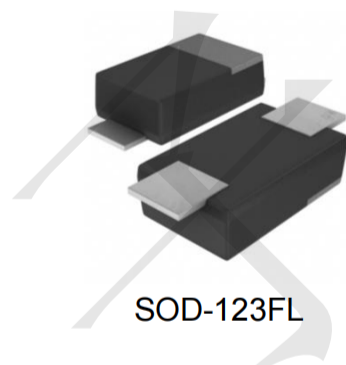


### Features

- 400 watts Peak Pulse Power (10/1000 $\mu$ s)
- Unidirectional and Bidirectional Protection
- Fast Response Time : Typically < 1ns
- Excellent Clamping Capability
- Built-in Strain relief
- Low inductance
- Low profile package
- IEC 61000-4-2 (ESD)  $\pm$ 30kV(air),  $\pm$ 30kV(contact)
- MSL: Level 1



### Mechanical Characteristics

- SOD-123FL package
- Matte tin lead - free plated
- Marking: Marking Code
- RoHS Compliant

### Applications

- I/O Interfaces
- Power lines
- Telecommunication
- Industrial Electronics
- Consumer Electronics

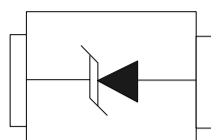
| Absolute Maximum Rating                                           |           |                                |            |
|-------------------------------------------------------------------|-----------|--------------------------------|------------|
| Rating                                                            | Symbol    | Value                          | Units      |
| Peak Pulse Power ( $t_p = 10/1000\mu s$ ) (see Note1&2)           | $P_{PPM}$ | 400                            | Watts      |
| Peak pulse current (10/1000 $\mu$ s) (see Note2)                  | $I_{PPM}$ | See Electrical Characteristics | A          |
| Peak Forward surge current (see Note3)                            | $I_{FSM}$ | 20                             | A          |
| Power Dissipation on infinite heat sink $T_L = 50^\circ C$ (Fig4) | $P_D$     | 1.0                            | W          |
| Operating Junction Temperature range                              | $T_J$     | -55 to + 150                   | $^\circ C$ |

**Note1:** Peak Pulse Power Rating as Pulse Width ,per Fig1.

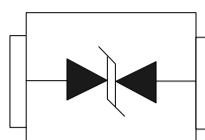
**Note2:** Peak Pulse Power or Current Derated above  $T_A=25^\circ C$  Per Fig. 2 and Non-Repetitive Current Pulse,Per Fig.3.

**Note3:** 8.3ms Single Half Sine Wave or Equivalent Square Wave unidirectional device only.

### Pin Configuration



Unidirectional



Bidirectional

# TPSMF4L Series

## Power Transient Voltage Suppressor

[WWW.TECHPUBLIC.COM](http://WWW.TECHPUBLIC.COM)

### Electrical Characteristics

| Part Number   |              | Reverse<br>Stand off<br>Voltage<br>$V_{RWM}$<br>(Volts) | Breakdown<br>Voltage<br>$V_{BR@I_T}$<br>(Volts) |      | Test<br>Current<br>$I_T$<br>(mA) | Maximum<br>Clamping<br>Voltage<br>$V_C@I_{PP}$<br>(Volts) | Maximum<br>Peak Pulse<br>Current<br>$I_{PP}$<br>(Amps) | Maximum<br>Reverse<br>Leakage<br>$I_R@V_{RWM}$<br>( $\mu A$ ) |
|---------------|--------------|---------------------------------------------------------|-------------------------------------------------|------|----------------------------------|-----------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|
| UNI-<br>POLAR | BI-<br>POLAR |                                                         | MIN                                             | MAX  |                                  |                                                           |                                                        |                                                               |
| TPSMF4L5.0A   | TPSMF4L5.0CA | 5.0                                                     | 6.4                                             | 7.0  | 10                               | 9.2                                                       | 43.5                                                   | 400                                                           |
| TPSMF4L6.0A   | TPSMF4L6.0CA | 6.0                                                     | 6.67                                            | 7.37 | 10                               | 10.3                                                      | 38.8                                                   | 400                                                           |
| TPSMF4L6.5A   | TPSMF4L6.5CA | 6.5                                                     | 7.22                                            | 7.98 | 10                               | 11.2                                                      | 35.7                                                   | 250                                                           |
| TPSMF4L7.0A   | TPSMF4L7.0CA | 7.0                                                     | 7.78                                            | 8.6  | 10                               | 12                                                        | 33.3                                                   | 100                                                           |
| TPSMF4L7.5A   | TPSMF4L7.5CA | 7.5                                                     | 8.33                                            | 9.21 | 1                                | 12.9                                                      | 31.0                                                   | 50                                                            |
| TPSMF4L8.0A   | TPSMF4L8.0CA | 8.0                                                     | 8.89                                            | 9.83 | 1                                | 13.6                                                      | 29.4                                                   | 25                                                            |
| TPSMF4L8.5A   | TPSMF4L8.5CA | 8.5                                                     | 9.44                                            | 10.4 | 1                                | 14.4                                                      | 27.8                                                   | 10                                                            |
| TPSMF4L9.0A   | TPSMF4L9.0CA | 9.0                                                     | 10.0                                            | 11.1 | 1                                | 15.4                                                      | 26.0                                                   | 5                                                             |
| TPSMF4L10A    | TPSMF4L10CA  | 10                                                      | 11.1                                            | 12.3 | 1                                | 17                                                        | 23.5                                                   | 2.5                                                           |
| TPSMF4L11A    | TPSMF4L11CA  | 11                                                      | 12.2                                            | 13.5 | 1                                | 18.2                                                      | 22.0                                                   | 2.5                                                           |
| TPSMF4L12A    | TPSMF4L12CA  | 12                                                      | 13.3                                            | 14.7 | 1                                | 19.9                                                      | 20.1                                                   | 2.5                                                           |
| TPSMF4L13A    | TPSMF4L13CA  | 13                                                      | 14.4                                            | 15.9 | 1                                | 21.5                                                      | 18.6                                                   | 1                                                             |
| TPSMF4L14A    | TPSMF4L14CA  | 14                                                      | 15.6                                            | 17.2 | 1                                | 23.2                                                      | 17.2                                                   | 1                                                             |
| TPSMF4L15A    | TPSMF4L15CA  | 15                                                      | 16.7                                            | 18.5 | 1                                | 24.4                                                      | 16.4                                                   | 1                                                             |
| TPSMF4L16A    | TPSMF4L16CA  | 16                                                      | 17.8                                            | 19.7 | 1                                | 26                                                        | 15.4                                                   | 1                                                             |
| TPSMF4L17A    | TPSMF4L17CA  | 17                                                      | 18.9                                            | 20.9 | 1                                | 27.6                                                      | 14.5                                                   | 1                                                             |
| TPSMF4L18A    | TPSMF4L18CA  | 18                                                      | 20.0                                            | 22.1 | 1                                | 29.2                                                      | 13.7                                                   | 1                                                             |
| TPSMF4L20A    | TPSMF4L20CA  | 20                                                      | 22.2                                            | 24.5 | 1                                | 32.4                                                      | 12.3                                                   | 1                                                             |
| TPSMF4L22A    | TPSMF4L22CA  | 22                                                      | 24.4                                            | 26.9 | 1                                | 35.5                                                      | 11.3                                                   | 1                                                             |
| TPSMF4L24A    | TPSMF4L24CA  | 24                                                      | 26.7                                            | 29.5 | 1                                | 38.9                                                      | 10.3                                                   | 1                                                             |
| TPSMF4L26A    | TPSMF4L26CA  | 26                                                      | 28.9                                            | 31.9 | 1                                | 42.1                                                      | 9.5                                                    | 1                                                             |
| TPSMF4L28A    | TPSMF4L28CA  | 28                                                      | 31.1                                            | 34.4 | 1                                | 45.4                                                      | 8.8                                                    | 1                                                             |
| TPSMF4L30A    | TPSMF4L30CA  | 30                                                      | 33.3                                            | 36.8 | 1                                | 48.4                                                      | 8.3                                                    | 1                                                             |
| TPSMF4L33A    | TPSMF4L33CA  | 33                                                      | 36.7                                            | 40.6 | 1                                | 53.3                                                      | 7.5                                                    | 1                                                             |
| TPSMF4L36A    | TPSMF4L36CA  | 36                                                      | 40.0                                            | 44.2 | 1                                | 58.1                                                      | 6.9                                                    | 1                                                             |
| TPSMF4L40A    | TPSMF4L40CA  | 40                                                      | 44.4                                            | 49.1 | 1                                | 64.5                                                      | 6.2                                                    | 1                                                             |
| TPSMF4L43A    | TPSMF4L43CA  | 43                                                      | 47.8                                            | 52.8 | 1                                | 69.4                                                      | 5.8                                                    | 1                                                             |
| TPSMF4L45A    | TPSMF4L45CA  | 45                                                      | 50.0                                            | 55.3 | 1                                | 72.7                                                      | 5.5                                                    | 1                                                             |
| TPSMF4L48A    | TPSMF4L48CA  | 48                                                      | 53.3                                            | 58.9 | 1                                | 77.4                                                      | 5.2                                                    | 1                                                             |
| TPSMF4L51A    | TPSMF4L51CA  | 51                                                      | 56.7                                            | 62.7 | 1                                | 82.4                                                      | 4.9                                                    | 1                                                             |
| TPSMF4L54A    | TPSMF4L54CA  | 54                                                      | 60.0                                            | 66.3 | 1                                | 87.1                                                      | 4.6                                                    | 1                                                             |
| TPSMF4L58A    | TPSMF4L58CA  | 58                                                      | 64.4                                            | 71.2 | 1                                | 93.6                                                      | 4.3                                                    | 1                                                             |

### Typical Characteristics

Figure 1: Peak Pulse Power Rating Curve

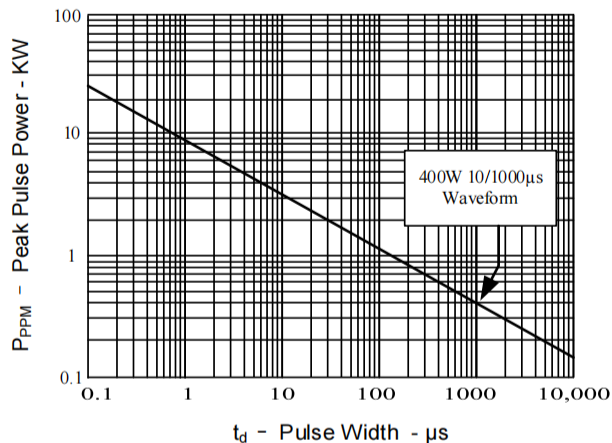


Figure 2: Pulse Derating Curve

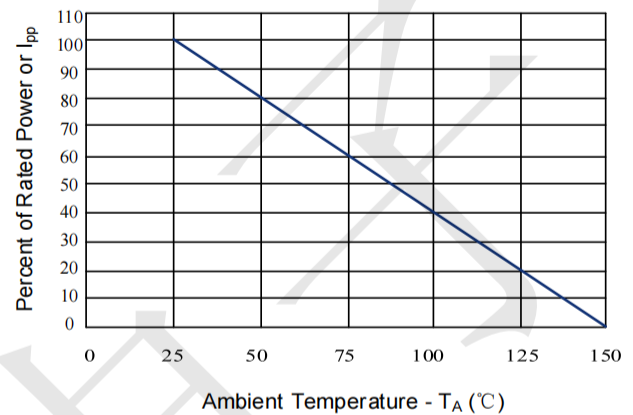


Figure 3: Pulse Waveform

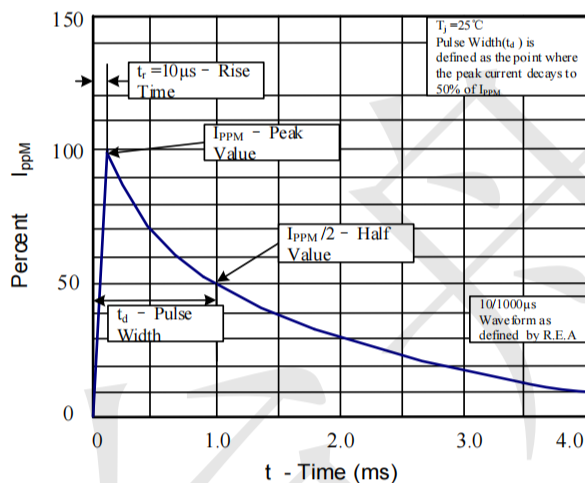


Figure 4: Steady State Power Dissipation Derating Curve

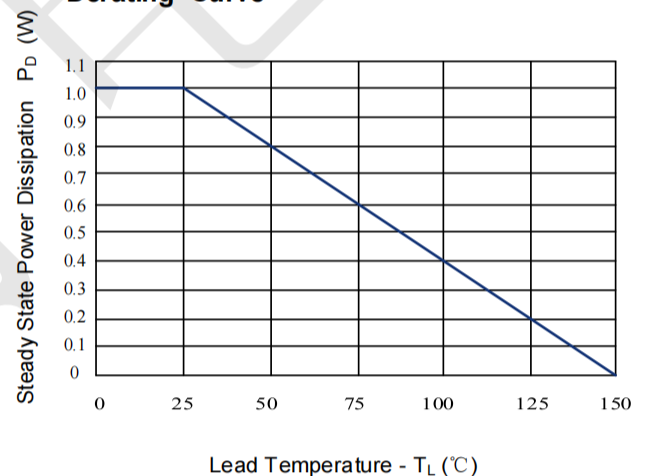
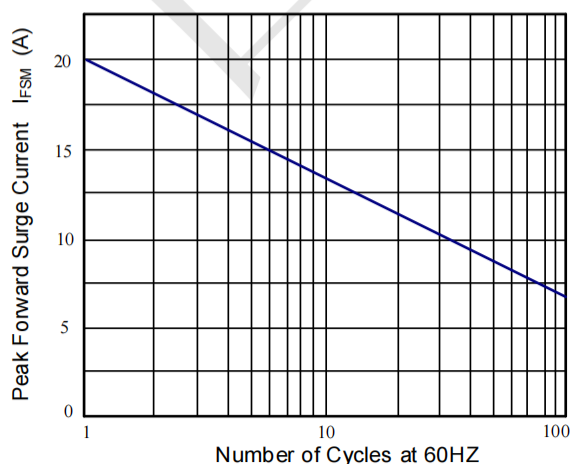


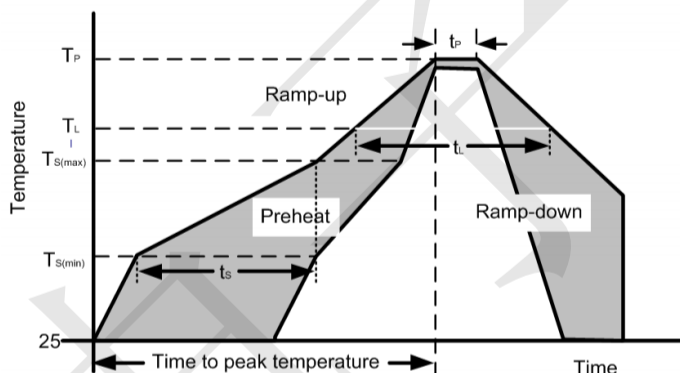
Figure 5: Maximum Non-Repetitive Forward Surge Current Only Unidirectional



Note: The above typical parameters or typical characteristics are only indicative and do not make specific guarantees. If detailed values are required, additional communication and provision are required.

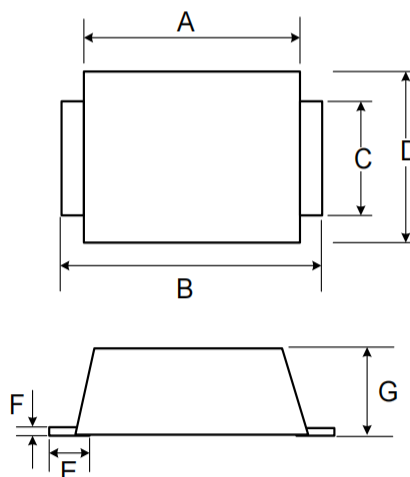
### Soldering Parameters

| Reflow Condition                                       |                                  |                   |
|--------------------------------------------------------|----------------------------------|-------------------|
| Pre-Heat                                               | Temperature min ( $T_{S(min)}$ ) | 150°C             |
|                                                        | Temperature max ( $T_{S(max)}$ ) | 200°C             |
|                                                        | Time (min to max) ( $t_s$ )      | 60-190 s          |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                  | 3°C/s max         |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate                   |                                  | 3°C/s max         |
| Reflow                                                 | Temperature ( $T_L$ ) (Liquidus) | 217°C             |
|                                                        | Temperature ( $t_L$ )            | 60-150 s          |
| Peak Temperature ( $T_P$ )                             |                                  | 260 $^{+0/-5}$ °C |
| Time within actual peak Temperature ( $t_p$ )          |                                  | 20-40 s           |
| Ramp-down Rate                                         |                                  | 5°C/s max         |
| Time 25°C to peak Temperature ( $T_P$ )                |                                  | 8 minutes max     |
| Do not exceed                                          |                                  | 260°C             |

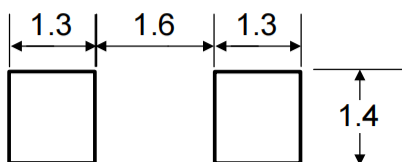


### Outline Drawing – SOD-123FL

| Ref. (mm) | Millimeters |      |
|-----------|-------------|------|
|           | Min.        | Max. |
| A         | 2.50        | 2.95 |
| B         | 3.40        | 3.95 |
| C         | 0.70        | 1.10 |
| D         | 1.50        | 1.90 |
| E         | 0.45        | 0.95 |
| F         | 0.05        | 0.26 |
| G         | 0.90        | 1.35 |



### Recommended Solder Pad Layout



Dimensions in mm