SMBJ

600 W Transient voltage suppressor

Applications

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

Product features

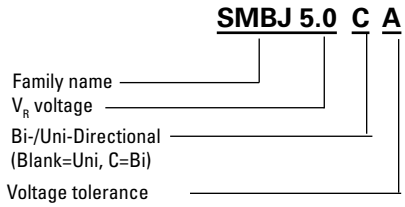
- Low profile SMB package
- Excellent clamping capability
- 600 W peak pulse power capability at 10/1000 µs waveform
- Typical I_R less than 1 µA above 10 V
- Fast response time: typically less than 1.0 ps from 0 V to V_{BR} minimum
- High temperature reflow soldering: +260 °C /40 s at terminal
- Plastic 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

Environmental compliance and general specifications

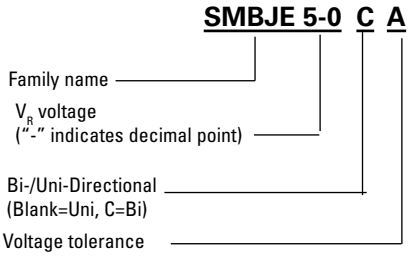
HALOGEN HF FREE

RoHS

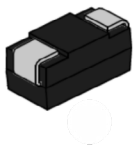
Ordering part number

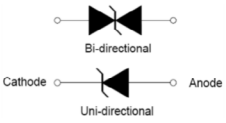


Alternate ordering part number



PIN configuration





Powering Business Worldwide

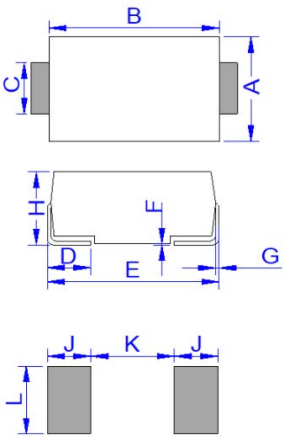
Absolute maximum ratings

(+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	$P_{M(AV)}$	5.0	W
Peak pulse power dissipation on 10/1000 µs waveform	P_{PP}	600	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}	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



	Millimeters		Inches	
Dimension	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	2.20		0.087	
K		2.60		0.102
L	2.30		0.091	

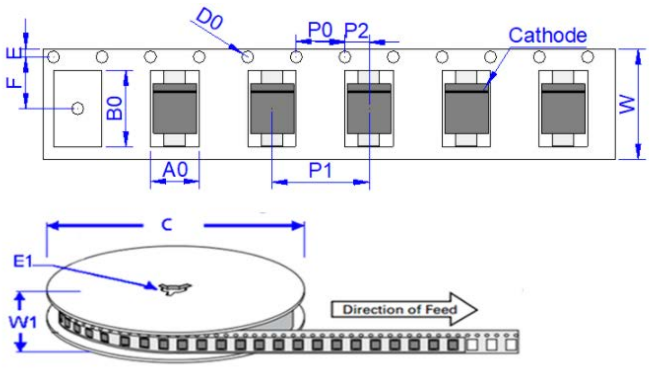
Part marking

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, 3,000 parts per 13" diameter reel (EIA-481 compliant)



Dimension	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

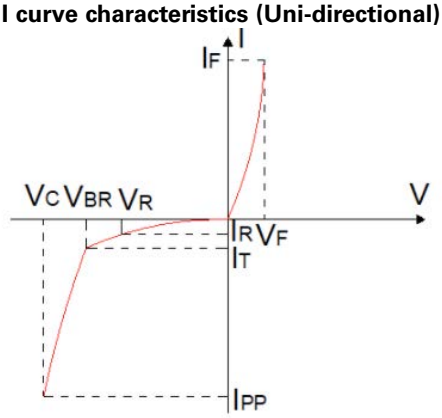
Electrical characteristics (+25 °C)

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)
SMBJ5.0A	SMBJ5.0CA	KE	AE	5	120	6.4	7	10	9.2	65.2
SMBJ6.0A	SMBJ6.0CA	KG	AG	6	120	6.67	7.37	10	10.3	58.3
SMBJ6.5A	SMBJ6.5CA	KK	AK	6.5	120	7.22	7.98	10	11.2	53.6
SMBJ7.0A	SMBJ7.0CA	KM	AM	7	50	7.78	8.6	10	12	50
SMBJ7.5A	SMBJ7.5CA	KP	AP	7.5	50	8.33	9.21	1	12.9	46.5
SMBJ8.0A	SMBJ8.0CA	KR	AR	8	20	8.89	9.83	1	13.6	44.1
SMBJ8.5A	SMBJ8.5CA	KT	AT	8.5	10	9.44	10.4	1	14.4	41.7
SMBJ9.0A	SMBJ9.0CA	KV	AV	9	5	10	11.1	1	15.4	39
SMBJ10A	SMBJ10CA	KX	AX	10	2	11.1	12.3	1	17	35.3
SMBJ11A	SMBJ11CA	KZ	AZ	11	1	12.2	13.5	1	18.2	33
SMBJ12A	SMBJ12CA	LE	BE	12	1	13.3	14.7	1	19.9	30.2
SMBJ13A	SMBJ13CA	LG	BG	13	1	14.4	15.9	1	21.5	27.9
SMBJ14A	SMBJ14CA	LK	BK	14	1	15.6	17.2	1	23.2	25.9
SMBJ15A	SMBJ15CA	LM	BM	15	1	16.7	18.5	1	24.4	24.6
SMBJ16A	SMBJ16CA	LP	BP	16	1	17.8	19.7	1	26	23.1
SMBJ17A	SMBJ17CA	LR	BR	17	1	18.9	20.9	1	27.6	21.8
SMBJ18A	SMBJ18CA	LT	BT	18	1	20	22.1	1	29.2	20.6
SMBJ20A	SMBJ20CA	LV	BV	20	1	22.2	24.5	1	32.4	18.6
SMBJ22A	SMBJ22CA	LX	BX	22	1	24.4	26.9	1	35.5	16.9
SMBJ24A	SMBJ24CA	LZ	BZ	24	1	26.7	29.5	1	38.9	15.4
SMBJ26A	SMBJ26CA	ME	CE	26	1	28.9	31.9	1	42.1	14.3
SMBJ28A	SMBJ28CA	MG	CG	28	1	31.1	34.4	1	45.4	13.2
SMBJ30A	SMBJ30CA	MK	CK	30	1	33.3	36.8	1	48.4	12.4
SMBJ33A	SMBJ33CA	MM	CM	33	1	36.7	40.6	1	53.3	11.3
SMBJ36A	SMBJ36CA	MP	CP	36	1	40	44.2	1	58.1	10.4
SMBJ40A	SMBJ40CA	MR	CR	40	1	44.4	49.1	1	64.5	9.3
SMBJ43A	SMBJ43CA	MT	CT	43	1	47.8	52.8	1	69.4	8.7
SMBJ45A	SMBJ45CA	MV	CV	45	1	50	55.3	1	72.7	8.3
SMBJ48A	SMBJ48CA	MX	CX	48	1	53.3	58.9	1	77.4	7.8
SMBJ51A	SMBJ51CA	MZ	CZ	51	1	56.7	62.7	1	82.4	7.3
SMBJ54A	SMBJ54CA	NE	DE	54	1	60	66.3	1	87.1	6.9
SMBJ58A	SMBJ58CA	NG	DG	58	1	64.4	71.2	1	93.6	6.4
SMBJ60A	SMBJ60CA	NK	DK	60	1	66.7	73.7	1	96.8	6.2
SMBJ64A	SMBJ64CA	NM	DM	64	1	71.1	78.6	1	103	5.8
SMBJ70A	SMBJ70CA	NP	DP	70	1	77.8	86	1	113	5.3
SMBJ75A	SMBJ75CA	NR	DR	75	1	83.3	92.1	1	121	5
SMBJ78A	SMBJ78CA	NT	DT	78	1	86.7	95.8	1	126	4.8
SMBJ85A	SMBJ85CA	NV	DV	85	1	94.4	104	1	137	4.4
SMBJ90A	SMBJ90CA	NX	DX	90	1	100	111	1	146	4.1
SMBJ100A	SMBJ100CA	NZ	DZ	100	1	111	123	1	162	3.7
SMBJ110A	SMBJ110CA	PE	EE	110	1	122	135	1	177	3.4
SMBJ120A	SMBJ120CA	PG	EG	120	1	133	147	1	193	3.1
SMBJ130A	SMBJ130CA	PK	EK	130	1	144	159	1	209	2.9
SMBJ150A	SMBJ150CA	PM	EM	150	1	167	185	1	243	2.5
SMBJ160A	SMBJ160CA	PP	EP	160	1	178	197	1	259	2.3
SMBJ170A	SMBJ170CA	PR	ER	170	1	189	209	1	275	2.2
SMBJ180A	SMBJ180CA	PT	ET	180	1	201	222	1	292	2.1
SMBJ190A	SMBJ190CA	PV	EV	190	1	211	234	1	307	2
SMBJ200A	SMBJ200CA	PX	EX	200	1	224	247	1	324	1.9
SMBJ210A	SMBJ210CA	PZ	EZ	210	1	233	258	1	337	1.8
SMBJ220A	SMBJ220CA	QE	FE	220	1	246	272	1	356	1.7
SMBJ250A	SMBJ250CA	QG	FG	250	1	279	309	1	405	1.5
SMBJ300A	SMBJ300CA	QK	FK	300	1	335	371	1	486	1.3
SMBJ350A	SMBJ350CA	QM	FM	350	1	391	432	1	567	1.1
SMBJ400A	SMBJ400CA	QP	FP	400	1	447	494	1	648	0.9
SMBJ440A	SMBJ440CA	QR	FR	440	1	492	543	1	713	0.8

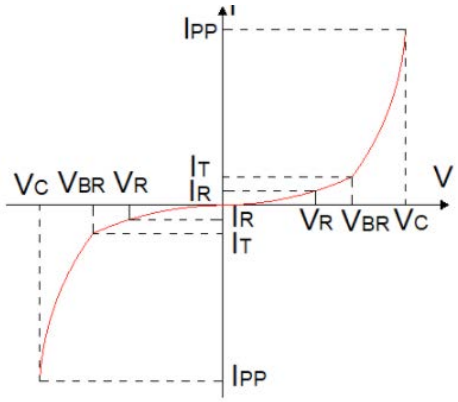
Note: Standard part numbers listed. Alternate part numbers have the addition of an E and a "-" for the "." where applicable. Example standard part number SMBJ5.0A, Alternate part number SMBJE5-0A

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 µs

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

V_{BR}: Breakdown voltage

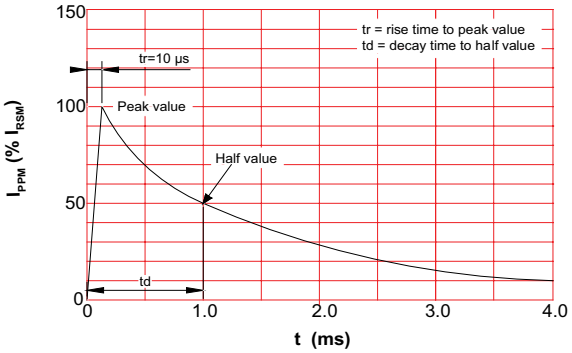
V_C: Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

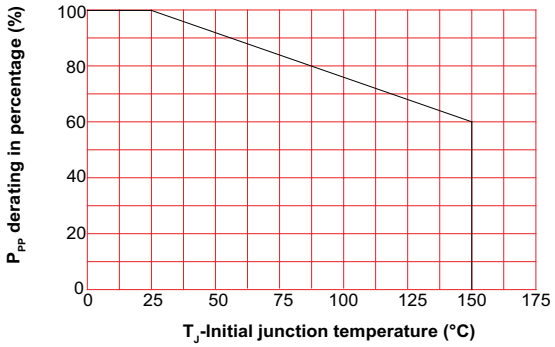
I_T: Test current

V_F: Forward voltage drop for Uni-directional TVS diode

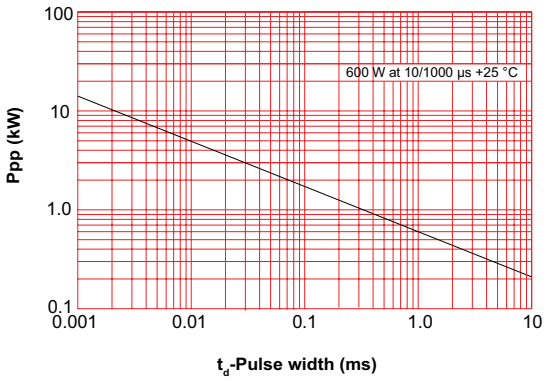
Pulse waveform



Pulse derating curve



Peak pulse power dissipation vs. pulse width



Solder reflow profile

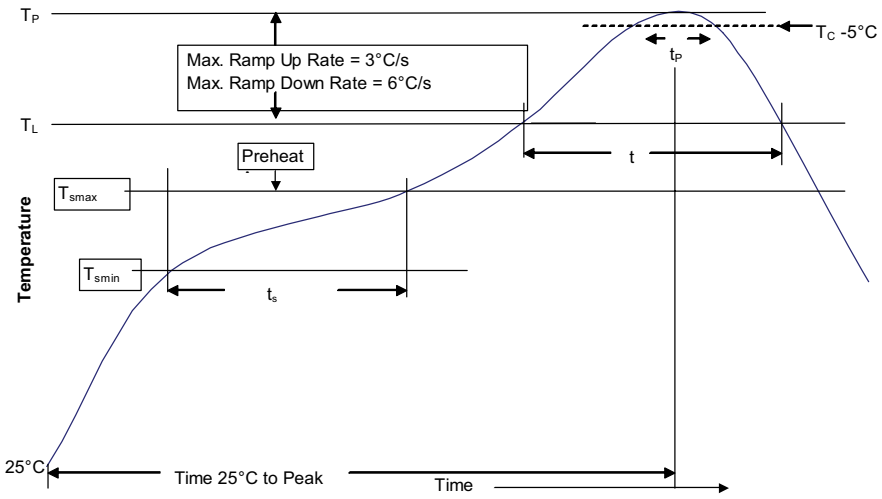


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥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 mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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) 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.

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