

## SMF Transient Voltage Suppressor Diode Series

### General Information

The SMF series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The SMF series is supplied in YINT Semiconductor 's exclusive, cost-effective, highly reliable and is ideally suited for use in communication systems, automotive, numerical controls , process controls, medical equipment, business machines, power supplies and many other industrial/consumer Applications.



Molded plastic  
glass passivated junction.

### Features

- Case: SOD-123FL
- Low profile maximum height of 1.1mm.
- For surface mounted applications in order to optimize board space.
- Polarity: Color band denoted positive end (cathode) except Bidirectional.
- Typical failure mode is short from over-specified voltage or current
- Fast response time: typically less than 1.0ps from 0 Volts to VB min.
- High Temperature soldering: 260° C/40 seconds at terminals.

### Typical Applications

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

### Electrical Characteristics (@ T<sub>A</sub> = 25°C Unless Otherwise Noted)

| Parameter                                                             | Symbol            | Value       | Unit  |
|-----------------------------------------------------------------------|-------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T <sub>p</sub> = 1 ms) (note 1) | P <sub>PK</sub>   | 200         | Watts |
| Thermal Resistance Junction- to- Ambient                              | R <sub>THJA</sub> | 220         | °C/W  |
| Thermal Resistance Junction- to- Lead                                 | R <sub>THJL</sub> | 100         | °C/W  |
| Operating Temperature Range                                           | T <sub>J</sub>    | -55 to +150 | °C    |
| Storage Temperature Range                                             | T <sub>STG</sub>  | -55 to +150 | °C    |

Notes:

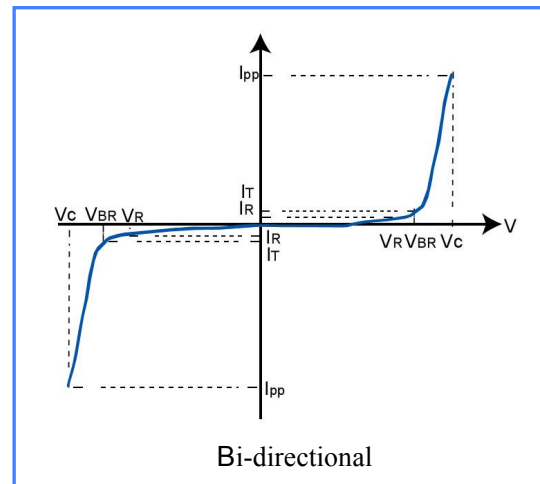
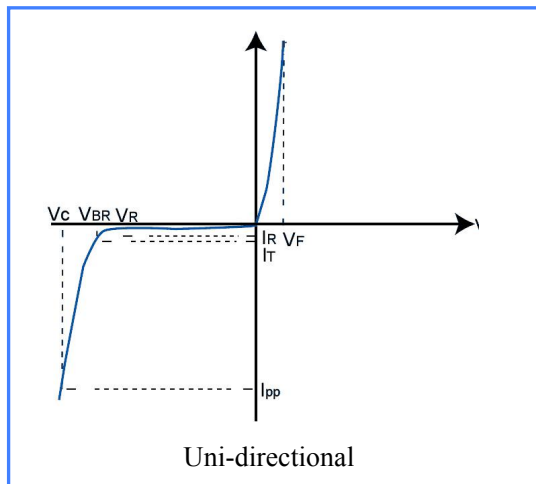
1. Non-repetitive current pulse, per Fig. 4 and derated above T<sub>A</sub>=25°C per Fig. 3.

## Electrical Characteristics

| Part Number (Bi) | Part Number (Uni) | Device Marking Code |      | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts)@ $I_T$ |        | Test Current $I_T$ (mA) | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu$ A) | Maximum Peak Pulse Current $I_{pp}$ (A) | Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V) |
|------------------|-------------------|---------------------|------|-----------------------------------------|-------------------------------------------|--------|-------------------------|--------------------------------------------------|-----------------------------------------|-----------------------------------------------|
|                  |                   | BI                  | UNI  |                                         | Min .V                                    | Max .V |                         |                                                  |                                         |                                               |
| SMF5.0CA         | SMF5.0A           | 5.0CA               | 5.0A | 5.0                                     | 6.40                                      | 7.00   | 10                      | 400                                              | 21.70                                   | 9.2                                           |
| SMF6.0CA         | SMF6.0A           | 6.0CA               | 6.0A | 6.0                                     | 6.67                                      | 7.37   | 10                      | 400                                              | 19.40                                   | 10.3                                          |
| SMF6.5CA         | SMF6.5A           | 6.5CA               | 6.5A | 6.5                                     | 7.22                                      | 7.98   | 10                      | 250                                              | 17.90                                   | 11.2                                          |
| SMF7.0CA         | SMF7.0A           | 7.0CA               | 7.0A | 7.0                                     | 7.78                                      | 8.60   | 10                      | 100                                              | 16.70                                   | 12.0                                          |
| SMF7.5CA         | SMF7.5A           | 7.5CA               | 7.5A | 7.5                                     | 8.33                                      | 9.21   | 1.0                     | 50                                               | 15.50                                   | 12.9                                          |
| SMF8.0CA         | SMF8.0A           | 8.0CA               | 8.0A | 8.0                                     | 8.89                                      | 9.83   | 1.0                     | 25                                               | 14.70                                   | 13.6                                          |
| SMF8.5CA         | SMF8.5 A          | 8.5CA               | 8.5A | 8.5                                     | 9.44                                      | 10.4   | 1.0                     | 10                                               | 13.90                                   | 14.4                                          |
| SMF9.0CA         | SMF9.0 A          | 9.0CA               | 9.0A | 9                                       | 10.0                                      | 11.1   | 1.0                     | 5.0                                              | 13.00                                   | 15.4                                          |
| SMF10CA          | SMF10A            | 10CA                | 10A  | 10                                      | 11.1                                      | 12.3   | 1.0                     | 2.0                                              | 11.80                                   | 17.0                                          |
| SMF11CA          | SMF11A            | 11CA                | 11A  | 11                                      | 12.2                                      | 13.5   | 1.0                     | 2.0                                              | 11.00                                   | 18.2                                          |
| SMF12CA          | SMF12A            | 12CA                | 12A  | 12                                      | 13.3                                      | 14.7   | 1.0                     | 2.0                                              | 10.10                                   | 19.9                                          |
| SMF13CA          | SMF13A            | 13CA                | 13A  | 13                                      | 14.4                                      | 15.9   | 1.0                     | 1.0                                              | 9.30                                    | 21.5                                          |
| SMF14CA          | SMF14A            | 14CA                | 14A  | 14                                      | 15.6                                      | 17.2   | 1.0                     | 1.0                                              | 8.62                                    | 23.2                                          |
| SMF15CA          | SMF15A            | 15CA                | 15A  | 15                                      | 16.7                                      | 18.5   | 1.0                     | 1.0                                              | 8.20                                    | 24.4                                          |
| SMF16CA          | SMF16A            | 16CA                | 16A  | 16                                      | 17.8                                      | 19.7   | 1.0                     | 1.0                                              | 7.69                                    | 26.0                                          |
| SMF17CA          | SMF17A            | 17CA                | 17A  | 17                                      | 18.9                                      | 20.9   | 1.0                     | 1.0                                              | 7.25                                    | 27.6                                          |
| SMF18CA          | SMF18A            | 18CA                | 18A  | 18                                      | 20.0                                      | 22.1   | 1.0                     | 1.0                                              | 6.85                                    | 29.2                                          |
| SMF19CA          | SMF19A            | 19CA                | 19A  | 19                                      | 21.0                                      | 23.3   | 1.0                     | 1.0                                              | 6.54                                    | 30.6                                          |
| SMF20CA          | SMF20A            | 20CA                | 20A  | 20                                      | 22.2                                      | 24.5   | 1.0                     | 1.0                                              | 6.17                                    | 32.4                                          |
| SMF22CA          | SMF22A            | 22CA                | 22A  | 22                                      | 24.4                                      | 26.9   | 1.0                     | 1.0                                              | 5.63                                    | 35.5                                          |
| SMF24CA          | SMF24A            | 24CA                | 24A  | 24                                      | 26.7                                      | 29.5   | 1.0                     | 1.0                                              | 5.14                                    | 38.9                                          |
| SMF26CA          | SMF26A            | 26CA                | 26A  | 26                                      | 28.9                                      | 31.9   | 1.0                     | 1.0                                              | 4.75                                    | 42.1                                          |
| SMF28CA          | SMF28A            | 28CA                | 28A  | 28                                      | 31.1                                      | 34.4   | 1.0                     | 1.0                                              | 4.41                                    | 45.4                                          |
| SMF30CA          | SMF30A            | 30CA                | 30A  | 30                                      | 33.3                                      | 36.8   | 1.0                     | 1.0                                              | 4.13                                    | 48.4                                          |
| SMF33CA          | SMF33A            | 33CA                | 33A  | 33                                      | 36.7                                      | 40.6   | 1.0                     | 1.0                                              | 3.75                                    | 53.3                                          |
| SMF36CA          | SMF36A            | 36CA                | 36A  | 36                                      | 40.0                                      | 44.2   | 1.0                     | 1.0                                              | 3.44                                    | 58.1                                          |
| SMF40CA          | SMF40A            | 40CA                | 40A  | 40                                      | 44.4                                      | 49.1   | 1.0                     | 1.0                                              | 3.10                                    | 64.5                                          |
| SMF43CA          | SMF43A            | 43CA                | 43A  | 43                                      | 47.8                                      | 52.8   | 1.0                     | 1.0                                              | 2.88                                    | 69.4                                          |
| SMF45CA          | SMF45A            | 45CA                | 45A  | 45                                      | 50.0                                      | 55.3   | 1.0                     | 1.0                                              | 2.75                                    | 72.7                                          |
| SMF48CA          | SMF48A            | 48CA                | 48A  | 48                                      | 53.3                                      | 58.9   | 1.0                     | 1.0                                              | 2.58                                    | 77.4                                          |
| SMF51CA          | SMF51A            | 51CA                | 51A  | 51                                      | 56.7                                      | 62.7   | 1.0                     | 1.0                                              | 2.43                                    | 82.4                                          |
| SMF54CA          | SMF54A            | 54CA                | 54A  | 54                                      | 60.0                                      | 66.3   | 1.0                     | 1.0                                              | 2.30                                    | 87.1                                          |
| SMF58CA          | SMF58A            | 58CA                | 58A  | 58                                      | 64.4                                      | 71.2   | 1.0                     | 1.0                                              | 2.14                                    | 93.6                                          |
| SMF60CA          | SMF60A            | 60CA                | 60A  | 60                                      | 66.7                                      | 73.7   | 1.0                     | 1.0                                              | 2.07                                    | 96.8                                          |
| SMF64CA          | SMF64A            | 64CA                | 64A  | 64                                      | 71.1                                      | 78.6   | 1.0                     | 1.0                                              | 1.94                                    | 103                                           |
| SMF70CA          | SMF70A            | 70CA                | 70A  | 70                                      | 77.8                                      | 86.0   | 1.0                     | 1.0                                              | 1.77                                    | 113                                           |
| SMF75CA          | SMF75A            | 75CA                | 75A  | 75                                      | 83.3                                      | 92.1   | 1.0                     | 1.0                                              | 1.65                                    | 121                                           |

| Part Number (Bi) | Part Number (Uni) | Device Marking Code |      | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts)@ $I_T$ |        | Test Current $I_T$ (mA) | Maximum Reverse Leakage $I_R$ @ $V_R$ (μA) | Maximum Peak Pulse Current $I_{pp}$ (A) | Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V) |
|------------------|-------------------|---------------------|------|-----------------------------------------|-------------------------------------------|--------|-------------------------|--------------------------------------------|-----------------------------------------|-----------------------------------------------|
|                  |                   | BI                  | UNI  |                                         | Min. V                                    | Max. V |                         |                                            |                                         |                                               |
| SMF78CA          | SMF78A            | 78CA                | 78A  | 78                                      | 86.7                                      | 95.8   | 1.0                     | 1.0                                        | 1.59                                    | 126                                           |
| SMF80CA          | SMF80A            | 80CA                | 80A  | 80                                      | 88.8                                      | 97.6   | 1.0                     | 1.0                                        | 1.55                                    | 129                                           |
| SMF85CA          | SMF85A            | 85CA                | 85A  | 85                                      | 94.4                                      | 104    | 1.0                     | 1.0                                        | 1.46                                    | 137                                           |
| SMF90CA          | SMF90A            | 90CA                | 90A  | 90                                      | 100                                       | 111    | 1.0                     | 1.0                                        | 1.37                                    | 146                                           |
| SMF100CA         | SMF100A           | 100CA               | 100A | 100                                     | 111                                       | 123    | 1.0                     | 1.0                                        | 1.23                                    | 162                                           |
| SMF110CA         | SMF110A           | 110CA               | 110A | 110                                     | 122                                       | 135    | 1.0                     | 1.0                                        | 1.13                                    | 177                                           |
| SMF120CA         | SMF120A           | 120CA               | 120A | 120                                     | 133                                       | 147    | 1.0                     | 1.0                                        | 1.04                                    | 193                                           |
| SMF130CA         | SMF130A           | 130CA               | 130A | 130                                     | 144                                       | 159    | 1.0                     | 1.0                                        | 0.96                                    | 209                                           |
| SMF140CA         | SMF140A           | 140CA               | 140A | 140                                     | 155                                       | 171    | 1.0                     | 1.0                                        | 0.89                                    | 224                                           |
| SMF150CA         | SMF150A           | 150CA               | 150A | 150                                     | 167                                       | 185    | 1.0                     | 1.0                                        | 0.82                                    | 243                                           |
| SMF160CA         | SMF160A           | 160CA               | 160A | 160                                     | 178                                       | 197    | 1.0                     | 1.0                                        | 0.77                                    | 259                                           |
| SMF170CA         | SMF170A           | 170CA               | 170A | 170                                     | 189                                       | 209    | 1.0                     | 1.0                                        | 0.73                                    | 275                                           |
| SMF180CA         | SMF180A           | 180CA               | 180A | 180                                     | 200                                       | 220    | 1.0                     | 1.0                                        | 0.69                                    | 290                                           |

## I-V Curve Characteristics



| Symbol    | Parameter                                   |
|-----------|---------------------------------------------|
| $I_{PP}$  | Maximum Reverse Peak Pulse Current          |
| $V_C$     | Clamping Voltage @ $I_{PP}$                 |
| $V_{RWM}$ | Working Peak Reverse Voltage                |
| $I_R$     | Maximum Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$                   |
| $I_T$     | Test Current                                |

## Rating & Characteristic Curves

Figure 1 - Peak Pulse Power Rating Curve

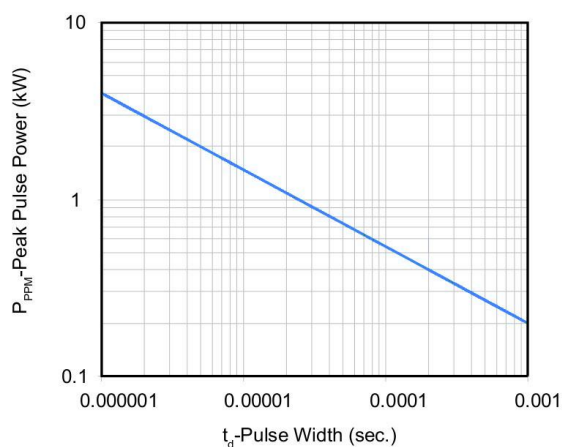


Figure 2 - Pulse Derating Curve

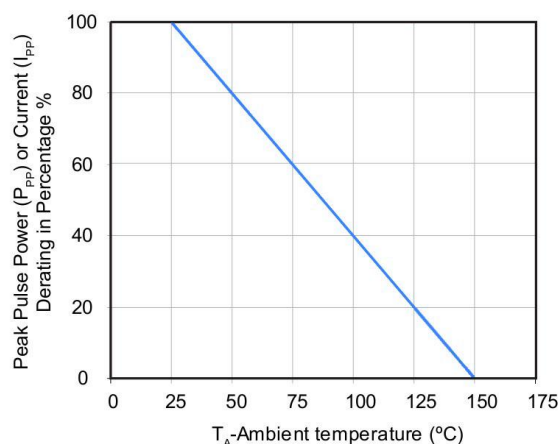


Figure 3 - Pulse Waveform

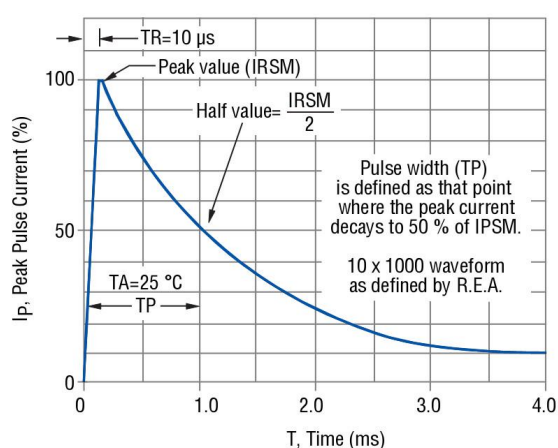


Figure 4 - Typical Junction Capacitance

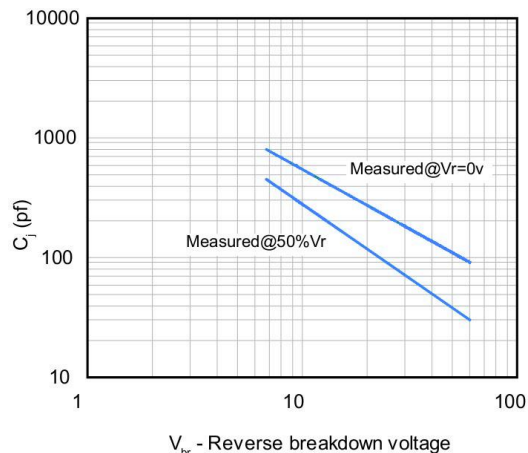


Figure5-Steady State Power Dissipation Derating Curve

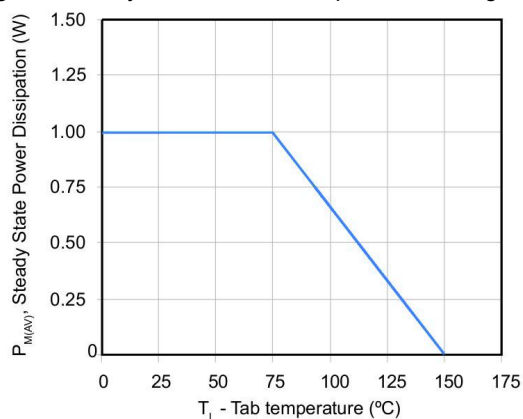
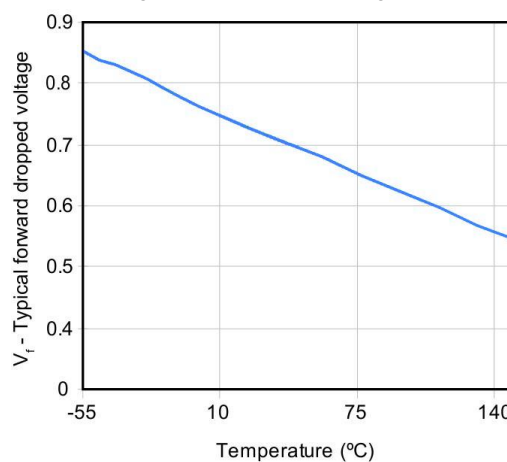
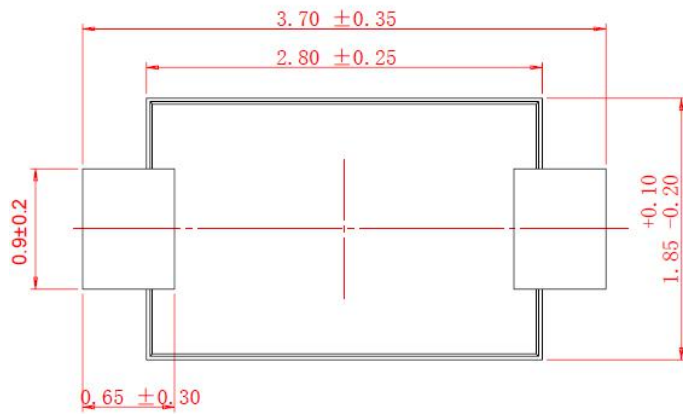
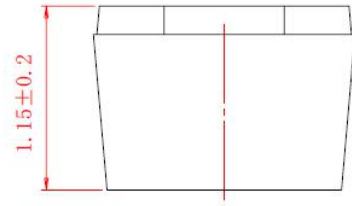
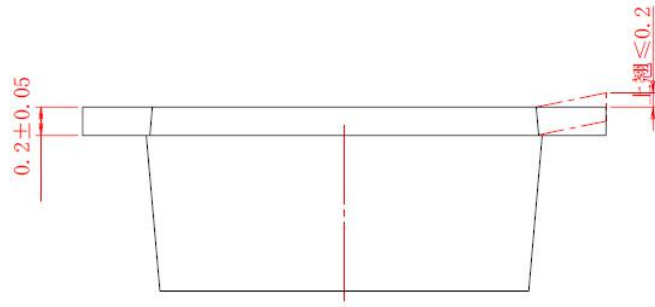


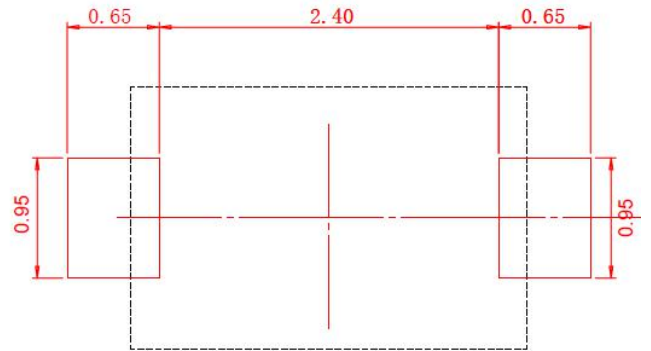
Figure 6 - Forward Voltage



**PACKAGE OUTLINE DIMENSIONS in millimeters (inches)**



**Mounting Pad Layout**



**Disclaimer**

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.

Users should verify actual device performance in their specific applications.