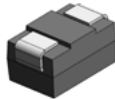


SMAJE

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

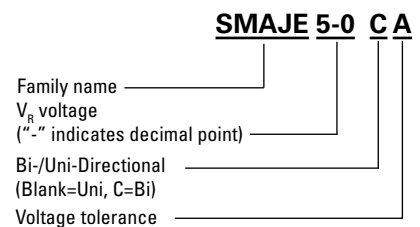
Applications

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

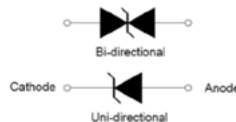
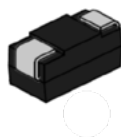
Environmental compliance and general specifications



Ordering part number



PIN configuration



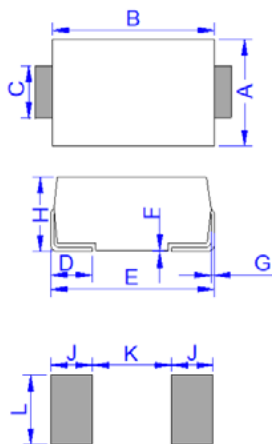
Absolute maximum ratings

(+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



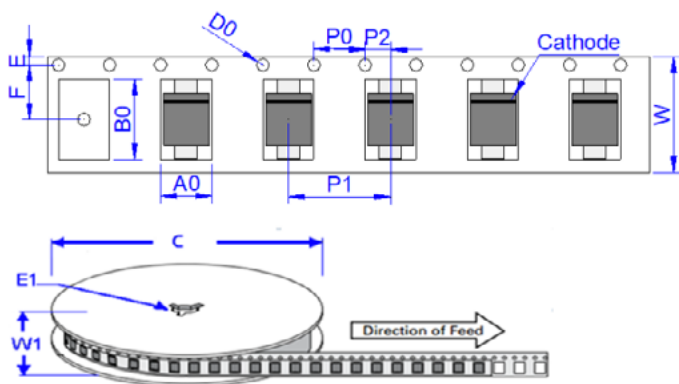
Cathode band (Uni-polar only)

Part marking: xxxx = Date code
yy- Refer to marking designator listed in Electrical Characteristics table

Packaging information (mm)

Drawing not to scale.

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



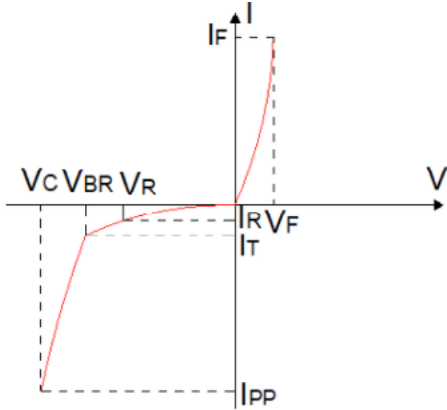
Dimension	Millimeters	Inches
A0	2.79 ± 0.3	0.110 ± 0.012
B0	5.33 ± 0.3	0.210 ± 0.012
C	330.0	13.0
D0	1.55 ± 0.1	0.061 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	5.50 ± 0.2	0.217 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	12.0 ±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

Electrical characteristics (+25 °C)

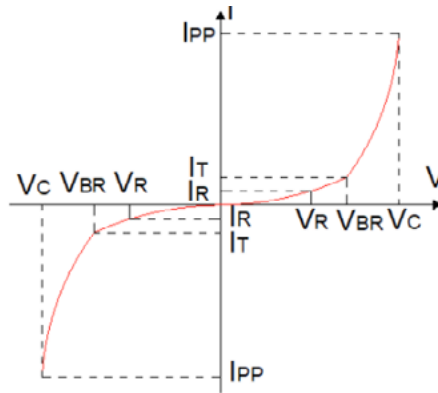
Part number	Marking		V_R (V)	$I_R @ V_R$ (μ A)	$V_{BR} @ I_T$ min (V)	max (V)	I_T (mA)	$V_C @ I_{PP}$ max (V)	I_{PP} (A)	
	Uni-polar	Bi-polar								Uni
SMAJE5-0A	SMAJE5-0CA	HE	TE	5	120	6.4	7	10	9.2	43.5
SMAJE6-0A	SMAJE6-0CA	HG	TG	6	120	6.67	7.37	10	10.3	38.8
SMAJE6-5A	SMAJE6-5CA	HK	TK	6.5	80	7.22	7.98	10	11.2	35.7
SMAJE7-0A	SMAJE7-0CA	HM	TM	7	50	7.78	8.6	10	12	33.3
SMAJE7-5A	SMAJE7-5CA	HP	TP	7.5	50	8.33	9.21	1	12.9	31
SMAJE8-0A	SMAJE8-0CA	HR	TR	8	20	8.89	9.83	1	13.6	29.4
SMAJE8-5A	SMAJE8-5CA	HT	TT	8.5	10	9.44	10.4	1	14.4	27.8
SMAJE9-0A	SMAJE9-0CA	HV	TV	9	5	10	11.1	1	15.4	26
SMAJE10A	SMAJE10CA	HX	TX	10	2	11.1	12.3	1	17	23.5
SMAJE11A	SMAJE11CA	HZ	TZ	11	1	12.2	13.5	1	18.2	22
SMAJE12A	SMAJE12CA	IE	UE	12	1	13.3	14.7	1	19.9	20.1
SMAJE13A	SMAJE13CA	IG	UG	13	1	14.4	15.9	1	21.5	18.6
SMAJE14A	SMAJE14CA	IK	UK	14	1	15.6	17.2	1	23.2	17.3
SMAJE15A	SMAJE15CA	IM	UM	15	1	16.7	18.5	1	24.4	16.4
SMAJE16A	SMAJE16CA	IP	UP	16	1	17.8	19.7	1	26	15.4
SMAJE17A	SMAJE17CA	IR	UR	17	1	18.9	20.9	1	27.6	14.5
SMAJE18A	SMAJE18CA	IT	UT	18	1	20	22.1	1	29.2	13.7
SMAJE20A	SMAJE20CA	IV	UV	20	1	22.2	24.5	1	32.4	12.4
SMAJE22A	SMAJE22CA	IX	UX	22	1	24.4	26.9	1	35.5	11.3
SMAJE24A	SMAJE24CA	IZ	UZ	24	1	26.7	29.5	1	38.9	10.3
SMAJE26A	SMAJE26CA	JE	VE	26	1	28.9	31.9	1	42.1	9.5
SMAJE28A	SMAJE28CA	JG	VG	28	1	31.1	34.4	1	45.4	8.8
SMAJE30A	SMAJE30CA	JK	VK	30	1	33.3	36.8	1	48.4	8.3
SMAJE33A	SMAJE33CA	JM	VM	33	1	36.7	40.6	1	53.3	7.5
SMAJE36A	SMAJE36CA	JP	VP	36	1	40	44.2	1	58.1	6.9
SMAJE40A	SMAJE40CA	JR	VR	40	1	44.4	49.1	1	64.5	6.2
SMAJE43A	SMAJE43CA	JT	VT	43	1	47.8	52.8	1	69.4	5.8
SMAJE45A	SMAJE45CA	JV	VV	45	1	50	55.3	1	72.7	5.5
SMAJE48A	SMAJE48CA	JX	VX	48	1	53.3	58.9	1	77.4	5.2
SMAJE51A	SMAJE51CA	JZ	VZ	51	1	56.7	62.7	1	82.4	4.9
SMAJE54A	SMAJE54CA	RE	WE	54	1	60	66.3	1	87.1	4.6
SMAJE58A	SMAJE58CA	RG	WG	58	1	64.4	71.2	1	93.6	4.3
SMAJE60A	SMAJE60CA	RK	WK	60	1	66.7	73.7	1	96.8	4.1
SMAJE64A	SMAJE64CA	RM	WM	64	1	71.1	78.6	1	103	3.9
SMAJE70A	SMAJE70CA	RP	WP	70	1	77.8	86	1	113	3.6
SMAJE75A	SMAJE75CA	RR	WR	75	1	83.3	92.1	1	121	3.3
SMAJE78A	SMAJE78CA	RT	WT	78	1	86.7	95.8	1	126	3.2
SMAJE85A	SMAJE85CA	RV	VV	85	1	94.4	104	1	137	2.9
SMAJE90A	SMAJE90CA	RX	WX	90	1	100	111	1	146	2.8
SMAJE100A	SMAJE100CA	RZ	WZ	100	1	111	123	1	162	2.5
SMAJE110A	SMAJE110CA	SE	XE	110	1	122	135	1	177	2.3
SMAJE120A	SMAJE120CA	SG	XG	120	1	133	147	1	193	2.1
SMAJE130A	SMAJE130CA	SK	XK	130	1	144	159	1	209	1.9
SMAJE150A	SMAJE150CA	SM	XM	150	1	167	185	1	243	1.7
SMAJE160A	SMAJE160CA	SP	XP	160	1	178	197	1	259	1.6
SMAJE170A	SMAJE170CA	SR	XR	170	1	189	209	1	275	1.5
SMAJE180A	SMAJE180CA	ST	XT	180	1	201	222	1	292	1.4
SMAJE200A	SMAJE200CA	SX	XX	200	1	224	247	1	324	1.3
SMAJE220A	SMAJE220CA	ZE	YE	220	1	246	272	1	356	1.1
SMAJE250A	SMAJE250CA	ZG	YG	250	1	279	309	1	405	1
SMAJE300A	SMAJE300CA	ZK	YK	300	1	335	371	1	486	0.8
SMAJE350A	SMAJE350CA	ZM	YM	350	1	391	432	1	567	0.7
SMAJE400A	SMAJE400CA	ZP	YP	400	1	447	494	1	648	0.6
SMAJE440A	SMAJE440CA	ZR	YR	440	1	492	543	1	713	0.6

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

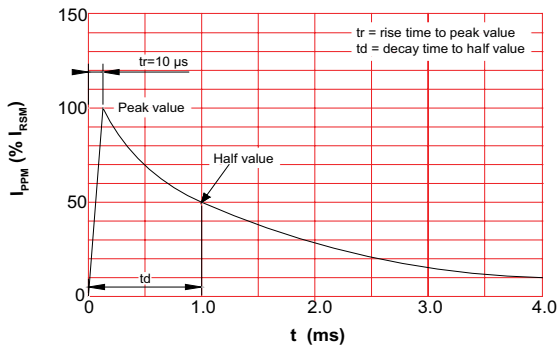
V_C : Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R : Reverse leakage current

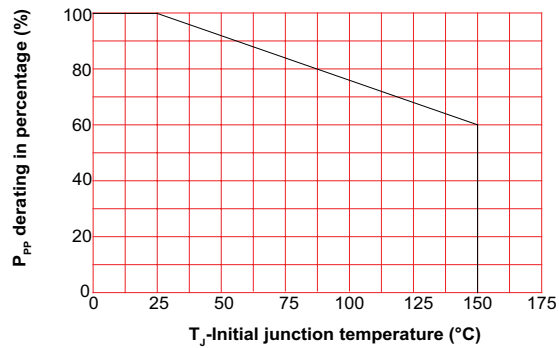
I_T : Test current

V_F : Forward voltage drop for Uni-directional TVS diode

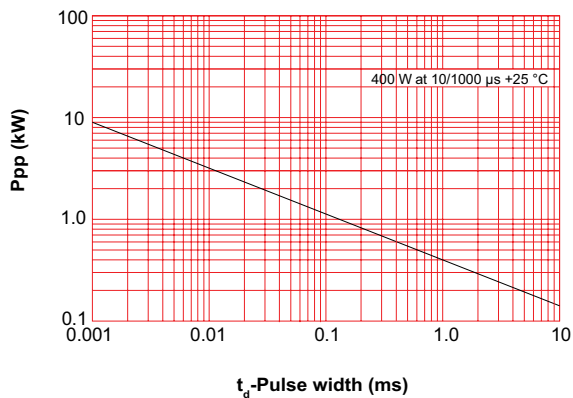
Pulse waveform



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 \geq 350
<2.5 mm	235 °C	220 °C
\geq 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	<ul style="list-style-type: none"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) 	<ul style="list-style-type: none"> 100 °C 150 °C 60-120 seconds
Ramp up rate T_L to T_p	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time (t_L) maintained above T_L	60-150 seconds	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

© 2020 Eaton
All Rights Reserved
Printed in USA
Publication No. 11213 BU-MC20191
November 2020

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.



X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [ESD Suppressors / TVS Diodes](#) category:

Click to view products by [Eaton](#) manufacturer:

Other Similar products are found below :

[60KS200C](#) [D18V0L1B2LP-7B](#) [D5V0F4U5P5-7](#) [NTE4902](#) [P4KE27CA](#) [P6KE11CA](#) [P6KE8.2A](#) [JANTX1N6053A](#) [SA60CA](#) [SA64CA](#)
[SMBJ12CATR](#) [SMBJ33CATR](#) [SMBJ8.0A](#) [ESD112-B1-02EL E6327](#) [ESD7451N2T5G](#) [19180-510](#) [CPDT-5V0USP-HF](#) [3.0SMCJ33CA-F](#)
[3.0SMCJ36A-F](#) [JANTX1N6126A](#) [JANTX1N6462](#) [JANTX1N6465](#) [D3V3Q1B2DLP3-7](#) [D55V0M1B2WS-7](#) [DRTR5V0U4SL-7](#) [SCM1293A-](#)
[04SO](#) [ESD200-B1-CSP0201 E6327](#) [SM12-7](#) [SMQA1000T1G](#) [CEN955 W/DATA](#) [VESD12A1A-HD1-GS08](#) [CPDUR5V0R-HF](#) [CPDQC5V0-](#)
[HF](#) [IP4042CX5/LF,135](#) [D1213A-01LP4-7B](#) [1SMB33CAT3G-XYZ](#) [ESD101-B1-02EL E6327](#) [5KP15A](#) [5KP48A](#) [5KP90A](#) [ESD3V3D7-TP](#)
[ESDAVLC12-1BV2](#) [15KPA36A-LF](#) [NTE4900](#) [P4KE56CA](#) [P4KE68A](#) [P4KE91CATR](#) [P6KE120A](#) [P6KE13CA](#) [P6KE43CA](#)