

## SuperTVS –200W Transient Voltage Suppressor

### 1. Features

- IEC61000-4-2 ESD 30KV Air,30KV contact compliance
- SOD-123F surface mount package
- Protects one I/O line
- Peak power dissipation of 1000W under 8/20 waveform
- Low leakage current
- Working voltage: 5V~220V
- Solid-state silicon avalanche technology
- Lead Free/RoHS compliant.
- Solder reflow temperature: Pure Tin-Sn,260-270°C

### 2. Application

- Personal digital assistants (PDA)
- Cellular handsets & Accessories
- Portable devices
- Portable instrumentation
- Handhelds and notebooks
- Digital cameras

### 3. Marking Information

| BI- directional                                                                     | UNI-directional                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |
|  |  |

### 4. Maximum Ratings

Ratings at 25° ambient temperature unless otherwise specified

| Rating                                             | Symbol                            | Value      | Units |
|----------------------------------------------------|-----------------------------------|------------|-------|
| Peak pulse power dissipation at 10/1000us waveform | P <sub>PP</sub>                   | 200        | W     |
| Peak pulse current of at 10/1000us waveform        | I <sub>PPM</sub>                  | See Table  | A     |
| Steady state power dissipation at TA=50°C          | P <sub>M(AV)</sub>                | 1.0        | W     |
| Peak pulse power at 8/20us waveform                | P <sub>PP</sub>                   | 1000       | W     |
| ESD voltage (Contact discharge)                    | V <sub>ESD</sub>                  | ± 30       | kV    |
| ESD voltage (Air discharge)                        |                                   | ± 30       |       |
| Storage & operating temperature range              | T <sub>STG</sub> , T <sub>J</sub> | -65 to 150 | °C    |

## SMF SERIES

Rev-1.1

## 5. Electrical Characteristics (TA=25°C)

| Part Number | Part Number | Marking |    | Reverse Stand off Voltage V <sub>R</sub><br>(Volts) | Breakdown Voltage V <sub>BR</sub><br>(Volts) @ I <sub>T</sub> |      | Test Current I <sub>T</sub><br>(mA) | Maximum Clamping Voltage V <sub>C</sub> @ I <sub>PP</sub><br>(V) | Maximum Peak Pulse Current I <sub>PP</sub><br>(A) | Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub><br>(μA) | ROHS2.0 |
|-------------|-------------|---------|----|-----------------------------------------------------|---------------------------------------------------------------|------|-------------------------------------|------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------|---------|
|             |             | Uni     | Bi |                                                     | MIN                                                           | MAX  |                                     |                                                                  |                                                   |                                                                 |         |
| SMF5.0A     | SMF5.0CA    | AE      | WE | 5                                                   | 6.4                                                           | 7    | 10                                  | 9.2                                                              | 21.7                                              | 200                                                             | y       |
| SMF6.0A     | SMF6.0CA    | AG      | WG | 6                                                   | 6.67                                                          | 7.37 | 10                                  | 10.3                                                             | 19.4                                              | 200                                                             | y       |
| SMF6.5A     | SMF6.5CA    | AK      | WK | 6.5                                                 | 7.22                                                          | 7.98 | 10                                  | 11.2                                                             | 17.9                                              | 150                                                             | y       |
| SMF7.0A     | SMF7.0CA    | AM      | WM | 7                                                   | 7.78                                                          | 8.6  | 10                                  | 12                                                               | 16.7                                              | 75                                                              | y       |
| SMF7.5A     | SMF7.5CA    | AP      | WP | 7.5                                                 | 8.33                                                          | 9.21 | 1                                   | 12.9                                                             | 15.5                                              | 50                                                              | y       |
| SMF8.0A     | SMF8.0CA    | AR      | WR | 8                                                   | 8.89                                                          | 9.83 | 1                                   | 13.6                                                             | 14.7                                              | 25                                                              | y       |
| SMF8.5A     | SMF8.5CA    | AT      | WT | 8.5                                                 | 9.44                                                          | 10.4 | 1                                   | 14.4                                                             | 13.9                                              | 20                                                              | y       |
| SMF9.0A     | SMF9.0CA    | AV      | WV | 9                                                   | 10                                                            | 11.1 | 1                                   | 15.4                                                             | 13                                                | 10                                                              | y       |
| SMF10A      | SMF10CA     | AX      | WX | 10                                                  | 11.1                                                          | 12.3 | 1                                   | 17                                                               | 11.8                                              | 5                                                               | y       |
| SMF11A      | SMF11CA     | AZ      | WZ | 11                                                  | 12.2                                                          | 13.5 | 1                                   | 18.2                                                             | 11                                                | 1                                                               | y       |
| SMF12A      | SMF12CA     | BE      | XE | 12                                                  | 13.3                                                          | 14.7 | 1                                   | 19.9                                                             | 10.1                                              | 1                                                               | y       |
| SMF13A      | SMF13CA     | BG      | XG | 13                                                  | 14.4                                                          | 15.9 | 1                                   | 21.5                                                             | 9.3                                               | 1                                                               | y       |
| SMF14A      | SMF14CA     | BK      | XK | 14                                                  | 15.6                                                          | 17.2 | 1                                   | 23.2                                                             | 8.62                                              | 1                                                               | y       |
| SMF15A      | SMF15CA     | BM      | XM | 15                                                  | 16.7                                                          | 18.5 | 1                                   | 24.4                                                             | 8.2                                               | 1                                                               | y       |
| SMF16A      | SMF16CA     | BP      | XP | 16                                                  | 17.8                                                          | 19.7 | 1                                   | 26                                                               | 7.69                                              | 1                                                               | y       |
| SMF17A      | SMF17CA     | BR      | XR | 17                                                  | 18.9                                                          | 20.9 | 1                                   | 27.6                                                             | 7.25                                              | 1                                                               | y       |
| SMF18A      | SMF18CA     | BT      | XT | 18                                                  | 20                                                            | 22.1 | 1                                   | 29.2                                                             | 6.85                                              | 1                                                               | y       |
| SMF20A      | SMF20CA     | BV      | XV | 20                                                  | 22.2                                                          | 24.5 | 1                                   | 32.4                                                             | 6.17                                              | 1                                                               | y       |
| SMF22A      | SMF22CA     | BX      | XX | 22                                                  | 24.4                                                          | 26.9 | 1                                   | 35.5                                                             | 5.63                                              | 1                                                               | y       |
| SMF24A      | SMF24CA     | BZ      | XZ | 24                                                  | 26.7                                                          | 29.5 | 1                                   | 38.9                                                             | 5.14                                              | 1                                                               | y       |
| SMF26A      | SMF26CA     | CE      | YE | 26                                                  | 28.9                                                          | 31.9 | 1                                   | 42.1                                                             | 4.75                                              | 1                                                               | y       |
| SMF28A      | SMF28CA     | CG      | YG | 28                                                  | 31.1                                                          | 34.4 | 1                                   | 45.4                                                             | 4.41                                              | 1                                                               | y       |
| SMF30A      | SMF30CA     | CK      | YK | 30                                                  | 33.3                                                          | 36.8 | 1                                   | 48.4                                                             | 4.13                                              | 1                                                               | y       |
| SMF33A      | SMF33CA     | CM      | YM | 33                                                  | 36.7                                                          | 40.6 | 1                                   | 53.3                                                             | 3.75                                              | 1                                                               | y       |
| SMF36A      | SMF36CA     | CP      | YP | 36                                                  | 40                                                            | 44.2 | 1                                   | 58.1                                                             | 3.44                                              | 1                                                               | y       |
| SMF40A      | SMF40CA     | CR      | YR | 40                                                  | 44.4                                                          | 49.1 | 1                                   | 64.5                                                             | 3.1                                               | 1                                                               | y       |
| SMF43A      | SMF43CA     | CT      | YT | 43                                                  | 47.8                                                          | 52.8 | 1                                   | 69.4                                                             | 2.88                                              | 1                                                               | y       |
| SMF45A      | SMF45CA     | CV      | YV | 45                                                  | 50                                                            | 55.3 | 1                                   | 72.7                                                             | 2.75                                              | 1                                                               | y       |
| SMF48A      | SMF48CA     | CX      | YX | 48                                                  | 53.3                                                          | 58.9 | 1                                   | 77.4                                                             | 2.58                                              | 1                                                               | y       |
| SMF51A      | SMF51CA     | CZ      | YZ | 51                                                  | 56.7                                                          | 62.7 | 1                                   | 82.4                                                             | 2.43                                              | 1                                                               | y       |

## SMF SERIES

Rev-1.1

| Part Number | Part Number | Marking |    | Reverse Stand off Voltage $V_R$<br>(Volts) | Breakdown Voltage $V_{BR}$<br>(Volts) @ $I_R$ |      | Test Current $I_R$<br>(mA) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$<br>(V) | Maximum Peak Pulse Current $I_{PP}$<br>(A) | Maximum Reverse Leakage $I_R$ @ $V_R$<br>( $\mu$ A) | ROHS2.0 |
|-------------|-------------|---------|----|--------------------------------------------|-----------------------------------------------|------|----------------------------|--------------------------------------------------|--------------------------------------------|-----------------------------------------------------|---------|
|             |             | Uni     | Bi |                                            | MIN                                           | MAX  |                            |                                                  |                                            |                                                     |         |
| SMF54A      | SMF54CA     | RE      | ZE | 54                                         | 60                                            | 66.3 | 1                          | 87.1                                             | 2.3                                        | 1                                                   | y       |
| SMF58A      | SMF58CA     | RG      | ZG | 58                                         | 64.4                                          | 71.2 | 1                          | 93.6                                             | 2.14                                       | 1                                                   | y       |
| SMF60A      | SMF60CA     | RK      | ZK | 60                                         | 66.7                                          | 73.7 | 1                          | 96.8                                             | 2.07                                       | 1                                                   | y       |
| SMF64A      | SMF64CA     | RM      | ZM | 64                                         | 71.1                                          | 78.6 | 1                          | 103                                              | 1.94                                       | 1                                                   | y       |
| SMF70A      | SMF70CA     | RP      | ZP | 70                                         | 77.8                                          | 86   | 1                          | 113                                              | 1.77                                       | 1                                                   | y       |
| SMF75A      | SMF75CA     | RR      | ZR | 75                                         | 83.3                                          | 92.1 | 1                          | 121                                              | 1.65                                       | 1                                                   | y       |
| SMF78A      | SMF78CA     | RT      | ZT | 78                                         | 86.7                                          | 95.8 | 1                          | 126                                              | 1.59                                       | 1                                                   | y       |
| SMF85A      | SMF85CA     | RV      | ZV | 85                                         | 94.4                                          | 104  | 1                          | 137                                              | 1.46                                       | 1                                                   | y       |
| SMF90A      | SMF90CA     | RX      | ZX | 90                                         | 100                                           | 111  | 1                          | 146                                              | 1.37                                       | 1                                                   | y       |
| SMF100A     | SMF100CA    | RZ      | ZZ | 100                                        | 111                                           | 123  | 1                          | 162                                              | 1.23                                       | 1                                                   | y       |
| SMF110A     | SMF110CA    | SE      | VE | 110                                        | 122                                           | 135  | 1                          | 177                                              | 1.13                                       | 1                                                   | y       |
| SMF120A     | SMF120CA    | SG      | VG | 120                                        | 133                                           | 147  | 1                          | 193                                              | 1.04                                       | 1                                                   | y       |
| SMF130A     | SMF130CA    | SK      | VK | 130                                        | 144                                           | 159  | 1                          | 209                                              | 0.96                                       | 1                                                   | y       |
| SMF150A     | SMF150CA    | SM      | VM | 150                                        | 167                                           | 185  | 1                          | 243                                              | 0.82                                       | 1                                                   | y       |
| SMF160A     | SMF160CA    | SP      | VP | 160                                        | 178                                           | 197  | 1                          | 259                                              | 0.77                                       | 1                                                   | y       |
| SMF170A     | SMF170CA    | SR      | VR | 170                                        | 189                                           | 209  | 1                          | 275                                              | 0.73                                       | 1                                                   | y       |

Notes: For bi-directional type having  $V_R$  of 10 volts and less, the  $I_R$  limit is double.

6. Ratings and Characteristic Curves (TA =25°C unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

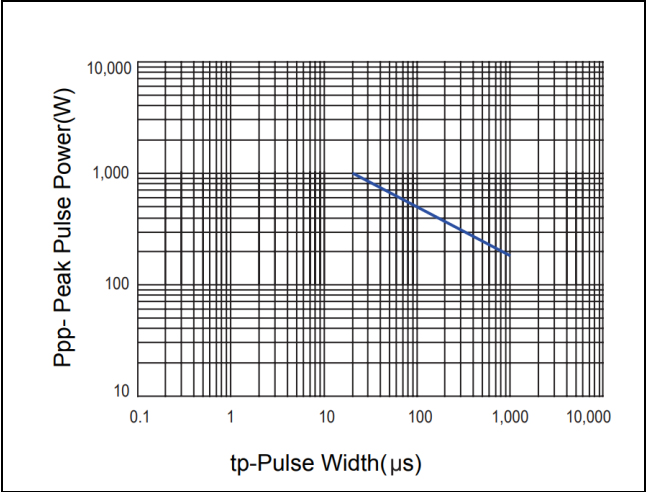


Figure 2. 10/1000 us Pulse Waveform

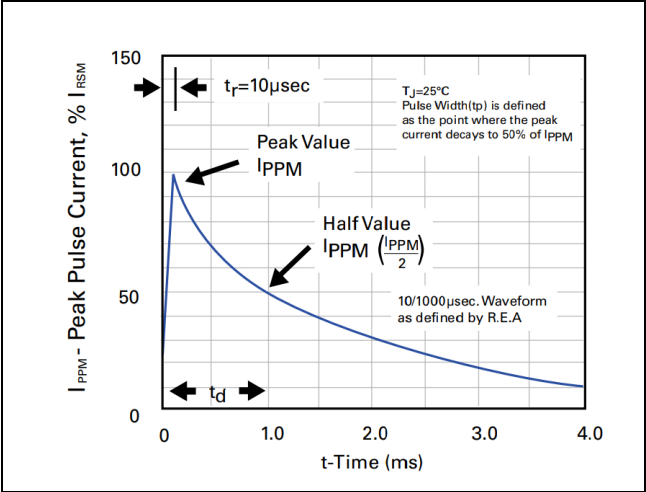


Figure 3. Capacitance vs. Reverse Voltage

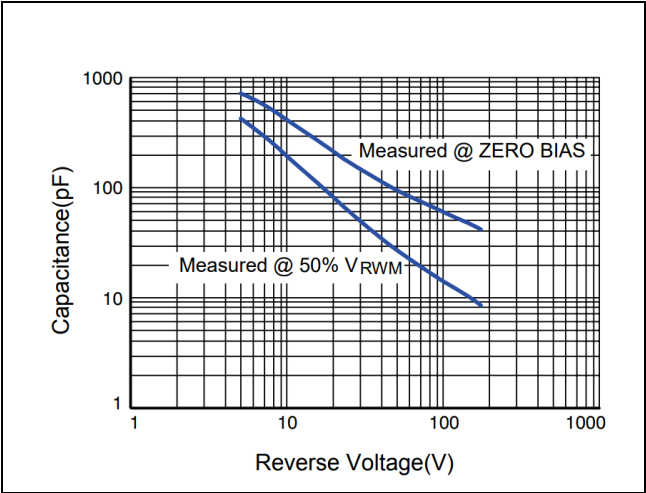
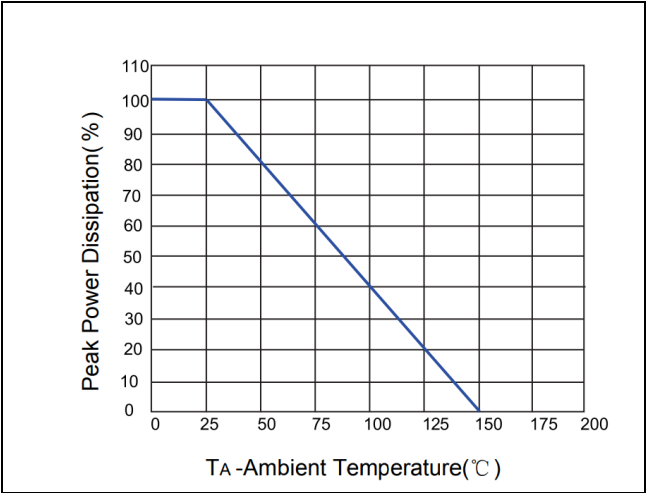


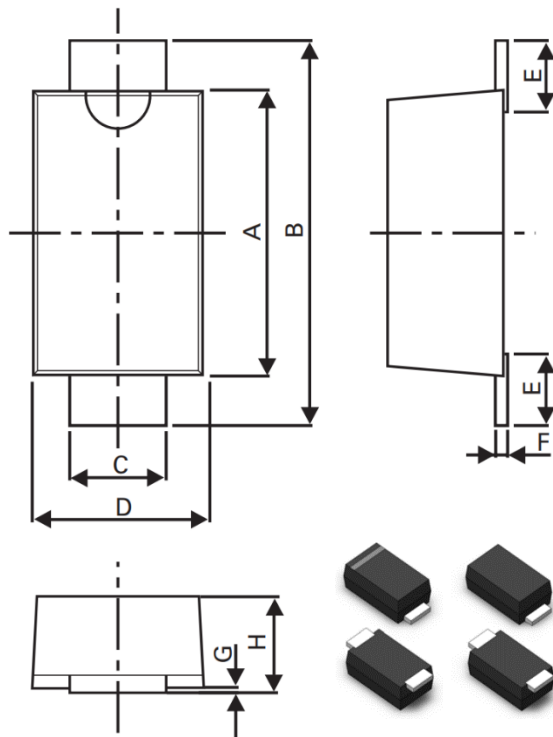
Figure 4. Power Derating curve



**SMF SERIES**

Rev-1.1

**7. Dimension (SOD-123F)**



| Dimensions | Millimeters |      | Inches |        |
|------------|-------------|------|--------|--------|
|            | Min         | Max  | Min    | Max    |
| A          | 2.5         | 3.05 | 0.0984 | 0.1201 |
| B          | 3.35        | 4.05 | 0.1319 | 0.1594 |
| C          | 0.7         | 1.2  | 0.0275 | 0.0472 |
| D          | 1.5         | 2    | 0.0591 | 0.0787 |
| E          | 0.35        | 0.95 | 0.0138 | 0.0374 |
| F          | 0.05        | 0.26 | 0.002  | 0.0102 |
| G          | 0           | 0.2  | 0      | 0.0079 |
| H          | 0.70        | 1.35 | 0.0276 | 0.0531 |

**8. Packaging**

| Part number | Component Package | Quantity | Packaging Option               | Packaging Specification |
|-------------|-------------------|----------|--------------------------------|-------------------------|
| SMFXXX      | SOD-123F          | 3000     | Tape & Reel – 8mm tape/7" reel | EIA RS-481              |

**DISCLAIMER**

ELECSUPER SUPERTVS PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with ElecSuper products. You are solely responsible for

- (1) selecting the appropriate ElecSuper products for your application;
- (2) designing, validating and testing your application;
- (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. ElecSuper grants you permission to use these resources only for development of an application that uses the ElecSuper products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other ElecSuper intellectual property right or to any third party intellectual property right. ElecSuper disclaims responsibility for, and you will fully indemnify ElecSuper and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources. ElecSuper's products are provided subject to ElecSuper's Terms of Sale or other applicable terms available either on [www.elecsuper.com](http://www.elecsuper.com) or provided in conjunction with such ElecSuper products. ElecSuper's provision of these resources does not expand or otherwise alter ElecSuper's applicable warranties or warranty disclaimers for ElecSuper products.