

Features

- For surface mounted applications in order to optimize board space
- Low profile space
- Glass passivated chip
- Low inductance
- Excellent clamping capability
- Very fast response time
- Typical ID less than 1µA at VWM
- 200 W peak pulse power capability with a 10/1000 µs waveform
- Component in accordance to
- RoHS 2002/95/1 and WEEE 2002/96/EC



Mechanical Date

- **Case:** JEDEC SOD-123FL molded plastic body over glass passivated chip
- **Terminals:** Solder plated, solderable per MIL-STD-750 Method 2026
- **Polarity:** For uni-directional types the band by laser denotes the cathode, which is positive with respect to the anode under normal TVS operation

Major Ratings and Characteristics

| | |
|---------------------------|---------------------|
| P_{RRM} | 200W |
| V_{RRM} | 5 V to 170 V |
| I_{FSM} | 20A |
| V_F | 1.25V |
| T_j max. | 150 °C |

Devices for Bidirectional Applications

- For bi-directional devices, use suffix C or CA (e.g.SMF10C, SMF0CA). Electrical characteristics apply in both directions.

Maximum Ratings & Thermal Characteristics

(T_A = 25 °C unless otherwise noted)

| Items | Symbol | VALUE | UNIT |
|---|-----------------------------------|----------------|------|
| Peak pulse power dissipation with a 10/1000µs waveform (see fig. 1) | P _{PPM} | 200 | W |
| Peak pulse current with a waveform (see fig. 3 , single pulse) | I _{PPM} | See Next Table | A |
| Peak forward surge current 8.3ms single half sine-wave uni-directional only | I _{FSM} | 20 | A |
| Typical thermal resistance, junction to ambient ⁽¹⁾ | R _{θJA} | 120 | °C / |
| Typical thermal resistance, junction to lead ⁽¹⁾ | R _{θJL} | 30 | °C / |
| Operating junction and storage temperature range | T _J , T _{STG} | -55 to +150 | °C |

Note 1: Mounted on P.C.B. with 0.036 x 0.06" (0.9 x 1.5mm) copper pad areas

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

| TRR House No. | Marking Code | | Breakdown Voltage at $I_T^{(2)}$ $V_{(BR)}$ (V) | | Test Current | Stand-off Voltage | Maximum Reverse Leakage at $V_{WM}^{(4)}$ | Maximum Peak Pulse Surge Current $I_{PPM}^{(3)}$ | Maximum Clamping Voltage at I_{PPM} |
|---------------|--------------|----|--|-------|--------------|-------------------|---|--|---------------------------------------|
| | UNI | BI | Min | Max | I_T (mA) | V_{WM} (V) | I_D (μ A) | I_{PPM} (A) | V_C (V) |
| SMF5.0(C) | KD | AD | 6.40 | 7.82 | 10 | 5.0 | 400 | 20.80 | 9.6 |
| SMF5.0(C)A | KE | AE | 6.40 | 7.00 | 10 | 5.0 | 400 | 21.70 | 9.2 |
| SMF6.0(C) | KF | AF | 6.67 | 8.15 | 10 | 6.0 | 400 | 17.55 | 11.4 |
| SMF6.0(C)A | KG | AG | 6.67 | 7.37 | 10 | 6.0 | 400 | 19.40 | 10.3 |
| SMF6.5(C) | KH | AH | 7.22 | 8.82 | 10 | 6.5 | 250 | 16.30 | 12.3 |
| SMF6.5(C)A | KK | AK | 7.22 | 7.98 | 10 | 6.5 | 250 | 17.90 | 11.2 |
| SMF7.0(C) | KL | AL | 7.78 | 9.51 | 10 | 7.0 | 100 | 15.10 | 13.3 |
| SMF7.0(C)A | KM | AM | 7.78 | 8.60 | 10 | 7.0 | 100 | 16.70 | 12.0 |
| SMF7.5(C) | KN | AN | 8.33 | 10.20 | 1 | 7.5 | 50 | 14.00 | 14.3 |
| SMF7.5(C)A | KP | AP | 8.33 | 9.21 | 1 | 7.5 | 50 | 15.50 | 12.9 |
| SMF8.0(C) | KQ | AQ | 8.89 | 10.90 | 1 | 8.0 | 25 | 13.35 | 15.0 |
| SMF8.0(C)A | KR | AR | 8.89 | 9.83 | 1 | 8.0 | 25 | 14.70 | 13.6 |
| SMF8.5(C) | KS | AS | 9.44 | 11.50 | 1 | 8.5 | 10 | 12.60 | 15.9 |
| SMF8.5(C)A | KT | AT | 9.44 | 10.40 | 1 | 8.5 | 10 | 13.90 | 14.4 |
| SMF9.0(C) | KU | AU | 10.0 | 12.2 | 1 | 9.0 | 5.0 | 11.85 | 16.9 |
| SMF9.0(C)A | KV | AV | 10.0 | 11.1 | 1 | 9.0 | 5.0 | 13.00 | 15.4 |
| SMF10(C) | KW | AW | 11.1 | 13.6 | 1 | 10 | 2.5 | 10.70 | 18.8 |
| SMF10(C)A | KX | AX | 11.1 | 12.3 | 1 | 10 | 2.5 | 11.80 | 17.0 |
| SMF11(C) | KY | AY | 12.2 | 14.9 | 1 | 11 | 2.5 | 9.95 | 20.1 |
| SMF11(C)A | KZ | AZ | 12.2 | 13.5 | 1 | 11 | 2.5 | 11.00 | 18.2 |
| SMF12(C) | LD | BD | 13.3 | 16.3 | 1 | 12 | 2.5 | 9.15 | 22.0 |
| SMF12(C)A | LE | BE | 13.3 | 14.7 | 1 | 12 | 2.5 | 10.10 | 19.9 |
| SMF13(C) | LF | BF | 14.4 | 17.6 | 1 | 13 | 1.0 | 8.40 | 23.8 |
| SMF13(C)A | LG | BG | 14.4 | 15.9 | 1 | 13 | 1.0 | 9.30 | 21.5 |
| SMF14(C) | LH | BH | 15.6 | 19.1 | 1 | 14 | 1.0 | 7.75 | 25.8 |
| SMF14(C)A | LK | BK | 15.6 | 17.2 | 1 | 14 | 1.0 | 8.60 | 23.2 |
| SMF15(C) | LL | BL | 16.7 | 20.4 | 1 | 15 | 1.0 | 7.45 | 26.9 |
| SMF15(C)A | LM | BM | 16.7 | 18.5 | 1 | 15 | 1.0 | 8.20 | 24.4 |
| SMF16(C) | LN | BN | 17.8 | 21.8 | 1 | 16 | 1.0 | 6.95 | 28.8 |
| SMF16(C)A | LP | BP | 17.8 | 19.7 | 1 | 16 | 1.0 | 7.70 | 17.0 |
| SMF17(C) | LQ | BQ | 18.9 | 23.1 | 1 | 17 | 1.0 | 6.50 | 30.5 |
| SMF17(C)A | LR | BR | 18.9 | 20.9 | 1 | 17 | 1.0 | 7.20 | 27.6 |
| SMF18(C) | LS | BS | 20.0 | 24.4 | | | | 6.15 | 32.2 |
| SMF18(C)A | LT | BT | 20.0 | 22.1 | 1 | 18 | 1.0 | 6.80 | 29.2 |
| SMF20(C) | LU | BU | 22.2 | 27.1 | 1 | 20 | 1.0 | 5.65 | 35.8 |
| SMF20(C)A | LV | BV | 22.2 | 24.5 | 1 | 20 | 1.0 | 6.20 | 32.4 |
| SMF22(C) | LW | BW | 24.4 | 29.8 | 1 | 22 | 1.0 | 5.05 | 39.4 |
| SMF22(C)A | LX | BX | 24.4 | 26.9 | 1 | 22 | 1.0 | 5.60 | 35.5 |
| SMF24(C) | LY | BY | 26.7 | 32.6 | 1 | 24 | 1.0 | 4.60 | 43.0 |
| SMF24(C)A | LZ | BZ | 26.7 | 29.5 | 1 | 24 | 1.0 | 5.10 | 38.9 |
| SMF26(C) | MD | CD | 28.9 | 35.3 | 1 | 26 | 1.0 | 4.35 | 46.6 |
| SMF26(C)A | ME | CE | 28.9 | 31.9 | 1 | 26 | 1.0 | 4.80 | 42.1 |
| SMF28(C) | MF | CF | 31.1 | 38.0 | 1 | 28 | 1.0 | 4.00 | 50.0 |
| SMF28(C)A | MG | CG | 31.1 | 34.4 | 1 | 28 | 1.0 | 4.40 | 45.4 |
| SMF30(C) | MH | CH | 33.3 | 40.7 | 1 | 30 | 1.0 | 3.70 | 53.5 |
| SMF30(C)A | MK | CK | 33.3 | 36.8 | 1 | 30 | 1.0 | 4.10 | 48.4 |
| SMF33(C) | ML | CL | 36.7 | 44.9 | 1 | 33 | 1.0 | 3.45 | 59.0 |
| SMF33(C)A | MM | CM | 36.7 | 40.6 | 1 | 33 | 1.0 | 3.80 | 53.3 |

Electrical Characteristics (T_A = 25 °C unless otherwise noted)

| TRR House No. | Marking Code | | Breakdown Voltage at I _T ⁽²⁾ V _(BR) (V) | | Test Current | Stand-off Voltage | Maximum Reverse Leakage at V _{WM} ⁽⁴⁾ | Maximum Peak Pulse Surge Current ⁽³⁾ | Maximum Clamping Voltage at I _{PPM} |
|---------------|--------------|----|---|-------|---------------------|---------------------|---|---|--|
| | UNI | BI | Min | Max | I _T (mA) | V _{WM} (V) | I _D (μA) | I _{PPM} (A) | V _C (V) |
| SMF36(C) | MN | CN | 40.0 | 48.9 | 1 | 36 | 1.0 | 3.06 | 64.3 |
| SMF36(C)A | MP | CP | 40.0 | 44.2 | 1 | 36 | 1.0 | 3.40 | 58.1 |
| SMF40(C) | MQ | CQ | 44.4 | 54.3 | 1 | 40 | 1.0 | 2.80 | 71.4 |
| SMF40(C)A | MR | CR | 44.4 | 49.1 | 1 | 40 | 1.0 | 3.10 | 64.5 |
| SMF43(C) | MS | CS | 47.8 | 58.4 | 1 | 43 | 1.0 | 2.60 | 76.7 |
| SMF43(C)A | MT | CT | 47.8 | 52.8 | 1 | 43 | 1.0 | 2.90 | 69.4 |
| SMF45(C) | MU | CU | 50.0 | 61.1 | 1 | 45 | 1.0 | 2.55 | 80.3 |
| SMF45(C)A | MV | CV | 50.0 | 55.3 | 1 | 45 | 1.0 | 2.80 | 72.7 |
| SMF48(C) | MW | CW | 53.3 | 65.1 | 1 | 48 | 1.0 | 2.35 | 85.5 |
| SMF48(C)A | MX | CX | 53.3 | 58.9 | 1 | 48 | 1.0 | 2.60 | 77.4 |
| SMF51(C) | MY | CY | 56.7 | 69.3 | 1 | 51 | 1.0 | 2.16 | 91.1 |
| SMF51(C)A | MZ | CZ | 56.7 | 62.7 | 1 | 51 | 1.0 | 2.40 | 82.4 |
| SMF54(C) | ND | DD | 60.0 | 73.3 | 1 | 54 | 1.0 | 2.10 | 96.3 |
| SMF54(C)A | NE | DE | 60.0 | 66.3 | 1 | 54 | 1.0 | 2.30 | 87.1 |
| SMF58(C) | NF | DF | 64.4 | 78.7 | 1 | 58 | 1.0 | 2.00 | 103 |
| SMF58(C)A | NG | DG | 64.4 | 71.2 | 1 | 58 | 1.0 | 2.20 | 93.6 |
| SMF60(C) | NH | DH | 66.7 | 81.5 | 1 | 60 | 1.0 | 1.90 | 107 |
| SMF60(C)A | NK | DK | 66.7 | 73.7 | 1 | 60 | 1.0 | 2.10 | 96.8 |
| SMF64(C) | NL | DL | 71.1 | 86.9 | 1 | 64 | 1.0 | 1.79 | 114 |
| SMF64(C)A | NM | DM | 71.1 | 78.6 | 1 | 64 | 1.0 | 2.00 | 103 |
| SMF70(C) | NN | DN | 77.8 | 95.1 | 1 | 70 | 1.0 | 1.65 | 125 |
| SMF70(C)A | NP | DP | 77.8 | 86.0 | 1 | 70 | 1.0 | 1.80 | 113 |
| SMF75(C) | NQ | DQ | 83.3 | 102.0 | 1 | 75 | 1.0 | 1.55 | 134 |
| SMF75(C)A | NR | DR | 83.3 | 92.1 | 1 | 75 | 1.0 | 1.70 | 121 |
| SMF78(C) | NS | DS | 86.7 | 106.0 | 1 | 78 | 1.0 | 1.45 | 139 |
| SMF78(C)A | NT | DT | 86.7 | 95.8 | 1 | 78 | 1.0 | 1.60 | 126 |
| SMF85(C) | NU | DU | 94.4 | 115.0 | 1 | 85 | 1.0 | 1.34 | 151 |
| SMF85(C)A | NV | DV | 94.4 | 104.0 | 1 | 85 | 1.0 | 1.50 | 137 |
| SMF90(C) | NW | DW | 100 | 122 | 1 | 90 | 1.0 | 1.30 | 160 |
| SMF90(C)A | NX | DX | 100 | 111 | 1 | 90 | 1.0 | 1.40 | 146 |
| SMF100(C) | NY | DY | 111 | 136 | 1 | 100 | 1.0 | 1.14 | 179 |
| SMF100(C)A | NZ | DZ | 111 | 123 | 1 | 100 | 1.0 | 1.30 | 162 |
| SMF110(C) | PD | ED | 122 | 149 | 1 | 110 | 1.0 | 1.04 | 196 |
| SMF110(C)A | PE | EE | 122 | 135 | 1 | 110 | 1.0 | 1.20 | 177 |
| SMF120(C) | PF | EF | 133 | 163 | 1 | 120 | 1.0 | 0.95 | 214 |
| SMF120(C)A | PG | EG | 133 | 147 | 1 | 120 | 1.0 | 1.00 | 193 |
| SMF130(C) | PH | EH | 144 | 176 | 1 | 130 | 1.0 | 0.89 | 231 |
| SMF130(C)A | PK | EK | 144 | 159 | 1 | 130 | 1.0 | 1.00 | 209 |
| SMF150(C) | PL | EL | 167 | 204 | 1 | 150 | 1.0 | 0.75 | 268 |
| SMF150(C)A | PM | EM | 167 | 185 | 1 | 150 | 1.0 | 0.80 | 243 |
| SMF160(C) | PN | EN | 178 | 218 | 1 | 160 | 1.0 | 0.75 | 287 |
| SMF160(C)A | PP | EP | 178 | 197 | 1 | 160 | 1.0 | 0.80 | 259 |
| SMF170(C) | PQ | EQ | 189 | 231 | 1 | 170 | 1.0 | 0.65 | 304 |
| SMF170(C)A | PR | ER | 189 | 209 | 1 | 170 | 1.0 | 0.70 | 275 |

Note 2: Pulse test : T_p ≅ 50ms.

Note 3: Surge current waveform 10 / 1000 μS.

Note 4: For bi-directional types with V_{WM} of 10 V and less, the I_D limit is doubled

Note 5: V_F = 3.5 V at I_F = 25 A (uni-directional only)

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

Fig.1 Peak Pulse Power Rating Curve

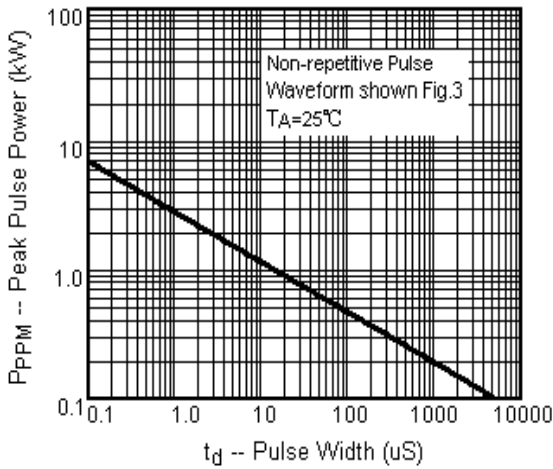


Fig.2 Pulse Derating Curve

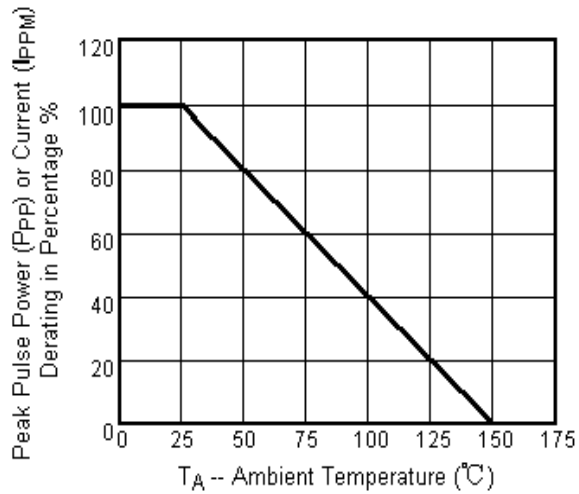


Fig.3 Pulse Waverform

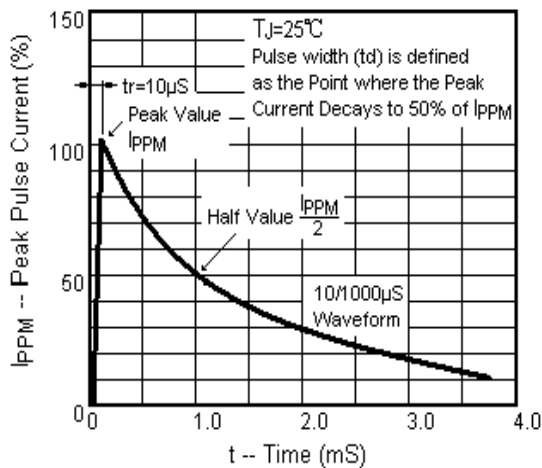


Fig.4 Typical Junction Capacitance

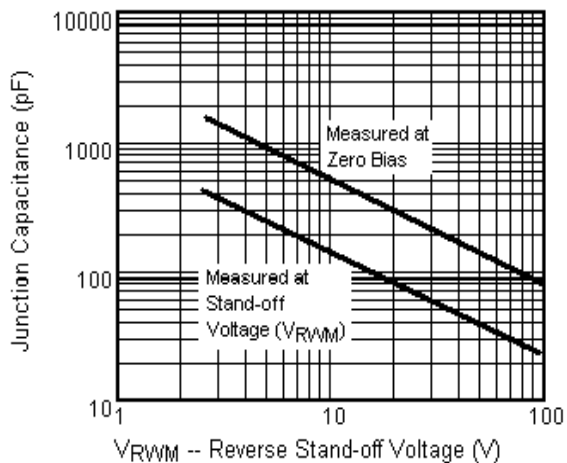
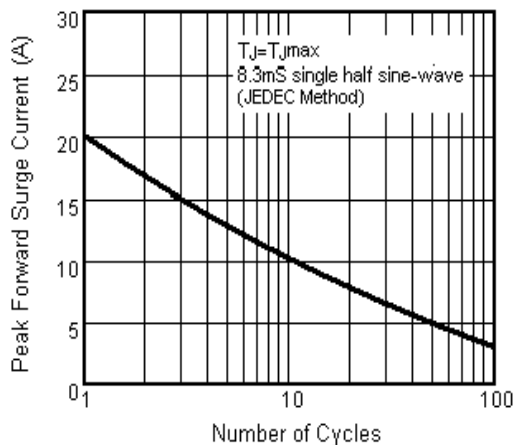
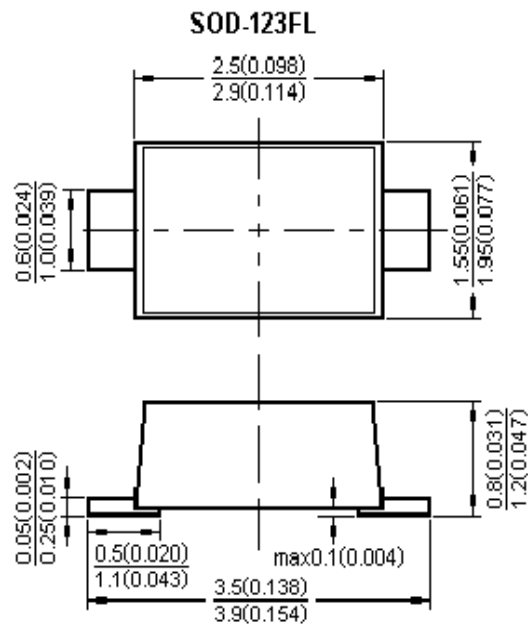


Fig.2 Maximum Non-Repetitive Peak Forward Surge Current



Package Outline



Dimensions in millimeters and (inches)