SM8T

Automotive grade 8000 W Transient voltage suppressor

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

Product features

- Automotive grade (AEC-Q101 qualified)
- Low profile DO-218AB package
- Excellent clamping capability
- High surge capability
- 8000 W peak pulse power capability at 10/1000 µs waveform
- Typical I_R less than 5 µA
- Plastic package meets UL 94 V-0 flammability rating
- Meets moisture sensitivity level (MSL) level 1
- Terminal: tin plated, solderable per J-STD-002

Environmental compliance and general specifications

- ISO16750-2 P5A: 12 V system*
- ISO16750-2 P5A: 24 V system*
- AEC-Q101 qualified

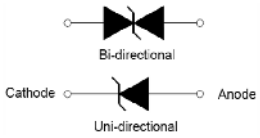
*= Varies by test condition. Bi-polar not recommended

Ordering part number

SM8T 36 C A H

- Family name
- V_R voltage
- Bi-/Uni-Directional (Blank=Uni, C=Bi)
- Voltage tolerance
- High reliability application

PIN configuration



Powering Business Worldwide

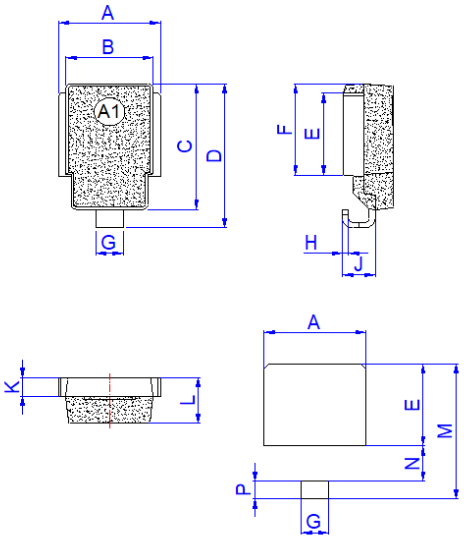
Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Storage operating junction temperature range	T_{STG}/ T_J	-55 to +175	°C
Steady state power dissipation at T_C= +25 °C	P_D	8.5	W
Peak pulse power dissipation on 10/1000 µs waveform	P_{PP}	8000	W
Peak pulse power dissipation on 10/10000 µs waveform	P_{PP}	6000	W
Peak forward surge current, 8.3 ms single half sine wave[1]	I_{FSM}	750	A
Typical thermal resistance junction to case	$R_{\theta JC}$	0.85	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	11	°C/W

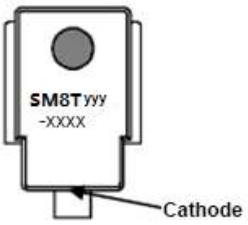
1. Measured on 8.3 ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle = 4 per minute maximum

Mechanical parameters, pad layout- mm/inches



	Millimeters		Inches	
Dimension	**Minimum**	**Maximum**	**Minimum**	**Maximum**
A	9.5	10.5	0.374	0.413
B	8.3	8.7	0.327	0.342
C	13.3	13.7	0.524	0.539
D	15.0	16.0	0.592	0.628
E	8.5	9.1	0.335	0.358
F	9.5	10.1	0.374	0.398
G	2.4	3.0	0.094	0.118
H	0.5	0.7	0.020	0.028
J	2.7	3.7	0.106	0.146
K	1.9	2.1	0.075	0.083
L	4.7	5.1	0.185	0.201
M	14.2	14.8	0.559	0.583
N	3.5	4.1	0.138	0.161
P	1.6	2.2	0.063	0.087

Part marking

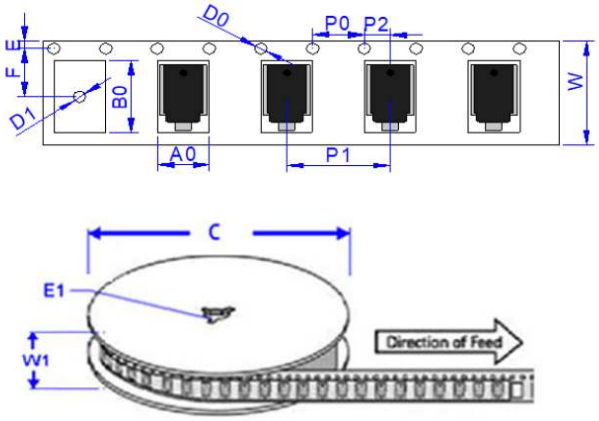


Part marking:
-xxxx = Date code
yyy- Refer to marking designator listed in Electrical characteristics table

Packaging information - mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 750 parts per 13" diameter reel (EIA-481 compliant)



Dimensions	Millimeters	Inches
A0	10.80 ± 0.3	0.425 ± 0.012
B0	16.13 ± 0.3	0.635 ± 0.012
C	330.0	13.0 ± 0.012
D0	1.55 ± 0.2	0.061 ± 0.008
D1	1.55 ± 0.2	0.061 ± 0.008
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.30 ± 0.2	0.524 ± 0.008
F	11.50 ± 0.2	0.453 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	16.00 ± 0.2	0.630 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	24.00 ± 0.2	0.945 ± 0.008
W1	25.85 ± 0.2	1.018 ± 0.008

Electrical specifications (+25 °C)

Part number		Marking		V_R	I_R @ 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 @ +25°C**	**µA@ +175°C**	**min (V)**	**max (V)**	**(mA)**	**max (V)**	**(A)**
SM8T20AH	/	SM8T20A	/	20	5	150	22.2	24.5	5	32.4	247
SM8T22AH	/	SM8T22A	/	22	5	150	24.4	26.9	5	35.5	225
SM8T24AH	/	SM8T24A	/	24	5	150	26.7	29.5	5	38.9	205
SM8T26AH	/	SM8T26A	/	26	5	150	28.9	31.9	5	42.1	190
SM8T28AH	/	SM8T28A	/	28	5	150	31.1	34.4	5	45.4	176
SM8T30AH	/	SM8T30A	/	30	5	150	33.3	36.8	5	48.4	165
SM8T32AH	/	SM8T32A	/	32	5	150	35.5	39.4	5	51.4	156
SM8T33AH	SM8T33CAH	SM8T33A	SM8T33C	33	5	150	36.7	40.6	5	53.3	150
SM8T36AH	SM8T36CAH	SM8T36A	SM8T36C	36	5	150	40	44.2	5	58.1	138
SM8T40AH	/	SM8T40A	/	40	5	150	44.4	49.1	5	64.5	124
SM8T43AH	/	SM8T43A	/	43	5	150	47.8	52.8	5	69.4	115

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}

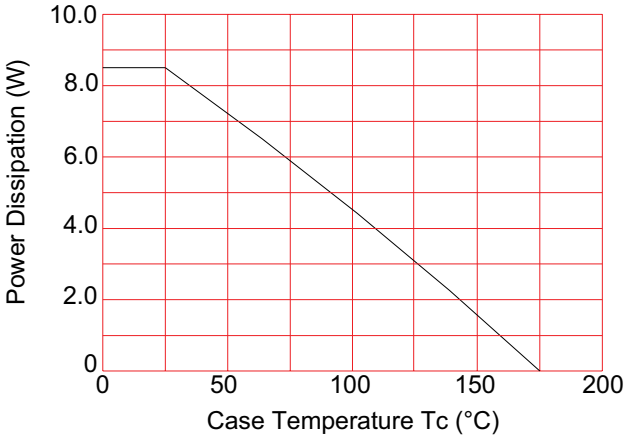
I_R: Reverse leakage current

I_T: Test current

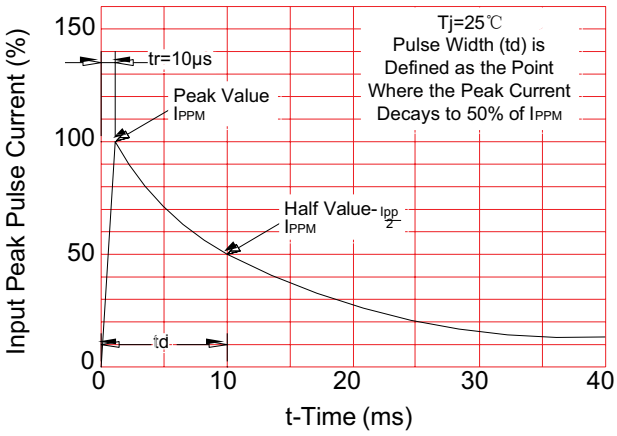
Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

Uni-polar curves

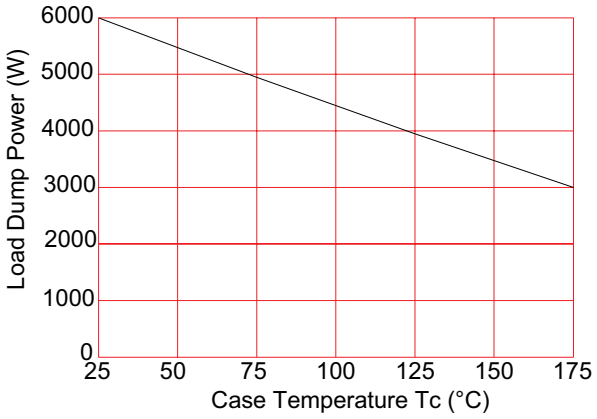
Power derating curves



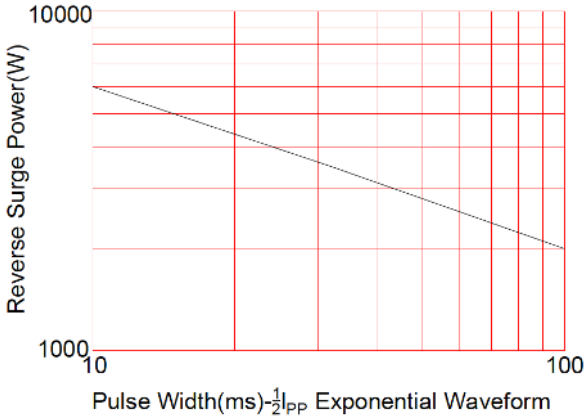
Pulse waveform



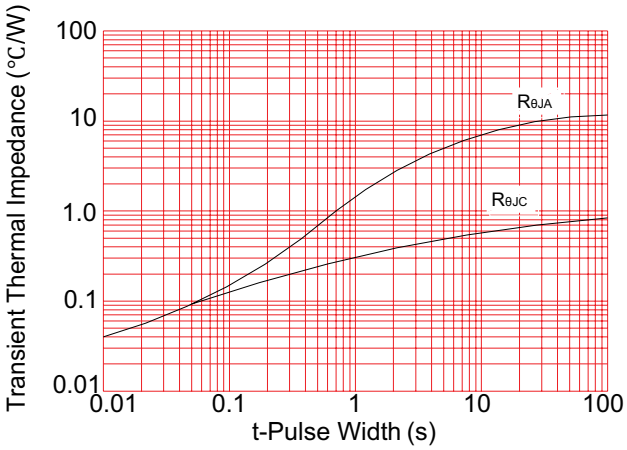
Load dump power characteristics



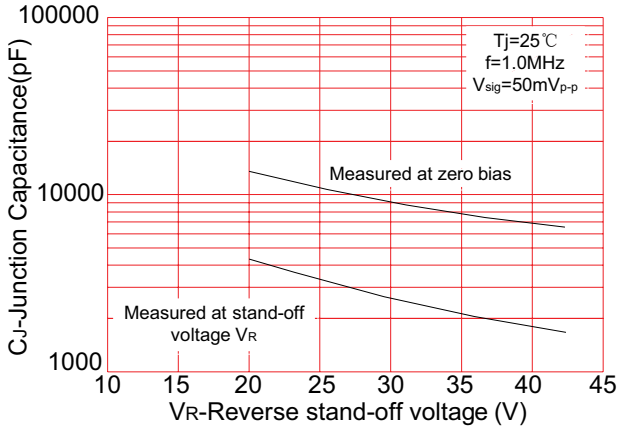
Reverse power capability



Typical transient thermal impedance



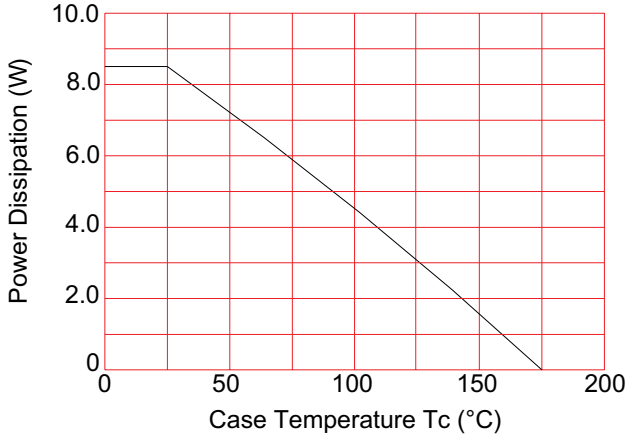
Typical junction capacitance



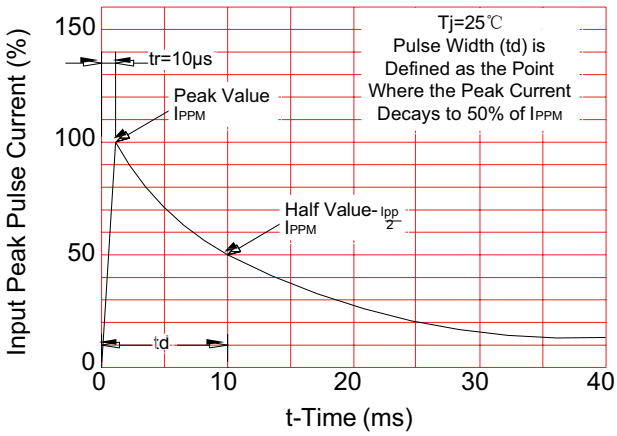
Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

Bi-polar curves

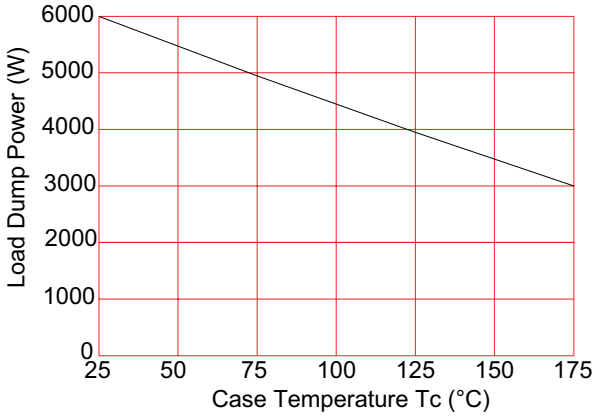
Power derating curve



Pulse waveform



Load dump power characteristics



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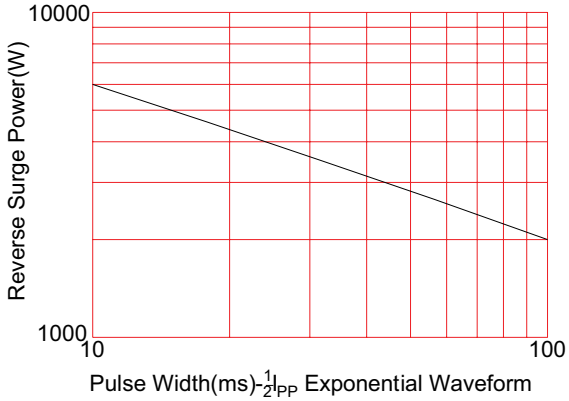

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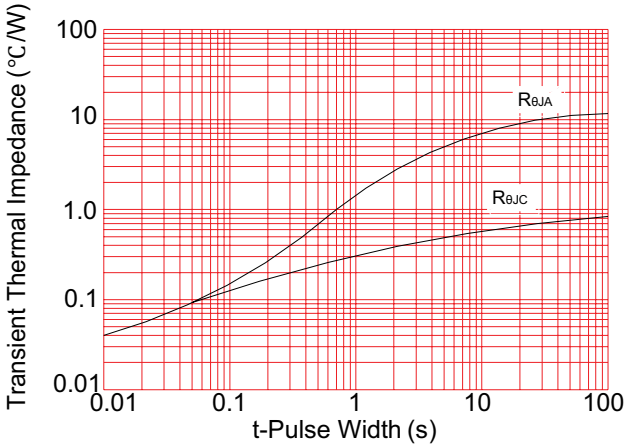

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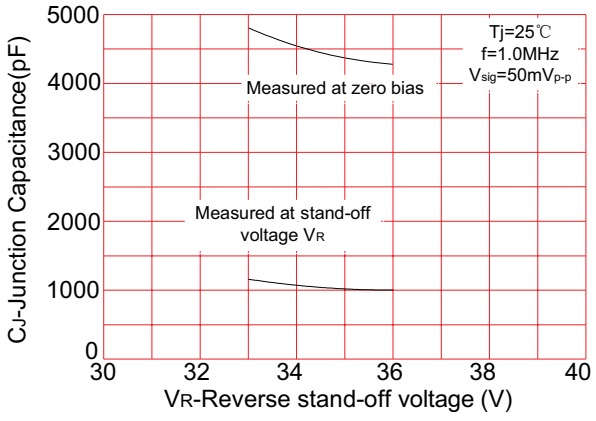

Solder reflow profile

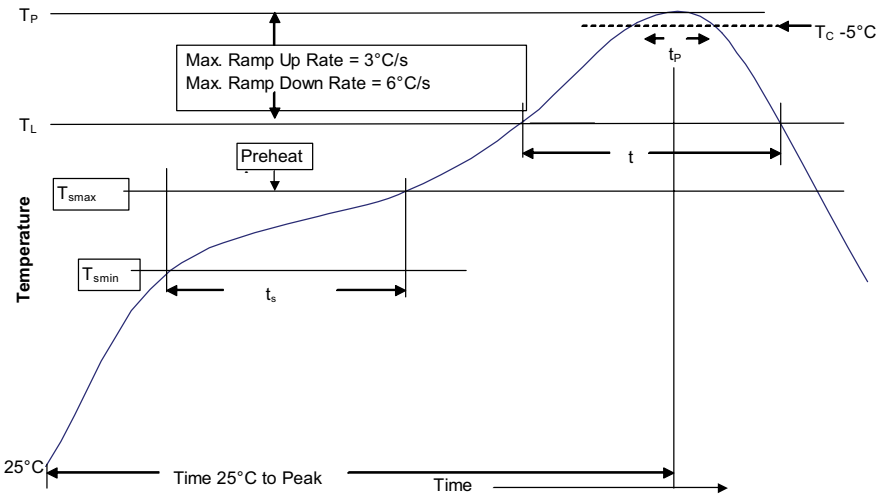

Table 1 - Standard SnPb solder (T_C)

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 (+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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