

Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|--------|--------------------|
| | E230531 |

Maximum Ratings and Thermal Characteristics
($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|------------|--------------------|
| Peak Pulse Power Dissipation at $T_A=25^\circ\text{C}$ by 10x1000 μs waveform (Fig.1)(Note 1), (Note 2) | P_{PPM} | 3000 | W |
| Power Dissipation on infinite heat sink at $T_A=50^\circ\text{C}$ | $P_{M(AV)}$ | 6.5 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | I_{FSM} | 300 | A |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional only | V_F | 3.5 | V |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -65 to 150 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | $^\circ\text{C/W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | $^\circ\text{C/W}$ |

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig. 2.
2. Mounted on 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 device only, duty cycle=4 per minute maximum.

Description

The SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.


Features

- Halogen-Free
- RoHS compliant
- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- Glass passivated chip junction
- 3000W peak pulse power capability at 10x1000 μs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 2 μA above 12V
- High Temperature soldering guaranteed: 260 $^\circ\text{C}$ /40 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability 94V-O
- Matte Tin Lead-free Plated

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Electrical Characteristics

| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ I_T | | Test Current I_T (mA) | Maximum Clamping Voltage V_C @ I_{PP} (V) | Maximum Peak Pulse Current I_{PP} (A) | Maximum Reverse Leakage I_R @ V_R (μ A) | Agency Approval  |
|-------------------|------------------|---------|-----|---|--|--------|-------------------------|---|---|--|---|
| | | UNI | BI | | MIN | MAX | | | | | |
| SMDJ5.0A | SMDJ5.0CA | RDE | DDE | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 326.1 | 800 | X |
| SMDJ6.0A | SMDJ6.0CA | RDG | DDG | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 291.3 | 800 | X |
| SMDJ6.5A | SMDJ6.5CA | RDK | DDK | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 267.9 | 500 | X |
| SMDJ7.0A | SMDJ7.0CA | PDM | DDM | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 250.0 | 200 | X |
| SMDJ7.5A | SMDJ7.5CA | PDP | DDP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 232.6 | 100 | X |
| SMDJ8.0A | SMDJ8.0CA | PDR | DDR | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 220.6 | 50 | X |
| SMDJ8.5A | SMDJ8.5CA | PDT | DDT | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 208.3 | 20 | X |
| SMDJ9.0A | SMDJ9.0CA | PDV | DDV | 9.0 | 10.00 | 11.10 | 1 | 15.4 | 194.8 | 10 | X |
| SMDJ10A | SMDJ10CA | PDX | DDX | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 176.5 | 5 | X |
| SMDJ11A | SMDJ11CA | PDZ | DDZ | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 164.8 | 2 | X |
| SMDJ12A | SMDJ12CA | PEE | DEE | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 150.8 | 2 | X |
| SMDJ13A | SMDJ13CA | PEG | DEG | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 139.5 | 2 | X |
| SMDJ14A | SMDJ14CA | PEK | DEK | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 129.3 | 2 | X |
| SMDJ15A | SMDJ15CA | PEM | DEM | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 123.0 | 2 | X |
| SMDJ16A | SMDJ16CA | PEP | DEP | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 115.4 | 2 | X |
| SMDJ17A | SMDJ17CA | PER | DER | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 108.7 | 2 | X |
| SMDJ18A | SMDJ18CA | PET | DET | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 102.7 | 2 | X |
| SMDJ20A | SMDJ20CA | PEV | DEV | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 92.6 | 2 | X |
| SMDJ22A | SMDJ22CA | PEX | DEX | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 84.5 | 2 | X |
| SMDJ24A | SMDJ24CA | PEZ | DEZ | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 77.1 | 2 | X |
| SMDJ26A | SMDJ26CA | PFE | DFE | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 71.3 | 2 | X |
| SMDJ28A | SMDJ28CA | PFG | DFG | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 66.1 | 2 | X |
| SMDJ30A | SMDJ30CA | PFK | DFK | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 62.0 | 2 | X |
| SMDJ33A | SMDJ33CA | PFM | DFM | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 56.3 | 2 | X |
| SMDJ36A | SMDJ36CA | PFP | DFP | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 51.6 | 2 | X |
| SMDJ40A | SMDJ40CA | PFR | DFR | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 46.5 | 2 | X |
| SMDJ43A | SMDJ43CA | PFT | DFT | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 43.2 | 2 | X |
| SMDJ45A | SMDJ45CA | PFV | DFV | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 41.3 | 2 | X |
| SMDJ48A | SMDJ48CA | PFX | DFX | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 38.8 | 2 | X |
| SMDJ51A | SMDJ51CA | PFZ | DFZ | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 36.4 | 2 | X |
| SMDJ54A | SMDJ54CA | RGE | DGE | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 34.4 | 2 | X |
| SMDJ58A | SMDJ58CA | PGG | DGG | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 32.1 | 2 | X |
| SMDJ60A | SMDJ60CA | PGK | DGK | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 31.0 | 2 | X |
| SMDJ64A | SMDJ64CA | PGM | DGM | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 29.1 | 2 | X |
| SMDJ70A | SMDJ70CA | PGP | DGP | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 26.5 | 2 | X |
| SMDJ75A | SMDJ75CA | PGR | DGR | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 24.8 | 2 | X |
| SMDJ78A | SMDJ78CA | PGT | DGT | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 23.8 | 2 | X |
| SMDJ85A | SMDJ85CA | PGV | DGV | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 21.9 | 2 | X |
| SMDJ90A | SMDJ90CA | PGX | DGX | 90.0 | 100.00 | 111.00 | 1 | 146.0 | 20.5 | 2 | X |
| SMDJ100A | SMDJ100CA | PGZ | DGZ | 100.0 | 111.00 | 123.00 | 1 | 162.0 | 18.5 | 2 | X |
| SMDJ110A | SMDJ110CA | PHE | DHE | 110.0 | 122.00 | 135.00 | 1 | 177.0 | 16.9 | 2 | X |
| SMDJ120A | SMDJ120CA | PHG | DHG | 120.0 | 133.00 | 147.00 | 1 | 193.0 | 15.5 | 2 | X |
| SMDJ130A | SMDJ130CA | PHK | DHK | 130.0 | 144.00 | 159.00 | 1 | 209.0 | 14.4 | 2 | X |
| SMDJ150A | SMDJ150CA | PHM | DHM | 150.0 | 167.00 | 185.00 | 1 | 243.0 | 12.3 | 2 | X |
| SMDJ160A | SMDJ160CA | PHP | DHP | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 11.6 | 2 | X |
| SMDJ170A | SMDJ170CA | PHR | DHR | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 10.9 | 2 | X |

For parts without A, the V_{BR} is $\pm 10\%$, and V_C is 5% higher than A parts.

For bidirectional type having V_R of 10 volts 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

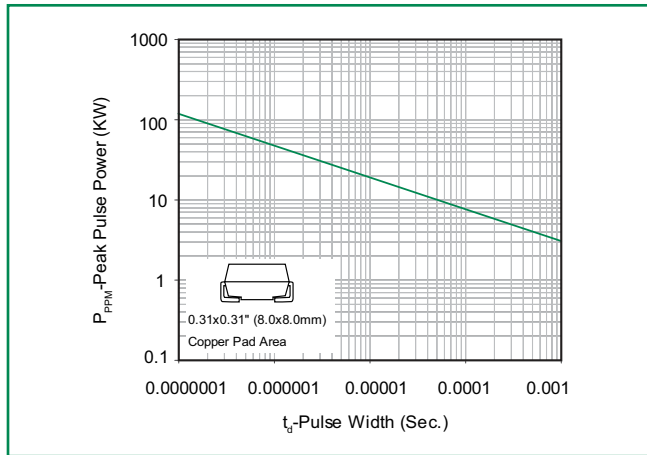


Figure 2 - Pulse Derating Curve

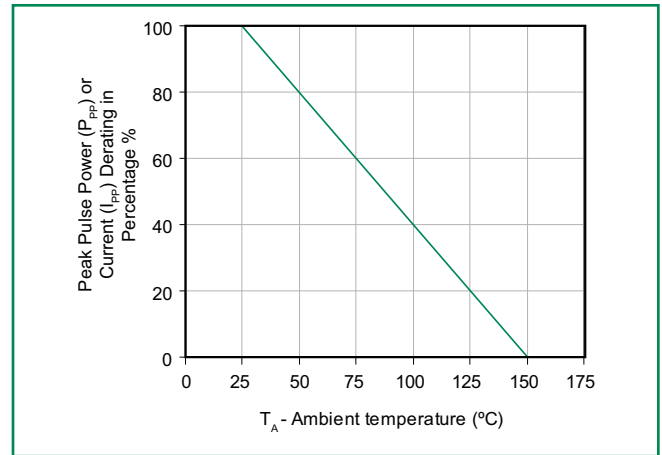


Figure 3 - Pulse Waveform

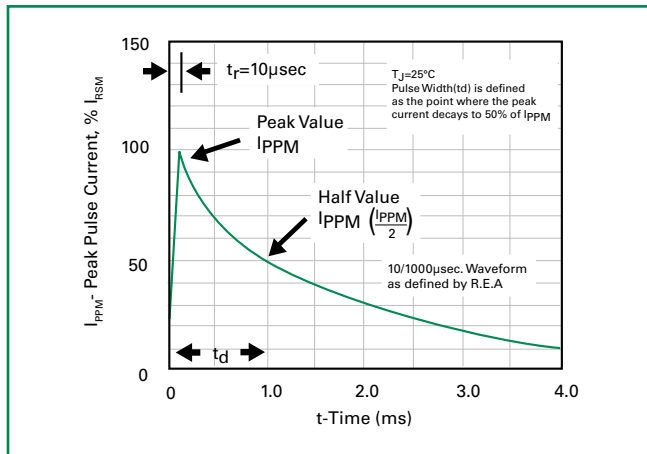


Figure 4 - Typical Junction Capacitance

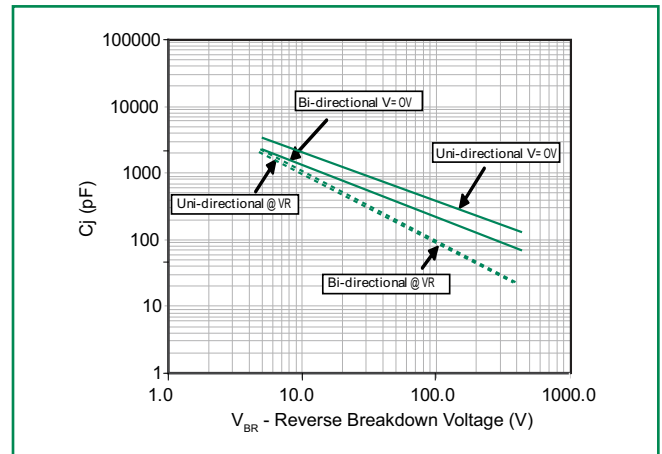


Figure 5 - Steady State Power Derating Curve

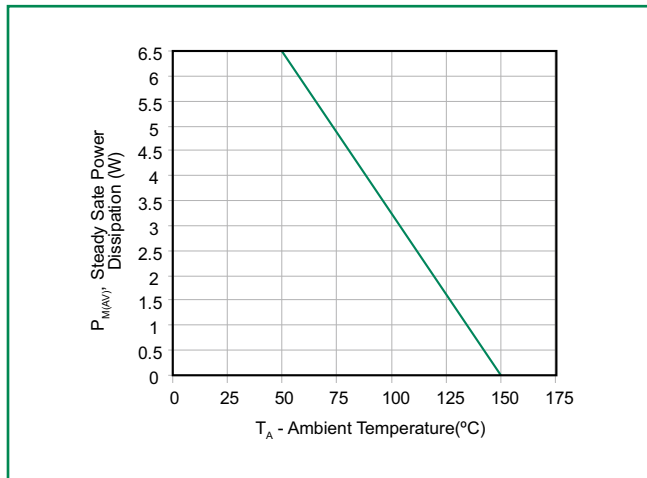
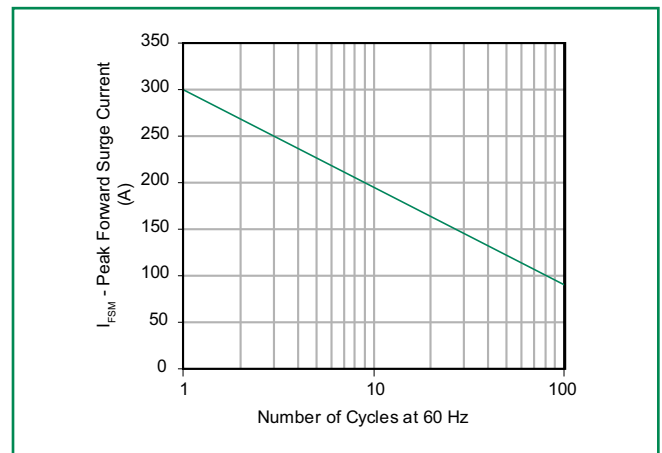


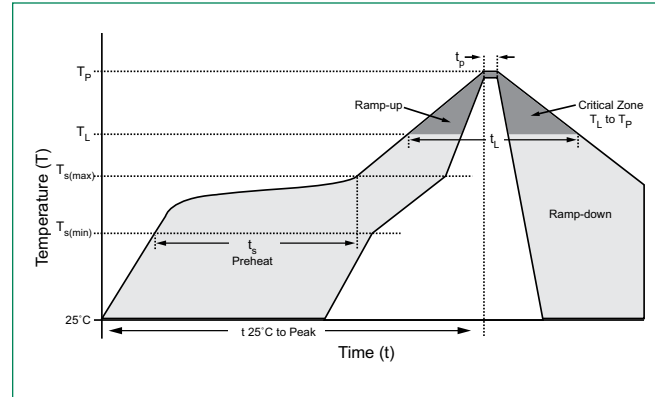
Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional only



SMDJ Series

Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | 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 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) 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_s) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 280°C |



Physical Specifications

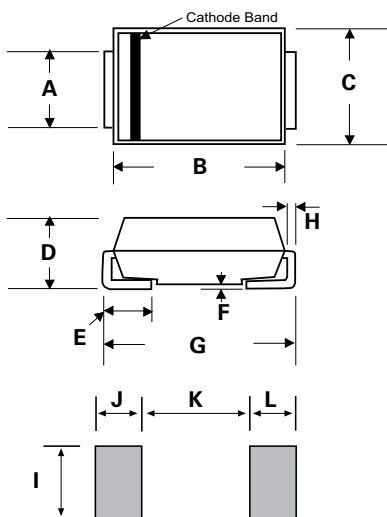
| | |
|-----------------|---|
| Weight | 0.007 ounce, 0.21 grams |
| Case | JEDEC DO214AB. Molded plastic body over glass passivated junction |
| Polarity | Color band denotes positive end (cathode) except Bidirectional. |
| Terminal | Matte Tin-plated leads, Solderable per JESD22-B102D |

Environmental Specifications

| | |
|---------------------------|--------------|
| Temperature Cycle | JESD22-A104 |
| Pressure Cooker | JESD 22-A102 |
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Thermal Shock | JESD22-A106 |

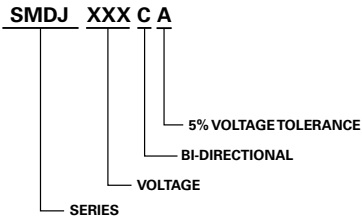
Dimensions

DO-214AB (SMC J-Bend)

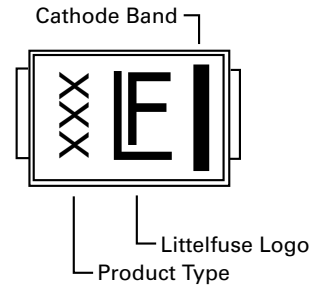


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.305 | 0.320 | 7.750 | 8.130 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.129 | - | 3.300 | - |
| J | 0.094 | - | 2.400 | - |
| K | - | 0.165 | - | 4.200 |
| L | 0.094 | - | 2.400 | - |

Part Numbering System



Part Marking System



Packaging

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|-----------------------------|-------------------------|
| SMDJxxxXX | DO-214AB | 3000 | Tape & Reel – 16mm/13" tape | EIA STD RS-481 |

SMDJ Series