

8.0SMDJ Series

Surface Mount – 8000W



Agency Recognitions

| 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 $T_L=25^{\circ}\text{C}$ by 10/1000 μs Waveform (Fig.2)(Note 1), (Note 2) | P_{PPM} | 8000 | W |
| Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$ | P_D | 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 Temperature Range | T_J | -65 to 150 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to 175 | $^{\circ}\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 15 | $^{\circ}\text{C}/\text{W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75 | $^{\circ}\text{C}/\text{W}$ |

Notes:

- Non-repetitive current pulse, per Fig. 4 and derated above T_J (initial) $=25^{\circ}\text{C}$ per Fig. 3.
- Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
- Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional component only, duty cycle=4 per minute maximum.

Description

The 8.0SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

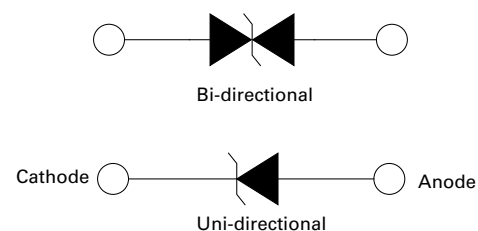
Features and Benefits

- For surface mounted applications to optimize board space
- Low profile package
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Built-in strain relief
- Glass passivated chip junction
- 8kW peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to VBR min
- Excellent clamping capability
- Compact size with high power density in DO-214AB Package
- Low incremental surge resistance
- Typical IR less than 5 μA when $V_{BR\ min}>22\text{V}$
- High temperature reflow soldering guaranteed: 260 $^{\circ}\text{C}/40\text{sec}$
- $V_{BR} @ T_J = V_{BR} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$ (α : Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^{\circ}\text{C}$
- 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)

Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.


Functional Diagram



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Surface Mount – 8000W

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

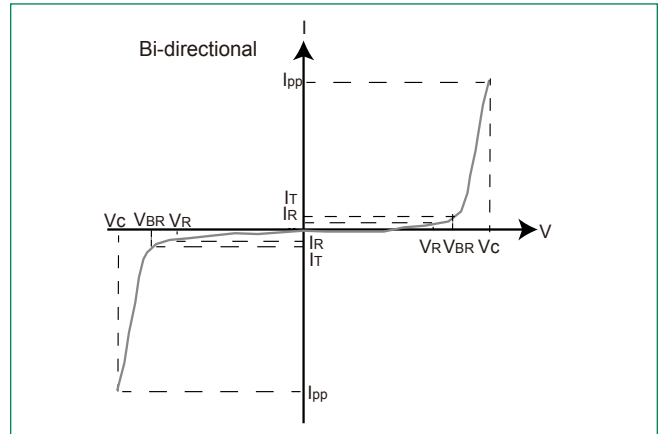
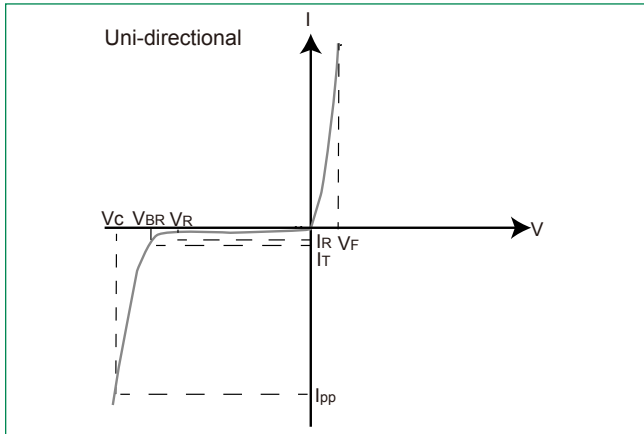
| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ I_T | | Test Current I_T (mA) | Maximum Clamping Voltage V_C @ I_{PP} (10/1000 μs) (V) | Maximum Peak Pulse Current I_{PP} (10/1000 μs) (A) | Maximum Clamping Voltage V_C @ I_{PP} (8/20 μs) (V) | Maximum Peak Pulse Current I_{PP} (8/20 μs) (A) | Maximum Reverse Leakage I_R @ V_R (μA) | Agency Approval  |
|-------------------|------------------|---------|------|---|--|-------|-------------------------|--|--|---|---|---|---|
| | | UNI | BI | | MIN | MAX | | | | | | | |
| 8.0SMDJ12A | 8.0SMDJ12CA | 8PEP | 8BEP | 12 | 13.3 | 14.7 | 10 | 19.9 | 402.1 | 25.7 | 2613.7 | 800 | X |
| 8.0SMDJ13A | 8.0SMDJ13CA | 8PEQ | 8BEQ | 13 | 14.4 | 15.9 | 10 | 21.5 | 372.1 | 27.8 | 2418.7 | 500 | X |
| 8.0SMDJ14A | 8.0SMDJ14CA | 8PER | 8BER | 14 | 15.6 | 17.2 | 10 | 23.2 | 344.9 | 30.0 | 2241.9 | 200 | X |
| 8.0SMDJ15A | 8.0SMDJ15CA | 8PES | 8BES | 15 | 16.7 | 18.5 | 1 | 24.4 | 327.9 | 31.5 | 2131.4 | 100 | X |
| 8.0SMDJ16A | 8.0SMDJ16CA | 8PET | 8BET | 16 | 17.8 | 19.7 | 1 | 26.0 | 307.7 | 33.6 | 2000.1 | 50 | X |
| 8.0SMDJ17A | 8.0SMDJ17CA | 8PEU | 8BEU | 17 | 18.9 | 20.9 | 1 | 27.6 | 290.0 | 35.7 | 1885.0 | 20 | X |
| 8.0SMDJ18A | 8.0SMDJ18CA | 8PEV | 8BEV | 18 | 20.0 | 22.1 | 1 | 29.2 | 274.0 | 37.7 | 1781.0 | 10 | X |
| 8.0SMDJ20A | 8.0SMDJ20CA | 8PEW | 8BEW | 20 | 22.2 | 24.5 | 1 | 32.4 | 247.0 | 41.9 | 1605.5 | 5 | X |
| 8.0SMDJ22A | 8.0SMDJ22CA | 8PEX | 8BEX | 22 | 24.4 | 26.9 | 1 | 35.5 | 225.4 | 45.9 | 1464.8 | 5 | X |
| 8.0SMDJ24A | 8.0SMDJ24CA | 8PEZ | 8BEZ | 24 | 26.7 | 29.5 | 1 | 38.9 | 205.7 | 50.3 | 1336.8 | 5 | X |
| 8.0SMDJ26A | 8.0SMDJ26CA | 8PFE | 8BFE | 26 | 28.9 | 31.9 | 1 | 42.1 | 190.1 | 54.4 | 1235.7 | 5 | X |
| 8.0SMDJ28A | 8.0SMDJ28CA | 8PFG | 8BFG | 28 | 31.1 | 34.4 | 1 | 45.4 | 176.2 | 58.7 | 1145.4 | 5 | X |
| 8.0SMDJ30A | 8.0SMDJ30CA | 8PFK | 8BFK | 30 | 33.3 | 36.8 | 1 | 48.4 | 165.3 | 62.5 | 1074.5 | 5 | X |
| 8.0SMDJ33A | 8.0SMDJ33CA | 8PFM | 8BFM | 33 | 36.7 | 40.6 | 1 | 53.3 | 150.1 | 68.9 | 975.7 | 5 | X |
| 8.0SMDJ36A | 8.0SMDJ36CA | 8PFP | 8BFP | 36 | 40.0 | 44.2 | 1 | 58.1 | 137.8 | 75.1 | 895.7 | 5 | X |
| 8.0SMDJ40A | 8.0SMDJ40CA | 8PFR | 8BFR | 40 | 44.4 | 49.1 | 1 | 64.5 | 124.1 | 83.3 | 806.7 | 5 | X |
| 8.0SMDJ43A | 8.0SMDJ43CA | 8PFT | 8BFT | 43 | 47.8 | 52.8 | 1 | 69.4 | 115.3 | 89.7 | 749.5 | 5 | X |
| 8.0SMDJ45A | 8.0SMDJ45CA | 8PFV | 8BFV | 45 | 50.0 | 55.3 | 1 | 72.7 | 110.1 | 93.9 | 715.7 | 5 | X |
| 8.0SMDJ48A | 8.0SMDJ48CA | 8PFX | 8BFX | 48 | 53.3 | 58.9 | 1 | 77.4 | 103.4 | 100.0 | 671.8 | 5 | X |
| 8.0SMDJ51A | 8.0SMDJ51CA | 8PFZ | 8BFZ | 51 | 56.7 | 62.7 | 1 | 82.4 | 97.1 | 106.5 | 631.2 | 5 | X |
| 8.0SMDJ54A | 8.0SMDJ54CA | 8PGE | 8BGE | 54 | 60.0 | 66.3 | 1 | 87.1 | 92.0 | 112.5 | 598.0 | 5 | X |
| 8.0SMDJ58A | 8.0SMDJ58CA | 8PGG | 8BGG | 58 | 64.4 | 71.2 | 1 | 93.6 | 85.5 | 120.9 | 555.8 | 5 | X |
| 8.0SMDJ60A | 8.0SMDJ60CA | 8PGK | 8BGK | 60 | 66.7 | 73.7 | 1 | 96.8 | 82.7 | 125.1 | 537.2 | 5 | X |
| 8.0SMDJ64A | 8.0SMDJ64CA | 8PGM | 8BGM | 64 | 71.1 | 78.6 | 1 | 103.0 | 77.7 | 133.1 | 504.9 | 5 | X |
| 8.0SMDJ70A | 8.0SMDJ70CA | 8PGP | 8BGP | 70 | 77.8 | 86.0 | 1 | 113.0 | 71.0 | 146.0 | 461.5 | 5 | X |
| 8.0SMDJ75A | 8.0SMDJ75CA | 8PGR | 8BGR | 75 | 83.3 | 92.1 | 1 | 121.0 | 66.2 | 156.3 | 430.3 | 5 | X |
| 8.0SMDJ78A | 8.0SMDJ78CA | 8PGT | 8BGT | 78 | 86.7 | 95.8 | 1 | 126.0 | 63.5 | 162.8 | 412.8 | 5 | X |
| 8.0SMDJ85A | 8.0SMDJ85CA | 8PGV | 8BGV | 85 | 94.4 | 104.0 | 1 | 137.0 | 58.4 | 177.0 | 379.6 | 5 | X |
| 8.0SMDJ90A | 8.0SMDJ90CA | 8PGX | 8BGX | 90 | 100.0 | 111.0 | 1 | 146.0 | 55.0 | 188.6 | 357.5 | 5 | X |
| 8.0SMDJ100A | 8.0SMDJ100CA | 8PGZ | 8BGZ | 100 | 111.0 | 123.0 | 1 | 162.0 | 49.4 | 209.3 | 321.1 | 5 | X |
| 8.0SMDJ110A | 8.0SMDJ110CA | 8PHE | 8BHE | 110 | 122.0 | 135.0 | 1 | 177.0 | 45.2 | 228.7 | 293.8 | 5 | X |

For bidirectional type having V_R of 20 volts and less, the I_R limit is double.

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I-V Curve Characteristics



- P_{PPM} Peak Pulse Power Dissipation** -- Max power dissipation
- V_R Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation
- V_{BR} Breakdown Voltage** -- Maximum voltage that flows through the TVS at a specified test current (I_T)
- V_C Clamping Voltage** -- Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)
- I_R Reverse Leakage Current** -- Current measured at V_R
- V_F Forward Voltage Drop for Uni-directional**

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

Figure 1:
TVS Transients Clamping Waveform

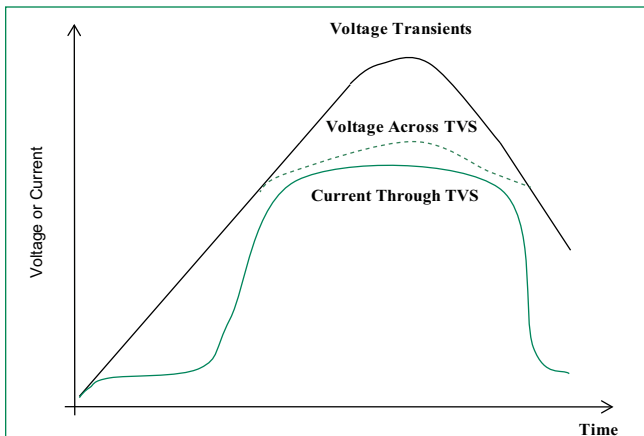
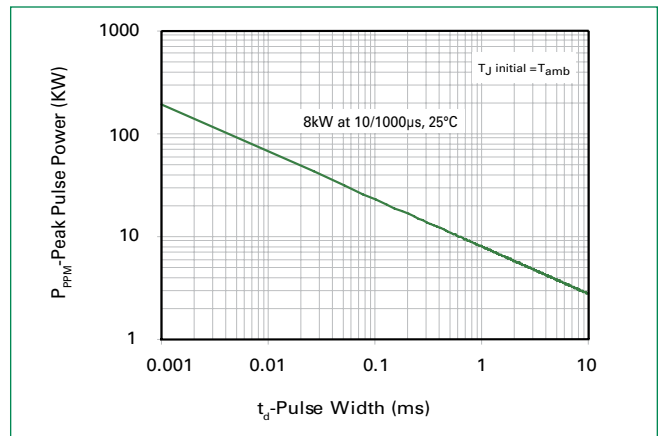


Figure 2:
Peak Pulse Power Rating



continues on next page.

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

Figure 3:
Peak Pulse Power Derating Curve

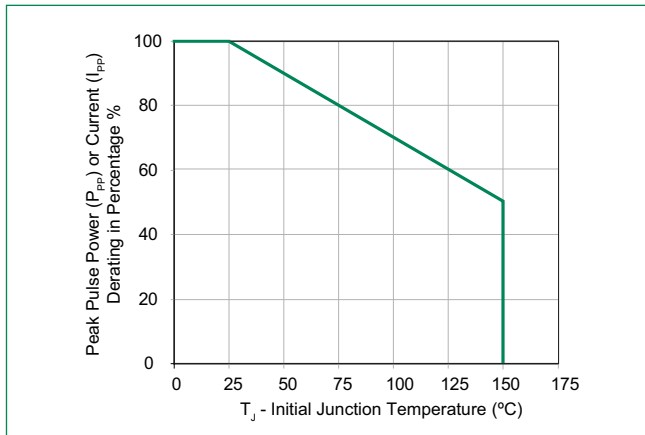


Figure 4:
Pulse Waveform

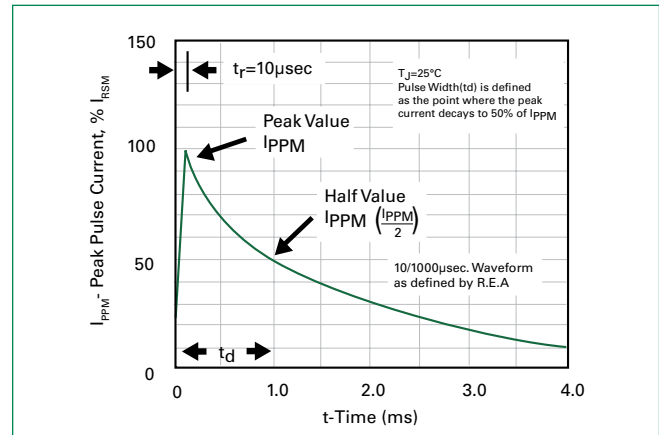


Figure 5:
Typical Junction Capacitance

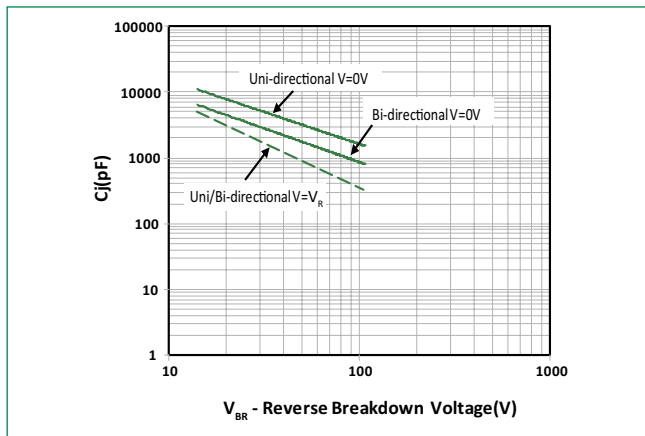


Figure 6:
Typical Transient Thermal Impedance

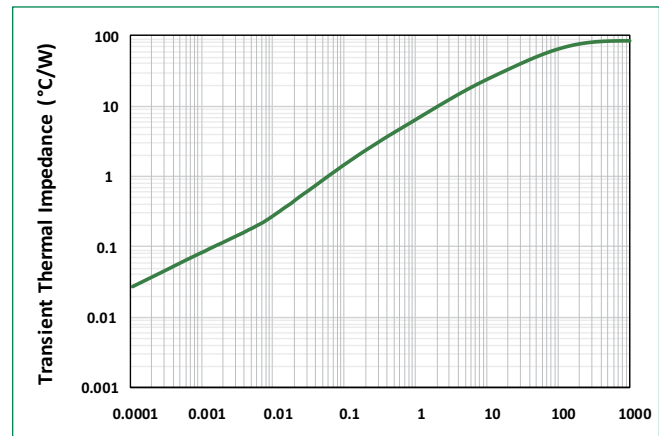


Figure 7:
Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

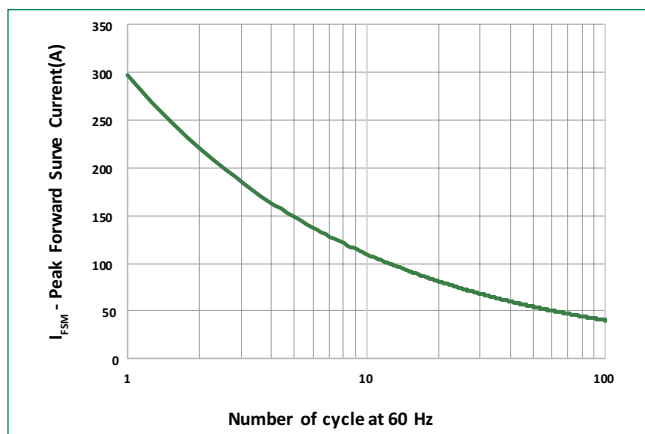
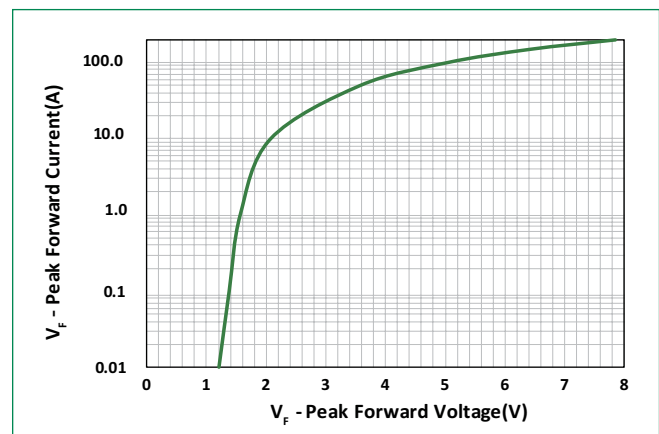


Figure 8:
Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)

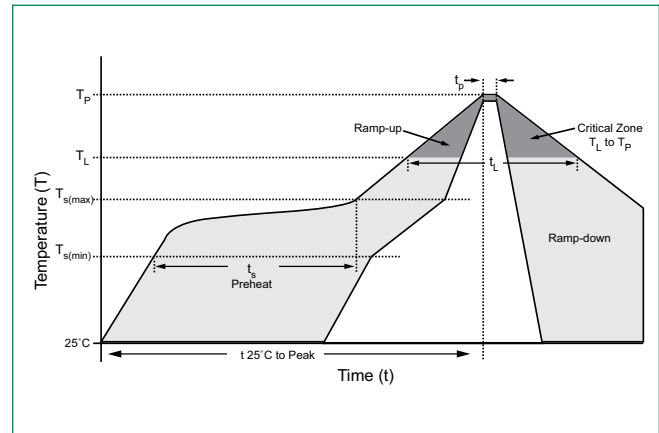


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Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| 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_p) | 60 – 120 secs |
| Average ramp up rate (Liquidus Temp (T_A) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_A - 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 within 5°C of actual peak Temperature (t_p) | | 30 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



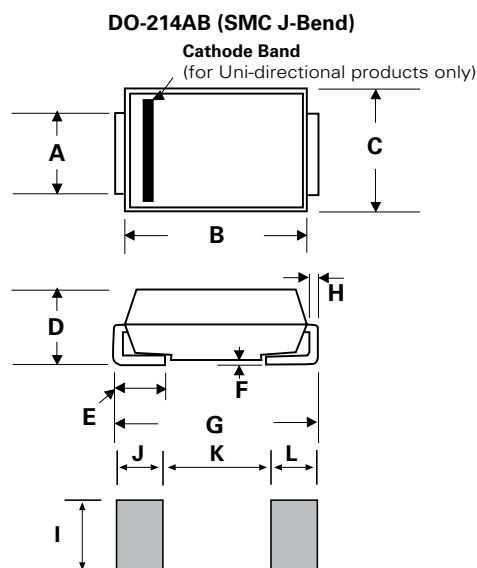
Physical Specifications

| | |
|-----------------|---|
| Weight | 0.011 ounce ,0.3 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-B102 |

Environmental Specifications

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

Dimensions

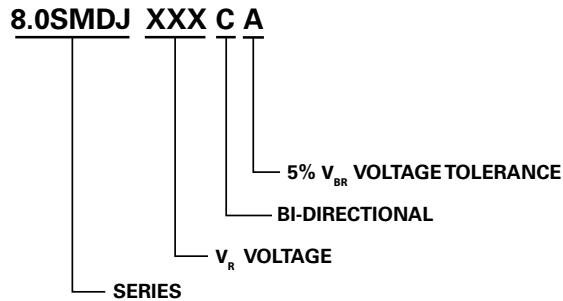


| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.114 | 0.126 | 2.900 | 3.200 |
| B | 0.260 | 0.280 | 6.600 | 7.110 |
| C | 0.220 | 0.245 | 5.590 | 6.220 |
| D | 0.079 | 0.103 | 2.060 | 2.620 |
| E | 0.030 | 0.060 | 0.760 | 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 | - |

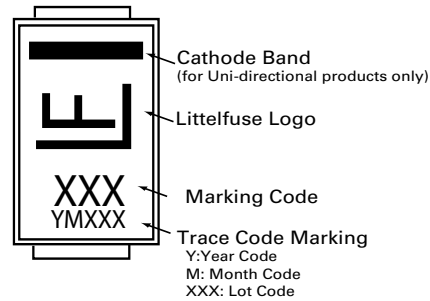
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Part Numbering System



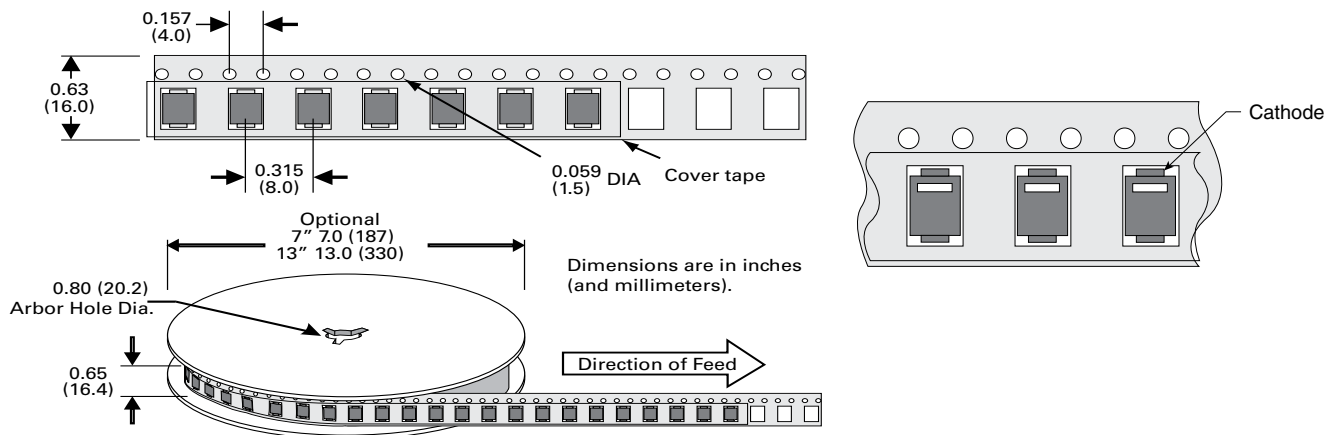
Part Marking System



Packaging Options

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-----------------|-------------------|----------|----------------------------------|-------------------------|
| 8.0SMDJxxxXX | DO-214AB | 3000 | Tape & Reel - 16mm tape/13" reel | EIA STD RS-481 |
| 8.0SMDJxxxXX-T7 | DO-214AB | 500 | Tape & Reel - 16mm tape/7" reel | EIA STD RS-481 |

Tape and Reel Specification



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