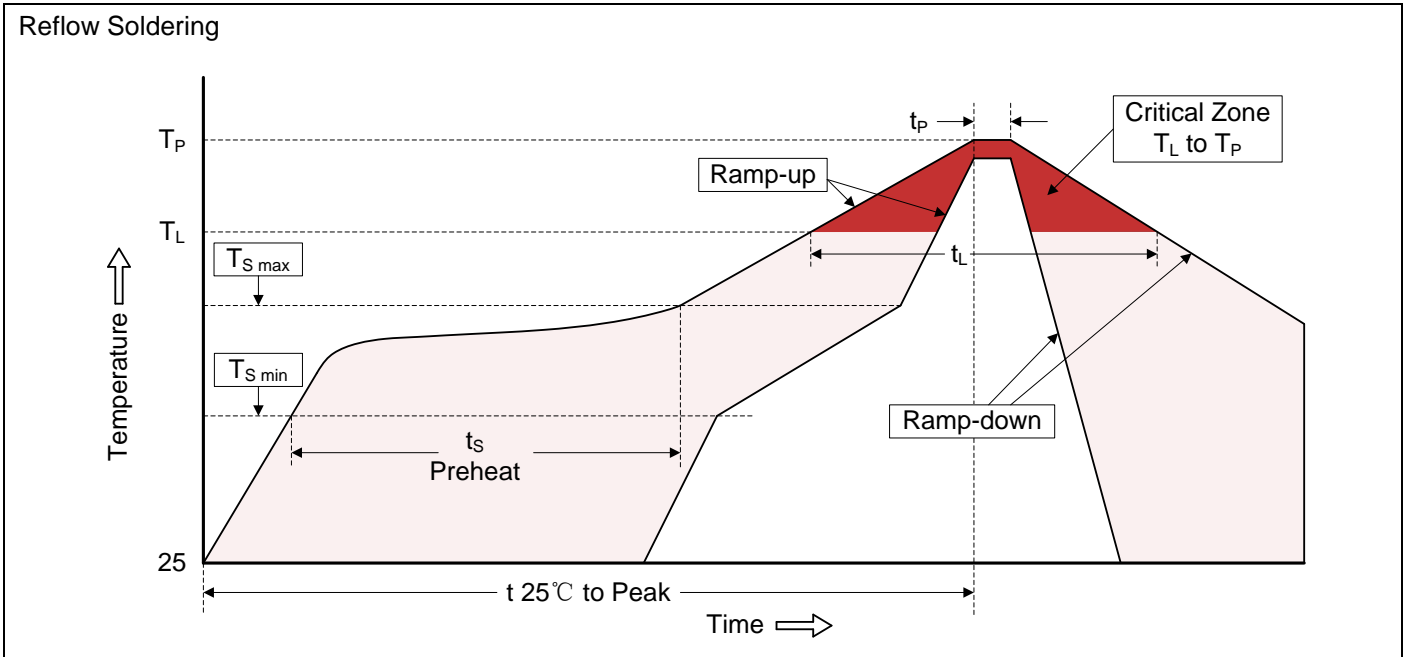
**Figure 5. Steady State Power Dissipation Derating Curve**



**Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only**



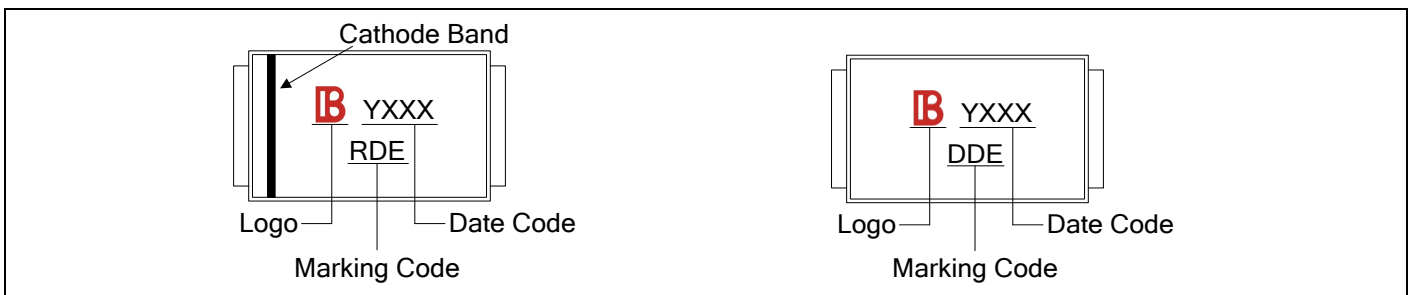
**Recommended Soldering Conditions**



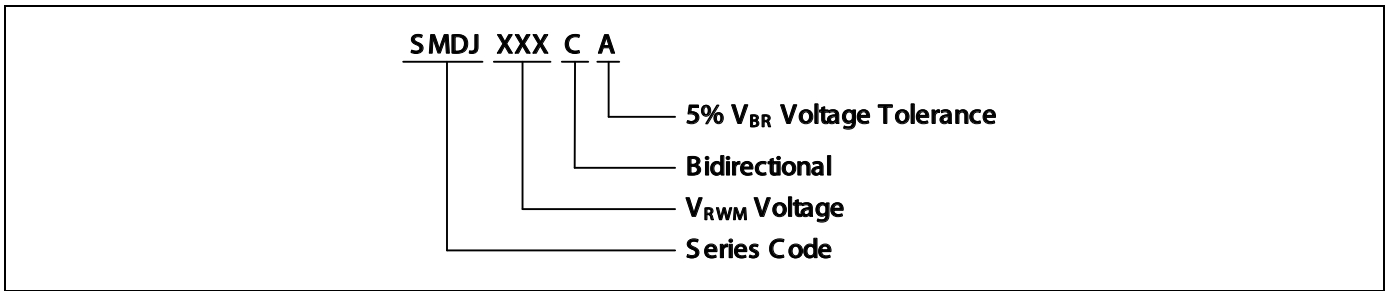
**Recommended Conditions**

| Profile Feature  | Pb-Free Assembly |
|--|------------------|
| Average ramp-up rate (T <sub>L</sub> to T <sub>P</sub> )     | 3°C/second max.  |
| Preheat  |                  |
| -Temperature Min (T <sub>S min</sub> )                       | 150°C            |
| -Temperature Max (T <sub>S max</sub> )                       | 200°C            |
| -Time (min to max) (t <sub>s</sub> )                         | 60-180 seconds   |
| T <sub>S max</sub> to T <sub>L</sub>                         |                  |
| -Ramp-up Rate  | 3°C/second max.  |
| Time maintained above:                                       |                  |
| -Temperature (T <sub>L</sub> )                               | 217°C            |
| -Time (t <sub>L</sub> )                                      | 60-150 seconds   |
| Peak Temperature (T <sub>P</sub> )                           | 260°C            |
| Time within 5°C of actual Peak Temperature (t <sub>p</sub> ) | 20-40 seconds    |
| Ramp-down Rate   | 6°C/second max.  |
| Time 25°C to Peak Temperature                                | 8 minutes max.   |

**Marking Code**



**Part Number Code**



**Ordering Code for Different Package**

7 inch reel package: Add suffix “/TR7” at the end of the part number, such as SMDJ5.0A/TR7

13 inch reel package: Add suffix “/TR13” at the end of the part number, such as SMDJ120CA/TR13

**Packaging**

| Tape             |           | Symbol            | Dimension (mm) |
|------------------|-----------|-------------------|----------------|
|                  |           | W                 | 16.00±0.20     |
|                  |           | P0                | 4.00±0.10      |
|                  |           | P1                | 8.00±0.10      |
|                  |           | P2                | 2.00±0.10      |
|                  |           | D0                | Φ1.5 ±0.10     |
|                  |           | D1                | Φ1.5 ±0.10     |
|                  |           | E                 | 1.75±0.10      |
|                  |           | F                 | 7.50±0.10      |
|                  |           | A0                | 6.27±0.15      |
|                  |           | B0                | 8.30±0.10      |
|                  |           | K0                | 3.15±0.15      |
|                  |           | T                 | 0.30±0.05      |
|                  |           | D2                | Φ178.0±2.0     |
|                  |           | D3                | Φ50.0Min.      |
| D4               | Φ13.0±0.5 |                   |                |
| W1               | 20.0 ±2.0 |                   |                |
| Quantity: 500PCS |           |                   |                |
|                  |           | D5                | Φ330.0±2.0     |
|                  |           | D6                | Φ13.5±0.5      |
|                  |           | H                 | 2.5±1.0        |
|                  |           | W2                | 20.0±2.0       |
|                  |           | Quantity: 3000PCS |                |
|                  |           |                   |                |

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [ESD Suppressors / TVS Diodes](#) category:*

*Click to view products by [Brightking](#) manufacturer:*

Other Similar products are found below :

[NTE4902](#) [P4SMAJ15A](#) [P4SMAJ26A](#) [SMAJ400CA-TP](#) [TGL34-47CA](#) [ESDAULC45-1BF4](#) [SM1605E3/TR13](#) [SMF20A-TP](#) [P4SMAJ12A](#)  
[CPDUR24V-HF](#) [CPDQC5V0USP-HF](#) [CPDQC5V0-HF](#) [MPLAD30KP45CAE3](#) [MMBZ27VCLQ-7-F](#) [MMAD1108/TR13](#) [MPLAD30KP24A](#)  
[ACPDQC5V0R-HF](#) [DFLT170A-7](#) [NTE4900](#) [NTE4926](#) [NTE4938](#) [SMF22A-TP](#) [SMF12A-TP](#) [SLVU2.8-TP](#) [SMLJ6.5CA-TP](#) [SMAJ6.5CA-](#)  
[TP](#) [MMAD1108E3/TR13](#) [D5V0M1U2LP3-7](#) [SMAJ400A-TP](#) [AOZ8811DT-03](#) [AOZ8831DI-05](#) [AOZ8831DT-03](#) [SMAJ188CA](#) [3SMC33CA](#)  
[BK](#) [CPDQC3V3C-HF](#) [CPDQC12VE-HF](#) [MPLAD30KP170CA](#) [82357120100](#) [5.0SMLJ15CA-TP](#) [5KP18A-TP](#) [P6KE8.2A-TP](#)  
[MPLAD30KP43CAE3](#) [SMAJ43A-TP](#) [D5V0F6U8LP33-7](#) [TVS5501V10MUT5G](#) [5.0SMLJ24CA-TP](#) [SMAJ110CA-TP](#) [MPLAD15KP75CAE3](#)  
[MMAD1103e3/TR13](#) [DFLT40AQ-7](#)