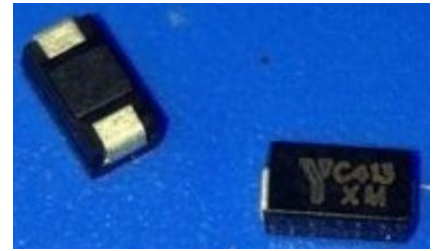


## SMAJ Series

### General Information

The SMA series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The SMA 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: DO-214AC/SMA
- 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
- High Temperature soldering: 260°C/10 seconds at terminals.
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026.

### Applications

TVS devices are ideal for the protection of I/O Interfaces, V<sub>CC</sub> bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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

| Parameter  | Symbol             | Value       | Unit  |
|--|--------------------|-------------|-------|
| Minimum Peak Pulse Power Dissipation (T = 1 ms) (note 1 note 2)  | P <sub>PK</sub>    | 400         | Watts |
| Peak Forward Surge Current<br>8.3 ms Single Half Sine Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) | I <sub>FSM</sub>   | 40          | Amps  |
| Steady State Power Dissipation @ TL = 75 °C  | P <sub>M(AV)</sub> | 3.3         | Watts |
| Maximum Instantaneous Forward Voltage @ I <sub>PP</sub> = 35 A<br>(For Unidirectional Units Only)(note 4 note 5) | V <sub>F</sub>     | 3.5/6.5     | Volts |
| Operating Temperature Range  | T <sub>J</sub>     | -55 to +150 | °C    |
| Storage Temperature Range  | T <sub>STG</sub>   | -55 to +150 | °C    |

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C per Pulse Derating Curve.
2. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).
4. Single Phase, Half Wave, 60 Hz, resistive or inductive load. For capacitive load, derate current by 20 %.
5. V<sub>F</sub> < 3.5V for V<sub>BR</sub> < 200V and V<sub>F</sub> < 6.5V for V<sub>BR</sub> > 201V.

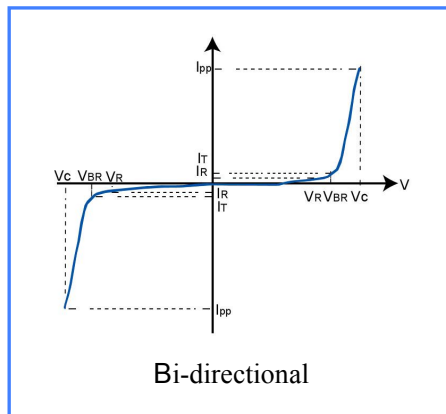
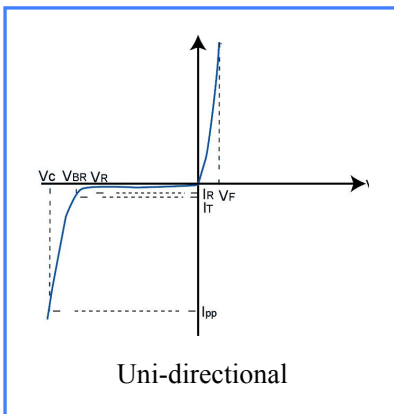
**Electrical Characteristics (TA = 25 °C unless otherwise noted)**

| Part Number (Bi) | Part Number (Uni) | MARKING |     | Reverse Stand off Voltage V <sub>R</sub> (Volts) | Breakdown Voltage V <sub>BR</sub> (Volts)@I <sub>T</sub> |        | Test Current I <sub>T</sub> (mA) | Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (μA) | Maximum Peak Pulse Current I <sub>pp</sub> (A) | Maximum Clamping Voltage V <sub>C</sub> @ I <sub>pp</sub> (V) |
|------------------|-------------------|---------|-----|--|--|--------|----------------------------------|--|--|---|
|                  |                   | BI      | UNI |  | Min .V   | Max .V |                                  |  |  |   |
| SMAJ5.0CA        | SMAJ5.0A          | WE      | AE  | 5.0  | 6.40   | 7.00   | 10                               | 500  | 43.5   | 9.2   |
| SMAJ6.0CA        | SMAJ6.0A          | WG      | AG  | 6.0  | 6.67   | 7.37   | 10                               | 500  | 38.8   | 10.3  |
| SMAJ 6.5CA       | SMAJ 6.5A         | WK      | AK  | 6.5  | 7.22   | 7.90   | 10                               | 300  | 35.7   | 11.2  |
| SMAJ7.0CA        | SMAJ7.0 A         | WM      | AM  | 7.0  | 7.78   | 8.60   | 10                               | 200  | 33.3   | 12.0  |
| SMAJ 7.5CA       | SMAJ 7.5A         | WP      | AP  | 7.5  | 8.33   | 9.21   | 1                                | 100  | 31.0   | 12.9  |
| SMAJ 8.0CA       | SMAJ 8.0A         | WR      | AR  | 8.0  | 8.89   | 9.83   | 1                                | 50   | 29.4   | 13.6  |
| SMAJ8.5CA        | SMAJ8.5 A         | WT      | AT  | 8.5  | 9.44   | 10.40  | 1                                | 20   | 27.8   | 14.4  |
| SMAJ9.0CA        | SMAJ9.0 A         | WV      | AV  | 9.0  | 10.00  | 11.10  | 1                                | 10   | 26.0   | 15.4  |
| SMAJ10CA         | SMAJ10 A          | WX      | AX  | 10.0   | 11.10  | 12.30  | 1                                | 5  | 23.5   | 17.0  |
| SMAJ11CA         | SMAJ11 A          | WZ      | AZ  | 11.0   | 12.20  | 13.50  | 1                                | 1  | 22.0   | 18.2  |
| SMAJ12CA         | SMAJ12 A          | XE      | BE  | 12.0   | 13.30  | 14.70  | 1                                | 1  | 20.1   | 19.9  |
| SMAJ13CA         | SMAJ13A           | XG      | BG  | 13.0   | 14.40  | 15.90  | 1                                | 1  | 18.6   | 21.5  |
| SMAJ14CA         | SMAJ14A           | XK      | BK  | 14.0   | 15.60  | 17.20  | 1                                | 1  | 17.2   | 23.2  |
| SMAJ15CA         | SMAJ15A           | XM      | BM  | 15.0   | 16.70  | 18.50  | 1                                | 1  | 16.4   | 24.4  |
| SMAJ16CA         | SMAJ16A           | XP      | BP  | 16.0   | 17.80  | 19.70  | 1                                | 1  | 15.4   | 26.0  |
| SMAJ17CA         | SMAJ17A           | XR      | BR  | 17.0   | 18.90  | 20.90  | 1                                | 1  | 14.5   | 27.6  |
| SMAJ18CA         | SMAJ18A           | XT      | BT  | 18.0   | 20.00  | 22.10  | 1                                | 1  | 13.7   | 29.2  |
| SMAJ20CA         | SMAJ20A           | XV      | BV  | 20.0   | 22.20  | 24.50  | 1                                | 1  | 12.3   | 32.4  |
| SMAJ22CA         | SMAJ22A           | XX      | BX  | 22.0   | 24.40  | 26.90  | 1                                | 1  | 11.3   | 35.5  |
| SMAJ24CA         | SMAJ24A           | XZ      | BZ  | 24.0   | 26.70  | 29.50  | 1                                | 1  | 10.3   | 38.9  |
| SMAJ26CA         | SMAJ26A           | YE      | CE  | 26.0   | 28.90  | 31.90  | 1                                | 1  | 9.5  | 42.1  |
| SMAJ28CA         | SMAJ28A           | YG      | CG  | 28.0   | 31.10  | 34.40  | 1                                | 1  | 8.8  | 45.4  |
| SMAJ30CA         | SMAJ30A           | YK      | CK  | 30.0   | 33.30  | 36.80  | 1                                | 1  | 8.3  | 48.4  |
| SMAJ33CA         | SMAJ33A           | YM      | CM  | 33.0   | 36.70  | 40.60  | 1                                | 1  | 7.5  | 53.3  |
| SMAJ36CA         | SMAJ36A           | YP      | CP  | 36.0   | 40.00  | 44.20  | 1                                | 1  | 6.9  | 58.1  |
| SMAJ40CA         | SMAJ40A           | YR      | CR  | 40.0   | 44.40  | 49.10  | 1                                | 1  | 6.2  | 64.5  |
| SMAJ43CA         | SMAJ43A           | YT      | CT  | 43.0   | 47.80  | 52.80  | 1                                | 1  | 5.8  | 69.4  |
| SMAJ45CA         | SMAJ45A           | YV      | CV  | 45.0   | 50.00  | 55.30  | 1                                | 1  | 5.5  | 72.7  |
| SMAJ48CA         | SMAJ48A           | YX      | CX  | 48.0   | 53.30  | 58.90  | 1                                | 1  | 5.2  | 77.4  |
| SMAJ51CA         | SMAJ51A           | YZ      | CZ  | 51.0   | 56.70  | 62.70  | 1                                | 1  | 4.9  | 82.4  |
| SMAJ54CA         | SMAJ54A           | ZE      | RE  | 54.0   | 60.00  | 66.30  | 1                                | 1  | 4.6  | 87.1  |
| SMAJ58CA         | SMAJ58A           | ZG      | RG  | 58.0   | 64.40  | 71.20  | 1                                | 1  | 4.3  | 93.6  |
| SMAJ60CA         | SMAJ60A           | ZK      | RK  | 60.0   | 66.70  | 73.70  | 1                                | 1  | 4.1  | 96.8  |
| SMAJ64CA         | SMAJ64A           | ZM      | RM  | 64.0   | 71.10  | 78.60  | 1                                | 1  | 3.9  | 103.0   |
| SMAJ70CA         | SMAJ70A           | ZP      | RP  | 70.0   | 77.80  | 86.00  | 1                                | 1  | 3.5  | 113.0   |
| SMAJ75CA         | SMAJ75A           | ZR      | RR  | 75.0   | 83.30  | 92.10  | 1                                | 1  | 3.3  | 121.0   |
| SMAJ78CA         | SMAJ78A           | ZT      | RT  | 78.0   | 86.70  | 95.80  | 1                                | 1  | 3.2  | 126.0   |
| SMAJ85CA         | SMAJ85A           | ZV      | RV  | 85.0   | 94.4   | 104.0  | 1                                | 1  | 2.9  | 137.0   |

| Part Number (Bi) | Part Number (Uni) | MARKING |     | 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 |                         |  |   |   |
| SMAJ90CA         | SMAJ90A           | ZX      | RX  | 90.0                                    | 100.0                                     | 111.0  | 1                       | 1  | 2.7                                     | 146.0   |
| SMAJ100CA        | SMAJ100A          | ZZ      | RZ  | 100.0                                   | 111.0                                     | 123.0  | 1                       | 1  | 2.5                                     | 162.0   |
| SMAJ110CA        | SMAJ110A          | VE      | SE  | 110.0                                   | 122.0                                     | 135.0  | 1                       | 1  | 2.3                                     | 177.0   |
| SMAJ120CA        | SMAJ120A          | VG      | SG  | 120.0                                   | 133.0                                     | 147.0  | 1                       | 1  | 2.1                                     | 193.0   |
| SMAJ130CA        | SMAJ130A          | VK      | SK  | 130.0                                   | 144.0                                     | 159.0  | 1                       | 1  | 1.9                                     | 209.0   |
| SMAJ150CA        | SMAJ150A          | VM      | SM  | 150.0                                   | 167.0                                     | 185.0  | 1                       | 1  | 1.6                                     | 243.0   |
| SMAJ160CA        | SMAJ160A          | VP      | SP  | 160.0                                   | 178.0                                     | 197.0  | 1                       | 1  | 1.5                                     | 259.0   |
| SMAJ170CA        | SMAJ170A          | VR      | SR  | 170.0                                   | 189.0                                     | 209.0  | 1                       | 1  | 1.5                                     | 275.0   |
| SMAJ180CA        | SMAJ180A          | VT      | ST  | 180.0                                   | 201.0                                     | 222.0  | 1                       | 1  | 1.4                                     | 292.0   |
| SMAJ190CA        | SMAJ190A          | YU      | SU  | 190.0                                   | 211.0                                     | 233.0  | 1                       | 1  | 1.3                                     | 308.0   |
| SMAJ200CA        | SMAJ200A          | VV      | SV  | 200.0                                   | 224.0                                     | 247.0  | 1                       | 1  | 1.2                                     | 324.0   |
| SMAJ210CA        | SMAJ210A          | YW      | SW  | 210.0                                   | 237.0                                     | 263.0  | 1                       | 1  | 1.2                                     | 340.0   |
| SMAJ220CA        | SMAJ220A          | VX      | GE  | 220.0                                   | 246.0                                     | 272.0  | 1                       | 1  | 1.1                                     | 356.0   |
| SMAJ250CA        | SMAJ250A          | VZ      | SZ  | 250.0                                   | 279.0                                     | 309.0  | 1                       | 1  | 1.0                                     | 405.0   |
| SMAJ300CA        | SMAJ300A          | UE      | TE  | 300.0                                   | 335.0                                     | 371.0  | 1                       | 1  | 0.8                                     | 486.0   |
| SMAJ350CA        | SMAJ350A          | UG      | TG  | 350.0                                   | 391.0                                     | 432.0  | 1                       | 1  | 0.7                                     | 567.0   |
| SMAJ400CA        | SMAJ400A          | UK      | TK  | 400.0                                   | 447.0                                     | 494.0  | 1                       | 1  | 0.6                                     | 648.0   |
| SMAJ440CA        | SMAJ440A          | UM      | TM  | 440.0                                   | 492.0                                     | 543.0  | 1                       | 1  | 0.6                                     | 713.0   |

Notes: For bidirectional devices with a  $V_R$  of 10 volts or less, the  $I_R$  limit is double.

### 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- Pulse Derating Curve

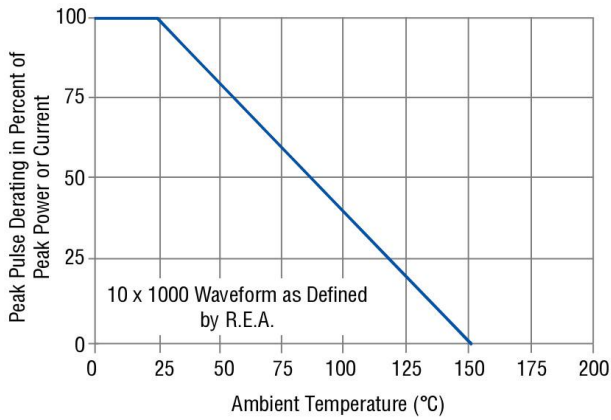


Figure 2- Maximum Non-Repetitive Surge Current

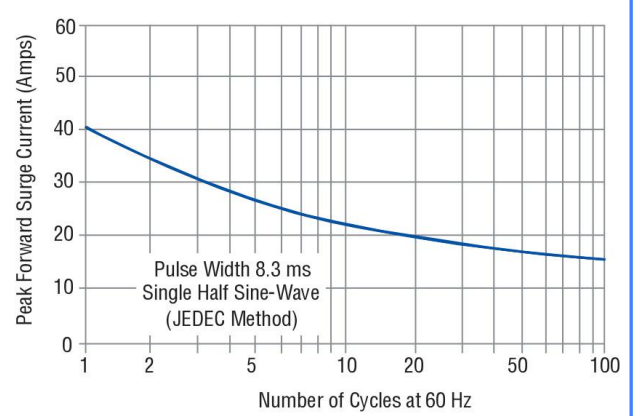


Figure 3- Typical Junction Capacitance

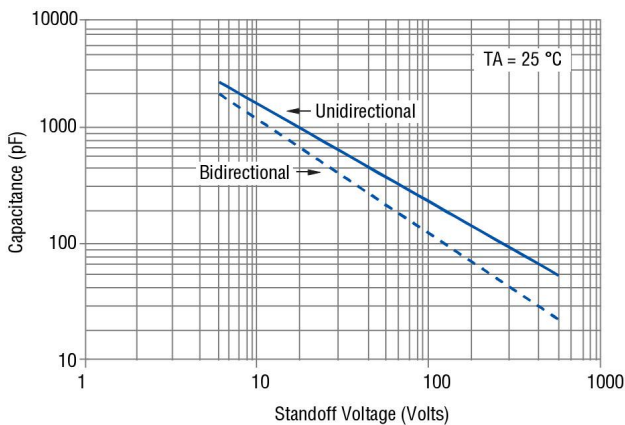


Figure 4- Pulse Waveform

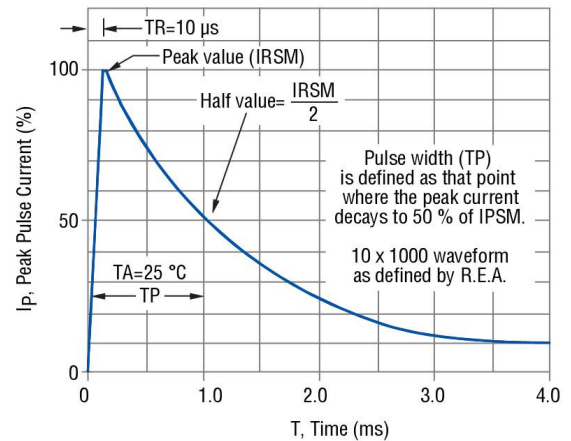


Figure 5- Steady State Power Derating Curve

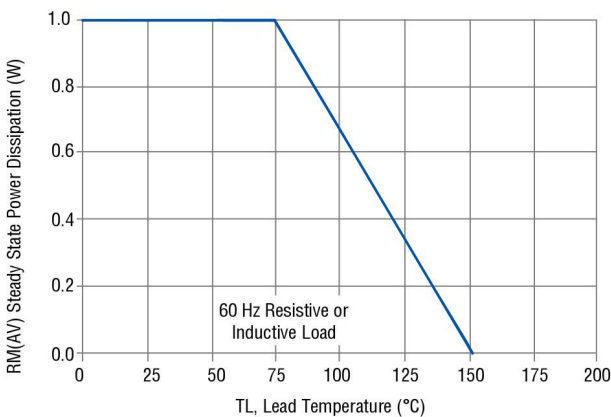
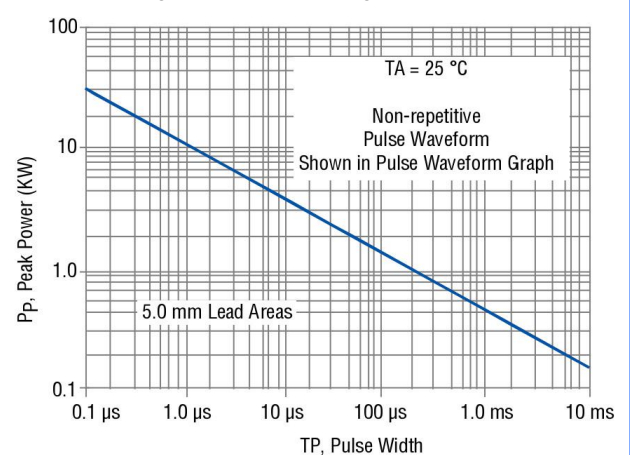
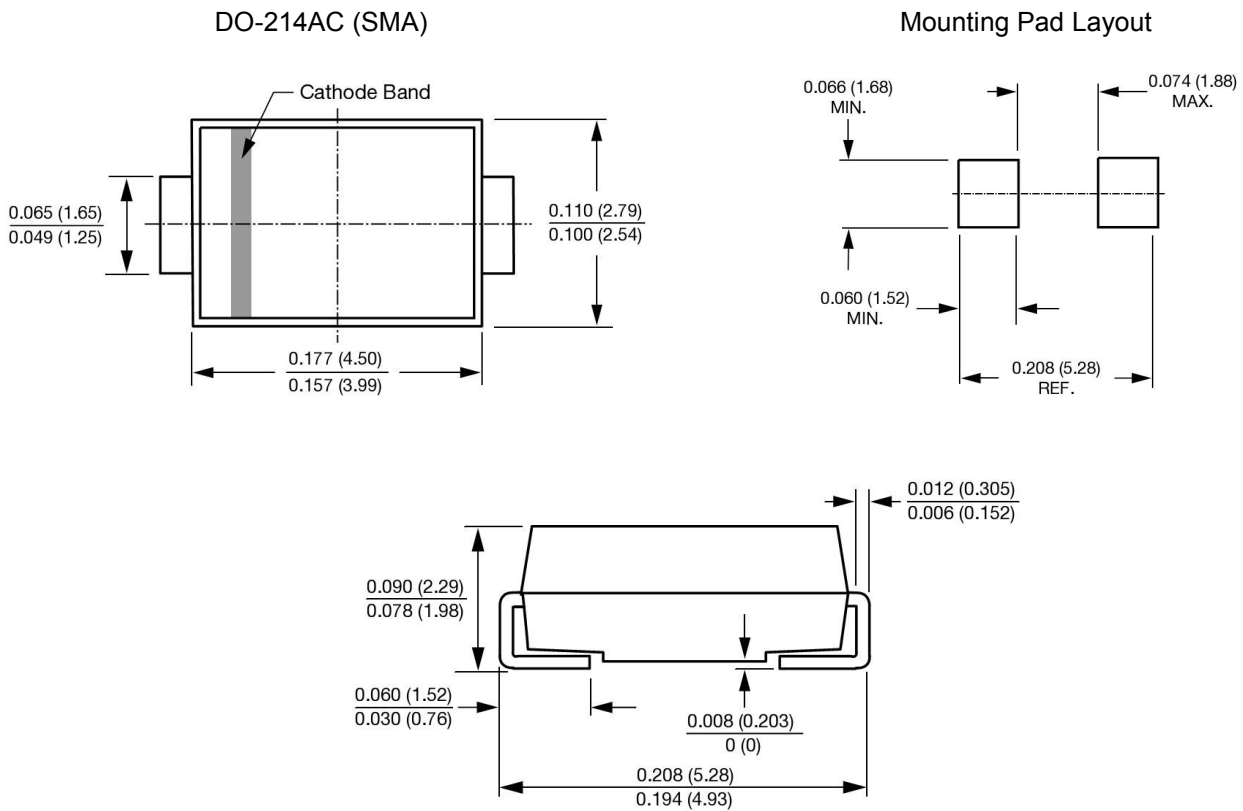


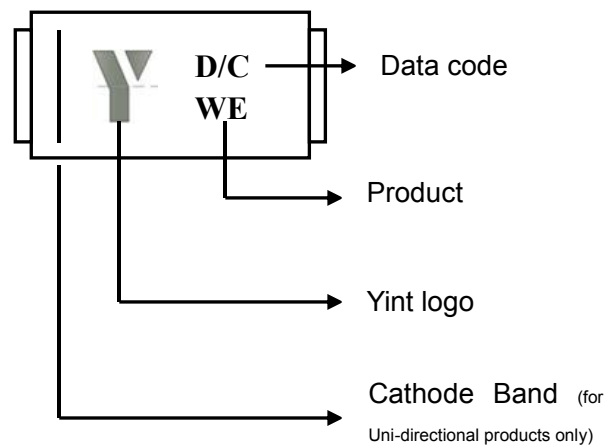
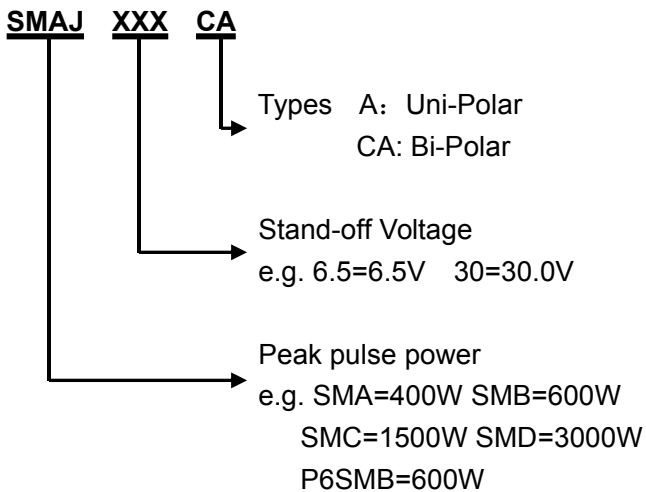
Figure 6- Pulse Rating Curve



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



**Part Numbering System**      **Part Marking System**



**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.

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