

## 200W, 5V - 100V Surface Mount Transient Voltage Suppressor

### FEATURES

- AEC-Q101 qualified
- Photo Glass passivated junction
- Low power loss, high efficiency
- Ideal for automated placement
- Excellent clamping capability
- Typical  $I_R$  less than  $1\mu A$  above 10V
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- 200 watts peak pulse power capability with a 10 / 1000  $\mu s$  waveform ( $V_{WM} \geq 60V$ ,  $P_{PPM} = 175W$ )
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

| KEY PARAMETERS                |            |      |
|-------------------------------|------------|------|
| PARAMETER                     | VALUE      | UNIT |
| $V_{WM}$                      | 5 - 100    | V    |
| $V_{BR}$<br>(uni-directional) | 6.8 - 117  | V    |
| $P_{PPM}$                     | 200        | W    |
| $T_{JMAX}$                    | 175        | °C   |
| Package                       | SOD-123W   |      |
| Configuration                 | Single die |      |



### APPLICATIONS

- Protect sensitive circuit from damage by high voltage transients
- Lighting, ESD transient voltage protection of IC, system
- Inductive switching load protection of IC, system
- Electrical Fast Transient Immunity protection of IC, system



SOD-123W

### MECHANICAL DATA

- Case: SOD-123W
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 0.016g (approximately)



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)

| PARAMETER  | SYMBOL    | VALUE       | UNIT |
|--|-----------|-------------|------|
| Non-repetitive peak impulse power dissipation with 10/1000us waveform <sup>(1)</sup> | $P_{PPM}$ | 200         | W    |
| Steady state power dissipation at $T_L = 25^\circ C$ <sup>(2)</sup>                  | $P_{tot}$ | 1           | W    |
| Forward Voltage @ $I_F = 12A$ for Uni-directional only <sup>(3)</sup>                | $V_F$     | 3.5         | V    |
| Junction temperature   | $T_J$     | -55 to +175 | °C   |
| Storage temperature  | $T_{STG}$ | -55 to +175 | °C   |

#### Notes:

1. Non-repetitive Current Pulse Per Fig.3 and derated above  $T_A = 25^\circ C$  Per Fig.2
2. Units mounted on PCB (5mm x 5mm Cu pad test board)
3. Pulse test with  $PW = 0.3ms$

| <b>THERMAL PERFORMANCE</b>             |                 |            |             |
|--|-----------------|------------|-------------|
| <b>PARAMETER</b>                       | <b>SYMBOL</b>   | <b>TYP</b> | <b>UNIT</b> |
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 33         | °C/W        |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 100        | °C/W        |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 34         | °C/W        |

**Thermal Performance Note:** Units mounted on PCB (5mm x 5mm Cu pad test board)

| <b>ORDERING INFORMATION</b>        |                |                      |
|------------------------------------|----------------|----------------------|
| <b>ORDERING CODE<sup>(1)</sup></b> | <b>PACKAGE</b> | <b>PACKING</b>       |
| SMFxAH                             | SOD-123W       | 10,000 / Tape & Reel |

**Notes:**

1. “x” defines voltage from 5V (SMF5.0AH) to 100V (SMF100AH)

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Part number | Marking code | Breakdown voltage<br>$V_{BR}@I_T$<br>(V)<br>(Note 1) |      | Test current<br>$I_T$<br>(mA) | Working stand-off voltage<br>$V_{WM}$<br>(V) | Maximum reverse leakage current<br>$I_R@V_{WM}$<br>( $\mu\text{A}$ )<br>(Note 1) | Maximum peak impulse current<br>$I_{PPM}$<br>(A)<br>$t_p = 10/1000\mu\text{s}$ | Maximum clamping voltage<br>$V_C@I_{PPM}$<br>(V)<br>$t_p = 10/1000\mu\text{s}$ |
|-------------|--------------|--|------|-------------------------------|--|--|--|--|
|             |              | Min  | Max  |                               |  |  |  |  |
| SMF5.0AH    | 2W5P0        | 6.4  | 7.0  | 10                            | 5  | 800  | 21.7   | 9.2  |
| SMF6.0AH    | 2W6P0        | 6.67   | 7.37 | 10                            | 6  | 800  | 19.4   | 10.3   |
| SMF6.5AH    | 2W6P5        | 7.22   | 7.98 | 10                            | 6.5  | 500  | 17.9   | 11.2   |
| SMF7.0AH    | 2W7P0        | 7.78   | 8.6  | 10                            | 7.0  | 200  | 16.7   | 12.0   |
| SMF7.5AH    | 2W7P5        | 8.33   | 9.21 | 1                             | 7.5  | 100  | 15.5   | 12.9   |
| SMF8.0AH    | 2W8P0        | 8.89   | 9.83 | 1                             | 8.0  | 50   | 14.7   | 13.6   |
| SMF8.5AH    | 2W8P5        | 9.44   | 10.5 | 1                             | 8.5  | 10   | 13.9   | 14.4   |
| SMF9.0AH    | 2W9P0        | 10.0   | 11.1 | 1                             | 9.0  | 5  | 13.0   | 15.4   |
| SMF10AH     | 2W010        | 11.1   | 12.3 | 1                             | 10   | 5  | 11.8   | 17.0   |
| SMF11AH     | 2W011        | 12.2   | 13.5 | 1                             | 11   | 1  | 11.0   | 18.2   |
| SMF12AH     | 2W012        | 13.3   | 14.7 | 1                             | 12   | 1  | 10.1   | 19.9   |
| SMF13AH     | 2W013        | 14.4   | 15.9 | 1                             | 13   | 1  | 9.3  | 21.5   |
| SMF14AH     | 2W014        | 15.6   | 17.2 | 1                             | 14   | 1  | 8.6  | 23.2   |
| SMF15AH     | 2W015        | 16.7   | 18.5 | 1                             | 15   | 1  | 8.2  | 24.4   |
| SMF16AH     | 2W016        | 17.8   | 19.7 | 1                             | 16   | 1  | 7.7  | 26.0   |
| SMF17AH     | 2W017        | 18.9   | 20.9 | 1                             | 17   | 1  | 7.2  | 27.6   |
| SMF18AH     | 2W018        | 20.0   | 22.1 | 1                             | 18   | 1  | 6.8  | 29.2   |
| SMF20AH     | 2W020        | 22.2   | 24.5 | 1                             | 20   | 1  | 6.2  | 32.4   |
| SMF22AH     | 2W022        | 24.4   | 26.9 | 1                             | 22   | 1  | 5.6  | 35.5   |
| SMF24AH     | 2W024        | 26.7   | 29.5 | 1                             | 24   | 1  | 5.1  | 38.9   |
| SMF26AH     | 2W026        | 28.9   | 31.9 | 1                             | 26   | 1  | 4.8  | 42.1   |
| SMF28AH     | 2W028        | 31.1   | 34.4 | 1                             | 28   | 1  | 4.4  | 45.4   |
| SMF30AH     | 2W030        | 33.3   | 36.8 | 1                             | 30   | 1  | 4.1  | 48.4   |
| SMF33AH     | 2W033        | 36.7   | 40.6 | 1                             | 33   | 1  | 3.8  | 53.3   |
| SMF36AH     | 2W036        | 40.0   | 44.2 | 1                             | 36   | 1  | 3.4  | 58.1   |
| SMF40AH     | 2W040        | 44.4   | 49.1 | 1                             | 40   | 1  | 3.1  | 64.5   |
| SMF43AH     | 2W043        | 47.8   | 52.8 | 1                             | 43   | 1  | 2.9  | 69.4   |
| SMF45AH     | 2W045        | 50.0   | 55.3 | 1                             | 45   | 1  | 2.8  | 72.7   |
| SMF48AH     | 2W048        | 53.3   | 58.9 | 1                             | 48   | 1  | 2.6  | 77.4   |
| SMF51AH     | 2W051        | 56.7   | 62.7 | 1                             | 51   | 1  | 2.4  | 82.4   |
| SMF54AH     | 2W054        | 60.0   | 66.3 | 1                             | 54   | 1  | 2.3  | 87.1   |
| SMF58AH     | 2W058        | 64.4   | 71.2 | 1                             | 58   | 1  | 2.1  | 95   |
| SMF60AH     | 2W060        | 66.7   | 73.7 | 1                             | 60   | 1  | 1.8  | 96.8   |
| SMF64AH     | 2W064        | 71.1   | 78.6 | 1                             | 64   | 1  | 1.7  | 103  |
| SMF70AH     | 2W070        | 77.8   | 86   | 1                             | 70   | 1  | 1.55   | 113  |
| SMF75AH     | 2W075        | 83.3   | 92.1 | 1                             | 75   | 1  | 1.45   | 121  |
| SMF78AH     | 2W078        | 86.7   | 95.8 | 1                             | 78   | 1  | 1.4  | 126  |
| SMF85AH     | 2W085        | 94.4   | 104  | 1                             | 85   | 1  | 1.3  | 137  |
| SMF90AH     | 2W090        | 100  | 111  | 1                             | 90   | 1  | 1.2  | 146  |
| SMF100AH    | 2W100        | 111  | 123  | 1                             | 100  | 1  | 1.08   | 162  |

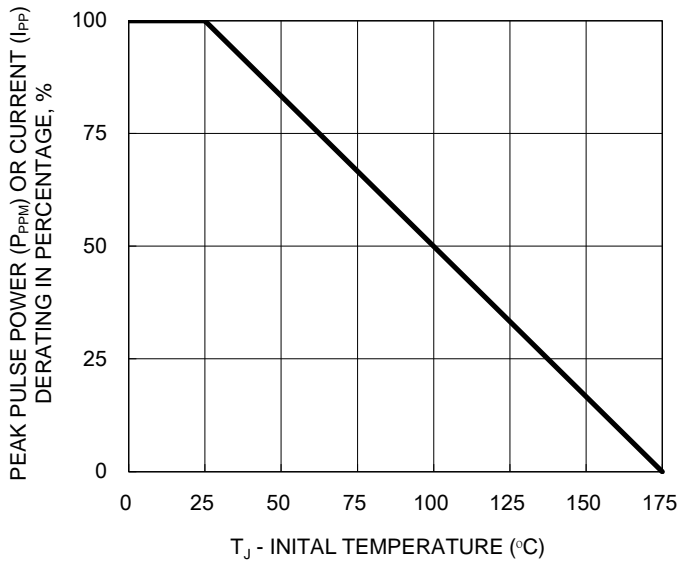
**Notes:**

1. Pulse test with  $PW = 30\text{ms}$

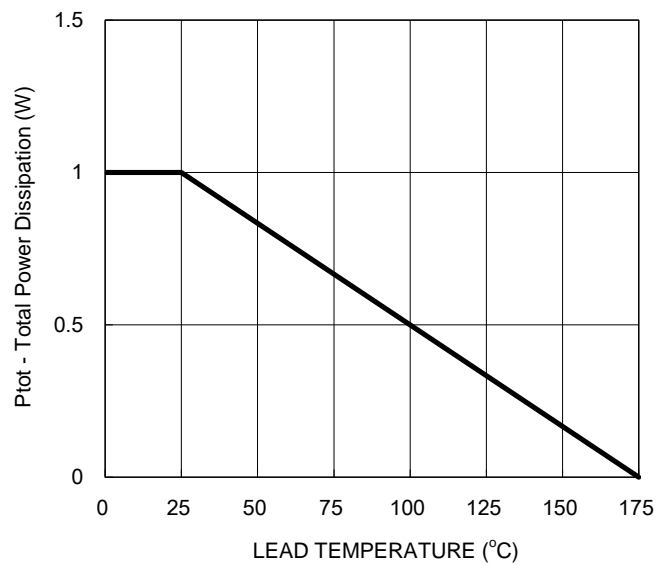
**CHARACTERISTICS CURVES**

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

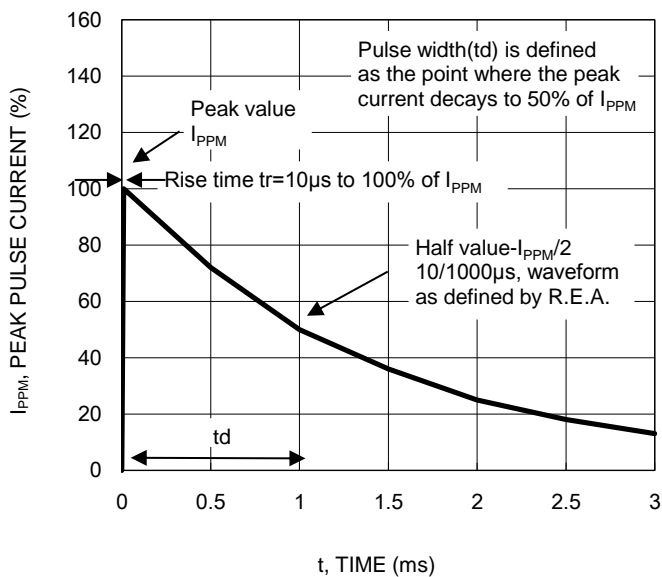
**Fig.1 Pulse Power or Current vs. Initial Junction Temperature**



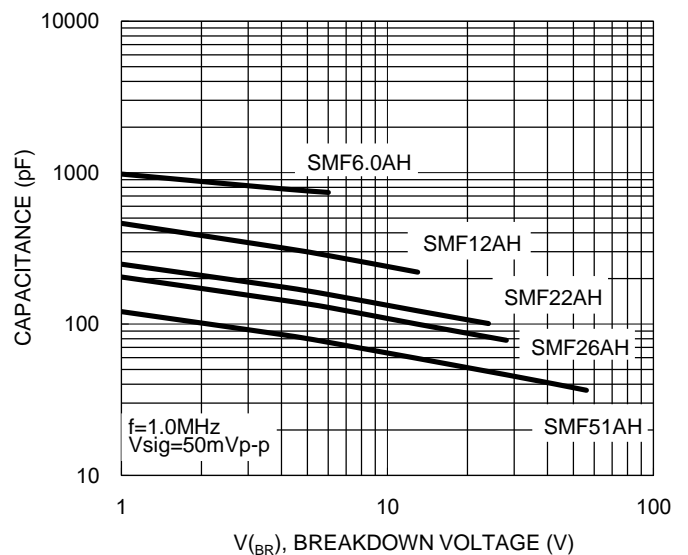
**Fig.2 Steady State Power Derating**



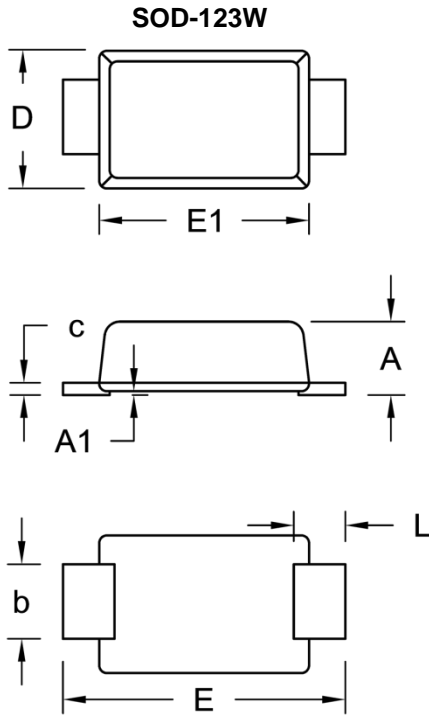
**Fig.3 Clamping Power Pulse Waveform**



**Fig.4 Typical Junction Capacitance**

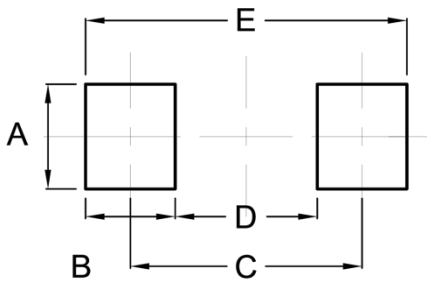


**PACKAGE OUTLINE DIMENSIONS**



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 0.90      | 1.02 | 0.035       | 0.040 |
| A1   | 0.00      | 0.10 | 0.000       | 0.004 |
| b    | 0.90      | 1.05 | 0.035       | 0.041 |
| c    | 0.10      | 0.22 | 0.004       | 0.009 |
| D    | 1.70      | 1.90 | 0.067       | 0.075 |
| E    | 3.60      | 3.80 | 0.142       | 0.150 |
| E1   | 2.60      | 2.90 | 0.102       | 0.114 |
| L    | 0.50      | 0.85 | 0.020       | 0.033 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.40      | 0.055       |
| B      | 1.20      | 0.047       |
| C      | 3.10      | 0.122       |
| D      | 1.90      | 0.075       |
| E      | 4.30      | 0.169       |

**MARKING DIAGRAM**



P/N = Marking Code  
 YW = Date Code  
 F = Factory Code