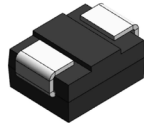


# SMBJE

## 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  $\mu$ s waveform
- Typical  $I_R$  less than 1  $\mu$ 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

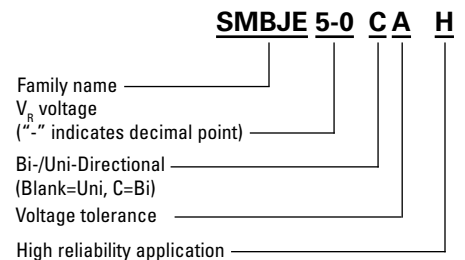
- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

### Environmental compliance and general specifications

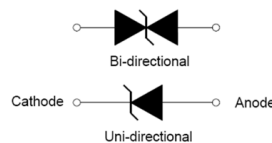
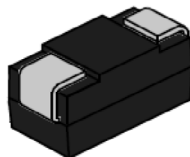
- AEC-Q101 qualified



### Ordering part number



### PIN configuration



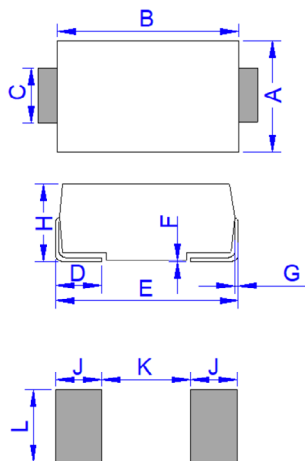
### Absolute maximum ratings

(+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 $\mu$ 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 <sup>1</sup>	$I_{FSM}$	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

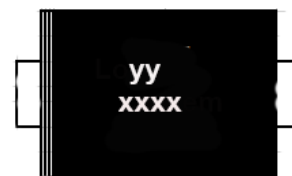
1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

### 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

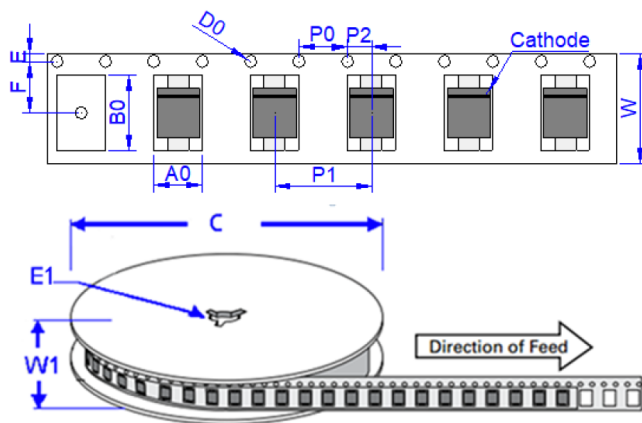


Cathode band (uni-polar only)  
Part marking:  
xxxx = Date code  
yy- Refer to marking designator listed in Electrical characteristics table

### 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

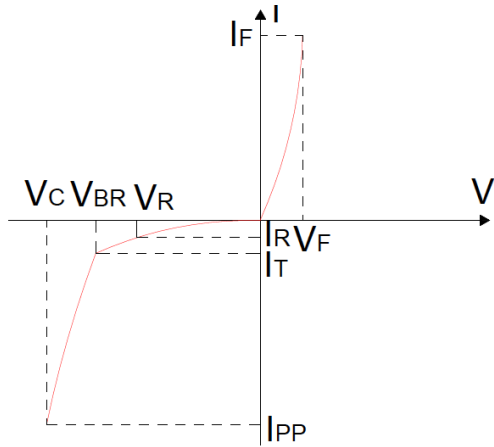
Technical Data ELX1063  
Effective June 2021

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

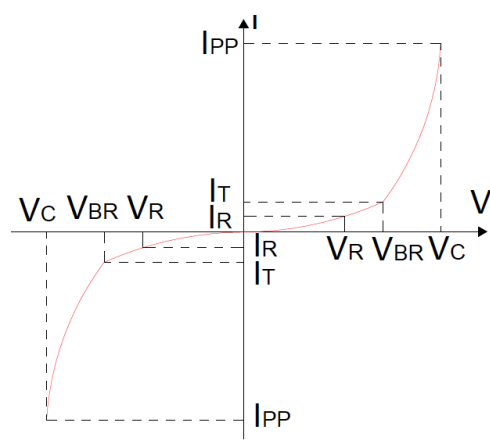
Part number		Marking		$V_R$	$I_R @ V_R$	$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}$
Uni-polar	Bi-polar	Uni	Bi	(V)	( $\mu$ A)	min (V)	max (V)	(mA)	max (V)	(A)
SMBJE5-0AH	SMBJE5-0CAH	KE	AE	5	120	6.4	7	10	9.2	65.2
SMBJE6-0AH	SMBJE6-0CAH	KG	AG	6	120	6.67	7.37	10	10.3	58.3
SMBJE6-5AH	SMBJE6-5CAH	KK	AK	6.5	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  $\mu$ s

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

$V_{BR}$ : Breakdown voltage

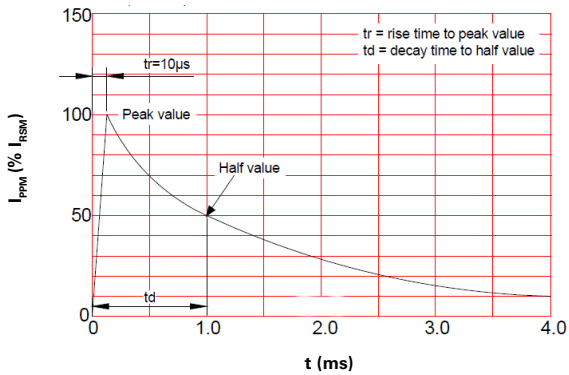
$V_C$ : Clamping voltage – Peak voltage measured across the suppressor at a specified  $I_{PP}$

$I_R$ : Reverse leakage current

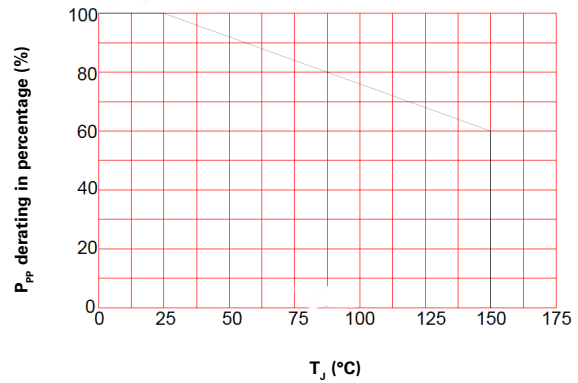
$I_T$ : Test current

$V_F$ : Forward voltage drop for Uni-directional

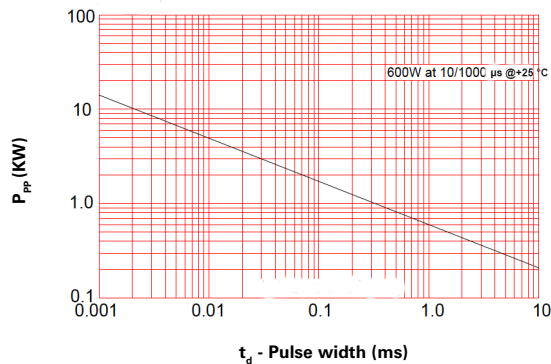
**Pulse waveform**



**Pulse derating curve**



**Peak pulse power dissipation curve**



Solder reflow profile

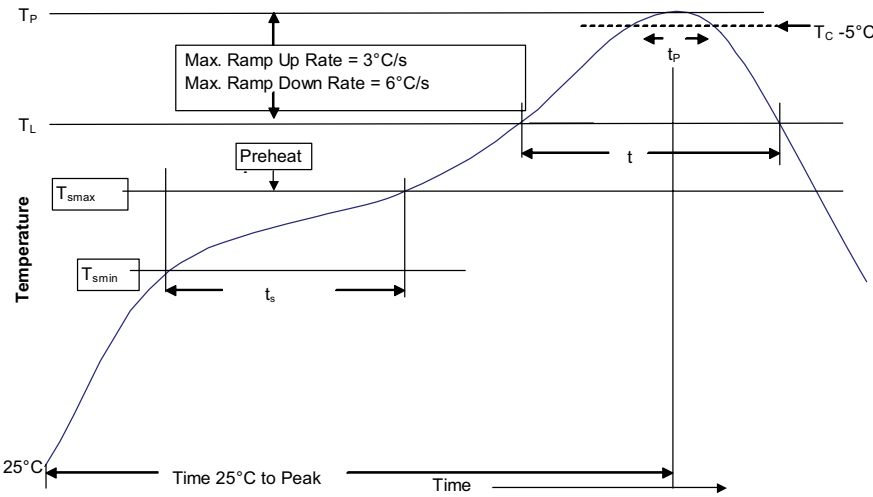


Table 1 - Standard SnPb solder ( $T_C$ )

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥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 <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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.

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