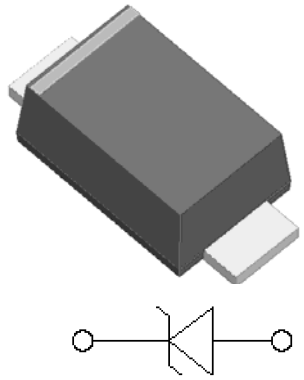
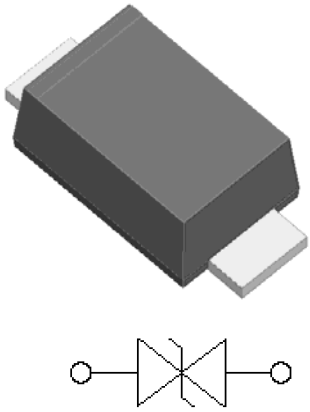
# Surface Mount Transient Voltage Suppressor

**Uni-directional**



**Bi-directional**



## Features

- For surface mounted applications
- Low-profile package
- Ideal for automated placement
- Available in Unidirectional and Bidirectional
- 400 W peak pulse power capability with a 10/1000 μs waveform
- Low incremental surge resistance, excellent clamping capability
- Very fast response time
- High temperature soldering guaranteed: 260 °C/10 s at terminals
- Meets MSL level 1
- Component in accordance to RoHS

## Typical Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, telecommunication.

## Mechanical Date

- **Package**: SOD-123FL
  Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals**: Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types

## ■Maximum Ratings (Ta=25℃ Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | Conditions | Max |
|---|---|---|---|---|
| Peak power dissipation(1) (2) (Fig.1) | $P_{PPM}$ | W | with a 10/1000us waveform | 400 |
| Peak pulse current(1) | $I_{PPM}$ | A | with a 10/1000us waveform | (See Next Table) |
| Power dissipation, on infinite heat sink | $P_D$ | W | TL=75℃ | 0.8 |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only (3) | $I_{FSM}$ | A | | 30 |
| Operating junction and storage temperature range | $T_J$,$T_{STG}$ | ℃ | | -55 to +150 |
| Electrostatic Discharge | ESD | KV | IEC61000-4-2 air discharge | ±30 |
| Electrostatic Discharge | | | IEC61000-4-2 contact discharge | |
| Thermal resistance | $R_{\theta JL}$ | ℃/W | Between junction and lead | 40 |
| | $R_{\theta JA}$ | | Between junction and Ambient | 180 |

Notes:

(1). Non repetitive current pulse，per Fig2 and derated above TA=25℃ per Fig3.

(2). $T_L$=30℃ unless otherwise noted , $V_F$ ≤1.25V@200mA.

(3). Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

(4).Thermal resistance from junction to ambient and from junction to lead mounted on P.C.B. with 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad areas

## ■Ordering Information (Example)

| PREFERED P/N | PACKING CODE | UNIT WEIGHT(g) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| **SM4F SERIES** | F1 | 0.0167 | 3000 | 30000 | 120000 | 7” reel |
| **SM4F SERIES** | F2 | 0.0167 | 10000 | 20000 | 160000 | 13” reel |

## ■ Electrical Characteristics (TA=25℃ unless otherwise noted)

| Part Number | | Marking | | Breakdown Voltage $V_{BR}$@$I_T$ | | | Maximum Reverse Leakage $I_R$ @ $V_{RWM}$ (μA) | Working Peak Reverse Voltage $V_{RWM}$ (V) | Maximum Reverse Surge Current $I_{PP}$ (2) (A) | Maximum Clamping Voltage Vc @ $I_{PP}$ (V) |
|---|---|---|---|---|---|---|---|---|---|---|
| （Uni） | （Bi） | （Uni） | （Bi） | Min(V) | Max (V) | $I_T$(1)(mA) | | | | |
| SM4F5.0A | SM4F5.0CA | F5.0A | F5.0CA | 6.40 | 7.07 | 10 | 800 | 5.0 | 43.38 | 9.2 |
| SM4F6.0A | SM4F6.0CA | F6.0A | F6.0CA | 6.67 | 7.37 | 10 | 800 | 6.0 | 38.83 | 10.3 |
| SM4F6.5A | SM4F6.5CA | F6.5A | F6.5CA | 7.22 | 7.98 | 10 | 500 | 6.5 | 35.71 | 11.2 |
| SM4F7.0A | SM4F7.0CA | F7.0A | F7.0CA | 7.78 | 8.60 | 10 | 200 | 7.0 | 33.33 | 12.0 |
| SM4F7.5A | SM4F7.5CA | F7.5A | F7.5CA | 8.33 | 9.21 | 1 | 100 | 7.5 | 31.01 | 12.9 |
| SM4F8.0A | SM4F8.0CA | F8.0A | F8.0CA | 8.89 | 9.83 | 1 | 50 | 8.0 | 29.41 | 13.6 |
| SM4F8.5A | SM4F8.5CA | F8.5A | F8.5CA | 9.44 | 10.40 | 1 | 10 | 8.5 | 27.78 | 14.4 |
| SM4F9.0A | SM4F9.0CA | F9.0A | F9.0CA | 10.00 | 11.10 | 1 | 5 | 9.0 | 25.97 | 15.4 |
| SM4F10A | SM4F10CA | F10A | F10CA | 11.10 | 12.30 | 1 | 2.5 | 10.0 | 23.52 | 17.0 |
| SM4F11A | SM4F11CA | F11A | F11CA | 12.20 | 13.50 | 1 | 2.5 | 11.0 | 21.98 | 18.2 |
| SM4F12A | SM4F12CA | F12A | F12CA | 13.30 | 14.70 | 1 | 2.5 | 12.0 | 20.1 | 19.9 |
| SM4F13A | SM4F13CA | F13A | F13CA | 14.40 | 15.90 | 1 | 1.0 | 13.0 | 18.6 | 20.0 |
| SM4F14A | SM4F14CA | F14A | F14CA | 15.60 | 17.20 | 1 | 1.0 | 14.0 | 17.24 | 23.2 |
| SM4F15A | SM4F15CA | F15A | F15CA | 16.70 | 18.50 | 1 | 1.0 | 15.0 | 16.4 | 24.4 |
| SM4F16A | SM4F16CA | F16A | F16CA | 17.80 | 19.70 | 1 | 1.0 | 16.0 | 15.38 | 26.0 |
| SM4F17A | SM4F17CA | F17A | F17CA | 18.90 | 20.90 | 1 | 1.0 | 17.0 | 14.5 | 27.6 |
| SM4F18A | SM4F18CA | F18A | F18CA | 20.00 | 22.10 | 1 | 1.0 | 18.0 | 13.7 | 29.2 |
| SM4F19A | SM4F19CA | F19A | F19CA | 21.10 | 23.30 | 1 | 1.0 | 19.0 | 13.08 | 30.6 |
| SM4F20A | SM4F20CA | F20A | F20CA | 22.20 | 24.50 | 1 | 1.0 | 20.0 | 12.34 | 32.4 |
| SM4F22A | SM4F22CA | F22A | F22CA | 24.40 | 26.90 | 1 | 1.0 | 22.0 | 11.26 | 35.5 |
| SM4F24A | SM4F24CA | F24A | F24CA | 26.70 | 29.50 | 1 | 1.0 | 24.0 | 10.28 | 38.9 |
| SM4F26A | SM4F26CA | F26A | F26CA | 28.90 | 31.90 | 1 | 1.0 | 26.0 | 9.5 | 42.1 |
| SM4F28A | SM4F28CA | F28A | F28CA | 31.10 | 34.40 | 1 | 1.0 | 28.0 | 8.82 | 45.4 |

| Part Number | | Marking | | Breakdown Voltage $V_{BR}$@$I_T$ | | | Maximum Reverse Leakage $I_R$ @ $V_{RWM}$ (μA) | Working Peak Reverse Voltage $V_{RWM}$ (V) | Maximum Reverse Surge Current $I_{PP}$ (2) (A) | Maximum Clamping Voltage Vc @ $I_{PP}$ (V) |
|---|---|---|---|---|---|---|---|---|---|---|
| （Uni） | （Bi） | （Uni） | （Bi） | Min(V) | Max (V) | $I_T$(1)(mA) | | | | |
| SM4F30A | SM4F30CA | F30A | F30CA | 33.30 | 36.80 | 1 | 1.0 | 30.0 | 8.26 | 48.4 |
| SM4F33A | SM4F33CA | F33A | F33CA | 36.70 | 40.60 | 1 | 1.0 | 33.0 | 7.5 | 53.3 |
| SM4F36A | SM4F36CA | F36A | F36CA | 40.00 | 44.20 | 1 | 1.0 | 36.0 | 6.88 | 58.1 |
| SM4F40A | SM4F40CA | F40A | F40CA | 44.40 | 49.10 | 1 | 1.0 | 40.0 | 6.2 | 64.5 |
| SM4F43A | SM4F43CA | F43A | F43CA | 47.80 | 52.80 | 1 | 1.0 | 43.0 | 5.76 | 69.4 |
| SM4F45A | SM4F45CA | F45A | F45CA | 50.00 | 55.30 | 1 | 1.0 | 45.0 | 5.5 | 72.7 |
| SM4F48A | / | F48A | / | 53.30 | 58.90 | 1 | 1.0 | 48.0 | 5.16 | 77.4 |
| SM4F51A | / | F51A | / | 56.70 | 62.70 | 1 | 1.0 | 51.0 | 4.86 | 82.4 |
| SM4F54A | / | F54A | / | 60.00 | 66.30 | 1 | 1.0 | 54.0 | 4.6 | 87.1 |
| SM4F58A | / | F58A | / | 64.40 | 71.20 | 1 | 1.0 | 58.0 | 4.28 | 93.6 |
| SM4F60A | / | F60A | / | 66.70 | 73.70 | 1 | 1.0 | 60.0 | 4.14 | 96.8 |
| SM4F64A | / | F64A | / | 71.10 | 78.60 | 1 | 1.0 | 64.0 | 3.88 | 103.0 |
| SM4F70A | / | F70A | / | 77.80 | 86.00 | 1 | 1.0 | 70.0 | 3.54 | 113.0 |
| SM4F75A | / | F75A | / | 83.30 | 92.10 | 1 | 1.0 | 75.0 | 3.3 | 121.0 |
| SM4F78A | / | F78A | / | 86.70 | 95.80 | 1 | 1.0 | 78.0 | 3.18 | 126.0 |
| SM4F80A | / | F80A | / | 88.80 | 97.60 | 1 | 1.0 | 80.0 | 3.1 | 129.0 |
| SM4F85A | / | F85A | / | 94.40 | 104.00 | 1 | 1.0 | 85.0 | 2.92 | 137.0 |
| SM4F90A | / | F90A | / | 100.00 | 111.00 | 1 | 1.0 | 90.0 | 2.74 | 146.0 |
| SM4F100A | / | F100A | / | 111.00 | 123.00 | 1 | 1.0 | 100.0 | 2.46 | 162.0 |

Notes:
(1) $t_p$≤50ms Pulse test: $t_p$≤50ms.
(2) Surge current waveform per Fig. 2 and derated per Fig.3.

## ■ **Characteristics**(Typical)

FIG1:Peak Pulse Power Rating Curve

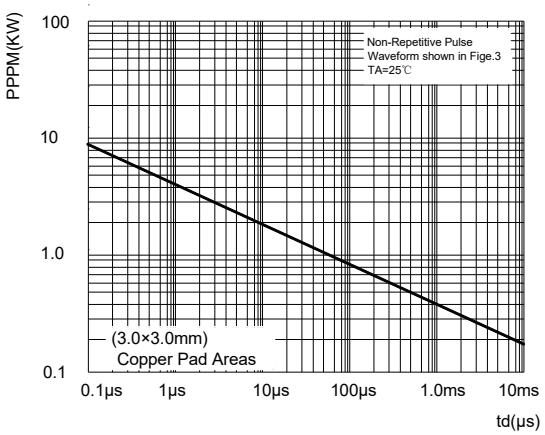
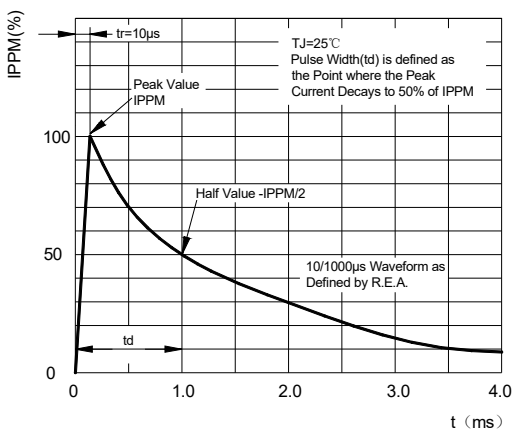



FIG2: Pulse Waveform



## ■ Characteristics(Typical)

FIG3: Pulse Power or Current vs. Initial Junction Temperature

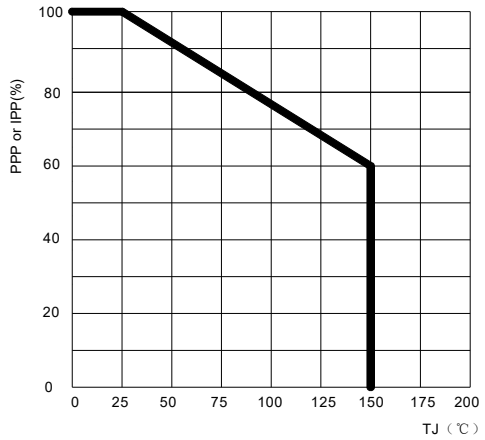
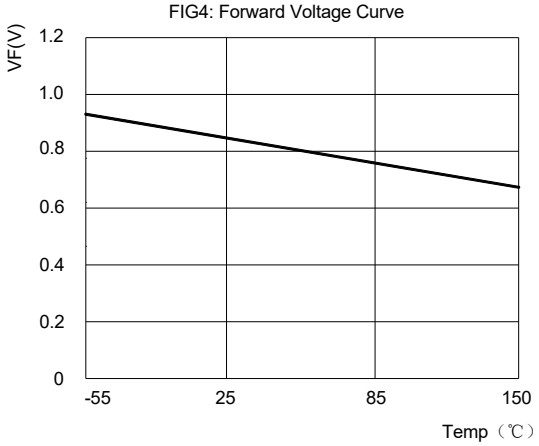
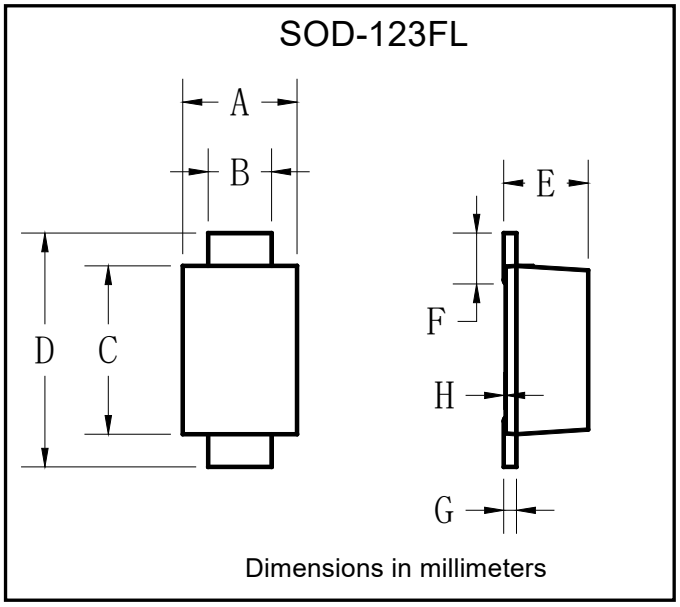



FIG4: Forward Voltage Curve

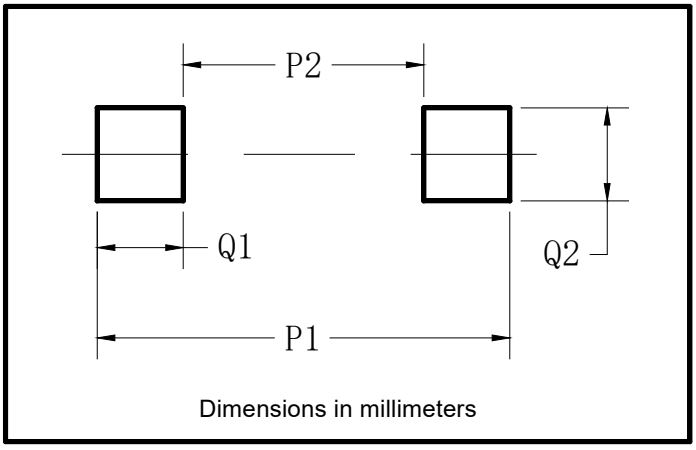



## ■ Outline Dimensions




| SOD-123FL | | |
|---|---|---|
| Dim | Min | Max |
| A | 1.60 | 1.90 |
| B | 0.90 | 1.10 |
| C | 2.55 | 2.85 |
| D | 3.60 | 3.90 |
| E | 1.00 | 1.20 |
| F | 0.40 | 0.90 |
| G | 0.10 | 0.25 |
| H | 0.02 | 0.05 |

## ■ Suggested pad layout




| SOD-123FL | |
|---|---|
| Dim | Millimeters |
| P1 | 3.90 |
| P2 | 1.90 |
| Q1 | 1.00 |
| Q2 | 1.50 |

## Notice

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