

SMF3.3

Surface Mount – 200W



Description

SMF3.3 is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features and Benefits

- 200W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- 1200W peak pulse power capability at 8/20 μ s waveform
- Excellent clamping capability
- Compatible with industrial standard package SOD-123FL
- Low profile: maximum height of 1.08mm.
- For surface mounted applications to optimize board space
- 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
- Fast response time: typically less than 1.0ns from 0 Volts to VBR min
- High temperature soldering: 260°C/30 seconds at terminals
- Built-in strain relief
- Meet MSL level1, per J-STD-020C, LF maximum peak of 260°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)

Additional Information



Resources



Accessories



Samples

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 $T_A = 25^\circ\text{C}$ (Note 1) | P_{PPM} | 1200 | W |
| 8/20 μ s (Note 2) 10/1000 μ s (Note 3) | | 200 | W |
| Thermal Resistance Junction- to- Ambient | $R_{\theta JA}$ | 220 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction- to- Lead | $R_{\theta JL}$ | 100 | $^\circ\text{C/W}$ |
| Operating Temperature Range | T_J | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ\text{C}$ |

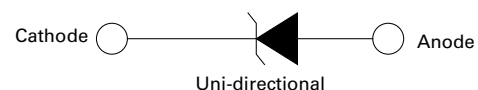
Notes:

1. Non-repetitive current pulse, per Fig. 4 and derated above T_J (initial) = 25°C per Fig. 3.

Applications

SMF3.3 series is ideal for the protection of portable electronics/ hard drives, notebooks, VCC busses, POS terminal, SSDs, power supplies, monitors, and vulnerable circuit used in other consumer applications.

Functional Diagram



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

| Part Number | Marking Code | Breakdown Voltage V_{BR} (Volts) @ I_T | | Test Current I_T (mA) | Reverse Stand off Voltage V_R (V) | Maximum Reverse Leakage @ V_R I_R (μ A) | Maximum Peak Pulse Current (10/1000 μ S) I_{PP} (A) | Maximum Clamping Voltage @ I_{PP} (10/1000 μ S) V_C (V) | Maximum Peak Pulse Current (8/20 μ S) I_{PP} (A) | Maximum Clamping Voltage @ I_{PP} (8/20 μ S) V_C (V) |
|-------------|--------------|--|-----|-------------------------|-------------------------------------|--|---|---|--|--|
| | | MIN | MAX | | | | | | | |
| SMF3.3 | 33 | 3.4 | 4.3 | 10 | 3.3 | 0.5 | 30.0 | 6.8 | 120.0 | 10.0 |

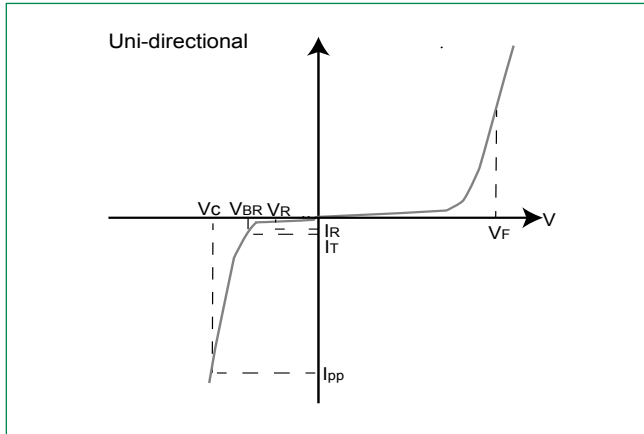
Notes:

- V_{BR} measured after I_T applied for 300 μ s, I_T = square wave pulse or equivalent.
- Surge current waveform per 10/1000 μ s exponential wave and derated per Fig.2.
- All terms and symbols are consistent with ANSI/IEEE C62.35.
- Surge current waveform per 8/20 μ s exponential wave and derated per Fig.6.

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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 though 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**
- Note:** V_F distribution range from 7V to 16V at I_F 1mA.

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

Figure 1 -
TVS Transients Clamping Waveform

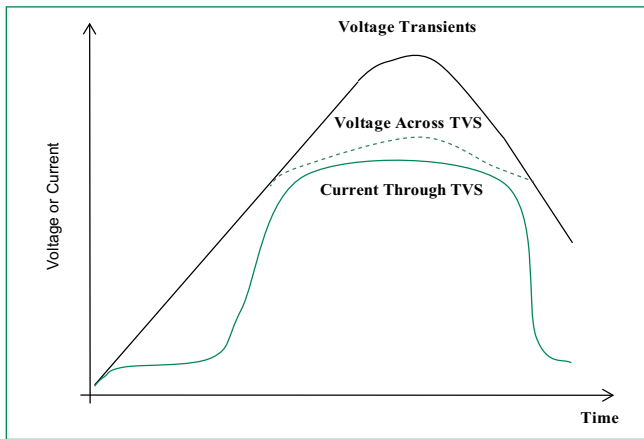


Figure 2 -
Peak Pulse Power Rating Curve

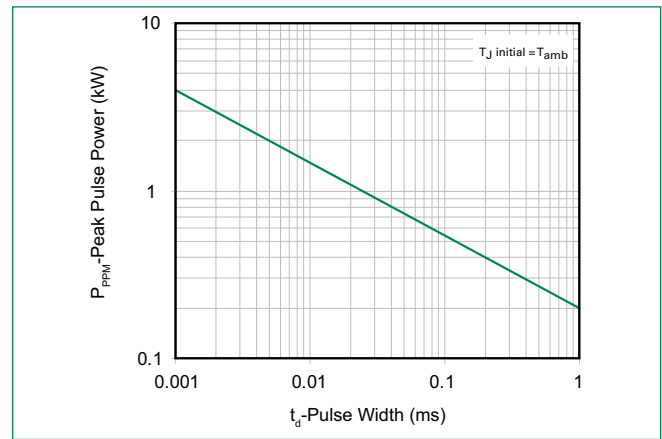


Figure 3 -
Peak Pulse Power Derating Curve

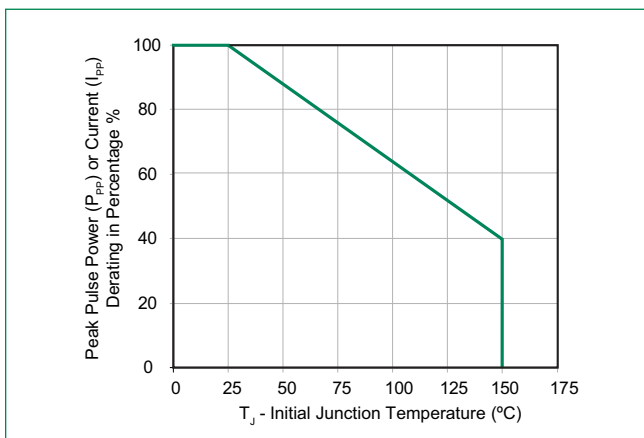
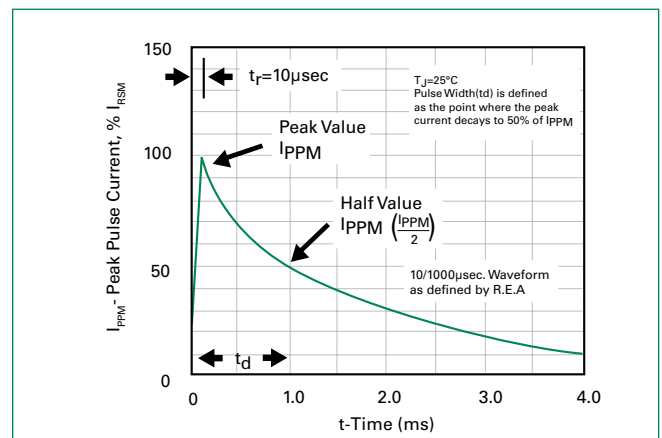


Figure 4 -
10/1000 μS Pulse Waveform



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Figure 5 -
Capacitance vs. Reverse Bias

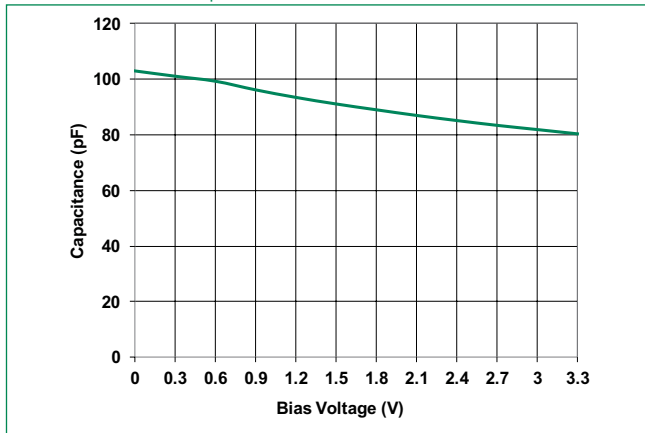
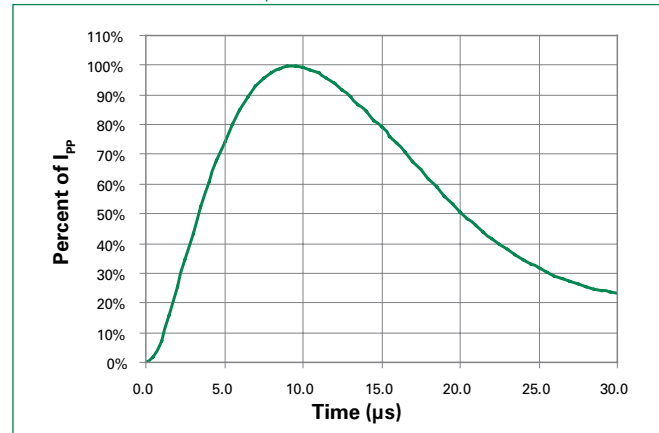
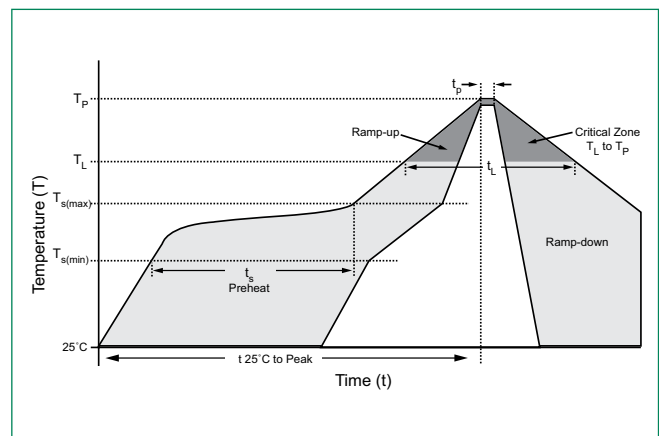


Figure 6 -
8/20 μ S Pulse Waveform



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 – 120 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_r) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °C |
| Time within 5°C of actual peak Temperature (t_p) | | 30 seconds max |
| 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

| | |
|-----------------|--|
| Case | SOD-123FL plastic over passivated junction |
| Polarity | Color band denotes cathode except bipolar |
| Terminal | Matte tin-plated leads, solderable per JESD22-B102 |

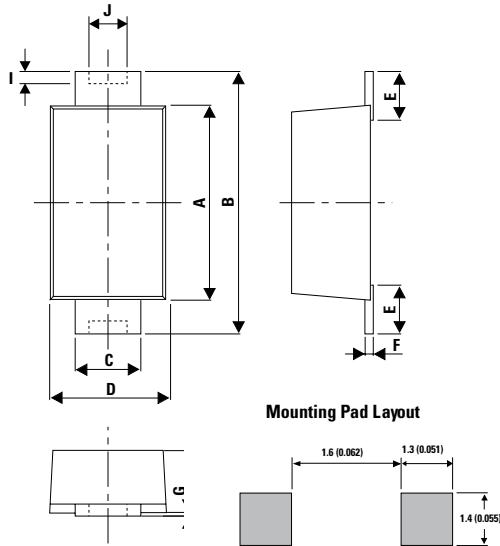
Environmental Specification

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

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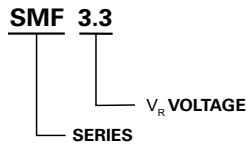
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Dimensions - SOD-123FL Package

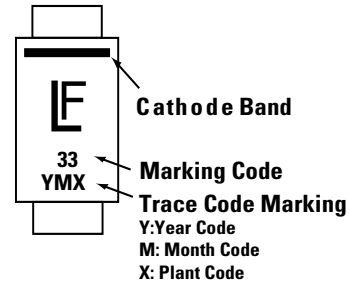


| Dimensions | Millimeters | | Inches | |
|------------|-------------|------|--------|-------|
| | Min | Max | Min | Max |
| A | 2.70 | 3.10 | 0.106 | 0.122 |
| B | 3.50 | 3.90 | 0.138 | 0.154 |
| C | 0.85 | 1.05 | 0.033 | 0.041 |
| D | 1.70 | 2.00 | 0.067 | 0.079 |
| E | 0.43 | 0.83 | 0.017 | 0.033 |
| F | 0.10 | 0.25 | 0.004 | 0.010 |
| G | 0.00 | 0.10 | 0.000 | 0.004 |
| H | 0.90 | 1.08 | 0.035 | 0.043 |
| I | 0.00 | 0.20 | 0.000 | 0.008 |
| J | 0.40 | 0.60 | 0.016 | 0.024 |

Part Numbering System



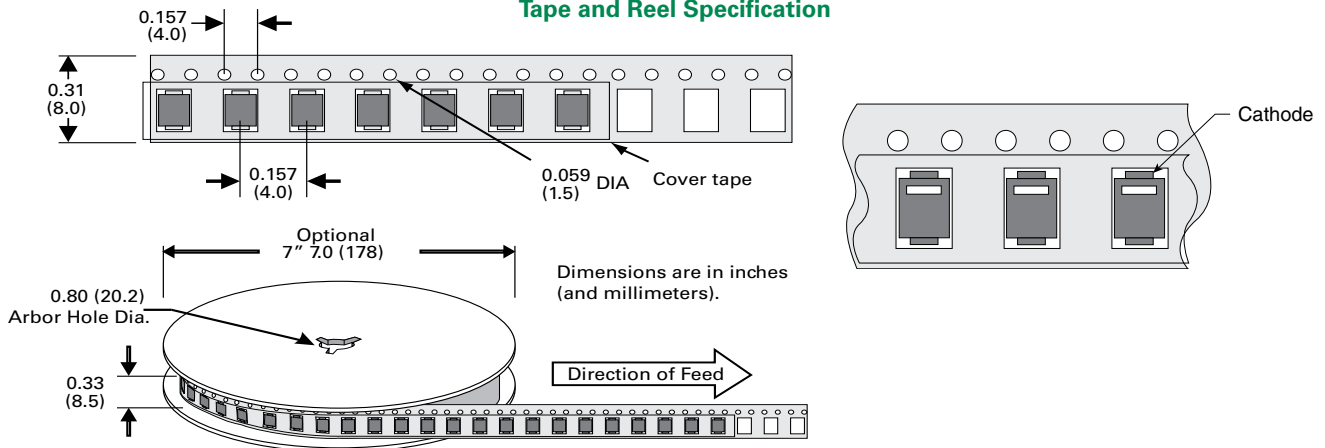
Part Marking System



Packaging Options

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|--------------------------------|-------------------------|
| SMF3.3 | SOD-123FL | 3000 | Tape & Reel – 8mm tape/7" reel | EIA RS-481 |

Tape and Reel Specification



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