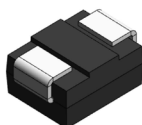


SMBJE

Automotive grade 600 W Transient voltage suppressor



Product features

- Automotive grade (AEC-Q101 qualified)
- Low profile SMB package
- Excellent clamping capability
- High reliability application
- 600 W peak pulse power capability at 10/1000 μ s waveform
- Typical I_R less than 1 μ A above 9 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

SMBJE 5-0 CA H

Family name _____

V_R voltage
("." indicates decimal point) _____

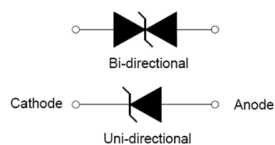
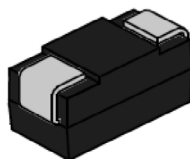
Bi-/Uni-Directional _____

(Blank=Uni, C=Bi)

Voltage tolerance _____

High reliability application _____

PIN configuration



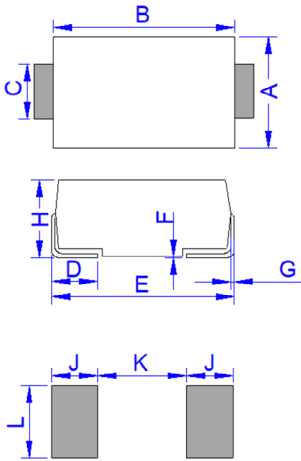
Absolute maximum ratings

(+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	$P_{M(AV)}$	5	W
Peak pulse power dissipation on 10/1000 μ s waveform	P_{PP}	600	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}	100	A
Typical thermal resistance junction to lead	$R_{\theta JL}$	20	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	100	°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	3.30	3.94	0.130	0.155
B	4.30	4.80	0.169	0.189
C	1.90	2.20	0.075	0.087
D	0.95	1.52	0.037	0.060
E	5.20	5.60	0.205	0.220
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.10	2.40	0.083	0.094
J	2.00	-	0.087	-
K	-	2.60	-	0.102
L	2.30	-	0.091	-

Part marking



Cathode band (uni-polar only)

Part marking:

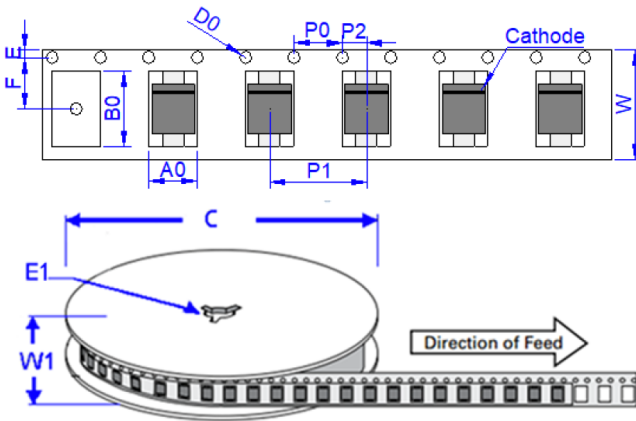
xxxx = Date code

yy- Refer to marking designator listed in Electrical characteristics table

Packaging information - mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 3,000 parts per 13" diameter reel (EIA-481 compliant)



Dimensions	Millimeters	Inches
A0	3.76 ± 0.3	0.148 ± 0.012
B0	5.69 ± 0.3	0.224 ± 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	8.00 ± 0.2	0.3145 ± 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

SMBJE

Automotive grade 600 W Transient voltage suppressor

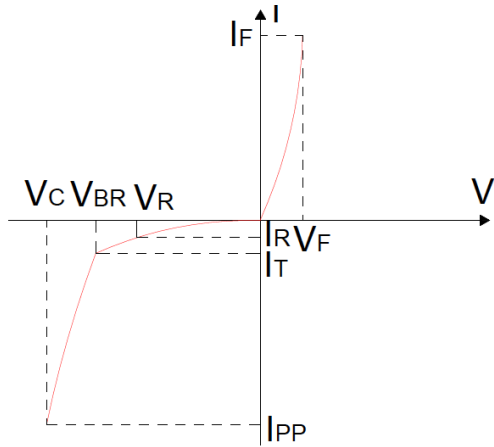
Technical Data ELX1063
Effective June 2021

Electrical specifications (+25 °C) * = not UL497B recognized

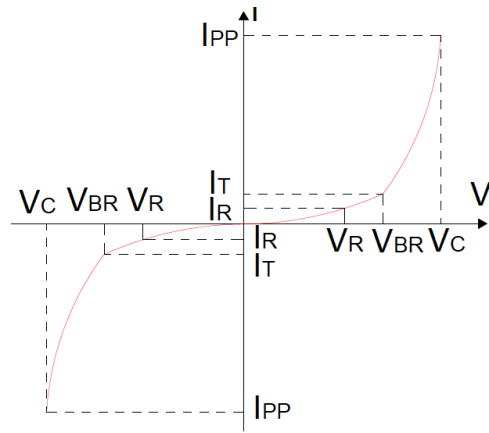
Part number		Marking		V _R	I _R @ V _R	V _{BR} @ I _T		I _T	V _C @ I _{PP}	I _{PP}
Uni-polar	Bi-polar	Uni	Bi	(V)	(μA)	min (V)	max (V)	(mA)	max (V)	(A)
SMBJE5-0AH	SMBJE5-0CAH	KE	AE	5	120	6.4	7	10	9.2	65.2
SMBJE6-0AH	SMBJE6-0CAH	KG	AG	6	120	6.67	7.37	10	10.3	58.3
SMBJE6-5AH	SMBJE6-5CAH	KK	AK	6.5	120	7.22	7.98	10	11.2	53.6
SMBJE7-0AH	SMBJE7-0CAH	KM	AM	7	50	7.78	8.6	10	12	50
SMBJE7-5AH	SMBJE7-5CAH	KP	AP	7.5	50	8.33	9.21	1	12.9	46.5
SMBJE8-0AH	SMBJE8-0CAH	KR	AR	8	20	8.89	9.83	1	13.6	44.1
SMBJE8-5AH	SMBJE8-5CAH	KT	AT	8.5	10	9.44	10.4	1	14.4	41.7
SMBJE9-0AH	SMBJE9-0CAH	KV	AV	9	5	10	11.1	1	15.4	39
SMBJE11AH	SMBJE11CAH	KZ	AZ	11	1	12.2	13.5	1	18.2	33
SMBJE12AH	SMBJE12CAH	LE	BE	12	1	13.3	14.7	1	19.9	30.2
SMBJE13AH	SMBJE13CAH	LG	BG	13	1	14.4	15.9	1	21.5	27.9
SMBJE14AH	SMBJE14CAH	LK	BK	14	1	15.6	17.2	1	23.2	25.9
SMBJE15AH	SMBJE15CAH	LM	BM	15	1	16.7	18.5	1	24.4	24.6
SMBJE16AH	SMBJE16CAH	LP	BP	16	1	17.8	19.7	1	26	23.1
SMBJE17AH	SMBJE17CAH	LR	BR	17	1	18.9	20.9	1	27.6	21.8
SMBJE18AH	SMBJE18CAH	LT	BT	18	1	20	22.1	1	29.2	20.6
SMBJE20AH	SMBJE20CAH	LV	BV	20	1	22.2	24.5	1	32.4	18.6
SMBJE22AH	SMBJE22CAH	LX	BX	22	1	24.4	26.9	1	35.5	16.9
SMBJE24AH	SMBJE24CAH	LZ	BZ	24	1	26.7	29.5	1	38.9	15.4
SMBJE26AH	SMBJE26CAH	ME	CE	26	1	28.9	31.9	1	42.1	14.3
SMBJE28AH	SMBJE28CAH	MG	CG	28	1	31.1	34.4	1	45.4	13.2
SMBJE30AH	SMBJE30CAH	MK	CK	30	1	33.3	36.8	1	48.4	12.4
SMBJE33AH	SMBJE33CAH	MM	CM	33	1	36.7	40.6	1	53.3	11.3
SMBJE36AH	SMBJE36CAH	MP	CP	36	1	40	44.2	1	58.1	10.4
SMBJE40AH	SMBJE40CAH	MR	CR	40	1	44.4	49.1	1	64.5	9.3
SMBJE43AH	SMBJE43CAH	MT	CT	43	1	47.8	52.8	1	69.4	8.7
SMBJE45AH	SMBJE45CAH	MV	CV	45	1	50	55.3	1	72.7	8.3
SMBJE48AH	SMBJE48CAH	MX	CX	48	1	53.3	58.9	1	77.4	7.8
SMBJE51AH	SMBJE51CAH	MZ	CZ	51	1	56.7	62.7	1	82.4	7.3
SMBJE54AH	SMBJE54CAH	NE	DE	54	1	60	66.3	1	87.1	6.9
SMBJE58AH	SMBJE58CAH	NG	DG	58	1	64.4	71.2	1	93.6	6.4
SMBJE60AH	SMBJE60CAH	NK	DK	60	1	66.7	73.7	1	96.8	6.2
SMBJE64AH	SMBJE64CAH	NM	DM	64	1	71.1	78.6	1	103	5.8
SMBJE70AH	SMBJE70CAH	NP	DP	70	1	77.8	86	1	113	5.3
SMBJE75AH	SMBJE75CAH	NR	DR	75	1	83.3	92.1	1	121	5
SMBJE78AH	SMBJE78CAH	NT	DT	78	1	86.7	95.8	1	126	4.8
SMBJE85AH	SMBJE85CAH	NV	DV	85	1	94.4	104	1	137	4.4
SMBJE90AH	SMBJE90CAH	NX	DX	90	1	100	111	1	146	4.1
SMBJE100AH	SMBJE100CAH	NZ	DZ	100	1	111	123	1	162	3.7
SMBJE110AH	SMBJE110CAH	PE	EE	110	1	122	135	1	177	3.4
SMBJE120AH	SMBJE120CAH	PG	EG	120	1	133	147	1	193	3.1
SMBJE130AH	SMBJE130CAH	PK	EK	130	1	144	159	1	209	2.9
SMBJE150AH	SMBJE150CAH	PM	EM	150	1	167	185	1	243	2.5
SMBJE160AH	SMBJE160CAH	PP	EP	160	1	178	197	1	259	2.3
SMBJE170AH	SMBJE170CAH	PR	ER	170	1	189	209	1	275	2.2
SMBJE180AH	SMBJE180CAH	PT	ET	180	1	201	222	1	292	2.1
SMBJE190AH	SMBJE190CAH	PV	EV	190	1	211	234	1	307	2
SMBJE200AH	SMBJE200CAH	PX	EX	200	1	224	247	1	324	1.9
SMBJE210AH	SMBJE210CAH	PZ	EZ	210	1	233	258	1	337	1.8
SMBJE220AH	SMBJE220CAH	QE	FE	220	1	246	272	1	356	1.7
SMBJE250AH	SMBJE250CAH	QG	FG	250	1	279	309	1	405	1.5
SMBJE300AH	SMBJE300CAH	QK	FK	300	1	335	371	1	486	1.3
SMBJE350AH	SMBJE350CAH	QM	FM	350	1	391	432	1	567	1.1
SMBJE400AH	SMBJE400CAH	QP	FP	400	1	447	494	1	648	0.9
SMBJE440AH	SMBJE440CAH	QR	FR	440	1	492	543	1	713	0.8
SMBJE460AH*	SMBJE460CAH*	QT	FT	460	1	510	560	1	735	0.8

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

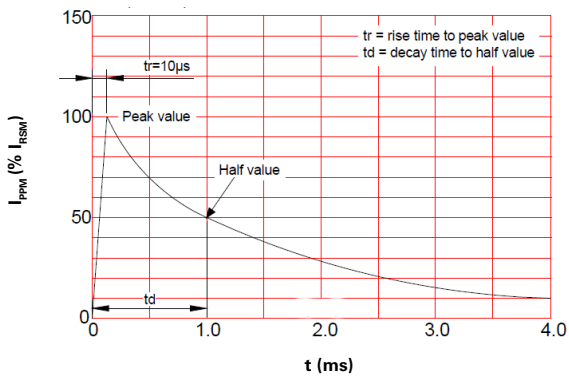
V_C : Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R : Reverse leakage current

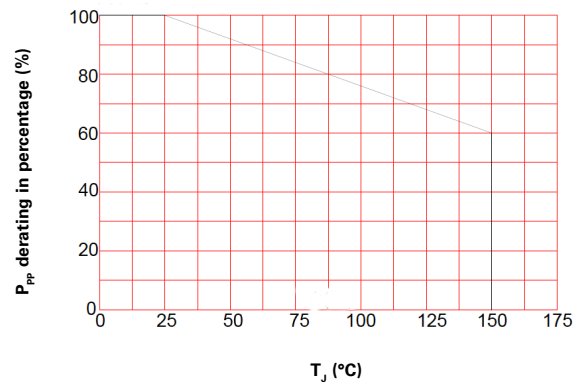
I_T : Test current

V_F : Forward voltage drop for Uni-directional

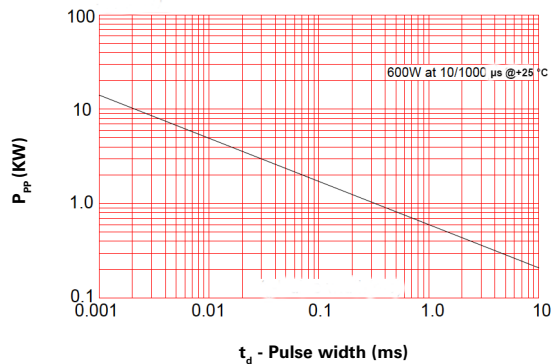
Pulse waveform



Pulse derating curve



Peak pulse power dissipation curve



Solder reflow profile

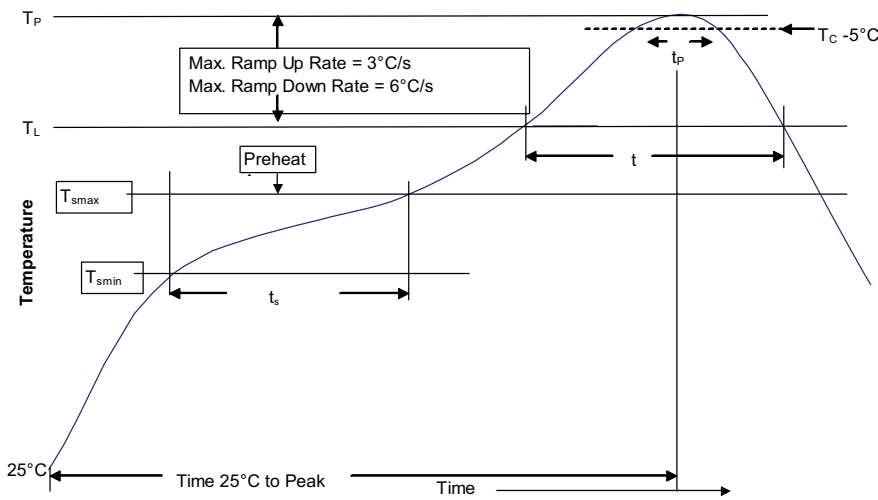


Table 1 - Standard SnPb solder (T_C)

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. ELX1063 BU-ELX21063
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.

