


HF  5.0SMDJ Series

Agency Approvals

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

**Maximum Ratings and Thermal Characteristics
(T_A=25°C unless otherwise noted)**

| Parameter | Symbol | Value | Unit |
|--|-----------------------------------|------------|------|
| Peak Pulse Power Dissipation at T _A =25°C by 10x1000µs waveform (Fig.1)(Note 1), (Note 2) | P _{PPM} | 5000 | W |
| Power Dissipation on infinite heat sink at T _A =50°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 | 5.0 | V |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -65 to 150 | °C |
| Typical Thermal Resistance Junction to Lead | R _{θJL} | 15 | °C/W |
| Typical Thermal Resistance Junction to Ambient | R _{θJA} | 75 | °C/W |

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25°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 5.0SMDJ 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 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
- 5000W peak pulse power capability at 10x1000µs 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 5µA above 22V
- High Temperature soldering guaranteed: 260°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 | | | | | |
| 5.0SMDJ12A | 5.0SMDJ12CA | 5PEP | 5BEP | 12.0 | 13.30 | 14.70 | 10 | 19.9 | 252.00 | 800 | X |
| 5.0SMDJ13A | 5.0SMDJ13CA | 5PEQ | 5BEQ | 13.0 | 14.40 | 15.90 | 10 | 21.5 | 233.00 | 500 | X |
| 5.0SMDJ14A | 5.0SMDJ14CA | 5PER | 5BER | 14.0 | 15.60 | 17.20 | 10 | 23.2 | 216.00 | 200 | X |
| 5.0SMDJ15A | 5.0SMDJ15CA | 5PES | 5BES | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 205.00 | 100 | X |
| 5.0SMDJ16A | 5.0SMDJ16CA | 5PET | 5BET | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 193.00 | 50 | X |
| 5.0SMDJ17A | 5.0SMDJ17CA | 5PEU | 5BEU | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 181.00 | 20 | X |
| 5.0SMDJ18A | 5.0SMDJ18CA | 5PEV | 5BEV | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 172.00 | 10 | X |
| 5.0SMDJ20A | 5.0SMDJ20CA | 5PEW | 5BEW | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 155.00 | 5 | X |
| 5.0SMDJ22A | 5.0SMDJ22CA | 5PEX | 5BEX | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 141.00 | 5 | X |
| 5.0SMDJ24A | 5.0SMDJ24CA | 5PEZ | 5BEZ | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 129.00 | 5 | X |
| 5.0SMDJ26A | 5.0SMDJ26CA | 5PFE | 5BFE | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 119.00 | 5 | X |
| 5.0SMDJ28A | 5.0SMDJ28CA | 5PFG | 5BFG | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 110.00 | 5 | X |
| 5.0SMDJ30A | 5.0SMDJ30CA | 5PFK | 5BFK | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 103.00 | 5 | X |
| 5.0SMDJ33A | 5.0SMDJ33CA | 5PFM | 5BFM | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 93.90 | 5 | X |
| 5.0SMDJ36A | 5.0SMDJ36CA | 5PFP | 5BFP | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 86.10 | 5 | X |
| 5.0SMDJ40A | 5.0SMDJ40CA | 5PFR | 5BFR | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 77.60 | 5 | X |
| 5.0SMDJ43A | 5.0SMDJ43CA | 5PFT | 5BFT | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 72.10 | 5 | X |
| 5.0SMDJ45A | 5.0SMDJ45CA | 5PFV | 5BFV | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 68.80 | 5 | X |
| 5.0SMDJ48A | - | 5PFX | - | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 64.70 | 5 | X |
| 5.0SMDJ51A | - | 5PFZ | - | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 60.70 | 5 | X |
| 5.0SMDJ54A | - | 5RGE | - | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 57.50 | 5 | X |
| 5.0SMDJ58A | - | 5PGG | - | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 53.50 | 5 | X |
| 5.0SMDJ60A | - | 5PGK | - | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 51.70 | 5 | X |
| 5.0SMDJ64A | - | 5PGM | - | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 48.60 | 5 | X |
| 5.0SMDJ70A | - | 5PGP | - | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 44.30 | 5 | X |
| 5.0SMDJ75A | - | 5PGR | - | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 41.40 | 5 | X |
| 5.0SMDJ78A | - | 5PGT | - | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 39.70 | 5 | X |
| 5.0SMDJ85A | - | 5PGV | - | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 36.50 | 5 | X |
| 5.0SMDJ90A | - | 5PGX | - | 90.0 | 100.00 | 111.00 | 1 | 146.0 | 34.30 | 5 | X |
| 5.0SMDJ100A | - | 5PGZ | - | 100.0 | 111.00 | 123.00 | 1 | 162.0 | 30.90 | 5 | X |
| 5.0SMDJ110A | - | 5PHE | - | 110.0 | 122.00 | 135.00 | 1 | 177.0 | 28.30 | 5 | X |
| 5.0SMDJ120A | - | 5PHG | - | 120.0 | 133.00 | 147.00 | 1 | 193.0 | 26.00 | 5 | X |
| 5.0SMDJ130A | - | 5PHK | - | 130.0 | 144.00 | 159.00 | 1 | 209.0 | 24.00 | 5 | X |
| 5.0SMDJ150A | - | 5PHM | - | 150.0 | 167.00 | 185.00 | 1 | 243.0 | 20.60 | 5 | X |
| 5.0SMDJ160A | - | 5PHP | - | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 19.30 | 5 | X |
| 5.0SMDJ170A | - | 5PHR | - | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 18.20 | 5 | X |

For Bidirectional type having V_R of 20 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

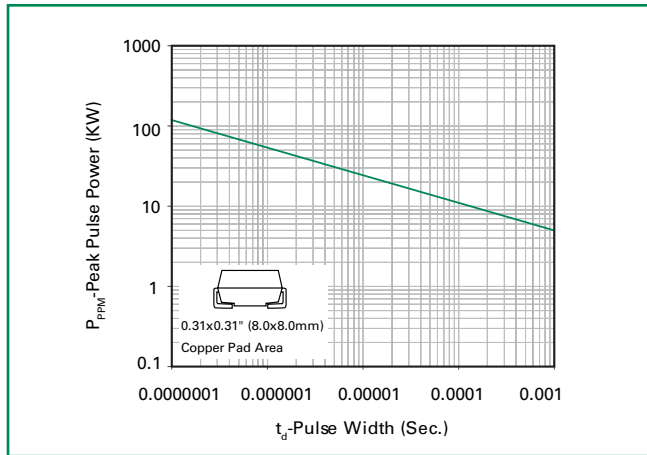


Figure 2 - Pulse Derating Curve

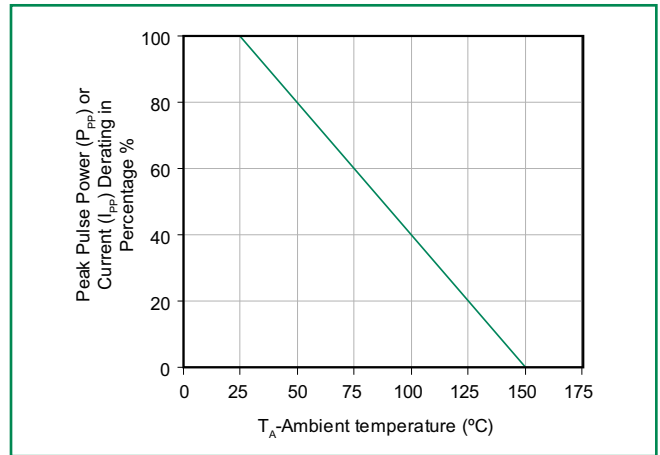


Figure 3 - Pulse Waveform

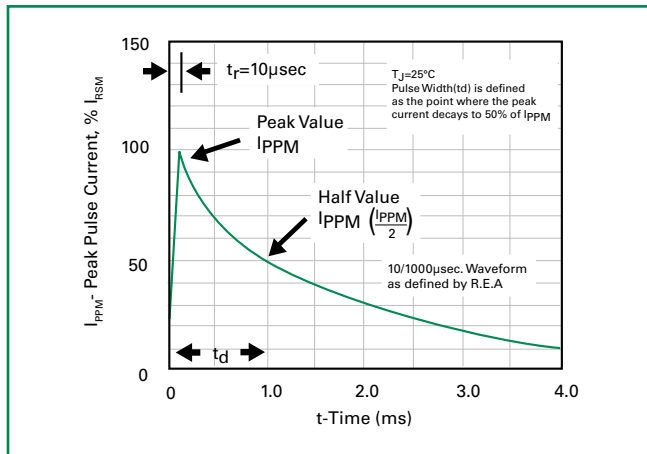


Figure 4 - Typical Junction Capacitance

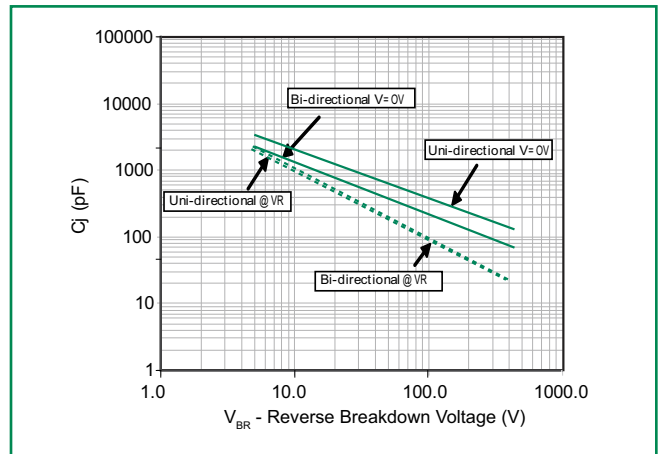


Figure 5 - Steady State Power Derating Curve

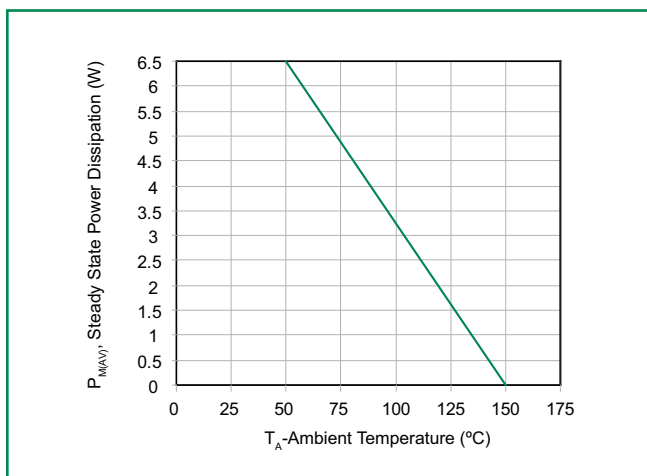
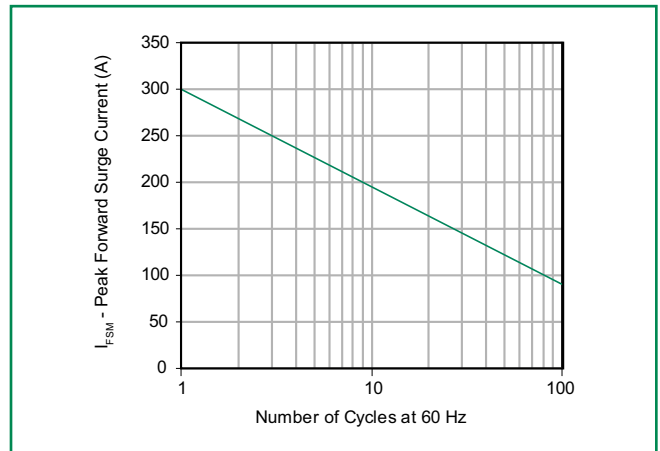
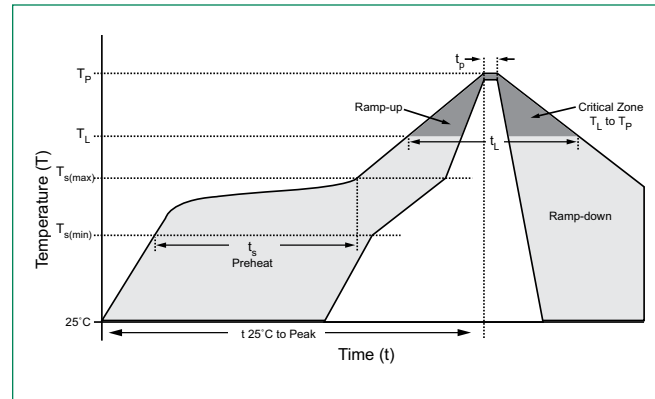


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



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 |



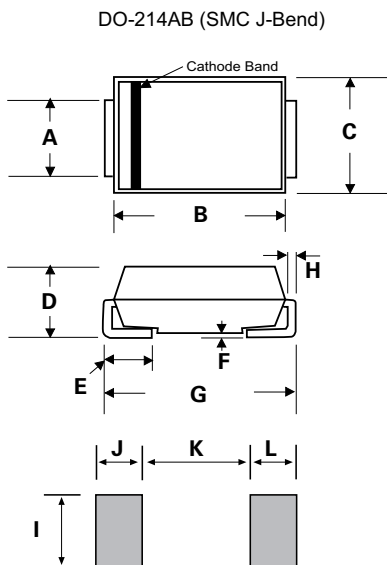
Physical Specifications

| | |
|-----------------|---|
| 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

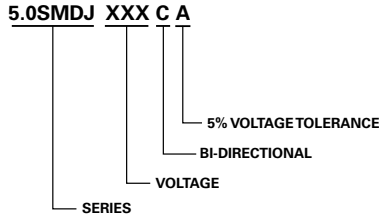
| | |
|---------------------------|--------------|
| Temperature Cycle | JESD22-A104 |
| Pressure Cooker | JESD 22-A102 |
| High Temp. Storage | JESD22-A103 |
| HTRB | JESD22-A108 |
| Thermal Shock | JESD22-A106 |

Dimensions

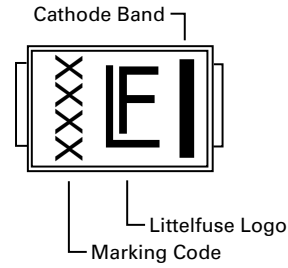


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 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 |
|--------------|-------------------|----------|-----------------------------|-------------------------|
| 5.0SMDJxxxXX | DO-214AB | 3000 | Tape & Reel – 16mm/13" tape | EIA STD RS-481 |

5.0SMDJ Series