

**Product Summary** (@T<sub>A</sub> = +25°C)

| P <sub>PK</sub> | I <sub>FSM</sub> | V <sub>RWM</sub> | PM <sub>(AV)</sub> |
|-----------------|------------------|------------------|--------------------|
| 400W            | 40A              | 5V to 200V       | 5W                 |

**Description and Applications**

Suitable to protect sensitive automotive circuits against surges defined in ISO7637-2 and against electrostatic discharges according to ISO10605.

Compliance with following standards

- ISO10605, C = 150pF, R = 330Ω:  
30kV (Air Discharge)  
30kV (Contact Discharge)
- ISO7637-2 (Note 5)  
Pulse 1: V<sub>S</sub> = -100V  
Pulse 2a: V<sub>S</sub> = +50V  
Pulse 3a: V<sub>S</sub> = -150V  
Pulse 3b: V<sub>S</sub> = +100V

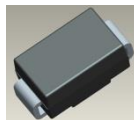
**Features and Benefits**

- 400W Peak Pulse Power Dissipation
- 5V to 200V Standoff Voltages
- Glass Passivated Die Construction
- Unidirectional and Bidirectional Versions Available
- Excellent Clamping Capability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The SMAJ5.0(C)AQ – SMAJ200(C)AQ are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

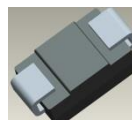
**Mechanical Data**

- Case: SMA
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead-Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208③
- Polarity Indicator: Cathode Band (Bidirectional Devices do not have a Polarity Indicator)
- Weight: 0.064 grams (Approximate)

SMA



Top View



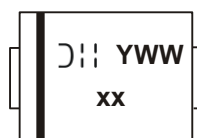
Bottom View

**Ordering Information** (Note 4)

| Part Number       | Qualification | Case | Packaging        |
|-------------------|---------------|------|------------------|
| SMAJX.X(C)AQ-13-F | Automotive    | SMA  | 5000/Tape & Reel |
| SMAJXX(C)AQ-13-F  | Automotive    | SMA  | 5000/Tape & Reel |
| SMAJXXX(C)AQ-13-F | Automotive    | SMA  | 5000/Tape & Reel |

\*X = Device Voltage, Example: SMAJ14AQ-13-F

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
  5. Not applicable to parts with stand-off voltage lower than the average battery voltage (13.5V).

**Marking Information**


- xx = Product Type Marking Code  
(See Electrical Characteristics Table)
- DII = Manufacturers' Marking
- YWW = Date Code Marking  
Y = Last Digit of Year (ex: 0 for 2020)  
WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic   | Symbol             | Value | Unit |
|--|--------------------|-------|------|
| Peak Pulse Power Dissipation<br>(Non-Repetitive Current Pulse Derated Above T <sub>A</sub> = +25°C) (Note 6) | P <sub>PK</sub>    | 400   | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave<br>Superimposed on Rated Load (Notes 6, 7 & 8)       | I <sub>FSM</sub>   | 40    | A    |
| Steady State Power Dissipation @ T <sub>L</sub> = +75°C  | PM <sub>(AV)</sub> | 1.0   | W    |
| Instantaneous Forward Voltage @ I <sub>PP</sub> = 35A (Notes 6, 7 & 8)                                       | V <sub>F</sub>     | 3.5   | V    |

- Notes:
6. Valid provided that terminals are kept at ambient temperature.
  7. Measured with 8.3ms single half sine-wave. Duty cycle = 4 pulses per minute maximum.
  8. Unidirectional units only.

**Thermal Characteristics**

| Characteristic              | Symbol           | Value       | Unit |
|-----------------------------|------------------|-------------|------|
| Operating Temperature Range | T <sub>J</sub>   | -55 to +150 | °C   |
| Storage Temperature Range   | T <sub>STG</sub> | -55 to +175 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Part Number<br>Add C For<br>Bidirectional<br>(Note 9) | Reverse<br>Standoff<br>Voltage<br>V <sub>RWM</sub> (V) | Breakdown<br>Voltage<br>V <sub>BR</sub> @ I <sub>T</sub><br>(Note 10) |         | Test<br>Current<br>I <sub>T</sub> (mA) | Max. Reverse<br>Leakage @ V <sub>RWM</sub><br>(Note 12)<br>I <sub>R</sub> (µA) | Max. Clamping<br>Voltage @ I <sub>PP</sub><br>(Note 11)<br>V <sub>C</sub> (V) | Max. Peak Pulse<br>Current<br>I <sub>PP</sub> (A) | Marking Code |      |
|---|--|---|---------|--|--|---|---|--------------|------|
|   |  | Min (V)   | Max (V) |  |  |   |   | BI-          | UNI- |
| SMAJ5.0(C)AQ  | 5.0  | 6.40  | 7.25    | 10                                     | 800  | 9.2   | 43.5  | TE           | HE   |
| SMAJ8.5(C)AQ  | 8.5  | 9.44  | 10.4    | 1.0                                    | 10   | 14.4  | 27.7  | TT           | HT   |
| SMAJ10(C)AQ   | 10   | 11.1  | 12.3    | 1.0                                    | 5.0  | 17.0  | 23.5  | TX           | HX   |
| SMAJ12(C)AQ   | 12   | 13.3  | 14.7    | 1.0                                    | 5.0  | 19.9  | 20.1  | UE           | IE   |
| SMAJ13(C)AQ   | 13   | 14.4  | 15.9    | 1.0                                    | 5.0  | 21.5  | 18.6  | UG           | IG   |
| SMAJ14(C)AQ   | 14   | 15.6  | 17.2    | 1.0                                    | 5.0  | 23.2  | 17.2  | UK           | IK   |
| SMAJ15(C)AQ   | 15   | 16.7  | 18.5    | 1.0                                    | 5.0  | 24.4  | 16.4  | UM           | IM   |
| SMAJ16(C)AQ   | 16   | 17.8  | 19.7    | 1.0                                    | 5.0  | 26.0  | 15.3  | UP           | IP   |
| SMAJ17(C)AQ   | 17   | 18.9  | 20.9    | 1.0                                    | 5.0  | 27.6  | 14.5  | UR           | IR   |
| SMAJ18(C)AQ   | 18   | 20.0  | 22.1    | 1.0                                    | 5.0  | 29.2  | 13.7  | UT           | IT   |
| SMAJ20(C)AQ   | 20   | 22.2  | 24.5    | 1.0                                    | 5.0  | 32.4  | 12.3  | UV           | IV   |
| SMAJ22(C)AQ   | 22   | 24.4  | 26.9    | 1.0                                    | 5.0  | 35.5  | 11.2  | UX           | IX   |
| SMAJ24(C)AQ   | 24   | 26.7  | 29.5    | 1.0                                    | 5.0  | 38.9  | 10.3  | UZ           | IZ   |
| SMAJ26(C)AQ   | 26   | 28.9  | 31.9    | 1.0                                    | 5.0  | 42.1  | 9.5   | VE           | JE   |
| SMAJ28(C)AQ   | 28   | 31.1  | 34.4    | 1.0                                    | 5.0  | 45.4  | 8.8   | VG           | JG   |
| SMAJ30(C)AQ   | 30   | 33.3  | 36.8    | 1.0                                    | 5.0  | 48.4  | 8.3   | VK           | JK   |
| SMAJ33(C)AQ   | 33   | 36.7  | 40.6    | 1.0                                    | 5.0  | 53.3  | 7.5   | VM           | JM   |
| SMAJ36(C)AQ   | 36   | 40.0  | 44.2    | 1.0                                    | 5.0  | 58.1  | 6.9   | VP           | JP   |
| SMAJ40(C)AQ   | 40   | 44.4  | 49.1    | 1.0                                    | 5.0  | 64.5  | 6.2   | VR           | JR   |
| SMAJ43(C)AQ   | 43   | 47.8  | 52.8    | 1.0                                    | 5.0  | 69.4  | 5.7   | VT           | JT   |
| SMAJ48(C)AQ   | 48   | 53.3  | 58.9    | 1.0                                    | 5.0  | 77.4  | 5.2   | VX           | JX   |
| SMAJ51(C)AQ   | 51   | 56.7  | 62.7    | 1.0                                    | 5.0  | 82.4  | 4.9   | VZ           | JZ   |
| SMAJ58(C)AQ   | 58   | 64.4  | 71.2    | 1.0                                    | 5.0  | 93.6  | 4.3   | WG           | RG   |
| SMAJ60(C)AQ   | 60   | 66.7  | 73.7    | 1.0                                    | 5.0  | 96.8  | 4.1   | WK           | RK   |
| SMAJ70(C)AQ   | 70   | 77.8  | 86.0    | 1.0                                    | 5.0  | 113   | 3.5   | WP           | RP   |
| SMAJ78(C)AQ   | 78   | 86.7  | 95.8    | 1.0                                    | 5.0  | 126   | 3.2   | WT           | RT   |
| SMAJ170(C)AQ  | 170  | 189   | 209     | 1.0                                    | 5.0  | 275   | 1.4   | XR           | SR   |
| SMAJ200(C)AQ  | 200  | 224   | 248     | 1.0                                    | 1.0  | 324   | 1.2   | YT           | ST   |

- Notes:
9. Suffix C denotes bidirectional device.
  10. V<sub>BR</sub> measured with I<sub>T</sub> current pulse = 10ms to 15ms.
  11. Per 10 × 1000µs waveform. See Figure 4.
  12. For bidirectional devices having V<sub>RWM</sub> of 10V and under, the I<sub>R</sub> is doubled.

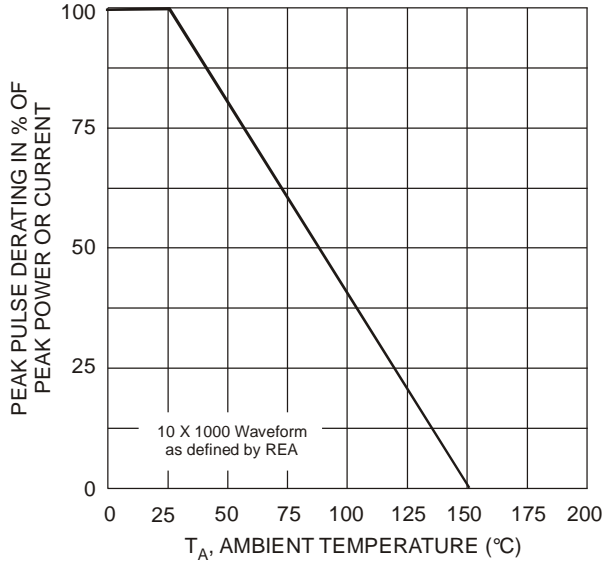


Fig. 1 Pulse Derating Curve

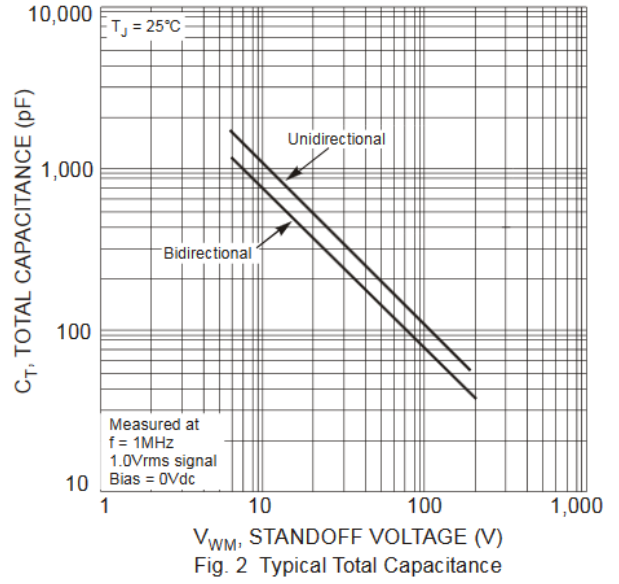


Fig. 2 Typical Total Capacitance

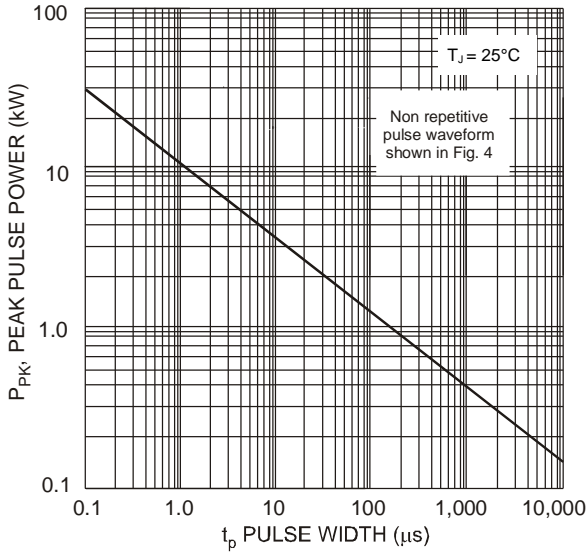


Fig. 3 Pulse Rating Curve

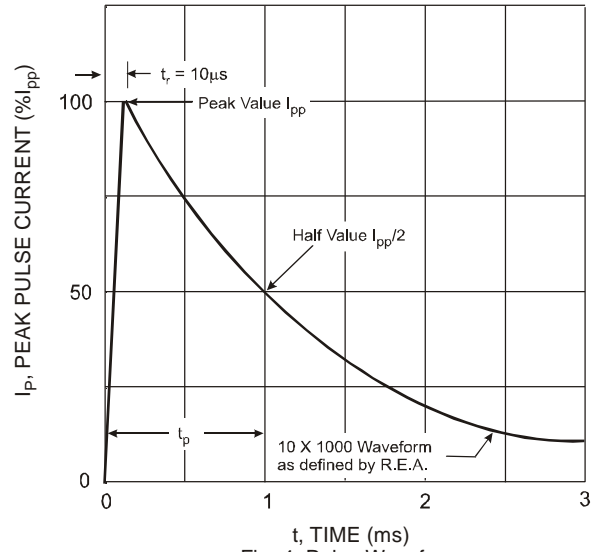


Fig. 4 Pulse Waveform

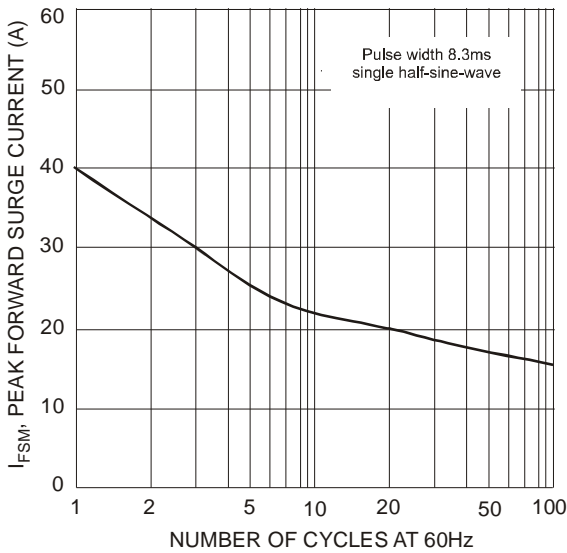


Fig. 5 Maximum Non-Repetitive Surge Current

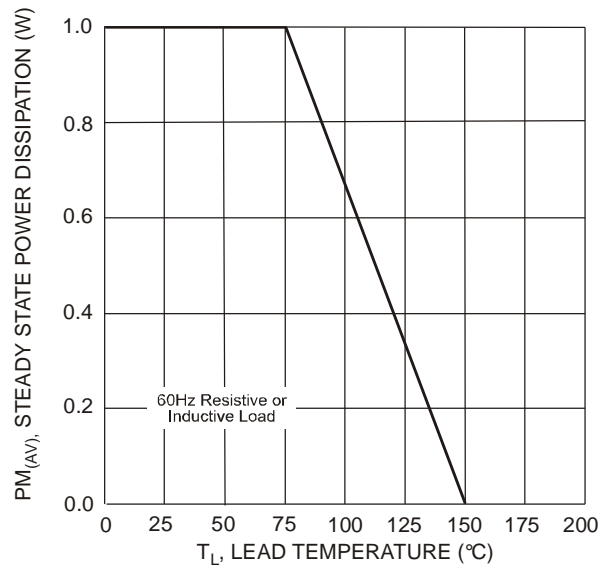
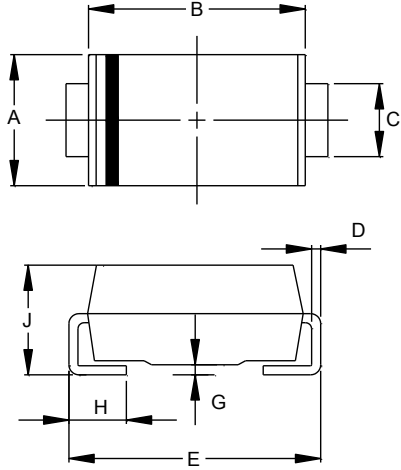


Fig. 6 Steady State Power Derating Curve

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SMA**

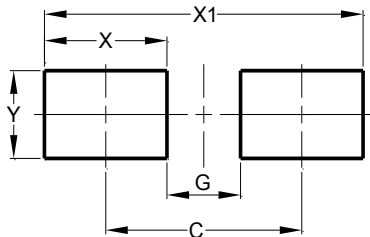


| SMA                  |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 2.29 | 2.92 |
| B                    | 4.00 | 4.60 |
| C                    | 1.27 | 1.63 |
| D                    | 0.15 | 0.31 |
| E                    | 4.80 | 5.59 |
| G                    | 0.05 | 0.20 |
| H                    | 0.76 | 1.52 |
| J                    | 1.96 | 2.40 |
| All Dimensions in mm |      |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SMA**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 4.00          |
| G          | 1.50          |
| X          | 2.50          |
| X1         | 6.50          |
| Y          | 1.70          |

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