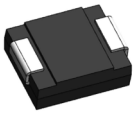
SMDJ

Automotive grade 3000 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 SMC package
- Excellent clamping capability
- High reliability application
- 3000 W peak pulse power capability at 10/1000 µs waveform
- Typical I_R less than 5 µA
- 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

Environmental compliance and general specifications

- ISO16750-2 P5A: 12 V system (90 V/4 Ω/200 ms)
- ISO16750-2 P5A: 24 V system (151 V/8 Ω/200 ms)
- AEC-Q101 qualified

HALOGEN HF FREE

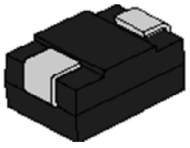
RoHS

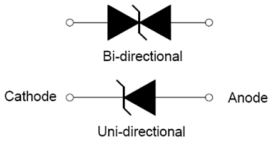
Ordering part number

SMDJ 12 C A H

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

PIN configuration





Alternate ordering part number

SMDJE 12 C A H

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

Powering Business Worldwide

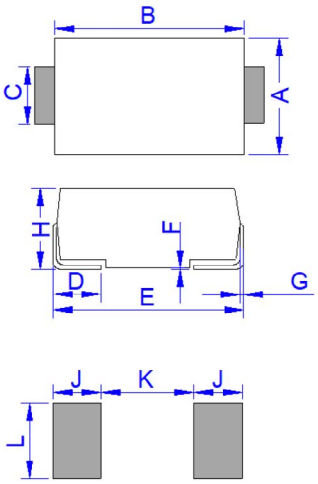
Absolute maximum ratings

(+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	$P_{M(AV)}$	6.5	W
Peak pulse power dissipation on 10/1000 µs waveform	P_{PP}	3000	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}	300	A
Typical thermal resistance junction to lead	$R_{\theta JL}$	15	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	75	°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	5.75	6.25	0.226	0.246
B	6.90	7.40	0.272	0.291
C	2.75	3.25	0.108	0.128
D	0.95	1.52	0.037	0.060
E	7.70	8.20	0.303	0.323
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.15	2.62	0.085	0.103
J	2.40	-	0.094	-
K	-	4.20	-	0.165
L	3.30	-	0.130	-

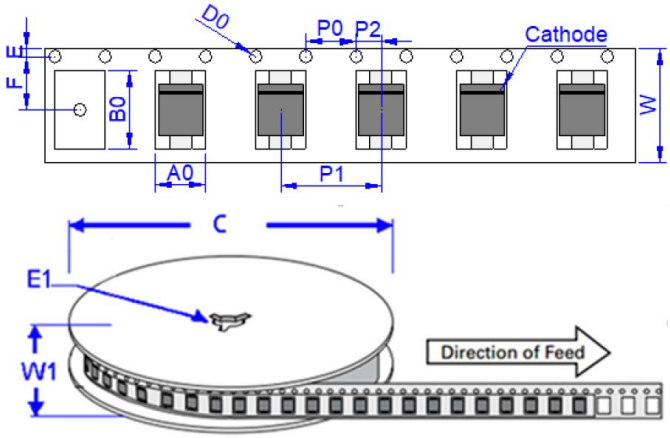
Part marking

Cathode band (uni-polar only)
Part marking: xxxx = Refer to marking designator listed in Electrical Characteristics table
yyyy- date code

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	6.05 ± 0.3	0.238 ± 0.012
B0	8.31 ± 0.3	0.327 ± 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	7.50 ± 0.2	0.295 ± 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	16.0 ± 0.2	0.630 ± 0.008
W1	19.7 ± 2.0	0.776 ± 0.079

Electrical specifications (+25 °C)

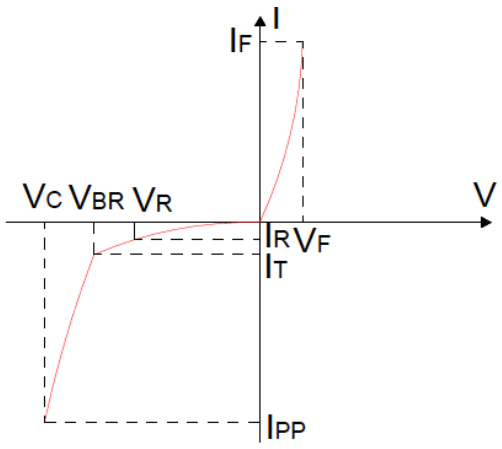
Part number		Marking		V_R	I_R @ V_R	V_{BR} @ I_T		I_T	V_C @ I_{PP}	I_{PP}
Uni-polar	**Bi-polar**	**Uni**	**Bi**	**(V)**	**(µA)**	**min (V)**	**max (V)**	**(mA)**	**max (V)**	**(A)**
SMDJ12AH	SMDJ12CAH	H12A	H12C	12	5	13.3	14.7	5	19.9	150.8
SMDJ13AH	SMDJ13CAH	H13A	H13C	13	5	14.4	15.9	5	21.5	139.5
SMDJ14AH	SMDJ14CAH	H14A	H14C	14	5	15.6	17.2	5	23.2	129.3
SMDJ15AH	SMDJ15CAH	H15A	H15C	15	5	16.7	18.5	5	24.4	123
SMDJ16AH	SMDJ16CAH	H16A	H16C	16	5	17.8	19.7	5	26	115.4
SMDJ17AH	SMDJ17CAH	H17A	H17C	17	5	18.9	20.9	5	27.6	108.7
SMDJ18AH	SMDJ18CAH	H18A	H18C	18	5	20	22.2	5	29.2	102.7
SMDJ20AH	SMDJ20CAH	H20A	H20C	20	5	22.2	24.5	5	32.4	92.6
SMDJ22AH	SMDJ22CAH	H22A	H22C	22	5	24.4	26.9	5	35.5	84.5
SMDJ24AH	SMDJ24CAH	H24A	H24C	24	5	26.7	29.5	5	38.9	77.1
SMDJ26AH	SMDJ26CAH	H26A	H26C	26	5	28.9	31.9	5	42.1	71.3
SMDJ28AH	SMDJ28CAH	H28A	H28C	28	5	31.1	34.4	5	45.4	66.1
SMDJ30AH	SMDJ30CAH	H30A	H30C	30	5	33.3	36.8	5	48.4	62
SMDJ33AH	SMDJ33CAH	H33A	H33C	33	5	36.7	40.6	5	53.3	56.3
SMDJ36AH	SMDJ36CAH	H36A	H36C	36	5	40	44.2	5	58.1	51.6
SMDJ40AH	SMDJ40CAH	H40A	H40C	40	5	44.4	49.1	5	64.5	46.5
SMDJ43AH	SMDJ43CAH	H43A	H43C	43	5	47.8	52.8	5	69.4	43.2
SMDJ45AH	SMDJ45CAH	H45A	H45C	45	5	50	55.3	5	72.7	41.3
SMDJ48AH	SMDJ48CAH	H48A	H48C	48	5	53.3	58.9	5	77.4	38.8
SMDJ51AH	SMDJ51CAH	H51A	H51C	51	5	56.7	62.7	5	82.4	36.4
SMDJ54AH	SMDJ54CAH	H54A	H54C	54	5	60	66.3	1	87.1	34.4

Note: Standard part numbers listed

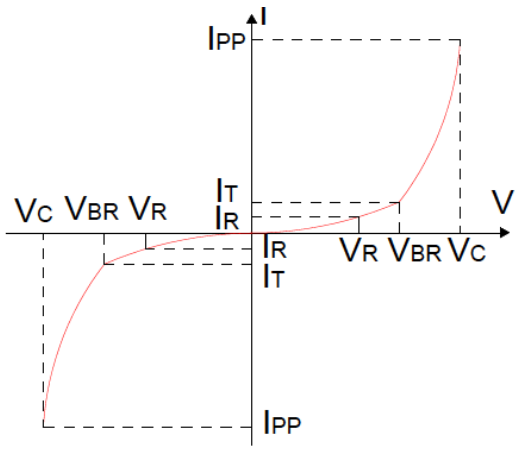
Alternate part numbers have the addition of an E and a "-" for the "." where applicable. Example standard part number SMDJ12AH, Alternate part number SMDJE12AH

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

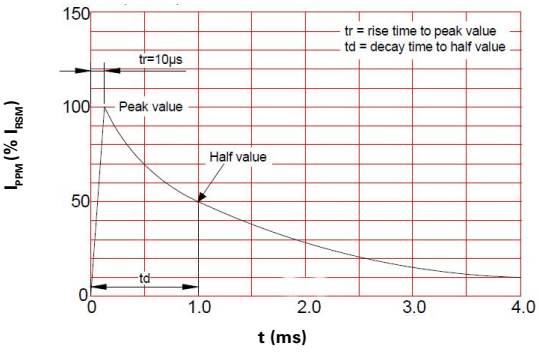
V_C: Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

I_R: Reverse leakage current

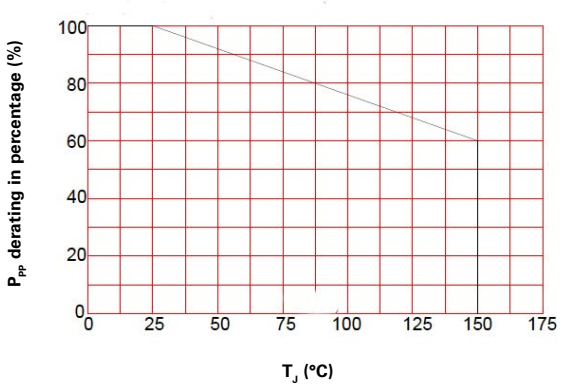
I_T: Test current

V_F: Forward voltage drop for Uni-directional

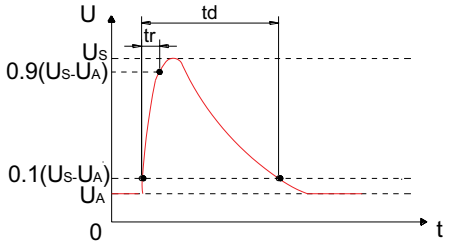
Pulse waveform



Pulse derating curve



ISO16750-2 Test pulse 5A



Parameter	12V system	24V system
Us	79V to 101V	151V to 202V
Ri	0.5Ω to 4Ω	1Ω to 8Ω
td	40ms to 400ms	100ms to 350ms
tr	5-10ms	5-10ms

Solder reflow profile

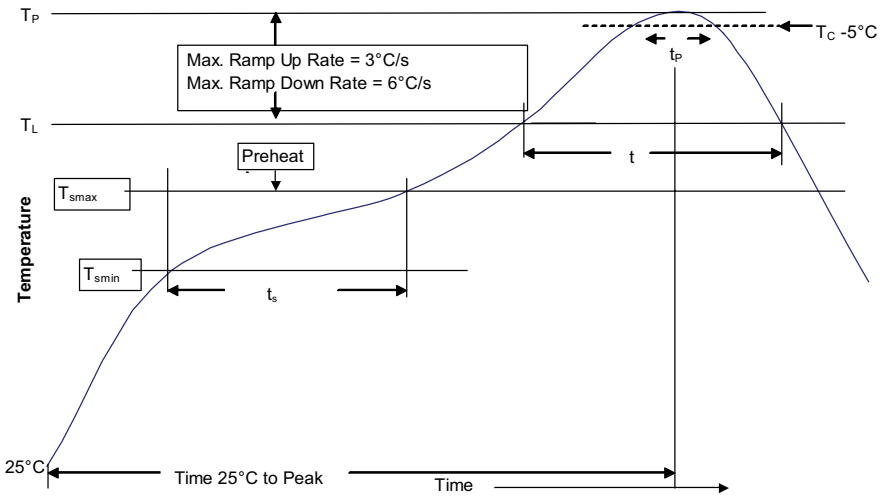


Table 1 - Standard SnPb solder (T_C)

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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