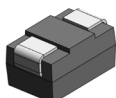


SMAJ

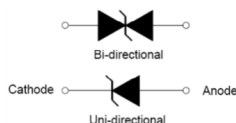
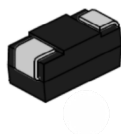
400 W Transient voltage suppressor



Product features

- Low profile SMA package
- Excellent clamping capability
- 400 W peak pulse power capability at 10/1000 μ s waveform
- Typical I_R less than 1 μ A above 10 V
- Fast response time: typically less than 1.0 ps from 0 V to V_{BR} minimum
- High temperature reflow soldering: +260 °C /40 s at terminal
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: Solder plated leads, solderable per J-STD-002
- For surface mounted applications in order to optimize board space
- UL 497B recognized.
File No. : E198449 Guide QVGQ2

PIN configuration



Applications

- Consumer electronics
- Telecommunications
- Computing and servers
- Appliances
- Industrial automation
- Mobile and wearables

Environmental compliance and general specifications



Ordering part number

SMAJ 5.0 C A

Family name _____

V_R voltage _____

Bi-/Uni-Directional (Blank=Uni, C=Bi) _____

Voltage tolerance _____

Alternate ordering part number

SMAJE 5-0 C A

Family name _____

V_R voltage ("-" indicates decimal point) _____

Bi-/Uni-Directional (Blank=Uni, C=Bi) _____

Voltage tolerance _____

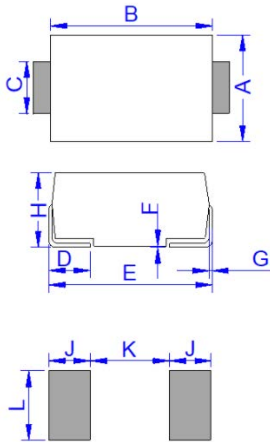
Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage operating junction temperature range	T_{STG}/T_J	-55 to +150	°C
Steady state power dissipation at $T_L = +75$ °C	$P_{M(AV)}$	3.3	W
Peak pulse power dissipation on 10/1000 μ s waveform	P_{PP}	400	W
Maximum instantaneous forward voltage at 100 A for unidirectional	V_F	5.0	V
Peak forward surge current, 8.3 ms single half sine wave ¹	I_{FSM}	60	A
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	°C/W

1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

Mechanical parameters, pad layout- mm



Dimension	Millimeters		Inches	
	Minimum	Maximum	Minimum	Maximum
A	2.60	3.00	0.102	0.118
B	4.15	4.65	0.163	0.183
C	1.25	1.65	0.049	0.065
D	0.95	1.52	0.037	0.060
E	4.90	5.30	0.193	0.209
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.00	2.44	0.079	0.096
J	2.00		0.079	
K		2.30		0.091
L	1.80		0.071	

Part marking

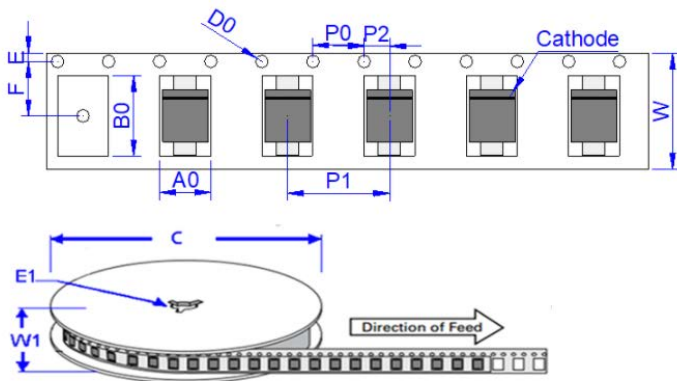


Cathode band (uni-polar only)
Part marking: xx = Refer to marking designator listed in Electrical Characteristics table
yyyy- date code

Packaging information (mm)

Drawing not to scale.

Supplied in tape and reel packaging, 5,000 parts per 13" diameter reel (EIA-481 compliant)



Dimension	Millimeters	Inches
A0	2.79 ± 0.3	0.110 ± 0.012
B0	5.33 ± 0.3	0.210 ± 0.012
C	330.0	13.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	5.50 ± 0.2	0.217 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	12.0 ± 0.2	0.472 ± 0.008
W1	15.7 ± 2.0	0.618 ± 0.079

SMAJ

400 W Transient voltage suppressor

Technical Data 11213
Effective September 2024

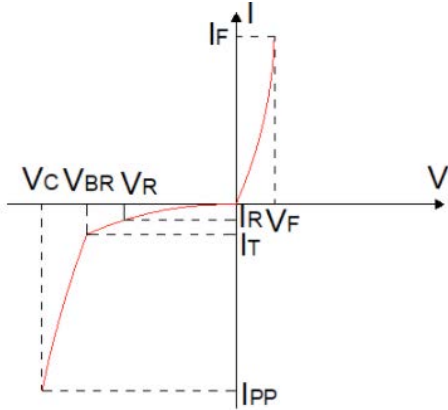
Electrical characteristics (+25 °C)

Part number Uni-polar	Bi-polar	Marking		V _R (V)	I _R @ V _R (μA)	V _{BR} @ I _T		I _T (mA)	V _C @ I _{PP} max (V)	I _{PP} (A)
		Uni	Bi			min (V)	max (V)			
SMAJ5.0A	SMAJ5.0CA	HE	TE	5	120	6.4	7	10	9.2	43.5
SMAJ6.0A	SMAJ6.0CA	HG	TG	6	120	6.67	7.37	10	10.3	38.8
SMAJ6.5A	SMAJ6.5CA	HK	TK	6.5	80	7.22	7.98	10	11.2	35.7
SMAJ7.0A	SMAJ7.0CA	HM	TM	7	50	7.78	8.6	10	12	33.3
SMAJ7.5A	SMAJ7.5CA	HP	TP	7.5	50	8.33	9.21	1	12.9	31
SMAJ8.0A	SMAJ8.0CA	HR	TR	8	20	8.89	9.83	1	13.6	29.4
SMAJ8.5A	SMAJ8.5CA	HT	TT	8.5	10	9.44	10.4	1	14.4	27.8
SMAJ9.0A	SMAJ9.0CA	HV	TV	9	5	10	11.1	1	15.4	26
SMAJ10A	SMAJ10CA	HX	TX	10	2	11.1	12.3	1	17	23.5
SMAJ11A	SMAJ11CA	HZ	TZ	11	1	12.2	13.5	1	18.2	22
SMAJ12A	SMAJ12CA	IE	UE	12	1	13.3	14.7	1	19.9	20.1
SMAJ13A	SMAJ13CA	IG	UG	13	1	14.4	15.9	1	21.5	18.6
SMAJ14A	SMAJ14CA	IK	UK	14	1	15.6	17.2	1	23.2	17.3
SMAJ15A	SMAJ15CA	IM	UM	15	1	16.7	18.5	1	24.4	16.4
SMAJ16A	SMAJ16CA	IP	UP	16	1	17.8	19.7	1	26	15.4
SMAJ17A	SMAJ17CA	IR	UR	17	1	18.9	20.9	1	27.6	14.5
SMAJ18A	SMAJ18CA	IT	UT	18	1	20	22.1	1	29.2	13.7
SMAJ20A	SMAJ20CA	IV	UV	20	1	22.2	24.5	1	32.4	12.4
SMAJ22A	SMAJ22CA	IX	UX	22	1	24.4	26.9	1	35.5	11.3
SMAJ24A	SMAJ24CA	IZ	UZ	24	1	26.7	29.5	1	38.9	10.3
SMAJ26A	SMAJ26CA	JE	VE	26	1	28.9	31.9	1	42.1	9.5
SMAJ28A	SMAJ28CA	JG	VG	28	1	31.1	34.4	1	45.4	8.8
SMAJ30A	SMAJ30CA	JK	VK	30	1	33.3	36.8	1	48.4	8.3
SMAJ33A	SMAJ33CA	JM	VM	33	1	36.7	40.6	1	53.3	7.5
SMAJ36A	SMAJ36CA	JP	VP	36	1	40	44.2	1	58.1	6.9
SMAJ40A	SMAJ40CA	JR	VR	40	1	44.4	49.1	1	64.5	6.2
SMAJ43A	SMAJ43CA	JT	VT	43	1	47.8	52.8	1	69.4	5.8
SMAJ45A	SMAJ45CA	JV	VV	45	1	50	55.3	1	72.7	5.5
SMAJ48A	SMAJ48CA	JX	VX	48	1	53.3	58.9	1	77.4	5.2
SMAJ51A	SMAJ51CA	JZ	VZ	51	1	56.7	62.7	1	82.4	4.9
SMAJ54A	SMAJ54CA	RE	WE	54	1	60	66.3	1	87.1	4.6
SMAJ58A	SMAJ58CA	RG	WG	58	1	64.4	71.2	1	93.6	4.3
SMAJ60A	SMAJ60CA	RK	WK	60	1	66.7	73.7	1	96.8	4.1
SMAJ64A	SMAJ64CA	RM	WM	64	1	71.1	78.6	1	103	3.9
SMAJ70A	SMAJ70CA	RP	WP	70	1	77.8	86	1	113	3.6
SMAJ75A	SMAJ75CA	RR	WR	75	1	83.3	92.1	1	121	3.3
SMAJ78A	SMAJ78CA	RT	WT	78	1	86.7	95.8	1	126	3.2
SMAJ85A	SMAJ85CA	RV	WV	85	1	94.4	104	1	137	2.9
SMAJ90A	SMAJ90CA	RX	WX	90	1	100	111	1	146	2.8
SMAJ100A	SMAJ100CA	RZ	WZ	100	1	111	123	1	162	2.5
SMAJ110A	SMAJ110CA	SE	XE	110	1	122	135	1	177	2.3
SMAJ120A	SMAJ120CA	SG	XG	120	1	133	147	1	193	2.1
SMAJ130A	SMAJ130CA	SK	XK	130	1	144	159	1	209	1.9
SMAJ150A	SMAJ150CA	SM	XM	150	1	167	185	1	243	1.7
SMAJ160A	SMAJ160CA	SP	XP	160	1	178	197	1	259	1.6
SMAJ170A	SMAJ170CA	SR	XR	170	1	189	209	1	275	1.5
SMAJ180A	SMAJ180CA	ST	XT	180	1	201	222	1	292	1.4
SMAJ200A	SMAJ200CA	SX	XX	200	1	224	247	1	324	1.3
SMAJ220A	SMAJ220CA	ZE	YE	220	1	246	272	1	356	1.1
SMAJ250A	SMAJ250CA	ZG	YG	250	1	279	309	1	405	1
SMAJ300A	SMAJ300CA	ZK	YK	300	1	335	371	1	486	0.8
SMAJ350A	SMAJ350CA	ZM	YM	350	1	391	432	1	567	0.7
SMAJ400A	SMAJ400CA	ZP	YP	400	1	447	494	1	648	0.6
SMAJ440A	SMAJ440CA	ZR	YR	440	1	492	543	1	713	0.6

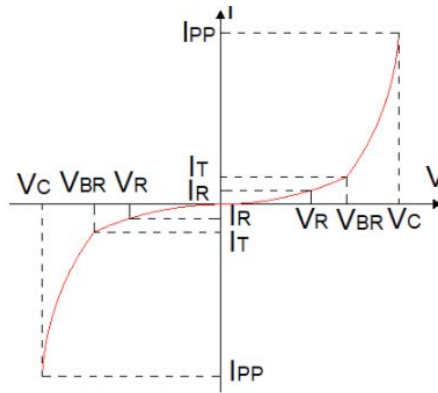
Note: Standard part numbers listed
Alternate part numbers have the
addition of an E and a “-” for the “.”
where applicable. Example standard
part number SMAJ5.0A, Alternate part
number SMAJE5-0A

Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

V- I curve characteristics (Uni-directional)



V- I curve characteristics (Bi-directional)



Surge waveform: 10/1000 μ s

V_R : Stand-off voltage – Maximum voltage that can be applied

V_{BR} : Breakdown voltage

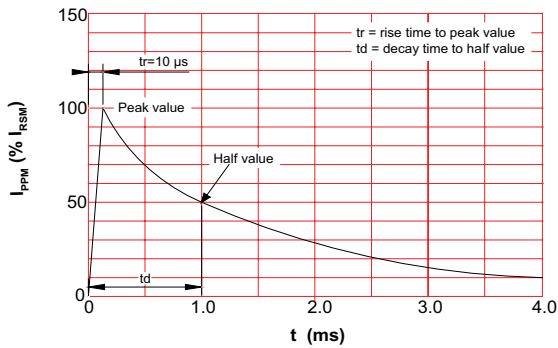
V_C : Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R : Reverse leakage current

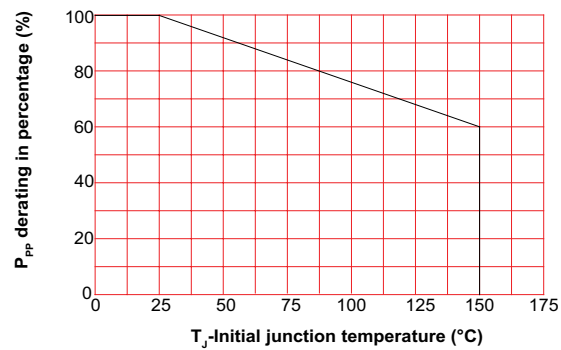
I_T : Test current

V_F : Forward voltage drop for Uni-directional TVS diode

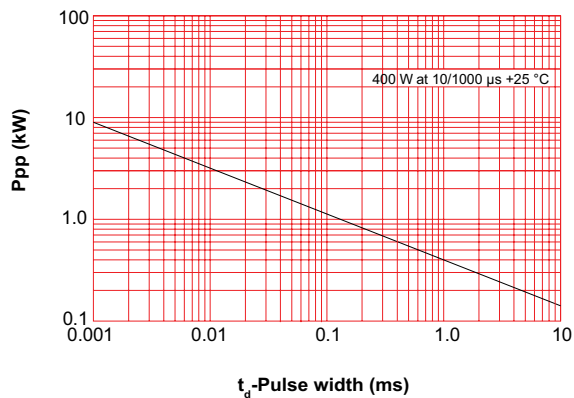
Pulse waveform



Pulse derating curve



Peak pulse power dissipation vs. pulse width



Solder reflow profile

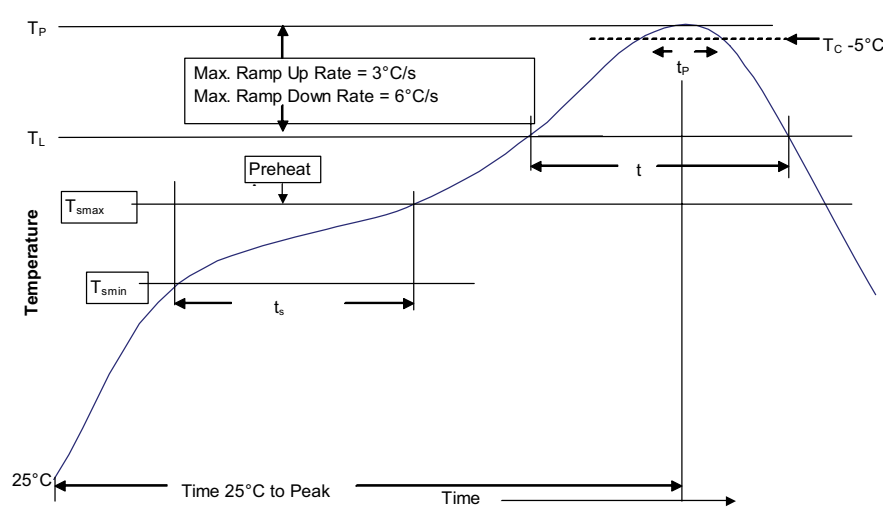


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference J-STD-020

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat and soak - Temperature min. (T_{smin}) - Temperature max. (T_{smax}) - Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-180 seconds
Ramp up rate T_L to T_p	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body temperature (T_p)*	Table 1	Table 2
Time (t_p)* within 5 °C of the specified classification temperature (T_C)	20 seconds*	40 seconds*
Ramp-down rate (T_p to T_L)	6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

© 2024 Eaton
All Rights Reserved
Printed in USA
Publication No. 11213
September 2024

Eaton is a registered trademark.

All other trademarks are property
of their respective owners.

Follow us on social media to get the
latest product and support information.

