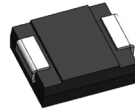


# SMDJ

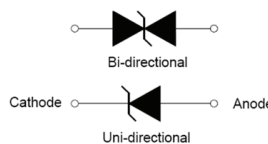
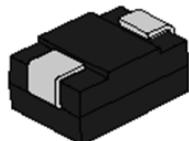
## Automotive grade 3000 W Transient voltage suppressor



### 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  $\mu$ s waveform
- Typical  $I_R$  less than 5  $\mu$ A
- 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

### PIN configuration



### Applications

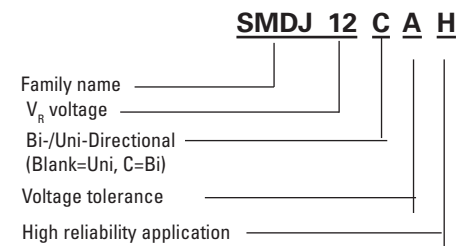
- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- Network systems and body electronics
- Power Train controls
- xEV and battery systems

### Environmental compliance and general specifications

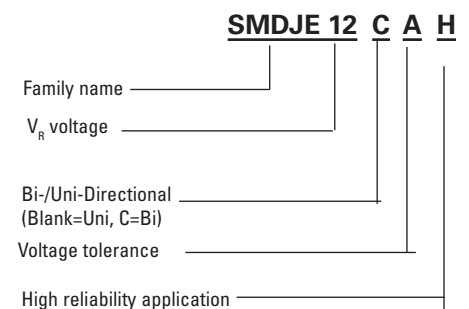
- ISO16750-2 P5A: 12 V system (90 V/4  $\Omega$ /200 ms)
- ISO16750-2 P5A: 24 V system (151 V/8  $\Omega$ /200 ms)
- AEC-Q101 qualified



### Ordering part number



### Alternate ordering part number



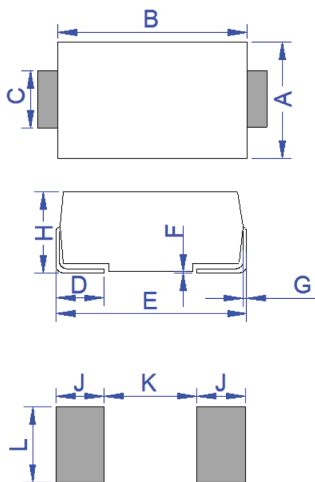
### Absolute maximum ratings

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



Dimension	Millimeters		Inches	
	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

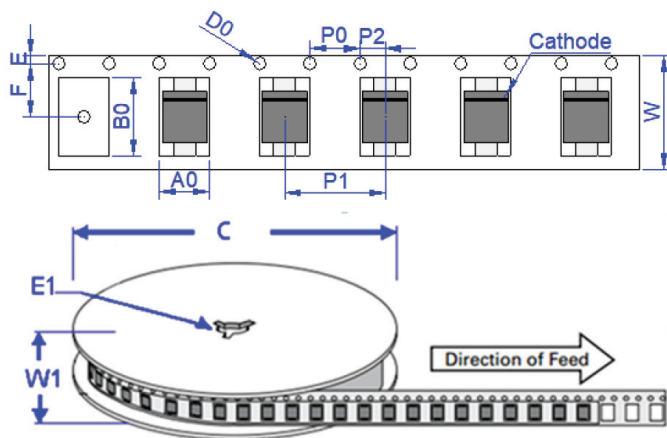


Cathode band (uni-polar only)  
Part marking: xxxx = Refer to marking designator listed in Electrical Characteristics table  
yyyy- date code

### 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)**

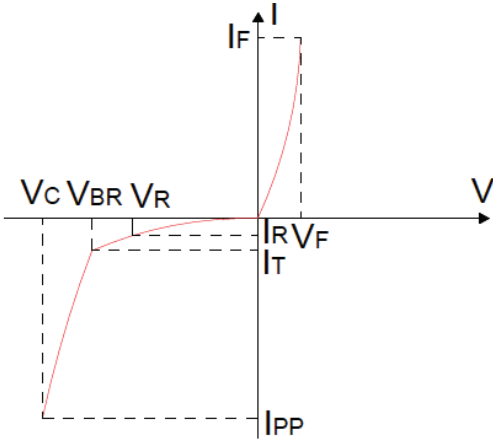
Part number		Marking		$V_R$	$I_R @ V_R$	$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}$
Uni-polar	Bi-polar	Uni	Bi	(V)	( $\mu$ A)	min (V)	max (V)	(mA)	max (V)	(A)
SMDJ12AH	SMDJ12CAH	H12A	H12C	12	5	13.3	14.7	5	19.9	150.8
SMDJ13AH	SMDJ13CAH	H13A	H13C	13	5	14.4	15.9	5	21.5	139.5
SMDJ14AH	SMDJ14CAH	H14A	H14C	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

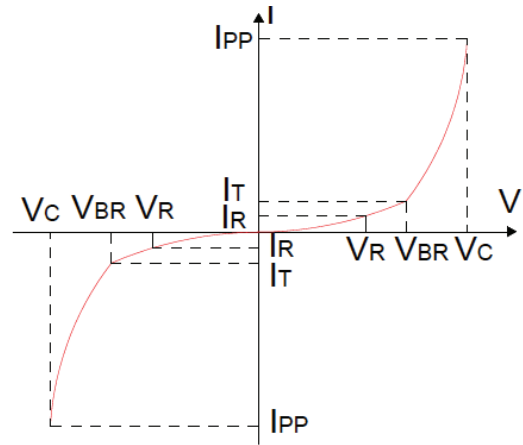
Alternate part numbers have the addition of an E and a "-" for the "." where applicable. Example standard part number SMDJ12AH, Alternate part number SMDJE12AH

**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  $\mu$ s

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

$V_{BR}$ : Breakdown voltage

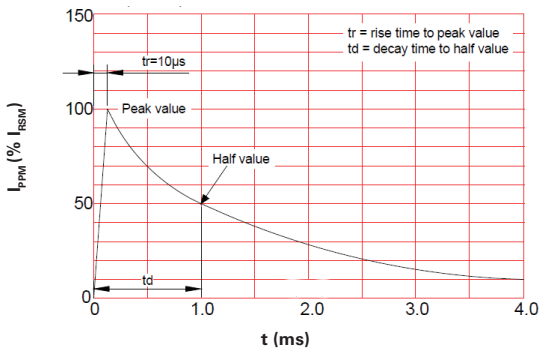
$V_C$ : Clamping voltage – Peak voltage measured across the suppressor at a specified  $I_{PP}$

$I_R$ : Reverse leakage current

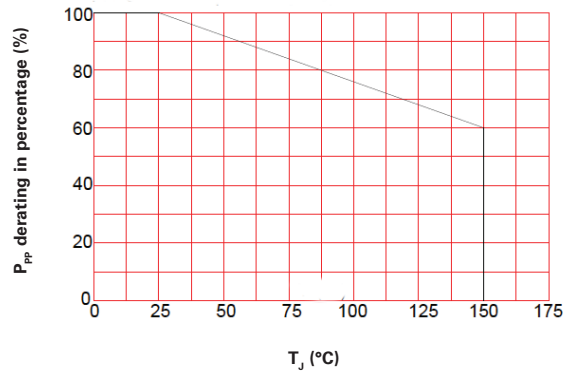
$I_T$ : Test current

$V_F$ : Forward voltage drop for Uni-directional

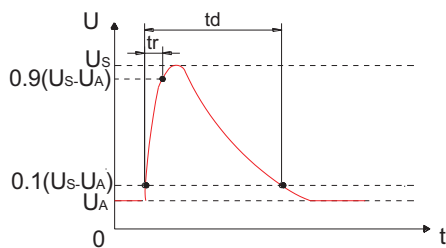
**Pulse waveform**



**Pulse derating curve**



**ISO16750-2 Test pulse 5A**



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

Solder reflow profile

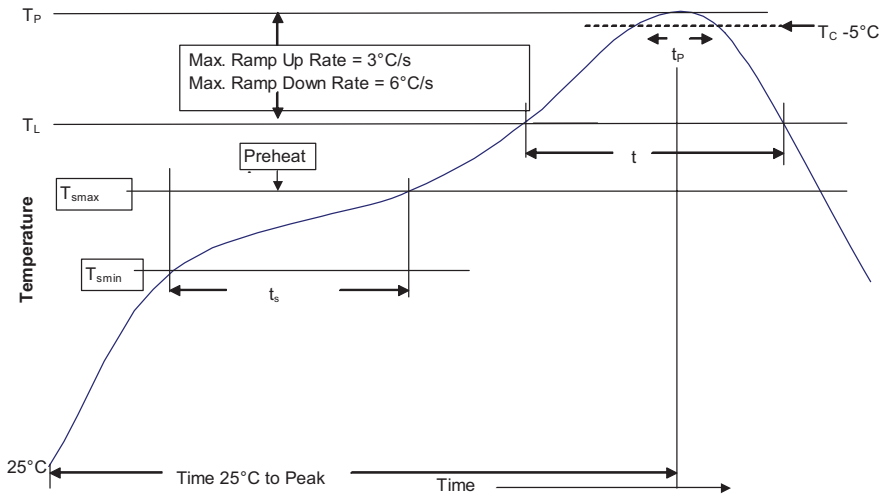


Table 1 - Standard SnPb solder (T<sub>C</sub>)

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<sub>C</sub>)

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 <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 seconds	60 - 180 seconds
Ramp up rate T <sub>L</sub> to T <sub>p</sub>	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds	60-150 seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2 (+0, -5 °C)
Time (t <sub>p</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 seconds*	40 seconds*
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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