

SMF Series

Surface Mount — 200W

HF **RoHS**



SOD-123FL

Additional Information



Resources



Accessories



Samples

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

| Rating | Symbol | Value |
|---|-----------------|---|
| Peak pulse power dissipation at 10/1000 μs waveform(Note1, Note2, Fig.1) | P_{PPM} | 200W |
| Peak pulse power ($t_p=8/20\mu\text{s}$ waveform) | P_{PPM} | 1000W |
| Peak pulse current of at 10/1000 μs waveform (Note 1, Fig.3) | I_{PPM} | See Table(A) |
| Steady state power dissipation at $T_J=75^{\circ}\text{C}$ (Fig.5) | $P_{M(AV)}$ | 1.0W |
| Maximum Instantaneous Forward Voltage at 12A for Unidirectional Only | V_F | 3.5V |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6) | I_{FSM} | 20A |
| Operating junction and Storage Temperature Ranges | T_J, T_{STG} | -55°C to $+150^{\circ}\text{C}$ |
| Typical thermal resistance junction to lead | $R_{\theta JL}$ | 100 $^{\circ}\text{C}/\text{W}$ |
| Typical thermal resistance junction to ambient | $R_{\theta JA}$ | 220 $^{\circ}\text{C}/\text{W}$ |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derating above $T_A=25^{\circ}\text{C}$ per Fig.2.
2. Each terminal is surface Mounted on the 5.0mm \times 5.0mm(0.03mm thick) copper pads.
3. 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.

Description

The SMF series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. SMF package is 50% smaller in footprint when compare to SMA package and delivering one of the low height profiles (1.2mm) in the industry.

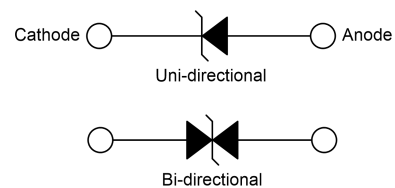
Features

- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- SOD-123FL surface mount package
- Peak power dissipation of 1000W under 8/20 μs waveform
- Low leakage current
- Solid-state silicon avalanche technology
- RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270 $^{\circ}\text{C}$
- Flammability rating UL 94V-0
- Meet MSL level1, per J-STD-020

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



SMF Series

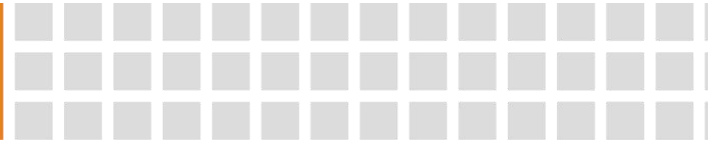
Surface Mount — 200W

Electrical Characteristics (T_A=25°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 _R |
|-------------|----------|---------------------|-----|---------------------------|-----------------------------------|-------------------------|---------------------|---|---------------------|---------------------------------|
| Uni. | Bi. | Uni. | Bi. | V _R (V) | V _{B Min.} (V) | V _{B Max.} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μA) |
| SMF5.0A | SMF5.0CA | KE | AE | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 21.8 | 500 |
| SMF6.0A | SMF6.0CA | KG | AG | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 19.4 | 400 |
| SMF6.5A | SMF6.5CA | KK | AK | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 17.9 | 350 |
| SMF7.0A | SMF7.0CA | KM | AM | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 16.7 | 200 |
| SMF7.5A | SMF7.5CA | KP | AP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 15.5 | 100 |
| SMF8.0A | SMF8.0CA | KR | AR | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 14.7 | 50 |
| SMF8.5A | SMF8.5CA | KT | AT | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 13.9 | 20 |
| SMF9.0A | SMF9.0CA | KV | AV | 9.0 | 10.00 | 11.10 | 1 | 15.4 | 13.0 | 10 |
| SMF10A | SMF10CA | KX | AX | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 11.8 | 5 |
| SMF11A | SMF11CA | KZ | AZ | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 11.0 | 3 |
| SMF12A | SMF12CA | LE | BE | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 10.1 | 1 |
| SMF13A | SMF13CA | LG | BG | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 9.3 | 1 |
| SMF14A | SMF14CA | LK | BK | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 8.6 | 1 |
| SMF15A | SMF15CA | LM | BM | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 8.2 | 1 |
| SMF16A | SMF16CA | LP | BP | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 7.7 | 1 |
| SMF17A | SMF17CA | LR | BR | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 7.3 | 1 |
| SMF18A | SMF18CA | LT | BT | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 6.9 | 1 |
| SMF20A | SMF20CA | LV | BV | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 6.2 | 1 |
| SMF22A | SMF22CA | LX | BX | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 5.7 | 1 |
| SMF24A | SMF24CA | LZ | BZ | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 5.2 | 1 |
| SMF26A | SMF26CA | ME | CE | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 4.8 | 1 |
| SMF28A | SMF28CA | MG | CG | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 4.4 | 1 |
| SMF30A | SMF30CA | MK | CK | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 4.2 | 1 |
| SMF33A | SMF33CA | MM | CM | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 3.8 | 1 |
| SMF36A | SMF36CA | MP | CP | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 3.5 | 1 |

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| 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_R |
|-------------|----------|---------------------|-----|---------------------------|---------------------------|------------------|--------------|-------------------------------------|--------------------|-------------------------|
| Uni. | Bi. | Uni. | Bi. | V_R (V) | $V_{B Min.}$ (V) | $V_{B Max.}$ (V) | I_T (mA) | V_C (V) | I_{PP} (A) | I_R (μ A) |
| SMF40A | SMF40CA | MR | CR | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 3.1 | 1 |
| SMF43A | SMF43CA | MT | CT | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 2.9 | 1 |
| SMF45A | SMF45CA | MV | CV | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 2.8 | 1 |
| SMF48A | SMF48CA | MX | CX | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 2.6 | 1 |
| SMF51A | SMF51CA | MZ | CZ | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 2.5 | 1 |
| SMF54A | SMF54CA | NE | DE | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 2.3 | 1 |
| SMF58A | SMF58CA | NG | DG | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 2.2 | 1 |
| SMF60A | SMF60CA | NK | DK | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 2.1 | 1 |
| SMF64A | SMF64CA | NM | DM | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 2.0 | 1 |
| SMF70A | SMF70CA | NP | DP | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 1.8 | 1 |
| SMF75A | SMF75CA | NR | DR | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 1.7 | 1 |
| SMF78A | SMF78CA | NT | DT | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 1.6 | 1 |
| SMF85A | SMF85CA | NV | DV | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 1.5 | 1 |
| SMF90A | SMF90CA | NX | DX | 90.0 | 100.00 | 111.00 | 1 | 146.0 | 1.4 | 1 |
| SMF100A | SMF100CA | NZ | DZ | 100.0 | 111.00 | 123.00 | 1 | 162.0 | 1.3 | 1 |
| SMF110A | SMF110CA | PE | EE | 110.0 | 122.00 | 135.00 | 1 | 177.0 | 1.2 | 1 |
| SMF120A | SMF120CA | PG | EG | 120.0 | 133.00 | 147.00 | 1 | 193.0 | 1.1 | 1 |
| SMF130A | SMF130CA | PK | EK | 130.0 | 144.00 | 159.00 | 1 | 209.0 | 1.0 | 1 |
| SMF150A | SMF150CA | PM | EM | 150.0 | 167.00 | 185.00 | 1 | 243.0 | 0.8 | 1 |
| SMF160A | SMF160CA | PP | EP | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 0.8 | 1 |
| SMF170A | SMF170CA | PR | ER | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 0.8 | 1 |

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

Figure 1. Peak Pulse Power Rating Curve

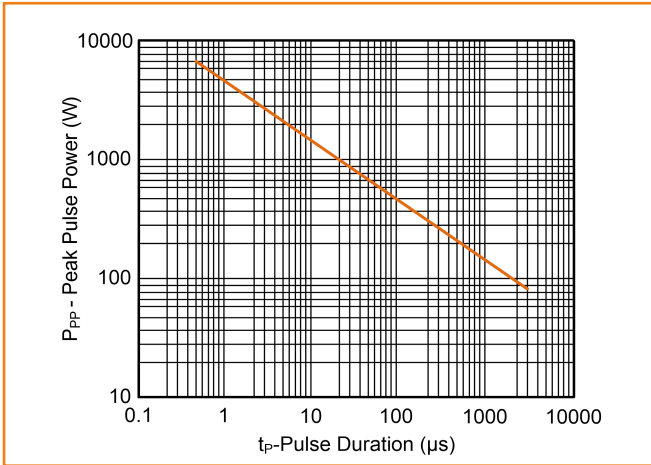


Figure 2. Pulse Derating Curve



Figure 3. Pulse Waveform



Figure 4. Typical Junction Capacitance

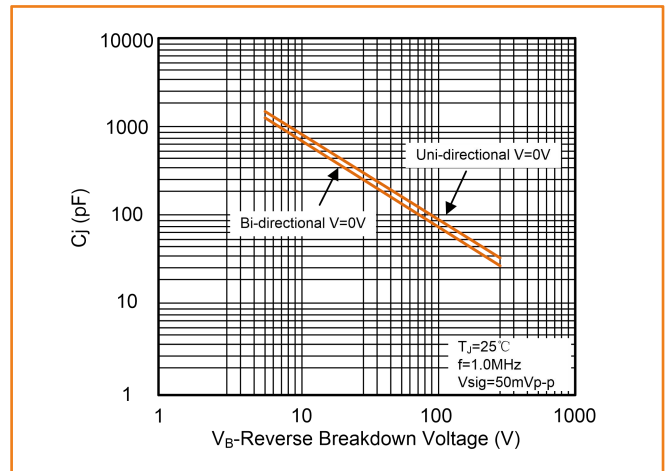


Figure 5. Steady State Power Dissipation Derating Curve

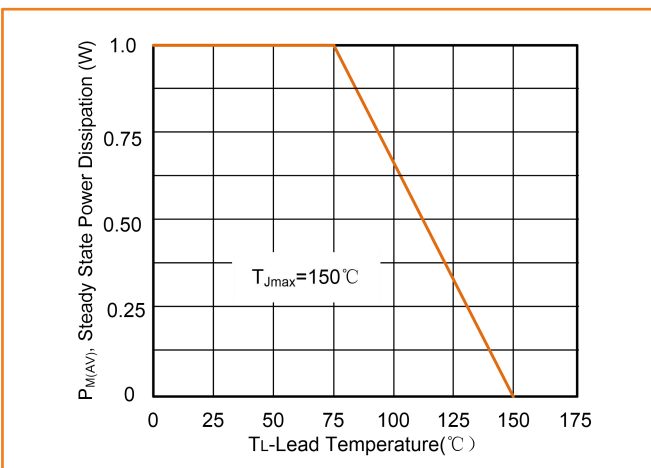
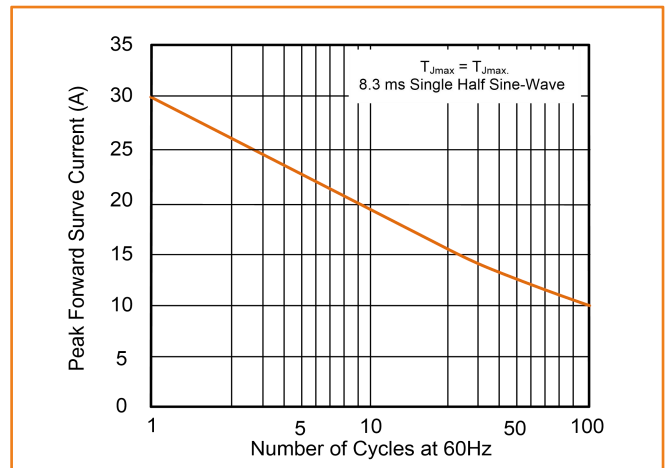


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional

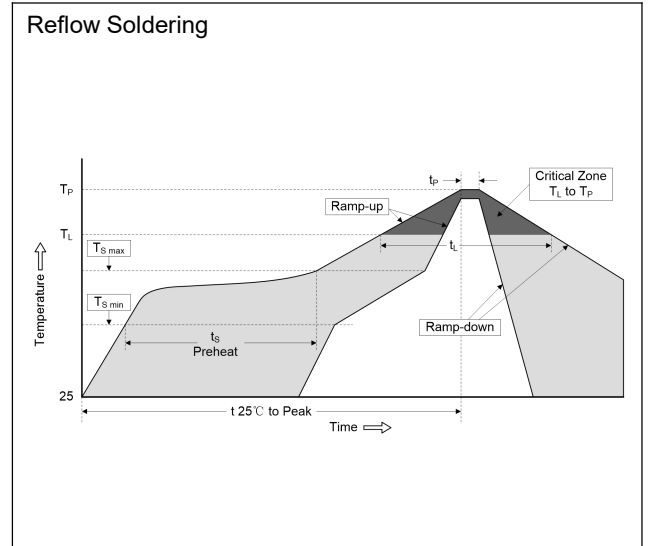


SMF Series

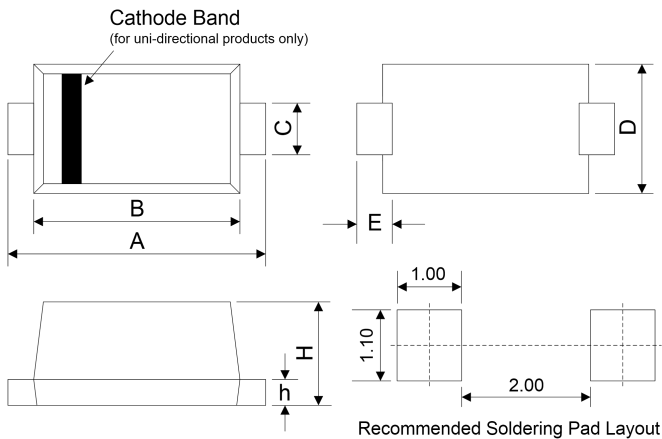
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Soldering Parameters

| Reflow Condition | | Lead-free |
|--|-----------------------------------|-----------------|
| 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 (T_L to T_P) | | 3°C/second max. |
| $T_{S\ max}$ to T_L -Ramp-up Rate | | 3°C/second max. |
| Time maintained above: | -Temperature (T_L) | 217°C |
| | -Time (t_L) | 60–150 seconds |
| Peak Temperature (T_P) | | 260°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 | | 8 minutes max. |



Dimensions (SOD-123FL)

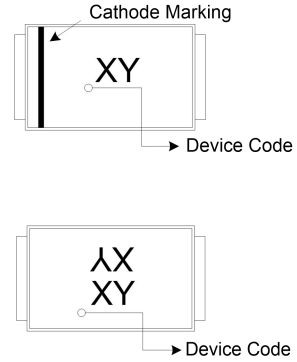
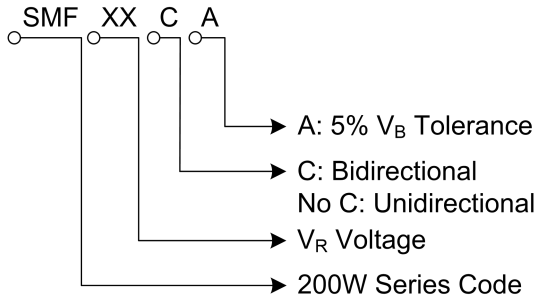


| Symbol | Millimeters | | Inches | |
|--------|-------------|------|-----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 3.50 | 3.90 | 0.138 | 0.154 |
| B | 2.60 | 3.00 | 0.102 | 0.118 |
| C | 0.75 | 1.10 | 0.030 | 0.043 |
| D | 1.60 | 2.00 | 0.063 | 0.079 |
| E | 0.80Typ. | | 0.031Typ. | |
| H | 0.90 | 1.35 | 0.035 | 0.053 |
| h | 0.12 | 0.22 | 0.005 | 0.009 |

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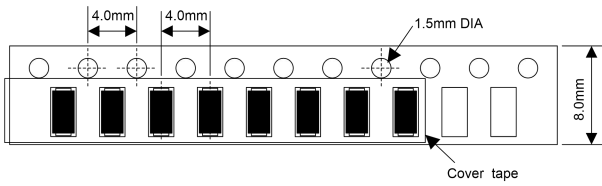
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Part Number Code and Marking Code

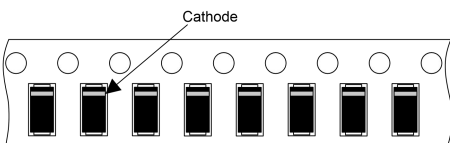


Packaging Specification

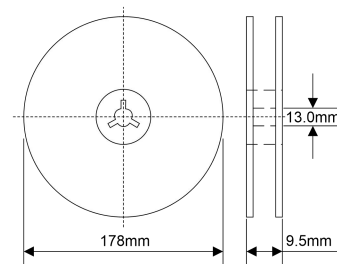
Tape



For Uni-Devices



7 Inches Reel



Quantity: 3000pcs/reel

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