



## 5.0SMDJ Series 5000W Transient Voltage Suppressor

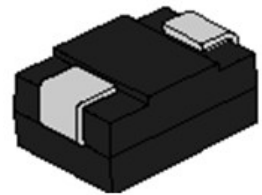
Rev.4.5

### DESCRIPTION

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

### FEATURES

- ✧ Low profile package.
- ✧ Low inductance.
- ✧ Excellent clamping capability.
- ✧ 5000W peak pulse power capability at 10/1000μs waveform.
- ✧ Typical I<sub>R</sub> less than 1μA above 30V.
- ✧ Fast response time: typically less than 1.0ps from 0V to V<sub>BR</sub> min.
- ✧ High temperature to reflow soldering: 260°C/40s at terminals.
- ✧ Plastic package has under writers laboratory flammability 94V-0.
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C.
- ✧ Terminal: solder plated, solderable per J-STD-002.
- ✧ IEC61000-4-2 (ESD) ±30kV (air), ±30kV (contact).
- ✧ UL 497B item recognized. (File No.:E480698).
- ✧ For surface mounted applications in order to optimize board space.



SMC



Bi-directional



Uni-directional

Symbol

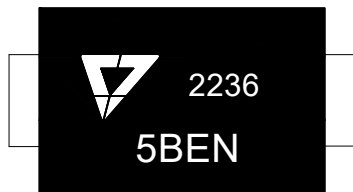
### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Operating junction and storage temperature range	T <sub>J</sub> /T <sub>STG</sub>	-55 to +150	°C
Steady state power dissipation at T <sub>L</sub> =75°C	P <sub>M(AV)</sub>	6.5	W
Peak pulse power dissipation at 10/1000μs waveform	P <sub>PP</sub>	5000	W
Maximum instantaneous forward voltage at 100A for unidirectional only	V <sub>F</sub>	5.0	V
Peak forward surge current, 8.3ms single half sine wave(Note 1)	I <sub>FSM</sub>	300	A
Typical thermal resistance junction to lead	R <sub>θJL</sub>	15	°C/W
Typical thermal resistance junction to ambient	R <sub>θJA</sub>	75	°C/W

#### Notes:

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

## MARKING



5BEN: Device Marking Code  
2236: the 36th week, 2022

ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Part Number		Marking		V <sub>R</sub>	I <sub>R</sub> @ V <sub>R</sub>	V <sub>BR</sub> @ I <sub>T</sub>		I <sub>T</sub>	V <sub>C</sub> @ I <sub>PP</sub>	I <sub>PP</sub> <sup>Ⓞ</sup>
Uni-Polar	Bi-Polar	Uni	Bi	V	Max (μA)	Min (V)	Max (V)	mA	Max (V)	A
5.0SMDJ11A	5.0SMDJ11CA	5PEN	5BEN	11	5	12.20	13.50	10	18.2	275.0
5.0SMDJ12A	5.0SMDJ12CA	5PEP	5BEP	12	5	13.30	14.70	10	19.9	252.0
5.0SMDJ13A	5.0SMDJ13CA	5PEQ	5BEQ	13	5	14.40	15.90	10	21.5	233.0
5.0SMDJ14A	5.0SMDJ14CA	5PER	5BER	14	5	15.60	17.20	10	23.2	216.0
5.0SMDJ15A	5.0SMDJ15CA	5PES	5BES	15	5	16.70	18.50	1	24.4	205.0
5.0SMDJ16A	5.0SMDJ16CA	5PET	5BET	16	5	17.80	19.70	1	26.0	193.0
5.0SMDJ17A	5.0SMDJ17CA	5PEU	5BEU	17	5	18.90	20.90	1	27.6	181.0
5.0SMDJ18A	5.0SMDJ18CA	5PEV	5BEV	18	5	20.00	22.10	1	29.2	172.0
5.0SMDJ20A	5.0SMDJ20CA	5PEW	5BEW	20	5	22.20	24.50	1	32.4	155.0
5.0SMDJ22A	5.0SMDJ22CA	5PEX	5BEX	22	5	24.40	26.90	1	35.5	141.0
5.0SMDJ24A	5.0SMDJ24CA	5PEZ	5BEZ	24	5	26.70	29.50	1	38.9	129.0
5.0SMDJ26A	5.0SMDJ26CA	5PFE	5BFE	26	5	28.90	31.90	1	42.1	119.0
5.0SMDJ28A	5.0SMDJ28CA	5PFG	5BFG	28	5	31.10	34.40	1	45.4	110.0
5.0SMDJ30A	5.0SMDJ30CA	5PFK	5BFK	30	5	33.30	36.80	1	48.4	103.0
5.0SMDJ33A	5.0SMDJ33CA	5PFM	5BFM	33	1	36.70	40.60	1	53.3	93.9
5.0SMDJ36A	5.0SMDJ36CA	5PFP	5BFP	36	1	40.00	44.20	1	58.1	86.1
5.0SMDJ40A	5.0SMDJ40CA	5PFR	5BFR	40	1	44.40	49.10	1	64.5	77.6
5.0SMDJ43A	5.0SMDJ43CA	5PFT	5BFT	43	1	47.80	52.80	1	69.4	72.1
5.0SMDJ45A	5.0SMDJ45CA	5PFV	5BFV	45	1	50.00	55.30	1	72.7	68.8
5.0SMDJ48A	5.0SMDJ48CA	5PFX	5BFX	48	1	53.30	58.90	1	77.4	64.7
5.0SMDJ51A	5.0SMDJ51CA	5PFZ	5BFZ	51	1	56.70	62.70	1	82.4	60.7
5.0SMDJ54A	5.0SMDJ54CA	5PGE	5BGE	54	1	60.00	66.30	1	87.1	57.5
5.0SMDJ58A	5.0SMDJ58CA	5PGG	5BGG	58	1	64.40	71.20	1	93.6	53.5

ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , continued)

Part Number		Marking		$V_R$	$I_R @ V_R$	$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}^{\circ}$
Uni-Polar	Bi-Polar	Uni	Bi	V	Max ( $\mu\text{A}$ )	Min (V)	Max (V)	mA	Max (V)	A
5.0SMDJ60A	5.0SMDJ60CA	5PGK	5BGK	60	1	66.70	73.70	1	96.8	51.7
5.0SMDJ64A	5.0SMDJ64CA	5PGM	5BGM	64	1	71.10	78.60	1	103.0	48.6
5.0SMDJ70A	5.0SMDJ70CA	5PGP	5BGP	70	1	77.80	86.00	1	113.0	44.3
5.0SMDJ75A	5.0SMDJ75CA	5PGR	5BGR	75	1	83.30	92.10	1	121.0	41.4
5.0SMDJ78A	5.0SMDJ78CA	5PGT	5BGT	78	1	86.70	95.80	1	126.0	39.7
5.0SMDJ85A	5.0SMDJ85CA	5PGV	5BGV	85	1	94.40	104.0	1	137.0	36.5
5.0SMDJ90A	5.0SMDJ90CA	5PGX	5BGX	90	1	100.0	111.0	1	146.0	34.3
5.0SMDJ100A	5.0SMDJ100CA	5PGZ	5BGZ	100	1	111.0	123.0	1	162.0	30.9
5.0SMDJ110A	5.0SMDJ110CA	5PHE	5BHE	110	1	122.0	135.0	1	177.0	28.3
5.0SMDJ120A	5.0SMDJ120CA	5PHG	5BHG	120	1	133.0	147.0	1	193.0	26.0
5.0SMDJ130A	5.0SMDJ130CA	5PHK	5BHK	130	1	144.0	159.0	1	209.0	24.0
5.0SMDJ150A	5.0SMDJ150CA	5PHM	5BHM	150	1	167.0	185.0	1	243.0	20.6
5.0SMDJ160A	5.0SMDJ160CA	5PHP	5BHP	160	1	178.0	197.0	1	259.0	19.3
5.0SMDJ170A	5.0SMDJ170CA	5PHR	5BHR	170	1	189.0	209.0	1	275.0	18.2
5.0SMDJ180A	5.0SMDJ180CA	5PHT	5BHT	180	1	201.0	222.0	1	292.0	17.1
5.0SMDJ190A	5.0SMDJ190CA	5PHU	5BHU	190	1	211.0	234.0	1	307.0	16.3
5.0SMDJ200A	5.0SMDJ200CA	5PHV	5BHV	200	1	224.0	247.0	1	324.0	15.4
5.0SMDJ210A	5.0SMDJ210CA	5PHW	5BHW	210	1	233.0	258.0	1	337.0	14.8
5.0SMDJ220A	5.0SMDJ220CA	5PHX	5BHX	220	1	246.0	272.0	1	356.0	14.0
5.0SMDJ250A	5.0SMDJ250CA	5PHZ	5BHZ	250	1	279.0	309.0	1	405.0	12.3
5.0SMDJ300A	5.0SMDJ300CA	5PJK	5BJK	300	1	335.0	371.0	1	486.0	10.3
5.0SMDJ350A	5.0SMDJ350CA	5PJM	5BJM	350	1	391.0	432.0	1	567.0	8.8
5.0SMDJ400A	5.0SMDJ400CA	5PJP	5BJP	400	1	447.0	494.0	1	648.0	7.72
5.0SMDJ440A	5.0SMDJ440CA	5PJR	5BJR	440	1	492.0	543.0	1	713.0	7.02

① Surge waveform: 10/1000 $\mu\text{s}$

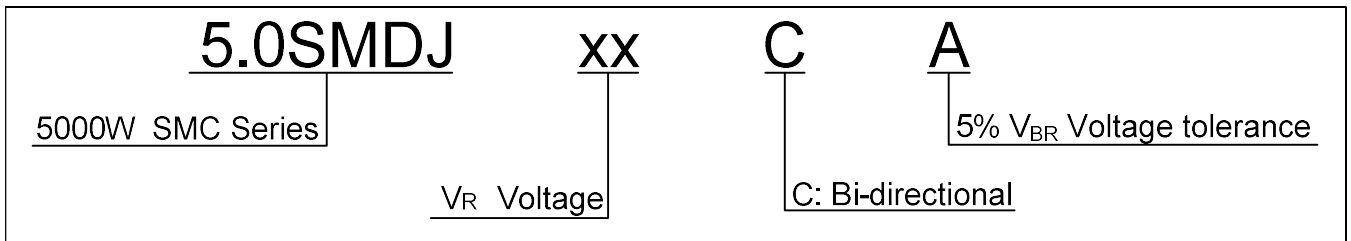
$V_R$ : Stand-off voltage -- Maximum voltage that can be applied

$V_{BR}$ : Breakdown voltage

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

$I_R$ : Reverse leakage current

ORDERING INFORMATION



RATINGS AND V-I CHARACTERISTICS CURVES ( $T_A=25^{\circ}C$ , unless otherwise noted)

FIG.1:V- I curve characteristics (Uni-directional)

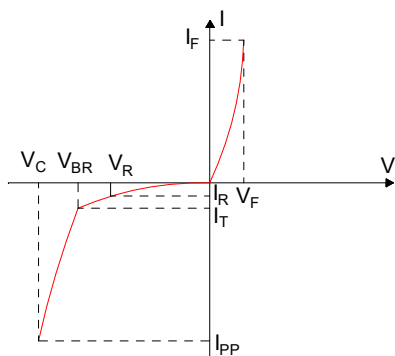


FIG.2:V- I curve characteristics (Bi-directional)

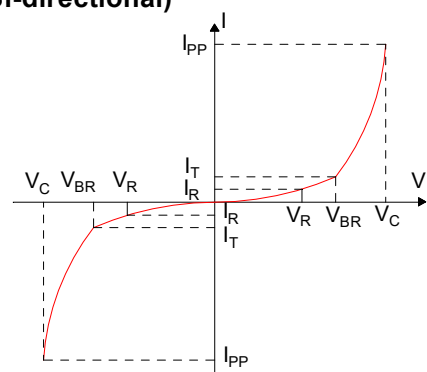


FIG.3: Pulse waveform

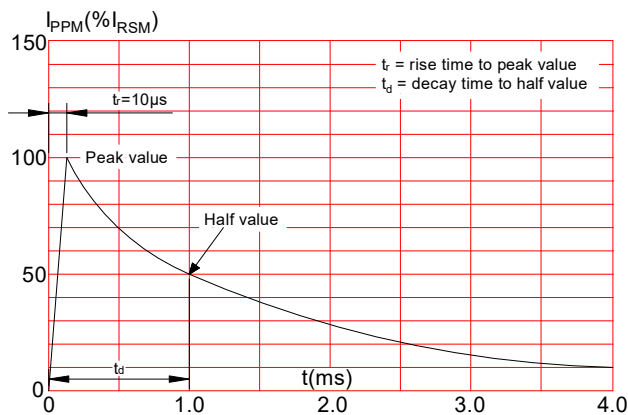


FIG.4: Pulse derating curve

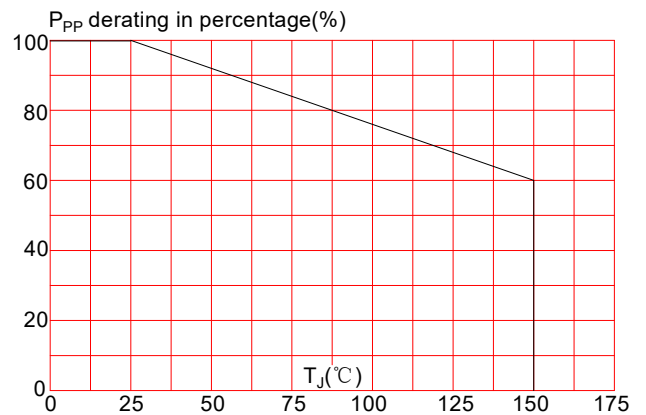


FIG.5: Typical junction capacitance

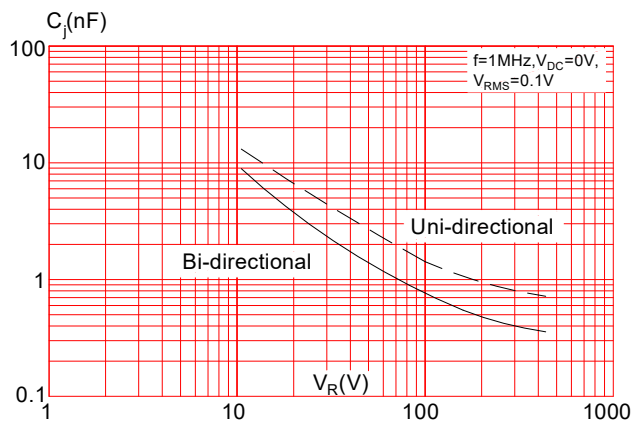
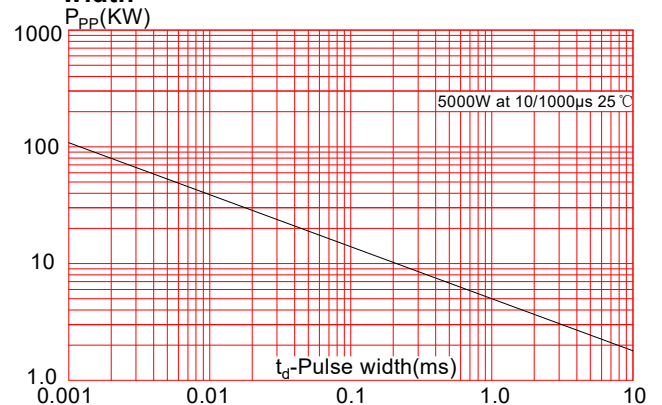
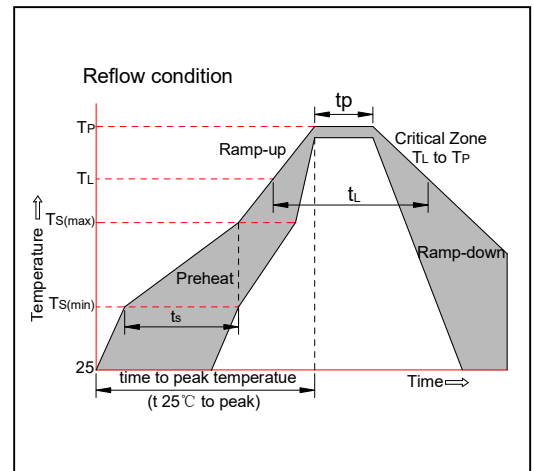


FIG.6:Peak pulse power dissipation vs. pulse width

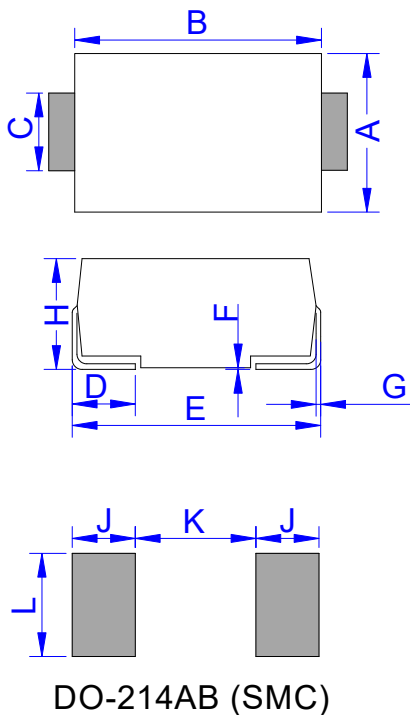


**SOLDERING PARAMETERS**

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquidus)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C

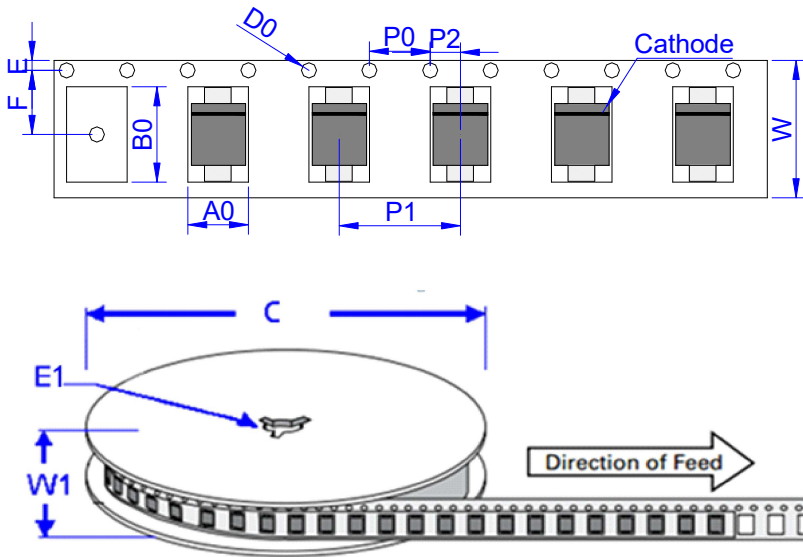


**PACKAGE MECHANICAL DATA**



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
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	

TAPE AND REEL SPECIFICATION-SMC



Ref.	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

PART No.	UNIT WEIGHT (g/PCS) TYP	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
5.0SMDJxxCA/A	0.294/0.342 (NOTE)	3,000	48,000	13 inch reel pack

**Notes:** 0.342g/PCS for single die; 0.294g/PCS for stacked dies


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