

# SURGiNG

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# Transient Voltage Suppressor

瞬态抑制二极管

SMF Series

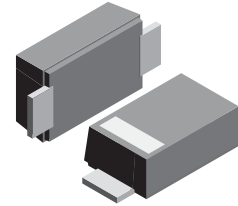
## Transient Voltage Suppressors - SMF Series

**VOLTAGE RANGE: 5.0 - 170V**

**POWER: 200Watts**

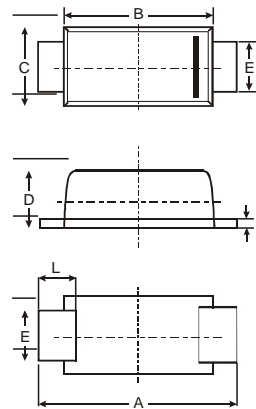
### Features

- For surface mounted applications
- Low profile package
- Low incremental surge resistance, excellent clamping capability
- 200W peak pulse power capability with a 10/1000 $\mu$ s wave from, repetition rate (duty cycle): 0.01%
- High temperature soldering guaranteed: 260 /10 seconds, at terminals



### Mechanical Data

- Case: JEDEC SOD-123FL, molded plastic over passivated chip
- Polarity: Color band denotes positive end (cathode) except for bidirectional
- Mounting position: Any
- Weight: 0.006 ounces, 0.02 gram



| SOD-123FL            |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 3.58  | 3.72 | 3.65 |
| B                    | 2.72  | 2.78 | 2.75 |
| C                    | 1.77  | 1.83 | 1.80 |
| D                    | 1.02  | 1.08 | 1.05 |
| E                    | 0.097 | 1.03 | 1.00 |
| H                    | 0.13  | 0.17 | 0.15 |
| L                    | 0.53  | 0.57 | 0.55 |
| All Dimensions in mm |       |      |      |

### Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Maximum $P_{PK}$ Dissipation (PW - 10/1000 $\mu$ s)                                  | $P_{PK}$        | 200         | W                         |
| Maximum $P_{PK}$ Dissipation @ $T_a = 25^\circ\text{C}$ (PW - 8/10 $\mu$ s) (Note 2) | $P_{PK}$        | 1000        | W                         |
| DC Power Dissipation @ $T_a = 25^\circ\text{C}$ (Note 3)                             | $P_D$           | 385         | mW                        |
| Derate above $25^\circ\text{C}$  |                 | 4.0         | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction to Ambient (Note 3)                                     | $R_{\theta JA}$ | 325         | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Lead (Note 3)  | $R_{\theta JL}$ | 26          | $^\circ\text{C}/\text{W}$ |
| Operating Junction and Storage Temperature Range                                     | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

**Notes :**

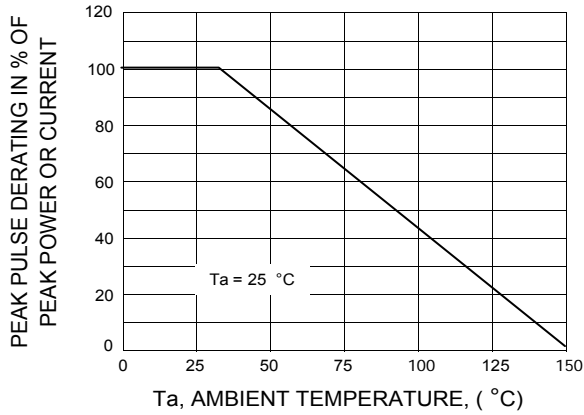
- (1) Non-repetitive current pulse at  $T_a = 25^\circ\text{C}$ , per waveform of Fig. 2.
- (2) Non-repetitive current pulse at  $T_a = 25^\circ\text{C}$ , per waveform of Fig. 5.
- (3) Mounted with recommended minimum pad size, DC board FR4.

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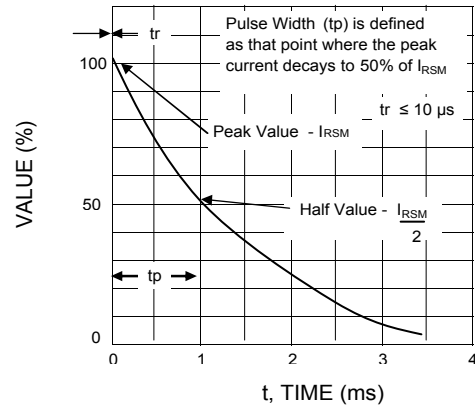
| TYPE    |          | Reverse Stand-Off Voltage | Breakdown Voltage Min. @I <sub>T</sub> | Breakdown Voltage Max. @I <sub>T</sub> | Test Current        | Reverse Leakage @V <sub>RWM</sub> | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  |
|---------|----------|---------------------------|--|--|---------------------|-----------------------------------|---|---------------------|
| (Uni)   | (Bi)     | V <sub>RWM</sub> (V)      | V <sub>BR</sub> MIN(V)                 | V <sub>BR</sub> MAX(V)                 | I <sub>T</sub> (mA) | I <sub>R</sub> (uA)               | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) |
| SMF5.0A | SMF5.0CA | 5.0                       | 6.40                                   | 7.00                                   | 10                  | 400                               | 9.2                                       | 21.7                |
| SMF6.0A | SMF6.0CA | 6.0                       | 6.67                                   | 7.37                                   | 10                  | 400                               | 10.3                                      | 19.4                |
| SMF6.5A | SMF6.5CA | 6.5                       | 7.22                                   | 7.98                                   | 10                  | 250                               | 11.2                                      | 17.9                |
| SMF7.0A | SMF7.0CA | 7.0                       | 7.78                                   | 8.60                                   | 10                  | 100                               | 12.0                                      | 16.7                |
| SMF7.5A | SMF7.5CA | 7.5                       | 8.33                                   | 9.21                                   | 1.0                 | 50                                | 12.9                                      | 15.5                |
| SMF8.0A | SMF8.0CA | 8.0                       | 8.89                                   | 9.83                                   | 1.0                 | 25                                | 13.6                                      | 14.7                |
| SMF8.5A | SMF8.5CA | 8.5                       | 9.44                                   | 10.4                                   | 1.0                 | 10                                | 14.4                                      | 13.9                |
| SMF9.0A | SMF9.0CA | 9.0                       | 10.0                                   | 11.1                                   | 1.0                 | 5.0                               | 15.4                                      | 13.0                |
| SMF10A  | SMF10CA  | 10                        | 11.1                                   | 12.3                                   | 1.0                 | 2.5                               | 17.0                                      | 11.8                |
| SMF11A  | SMF11CA  | 11                        | 12.2                                   | 13.5                                   | 1.0                 | 2.5                               | 18.2                                      | 11.0                |
| SMF12A  | SMF12CA  | 12                        | 13.3                                   | 14.7                                   | 1.0                 | 2.5                               | 19.9                                      | 10.1                |
| SMF13A  | SMF13CA  | 13                        | 14.4                                   | 15.9                                   | 1.0                 | 1.0                               | 21.5                                      | 9.3                 |
| SMF14A  | SMF14CA  | 14                        | 15.6                                   | 17.2                                   | 1.0                 | 1.0                               | 23.2                                      | 8.6                 |
| SMF15A  | SMF15CA  | 15                        | 16.7                                   | 18.5                                   | 1.0                 | 1.0                               | 24.4                                      | 8.2                 |
| SMF16A  | SMF16CA  | 16                        | 17.8                                   | 19.7                                   | 1.0                 | 1.0                               | 26.0                                      | 7.7                 |
| SMF17A  | SMF17CA  | 17                        | 18.9                                   | 20.9                                   | 1.0                 | 1.0                               | 27.6                                      | 7.2                 |
| SMF18A  | SMF18CA  | 18                        | 20.0                                   | 22.1                                   | 1.0                 | 1.0                               | 29.2                                      | 6.8                 |
| SMF20A  | SMF20CA  | 20                        | 22.2                                   | 24.5                                   | 1.0                 | 1.0                               | 32.4                                      | 6.2                 |
| SMF22A  | SMF22CA  | 22                        | 24.4                                   | 26.9                                   | 1.0                 | 1.0                               | 35.5                                      | 5.6                 |
| SMF24A  | SMF24CA  | 24                        | 26.7                                   | 29.5                                   | 1.0                 | 1.0                               | 38.9                                      | 5.1                 |
| SMF26A  | SMF26CA  | 26                        | 28.9                                   | 31.9                                   | 1.0                 | 1.0                               | 42.1                                      | 4.8                 |
| SMF28A  | SMF28CA  | 28                        | 31.1                                   | 34.4                                   | 1.0                 | 1.0                               | 45.4                                      | 4.4                 |
| SMF30A  | SMF30CA  | 30                        | 33.3                                   | 36.8                                   | 1.0                 | 1.0                               | 48.4                                      | 4.1                 |
| SMF33A  | SMF33CA  | 33                        | 36.7                                   | 40.6                                   | 1.0                 | 1.0                               | 53.3                                      | 3.8                 |
| SMF36A  | SMF36CA  | 36                        | 40.0                                   | 44.2                                   | 1.0                 | 1.0                               | 58.1                                      | 3.4                 |
| SMF40A  | SMF40CA  | 40                        | 44.4                                   | 49.1                                   | 1.0                 | 1.0                               | 64.5                                      | 3.1                 |
| SMF43A  | SMF43CA  | 43                        | 47.8                                   | 52.8                                   | 1.0                 | 1.0                               | 69.4                                      | 2.9                 |
| SMF45A  | SMF45CA  | 45                        | 50.0                                   | 55.3                                   | 1.0                 | 1.0                               | 72.7                                      | 2.8                 |
| SMF48A  | SMF48CA  | 48                        | 53.3                                   | 58.9                                   | 1.0                 | 1.0                               | 77.4                                      | 2.6                 |
| SMF51A  | SMF51CA  | 51                        | 56.7                                   | 62.7                                   | 1.0                 | 1.0                               | 82.4                                      | 2.4                 |
| SMF54A  | SMF54CA  | 54                        | 60.0                                   | 66.3                                   | 1.0                 | 1.0                               | 87.1                                      | 2.3                 |
| SMF58A  | SMF58CA  | 58                        | 64.4                                   | 71.2                                   | 1.0                 | 1.0                               | 93.6                                      | 2.1                 |
| SMF60A  | SMF60CA  | 60                        | 66.7                                   | 73.7                                   | 1.0                 | 1.0                               | 96.8                                      | 1.8                 |
| SMF64A  | SMF64CA  | 64                        | 71.1                                   | 78.6                                   | 1.0                 | 1.0                               | 103                                       | 1.7                 |
| SMF70A  | SMF70CA  | 70                        | 77.8                                   | 86.0                                   | 1.0                 | 1.0                               | 113                                       | 1.5                 |
| SMF75A  | SMF75CA  | 75                        | 83.3                                   | 92.1                                   | 1.0                 | 1.0                               | 121                                       | 1.4                 |
| SMF78A  | SMF78CA  | 78                        | 86.7                                   | 95.8                                   | 1.0                 | 1.0                               | 126                                       | 1.4                 |
| SMF85A  | SMF85CA  | 85                        | 94.4                                   | 104                                    | 1.0                 | 1.0                               | 137                                       | 1.3                 |
| SMF90A  | SMF90CA  | 90                        | 100                                    | 111                                    | 1.0                 | 1.0                               | 146                                       | 1.2                 |
| SMF100A | SMF100CA | 100                       | 111                                    | 123                                    | 1.0                 | 1.0                               | 162                                       | 1.1                 |
| SMF110A | SMF110CA | 110                       | 122                                    | 135                                    | 1.0                 | 1.0                               | 177                                       | 1.0                 |
| SMF120A | SMF120CA | 120                       | 133                                    | 147                                    | 1.0                 | 1.0                               | 193                                       | 0.9                 |
| SMF130A | SMF130CA | 130                       | 144                                    | 159                                    | 1.0                 | 1.0                               | 209                                       | 0.8                 |
| SMF150A | SMF150CA | 150                       | 167                                    | 185                                    | 1.0                 | 1.0                               | 243                                       | 0.7                 |
| SMF160A | SMF160CA | 160                       | 178                                    | 197                                    | 1.0                 | 1.0                               | 259                                       | 0.7                 |
| SMF170A | SMF170CA | 170                       | 189                                    | 209                                    | 1.0                 | 1.0                               | 275                                       | 0.6                 |

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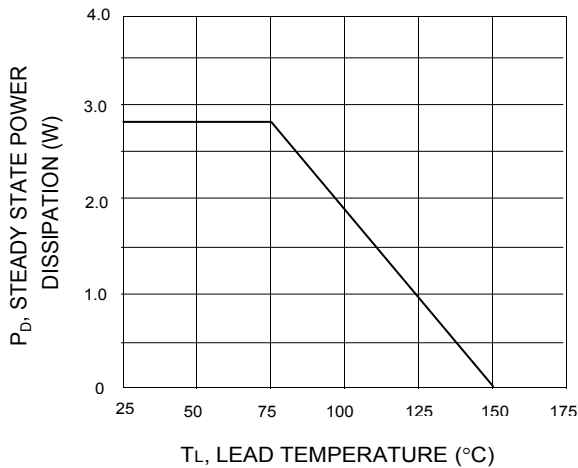
**FIG.1 - PULSE DERATING CURVE**



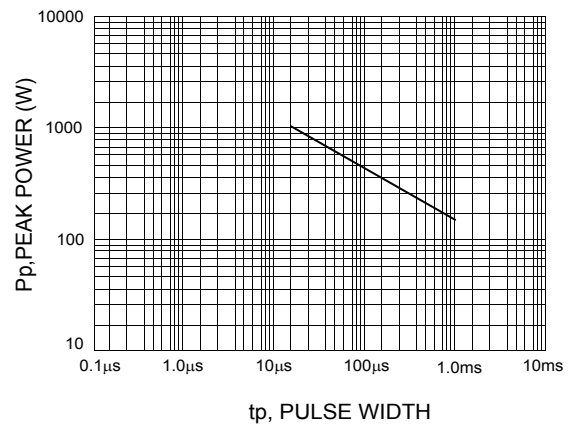
**FIG.2 - 10 x 1000 μs PULSE WAVEFORM**



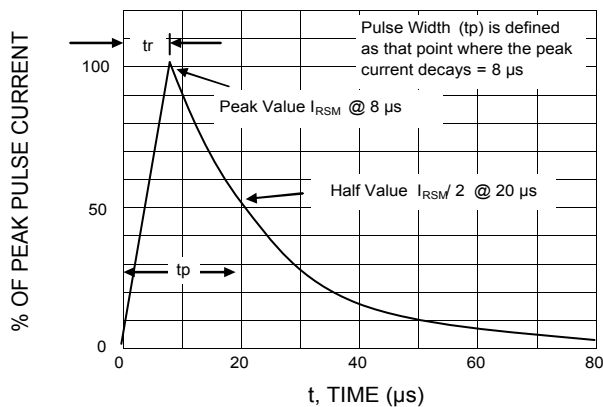
**FIG.3 - STEADY STATE POWER DERATING**



**FIG.4 - PULSE RATING CURVE**



**FIG.5 - 8 x 20 μs PULSE WAVEFORM**



**FIG. 6 - CAPACITANCE VS. WORKING PEAK REVERSE VOLTAGE**

