400W SURFACE-MOUNT AUTOMOTIVE TRANSIENT VOLTAGE SUPPRESSOR

Product Summary (@T_A = +25°C)

P_{PK}	I_{FSM}	V_{RWM}	$PM_{(AV)}$
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.

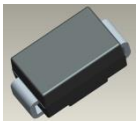
Compliance with following standards:

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

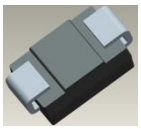
Mechanical Data

- 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 e3
- Polarity Indicator: Cathode Band (Bidirectional Devices Do Not Have a Polarity Indicator)
- Weight: 0.064 grams (Approximate)

SMA



Top View



Bottom View

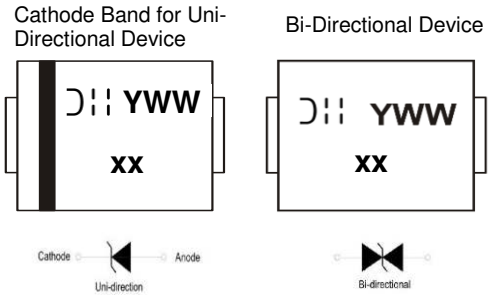
Ordering Information (Note 4)

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)
= Manufacturers' Marking
YWW = Date Code Marking
Y = Last Digit of Year (ex: 3 for 2023)
WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Peak Pulse Power Dissipation (Non-Repetitive Current Pulse Derated Above T_A = +25°C) (Note 6)	P_{PK}	400	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Superimposed on Rated Load (Notes 6, 7, 8)	I_{FSM}	40	A
Steady-State Power Dissipation @ T_L = +75°C	$PM_{(AV)}$	1.0	W
Instantaneous Forward Voltage @ I_{PP} = 35A (Notes 6, 7, 8)	V_F	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_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +175	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Part Number Add C For Bidirectional (Note 9)	Reverse Standoff Voltage	Breakdown Voltage V_{BR} @ I_T (Note 10)		Test Current	Max Reverse Leakage @ V_{RWM} (Note 12)	Max Clamping Voltage @ I_{PP} (Note 11)	Max Peak Pulse Current	Marking Code	
	V_{RWM} (V)	Min (V)	Max (V)	I_T (mA)	I_R (µA)	V_C (V)	I_{PP} (A)	BI-	UNI-
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
SMAJ100(C)AQ	100	111	123	1.0	5.0	162	2.5	WZ	RZ
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_{BR} measured with I_T current pulse = 10ms to 15ms.
11. Per 10 × 1000µs waveform. See Figure 4.
12. For bidirectional devices having V_{RWM} of 10V and under, the I_R is doubled.

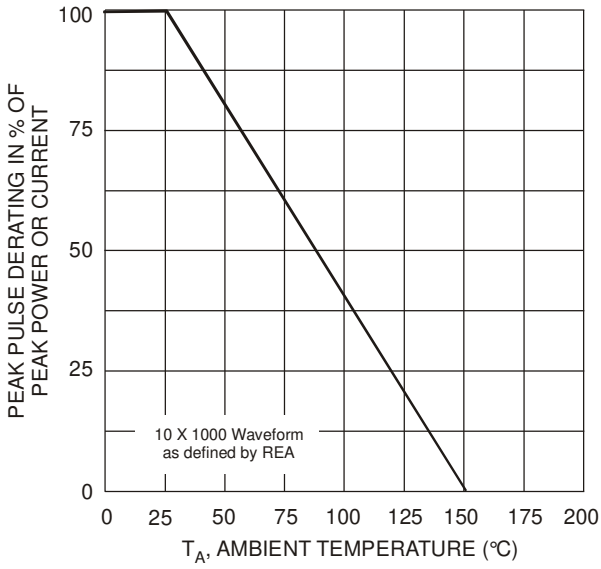


Figure 1. Pulse Derating Curve

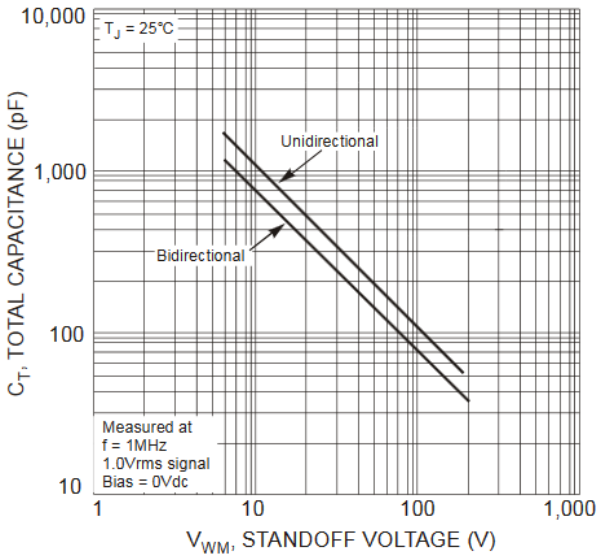


Figure 2. Typical Total Capacitance

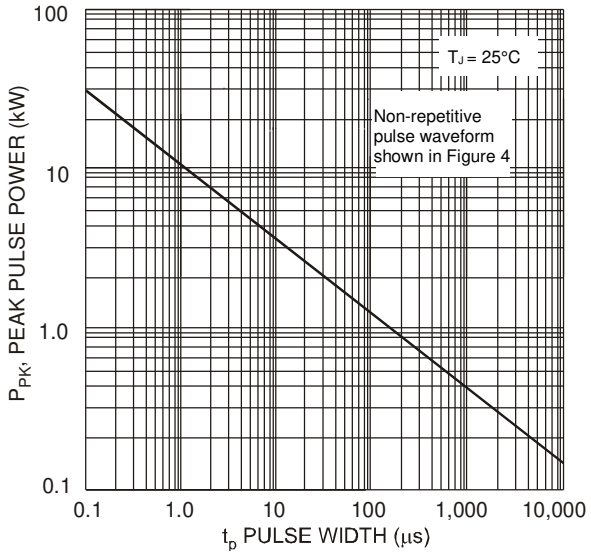


Figure 3. Pulse Rating Curve

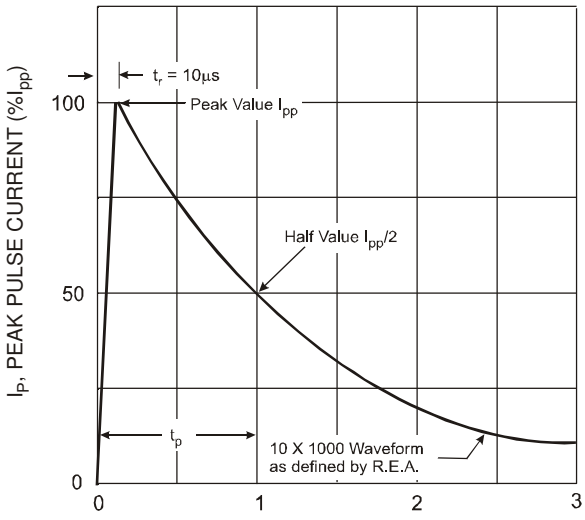


Figure 4. Pulse Waveform

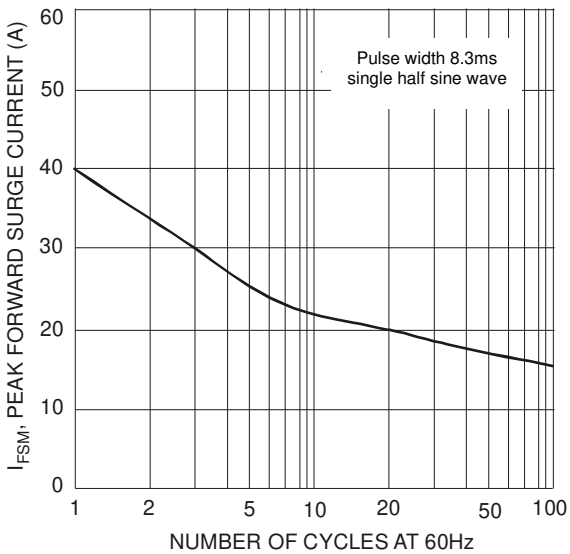


Figure 5. Maximum Non-Repetitive Surge Current

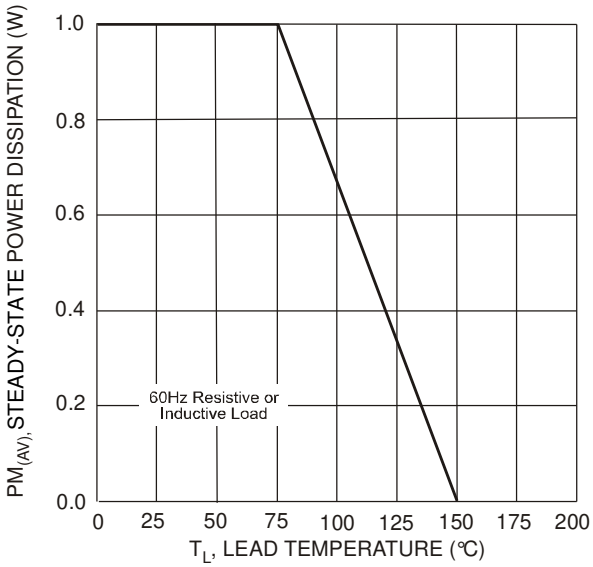
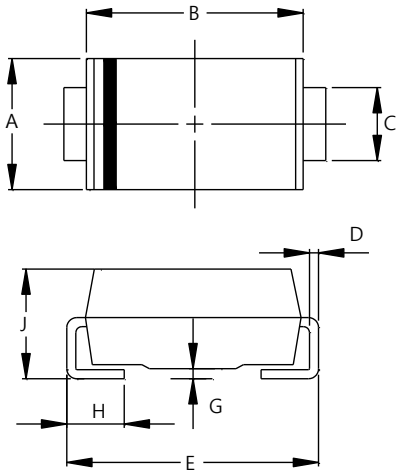


Figure 6. Steady-State Power Derating Curve

Package Outline Dimensions

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

SMA

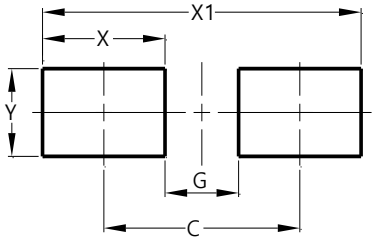


SMA		
Dim	**Min**	**Max**
A	2.29	2.92
B	4.00	4.60
C	1.27	1.63
D	0.15	0.31
E	4.80	5.59
G	0.05	0.20
H	0.76	1.52
J	1.96	2.40
All Dimensions in mm		

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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