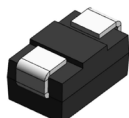


SMAJE

Automotive grade 400 W Transient voltage suppressor



Product features

- Automotive grade (AEC-Q101 qualified)
- Low profile SMA package
- Excellent clamping capability
- High reliability application
- 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
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: tin plated, solderable per J-STD-002
- UL 497B recognized.
File No. : E198449 Guide QVGQ2

Applications

- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

Environmental compliance and general specifications

- AEC-Q101 qualified



Ordering part number

SMAJE 5-0 CA H

Family name _____

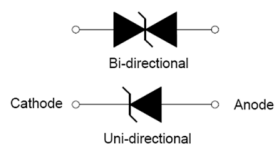
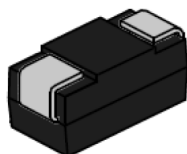
V_R voltage _____
 ("-" indicates decimal point)

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

Voltage tolerance _____

High reliability application _____

PIN configuration



Powering Business Worldwide

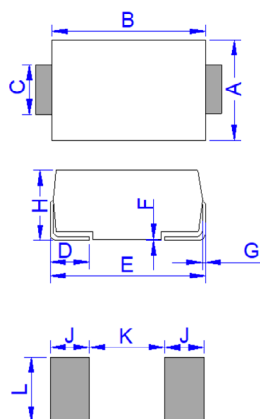
Absolute maximum ratings

(+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	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/inches



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:

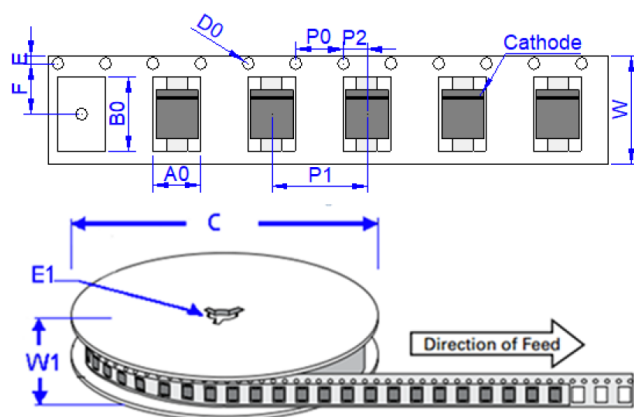
xxxx = Date code

yy- Refer to marking designator listed in Electrical characteristics table

Packaging information - mm/inches

Drawing not to scale.

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



Dimensions	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	0.042 ± 0.008
W1	15.7 ± 2.0	0.618 ± 0.079

SMAJE

Automotive grade 400 W Transient voltage suppressor

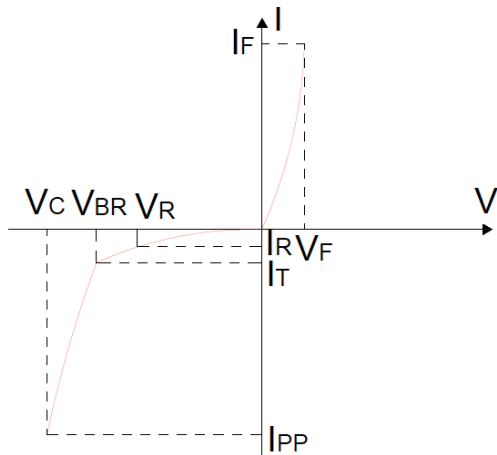
Technical Data ELX1062
Effective June 2021

Electrical specifications (+25 °C)

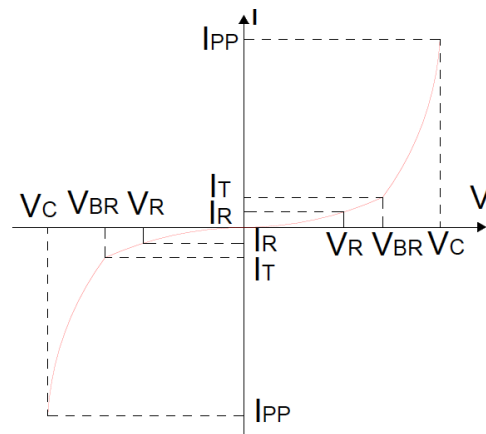
Part number		Marking		V _R	I _R @ V _R	V _{BR} @ I _T		I _T	V _C @ I _{PP}	I _{PP}
Uni-polar	Bi-polar	Uni	Bi	(V)	(μA)	min (V)	max (V)	(mA)	max (V)	(A)
SMAJE5-0AH	SMAJE5-0CAH	HE	TE	5	120	6.4	7	10	9.2	43.5
SMAJE6-0AH	SMAJE6-0CAH	HG	TG	6	120	6.67	7.37	10	10.3	38.8
SMAJE6-5AH	SMAJE6-5CAH	HK	TK	6.5	80	7.22	7.98	10	11.2	35.7
SMAJE7-0AH	SMAJE7-0CAH	HM	TM	7	50	7.78	8.6	10	12	33.3
SMAJE7-5AH	SMAJE7-5CAH	HP	TP	7.5	50	8.33	9.21	1	12.9	31
SMAJE8-0AH	SMAJE8-0CAH	HR	TR	8	20	8.89	9.83	1	13.6	29.4
SMAJE8-5AH	SMAJE8-5CAH	HT	TT	8.5	10	9.44	10.4	1	14.4	27.8
SMAJE9-0AH	SMAJE9-0CAH	HV	TV	9	5	10	11.1	1	15.4	26
SMAJE10AH	SMAJE10CAH	HX	TX	10	2	11.1	12.3	1	17	23.5
SMAJE11AH	SMAJE11CAH	HZ	TZ	11	1	12.2	13.5	1	18.2	22
SMAJE12AH	SMAJE12CAH	IE	UE	12	1	13.3	14.7	1	19.9	20.1
SMAJE13AH	SMAJE13CAH	IG	UG	13	1	14.4	15.9	1	21.5	18.6
SMAJE14AH	SMAJE14CAH	IK	UK	14	1	15.6	17.2	1	23.2	17.3
SMAJE15AH	SMAJE15CAH	IM	UM	15	1	16.7	18.5	1	24.4	16.4
SMAJE16AH	SMAJE16CAH	IP	UP	16	1	17.8	19.7	1	26	15.4
SMAJE17AH	SMAJE17CAH	IR	UR	17	1	18.9	20.9	1	27.6	14.5
SMAJE18AH	SMAJE18CAH	IT	UT	18	1	20	22.1	1	29.2	13.7
SMAJE20AH	SMAJE20CAH	IV	UV	20	1	22.2	24.5	1	32.4	12.4
SMAJE22AH	SMAJE22CAH	IX	UX	22	1	24.4	26.9	1	35.5	11.3
SMAJE24AH	SMAJE24CAH	IZ	UZ	24	1	26.7	29.5	1	38.9	10.3
SMAJE26AH	SMAJE26CAH	JE	VE	26	1	28.9	31.9	1	42.1	9.5
SMAJE28AH	SMAJE28CAH	JG	VG	28	1	31.1	34.4	1	45.4	8.8
SMAJE30AH	SMAJE30CAH	JK	VK	30	1	33.3	36.8	1	48.4	8.3
SMAJE33AH	SMAJE33CAH	JM	VM	33	1	36.7	40.6	1	53.3	7.5
SMAJE36AH	SMAJE36CAH	JP	VP	36	1	40	44.2	1	58.1	6.9
SMAJE40AH	SMAJE40CAH	JR	VR	40	1	44.4	49.1	1	64.5	6.2
SMAJE43AH	SMAJE43CAH	JT	VT	43	1	47.8	52.8	1	69.4	5.8
SMAJE45AH	SMAJE45CAH	JV	VV	45	1	50	55.3	1	72.7	5.5
SMAJE48AH	SMAJE48CAH	JX	VX	48	1	53.3	58.9	1	77.4	5.2
SMAJE51AH	SMAJE51CAH	JZ	VZ	51	1	56.7	62.7	1	82.4	4.9
SMAJE54AH	SMAJE54CAH	RE	WE	54	1	60	66.3	1	87.1	4.6
SMAJE58AH	SMAJE58CAH	RG	WG	58	1	64.4	71.2	1	93.6	4.3
SMAJE60AH	SMAJE60CAH	RK	WK	60	1	66.7	73.7	1	96.8	4.1
SMAJE64AH	SMAJE64CAH	RM	WM	64	1	71.1	78.6	1	103	3.9
SMAJE70AH	SMAJE70CAH	RP	WP	70	1	77.8	86	1	113	3.6
SMAJE75AH	SMAJE75CAH	RR	WR	75	1	83.3	92.1	1	121	3.3
SMAJE78AH	SMAJE78CAH	RT	WT	78	1	86.7	95.8	1	126	3.2
SMAJE85AH	SMAJE85CAH	RV	WV	85	1	94.4	104	1	137	2.9
SMAJE90AH	SMAJE90CAH	RX	WX	90	1	100	111	1	146	2.8
SMAJE100AH	SMAJE100CAH	RZ	WZ	100	1	111	123	1	162	2.5
SMAJE110AH	SMAJE110CAH	SE	XE	110	1	122	135	1	177	2.3
SMAJE120AH	SMAJE120CAH	SG	XG	120	1	133	147	1	193	2.1
SMAJE130AH	SMAJE130CAH	SK	XK	130	1	144	159	1	209	1.9
SMAJE150AH	SMAJE150CAH	SM	XM	150	1	167	185	1	243	1.7
SMAJE160AH	SMAJE160CAH	SP	XP	160	1	178	197	1	259	1.6
SMAJE170AH	SMAJE170CAH	SR	XR	170	1	189	209	1	275	1.5
SMAJE180AH	SMAJE180CAH	ST	XT	180	1	201	222	1	292	1.4
SMAJE200AH	SMAJE200CAH	SX	XX	200	1	224	247	1	324	1.3
SMAJE220AH	SMAJE220CAH	ZE	YE	220	1	246	272	1	356	1.1
SMAJE250AH	SMAJE250CAH	ZG	YG	250	1	279	309	1	405	1
SMAJE300AH	SMAJE330CAH	ZK	YK	300	1	335	371	1	486	0.8
SMAJE350AH	SMAJE350CAH	ZM	YM	350	1	391	432	1	567	0.7
SMAJE400AH	SMAJE400CAH	ZP	YP	400	1	447	494	1	648	0.6
SMAJE440AH	SMAJE440CAH	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

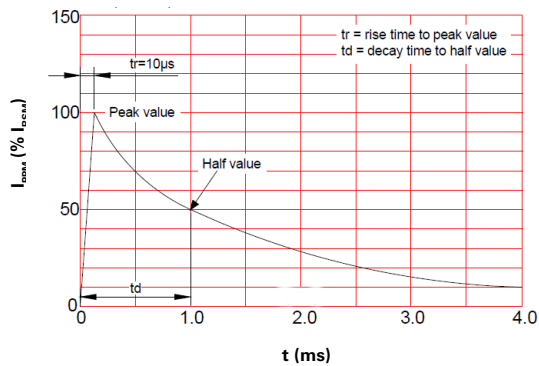
V_C : Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R : Reverse leakage current

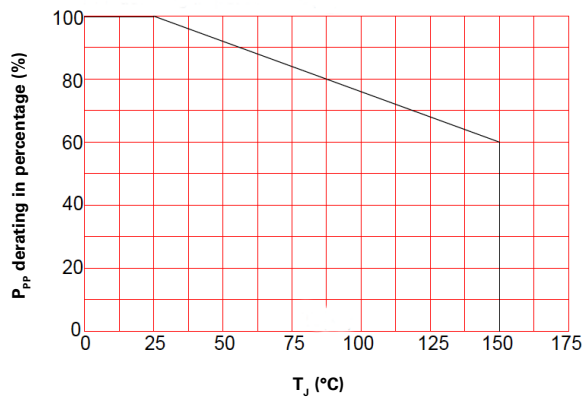
I_T : Test current

V_F : Forward voltage drop for Uni-directional

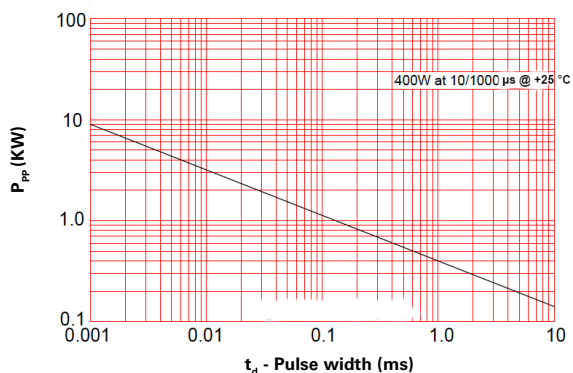
Pulse waveform



Pulse derating curve



Peak pulse power dissipation curve



Solder reflow profile

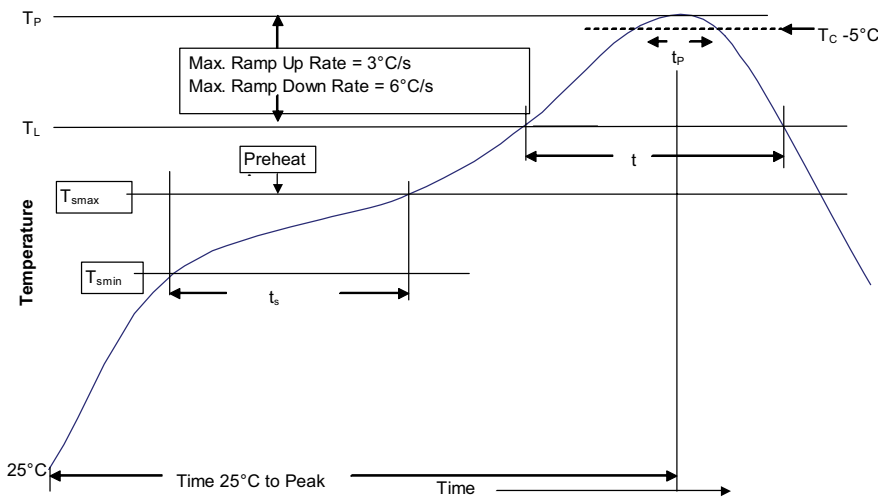


Table 1 - Standard SnPb solder (T_C)

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})	100 °C	150 °C
• Temperature max. (T_{smax})	150 °C	200 °C
• Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60 - 180 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 (+0, -5 °C)
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

© 2021 Eaton
All Rights Reserved
Printed in USA
Publication No. ELX1062 BU-ELX21062
June 2021

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.

