



**THE DATASHEET OF  
SMAJ20AQ-13-F**



**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

**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/>

**Description and Applications**

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

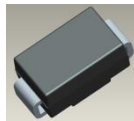
Compliance with following standards:

- 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

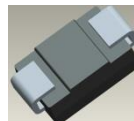
**Mechanical Data**

- Package: SMA
- Package 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 208 (3)
- Polarity Indicator: Cathode Band (Bidirectional Devices Do Not Have a Polarity Indicator)
- Weight: 0.064 grams (Approximate)

SMA



Top View



Bottom View

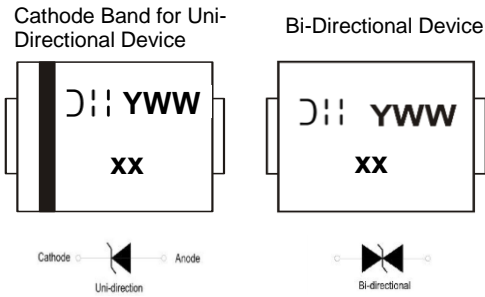
**Ordering Information** (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
SMAJX.X(C)AQ-13-F	SMA	5000	Tape & Reel
SMAJXX(C)AQ-13-F	SMA	5000	Tape & Reel
SMAJXXX(C)AQ-13-F	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 standoff 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: 3 for 2023)  
 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 (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 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 Add C For Bidirectional (Note 9)	Reverse Standoff Voltage	Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (Note 10)		Test Current I <sub>T</sub> (mA)	Max Reverse Leakage @ V <sub>RWM</sub> (Note 12)	Max Clamping Voltage @ I <sub>PP</sub> (Note 11)	Max Peak Pulse Current	Marking Code	
		V <sub>RWM</sub> (V)	Min (V)					Max (V)	BI-
SMAJ5.0(C)AQ	5.0	6.40	7.25	10	800	9.2	43.5	TE	HE
SMAJ6.0(C)AQ	6.0	6.67	7.37	10	800	10.3	38.8	TG	HG
SMAJ7.5(C)AQ	7.5	8.33	9.21	1.0	100	12.9	31.0	TP	HP
SMAJ8.5(C)AQ	8.5	9.44	10.4	1.0	10	14.4	27.7	TT	HT
SMAJ9.0(C)AQ	9.0	10.0	11.1	1.0	5.0	15.4	26.0	TV	HV
SMAJ10(C)AQ	10	11.1	12.3	1.0	5.0	17.0	23.5	TX	HX
SMAJ11(C)AQ	11	12.2	13.5	1.0	5.0	18.2	22.0	TZ	HZ
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
SMAJ54(C)AQ	54	60.0	66.3	1.0	5.0	87.1	4.6	WE	RE
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
SMAJ64(C)AQ	64	71.1	78.6	1.0	5.0	103	3.9	WM	RM
SMAJ70(C)AQ	70	77.8	86.0	1.0	5.0	113	3.5	WP	RP
SMAJ75(C)AQ	75	83.3	92.1	1.0	5.0	121	3.3	WR	RR
SMAJ78(C)AQ	78	86.7	95.8	1.0	5.0	126	3.2	WT	RT
SMAJ85(C)AQ	85	94.4	104	1.0	5.0	137	2.9	WV	RV
SMAJ90(C)AQ	90	100	111	1.0	5.0	146	2.7	WX	RX
SMAJ100(C)AQ	100	111	123	1.0	5.0	162	2.5	WZ	RZ
SMAJ110(C)AQ	110	122	135	1.0	5.0	177	2.3	XE	SE
SMAJ120(C)AQ	120	133	147	1.0	5.0	193	2.0	XG	SG
SMAJ130(C)AQ	130	144	159	1.0	5.0	209	1.9	XK	SK
SMAJ150(C)AQ	150	167	185	1.0	5.0	243	1.6	XM	SM
SMAJ160(C)AQ	160	178	197	1.0	5.0	259	1.5	XP	SP
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 devices.
  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.

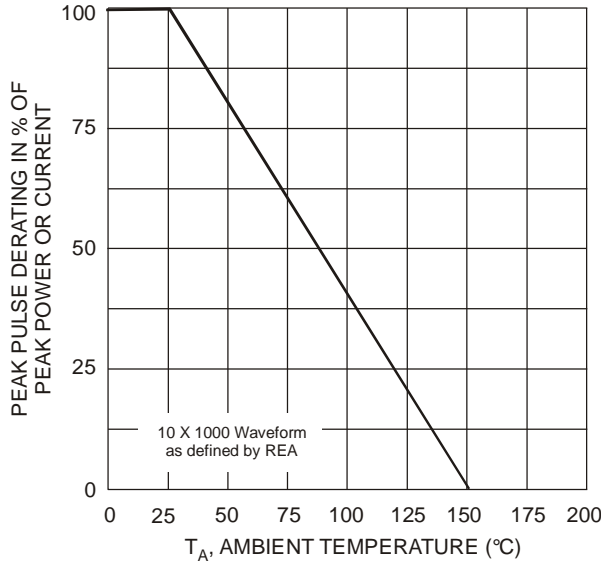


Figure 1. Pulse Derating Curve

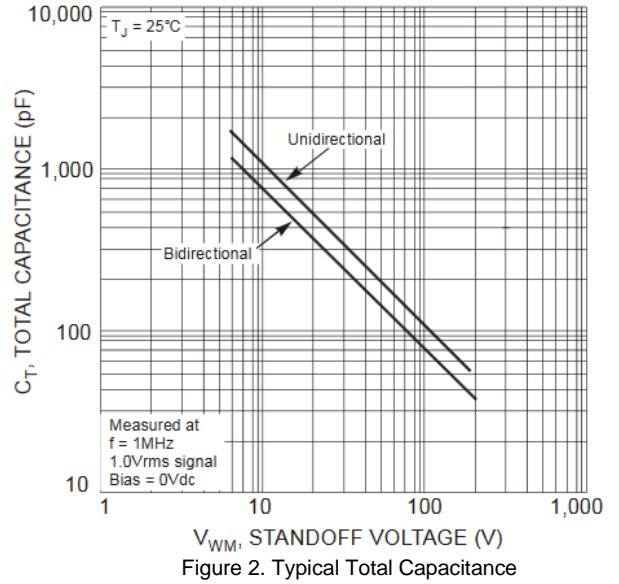


Figure 2. Typical Total Capacitance

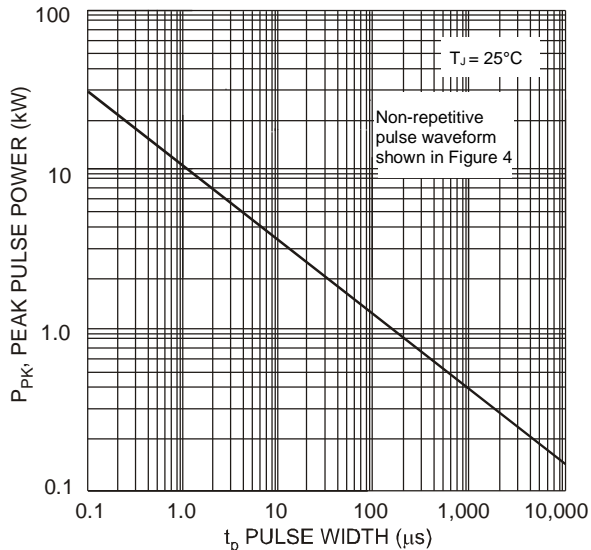


Figure 3. Pulse Rating Curve



Figure 4. Pulse Waveform



Figure 5. Maximum Non-Repetitive Surge Current

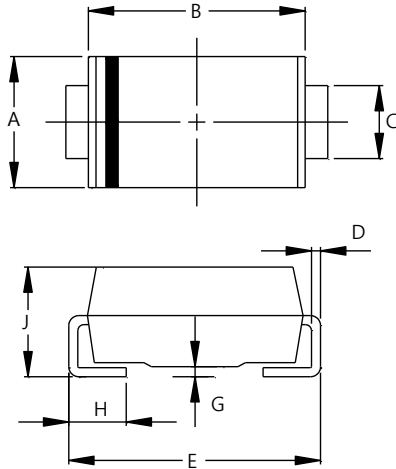


Figure 6. Steady-State Power Derating Curve

**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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