

## DESCRIPTION

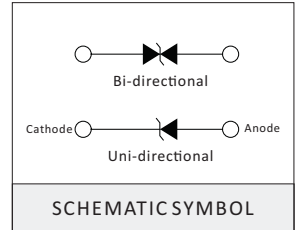
The SMDJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

## FEATURES

- > Low profile package
- > Ideal for automated placement
- > Available in uni-directional and Bi-directional
- > 3000 Watt peak pulse power capability with a 10/1000  $\mu$ s waveform
- > For surface mounted applications to optimize board space
- > Excellent clamping capability
- > Very fast response time
- > Low incremental surge resistance
- > AEC-Q101

## APPLICATIONS

TVS devices are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.



## MAXIMUM RATINGS AND CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

RATING	SYMBOL	VALUE	UNITS
Peak Pulse Power Dissipation on 10/1000us waveform (Note1,Note2).	P <sub>PPM</sub>	3000	Watts
Peak Pulse Current of on 10/1000us waveform(Note1).	I <sub>PPM</sub>	See Table	Amps
Steady State Power Dissipation at T <sub>A</sub> =50°C (Note2).	P <sub>M(AV)</sub>	6.5	Watts
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only	V <sub>F</sub>	3.5	Volts
Peak Forward Surge Current,8.3ms Single Half Sine-Wave Superimposed on Rated Load,(JEDEC Method) (Note 3).	I <sub>FSM</sub>	300	Amps

### NOTES:

1. Non-repetitive current pulse, T<sub>A</sub> = 25°C.
2. Mounted on 8.0mm x 8.0mm (0.03mm thick) Copper Pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave for unidirectional device only, Duty cycle=4 pulses per minutes maximum.

## THERMAL CONSIDERATIONS

Symbol	Parameter	Value	Unit
T <sub>J</sub>	Operating Junction Temperature	-55 to +150	°C
T <sub>S</sub>	Storage Temperature Range	-55 to +150	°C
R <sub>θJA</sub>	Junction to Ambient on printed circuit	75	°C/W



## ELECTRICAL CHARACTERISTICS

Part Number		Marking Code		Reverse Stand-off Voltage	Breakdown Voltage Min. @I <sub>T</sub>	Breakdown Voltage Max. @I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Maximum Reverse Leakage @V <sub>RWM</sub>
UNI	BI	UNI	BI	V <sub>R</sub> (V)	V <sub>B</sub> (V)	V <sub>B</sub> (V)		V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> ( $\mu$ A)
SMDJ5.0A	SMDJ5.0CA	RDE	DDE	5	6.4	7	10	9.2	326.1	800
SMDJ6.0A	SMDJ6.0CA	RDG	DDG	6	6.67	7.37	10	10.3	291.3	800
SMDJ6.5A	SMDJ6.5CA	RDK	DDK	6.5	7.22	7.98	10	11.2	267.9	500
SMDJ7.0A	SMDJ7.0CA	PDM	DDM	7	7.78	8.6	10	12	250	200
SMDJ7.5A	SMDJ7.5CA	PDP	DDP	7.5	8.33	9.21	1	12.9	232.6	100
SMDJ8.0A	SMDJ8.0CA	PDR	DDR	8	8.89	9.83	1	13.6	220.6	50
SMDJ8.5A	SMDJ8.5CA	PDT	DDT	8.5	9.44	10.4	1	14.4	208.3	20
SMDJ9.0A	SMDJ9.0CA	PDV	DDV	9	10	11.1	1	15.4	194.8	10
SMDJ10A	SMDJ10CA	PDX	DDX	10	11.1	12.3	1	17	176.5	5
SMDJ11A	SMDJ11CA	PDZ	DDZ	11	12.2	13.5	1	18.2	164.8	2
SMDJ12A	SMDJ12CA	PEE	DEE	12	13.3	14.7	1	19.9	150.8	2
SMDJ13A	SMDJ13CA	PEG	DEG	13	14.4	15.9	1	21.5	139.5	2
SMDJ14A	SMDJ14CA	PEK	DEK	14	15.6	17.2	1	23.2	129.3	2
SMDJ15A	SMDJ15CA	PEM	DEM	15	16.7	18.5	1	24.4	123	2
SMDJ16A	SMDJ16CA	PEP	DEP	16	17.8	19.7	1	26	115.4	2
SMDJ17A	SMDJ17CA	PER	DER	17	18.9	20.9	1	27.6	108.7	2
SMDJ18A	SMDJ18CA	PET	DET	18	20	22.1	1	29.2	102.7	2
SMDJ20A	SMDJ20CA	PEV	DEV	20	22.2	24.5	1	32.4	92.6	2
SMDJ22A	SMDJ22CA	PEX	DEX	22	24.4	26.9	1	35.5	84.5	2
SMDJ24A	SMDJ24CA	PEZ	DEZ	24	26.7	29.5	1	38.9	77.1	2
SMDJ26A	SMDJ26CA	PFE	DFE	26	28.9	31.9	1	42.1	71.3	2
SMDJ28A	SMDJ28CA	PFG	DFG	28	31.1	34.4	1	45.4	66.1	2
SMDJ30A	SMDJ30CA	PFK	DFK	30	33.3	36.8	1	48.4	62	2
SMDJ33A	SMDJ33CA	PFM	DFM	33	36.7	40.6	1	53.3	56.3	2
SMDJ36A	SMDJ36CA	PFP	DFP	36	40	44.2	1	58.1	51.6	2
SMDJ40A	SMDJ40CA	PFR	DFR	40	44.4	49.1	1	64.5	46.5	2
SMDJ43A	SMDJ43CA	PFT	DFT	43	47.8	52.8	1	69.4	43.2	2
SMDJ45A	SMDJ45CA	PFV	DFV	45	50	55.3	1	72.7	41.3	2
SMDJ48A	SMDJ48CA	PFX	DFX	48	53.3	58.9	1	77.4	38.8	2
SMDJ51A	SMDJ51CA	PFZ	DFZ	51	56.7	62.7	1	82.4	36.4	2
SMDJ54A	SMDJ54CA	RGE	DGE	54	60	66.3	1	87.1	34.4	2
SMDJ58A	SMDJ58CA	PGG	DGG	58	64.4	71.2	1	93.6	32.1	2
SMDJ60A	SMDJ60CA	PGK	DGK	60	66.7	73.7	1	96.8	31	2
SMDJ64A	SMDJ64CA	PGM	DGM	64	71.1	78.6	1	103	29.1	2
SMDJ70A	SMDJ70CA	PGP	DGP	70	77.8	86	1	113	26.5	2
SMDJ75A	SMDJ75CA	PGR	DGR	75	83.3	92.1	1	121	24.8	2
SMDJ78A	SMDJ78CA	PGT	DGT	78	86.7	95.8	1	126	23.8	2
SMDJ85A	SMDJ85CA	PGV	DGV	85	94.4	104	1	137	21.9	2
SMDJ90A	SMDJ90CA	PGX	DGX	90	100	111	1	146	20.5	2
SMDJ100A	SMDJ100CA	PGZ	DGZ	100	111	123	1	162	18.5	2

**ELECTRICAL CHARACTERISTICS**

Part Number		Marking Code		Reverse Stand-off Voltage	Breakdown Voltage Min. @I <sub>T</sub>	Breakdown Voltage Max. @I <sub>T</sub>	Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Maximum Reverse Leakage @V <sub>RWM</sub>
UNI	BI	UNI	BI	V <sub>R</sub> (V)	V <sub>B</sub> (V)	V <sub>B</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
SMDJ110A	SMDJ110CA	PHE	DHE	110	122	135	1	177	16.9	2
SMDJ120A	SMDJ120CA	PHG	DHG	120	133	147	1	193	15.5	2
SMDJ130A	SMDJ130CA	PHK	DHK	130	144	159	1	209	14.4	2
SMDJ150A	SMDJ150CA	PHM	DHM	150	167	185	1	243	12.3	2
SMDJ160A	SMDJ160CA	PHP	DHP	160	178	197	1	259	11.6	2
SMDJ170A	SMDJ170CA	PHR	DHR	170	189	209	1	275	10.9	2
SMDJ180A	SMDJ180CA	PHT	DHT	180	201	222	1	292	10.3	2
SMDJ190A	SMDJ190CA	PHU	DHU	190	209	243	1	308	9.7	2
SMDJ200A	SMDJ200CA	PHV	DHV	200	224	247	1	324	9.3	2
SMDJ210A	SMDJ210CA	PHW	DHW	210	231	269	1	340	8.8	2
SMDJ220A	SMDJ220CA	PKE	DKE	220	246	272	1	356	8.4	2

RATINGS AND CHARACTERISTIC CURVES ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

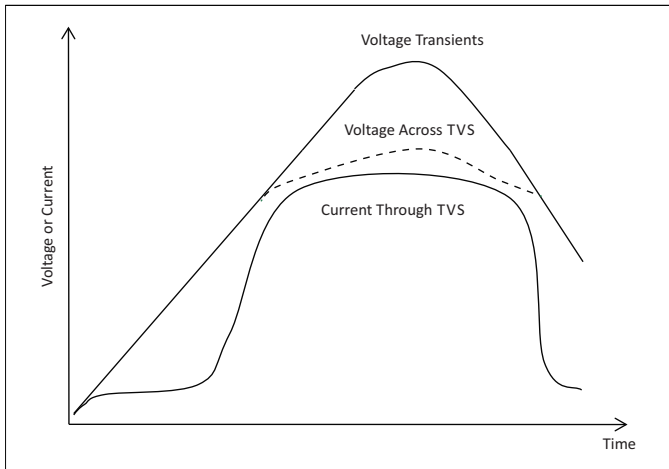


Figure 1. TVS Transients Clamping Waveform

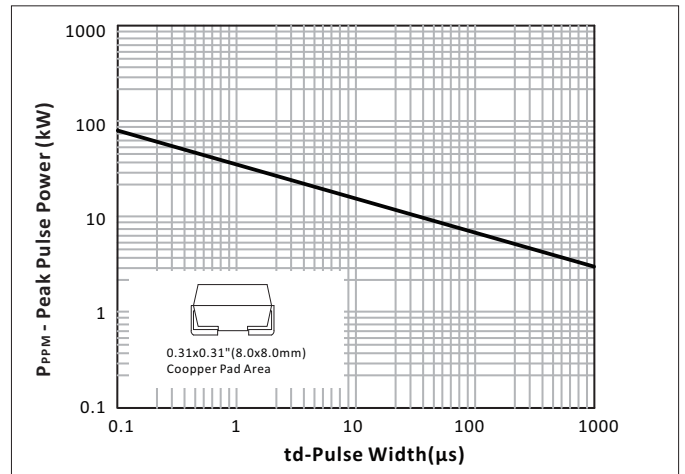


Figure 2. Peak Pulse Power Rating Curve

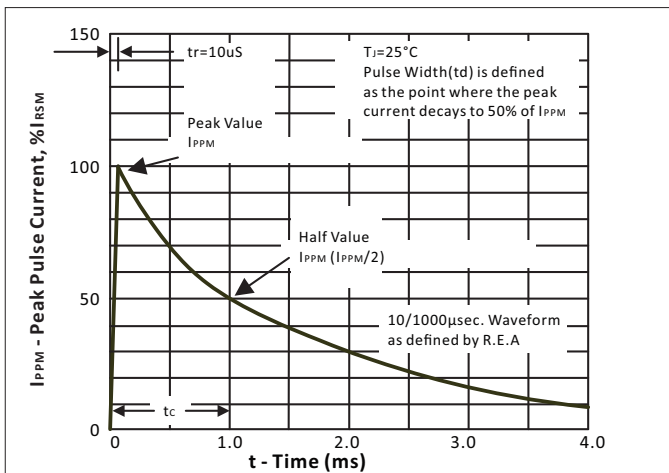


Figure 3. Pulse Waveform

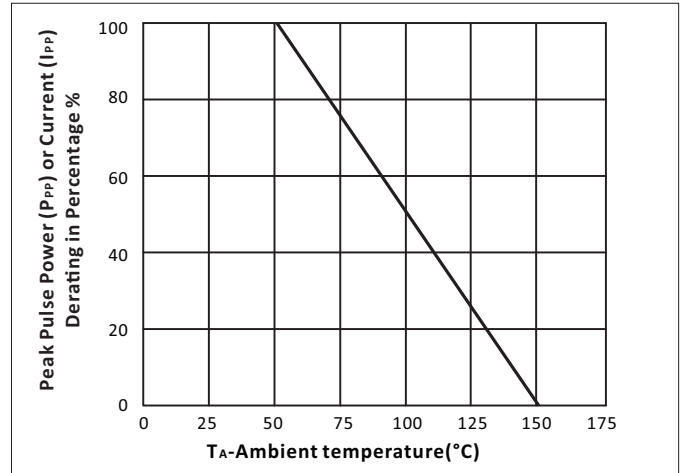


Figure 4. Pulse Derating Curve

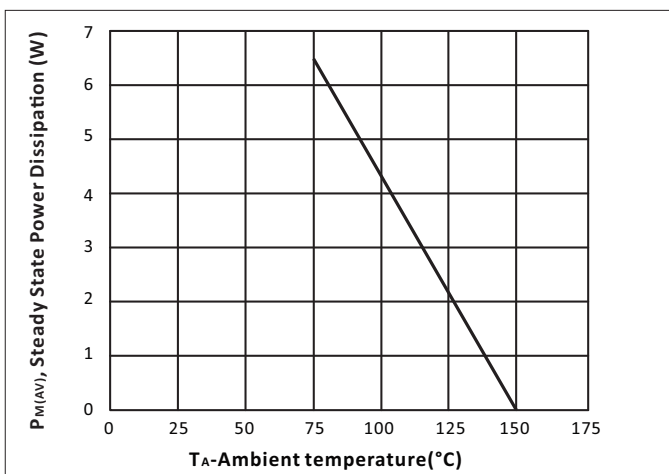


Figure 5. Steady State Power Dissipation Derating Curve

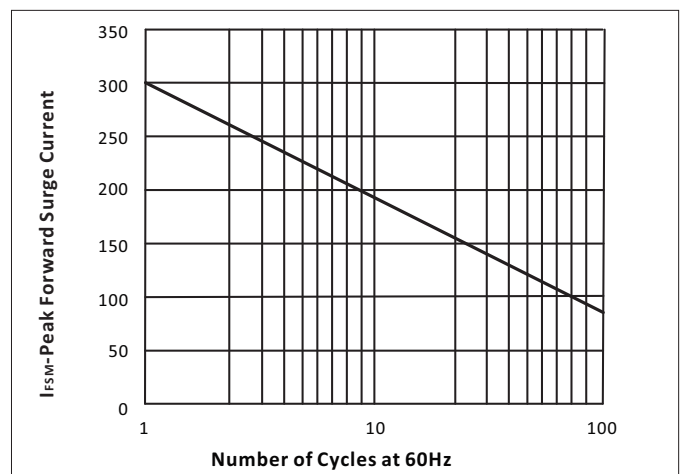
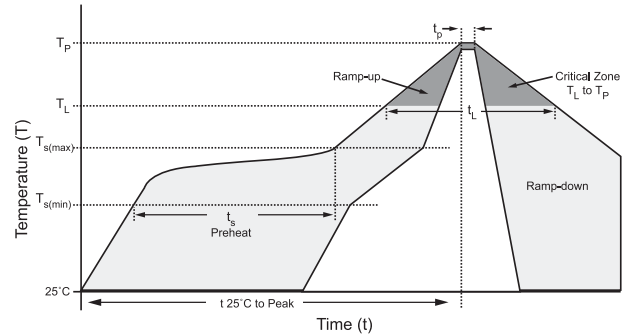


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



### SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Min (Ts(min))	150°C
	Temperature Max (Ts(max))	200°C
	Time (min to max) (ts)	60 – 180 secs
Average ramp up rate (Liquidus Temp (TL) to peak)		3°C/second max
Ts(max)to TL - Ramp-up Rate		3°C/second max
Reflow	Temperature (TL) (Liquidus)	217°C
	Time (min to max) (tl)	60 – 150 seconds
Peak Temperature (TP)		260°C
Time within 5°C of actual peak Temperature (tp)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (TP)		8 minutes Max.
Do not exceed		260°C



### DO-214AB(SMC) PACKAGE DIMENSIONS

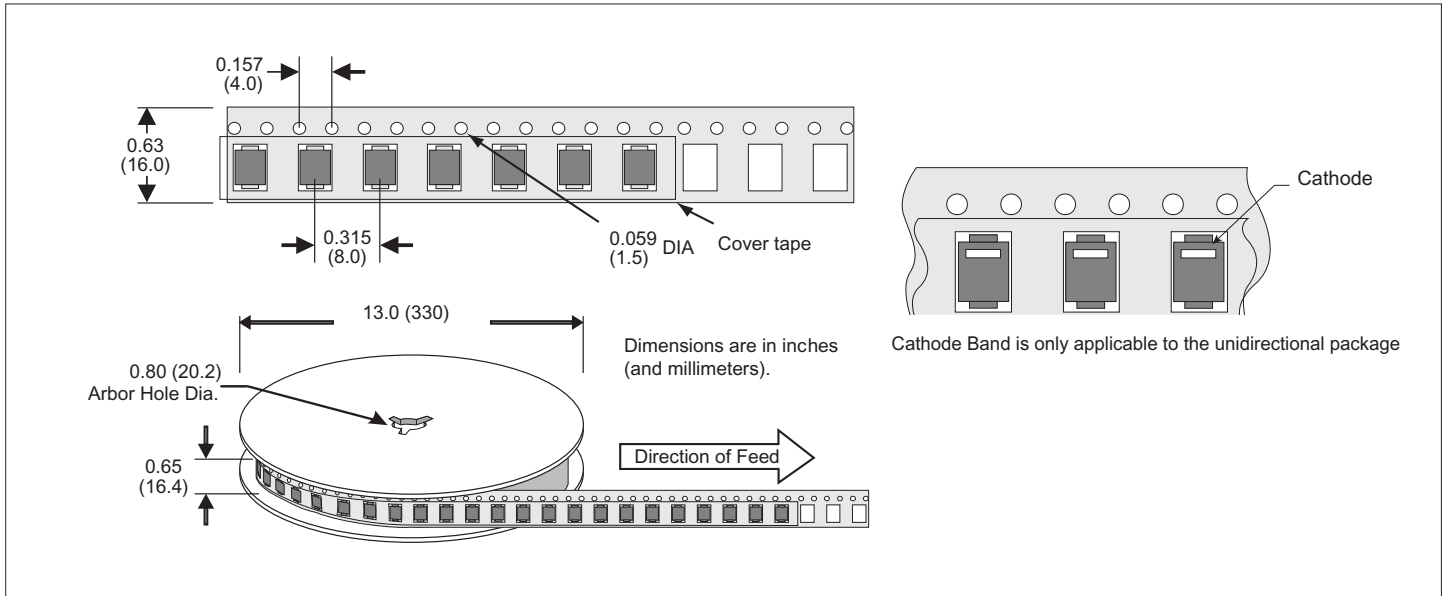
Item	Millimeters		Inches	
	Min.	Max.	Min.	Max.
L	6.50	7.40	0.256	0.291
D	5.50	6.25	0.217	0.246
D1	2.75	3.25	0.108	0.123
T	7.40	8.40	0.291	0.331
T1	0.90	1.52	0.035	0.060
d	-	0.20	-	0.008
s	2.10	2.70	0.083	0.106
t	0.152	0.31	0.006	0.012

**NOTES:**  
1. Dimensions are exclusive of mold flash and metal burrs  
2. Cathode Band is only applicable to the unidirectional package

### RECOMMENDED PAD LAYOUT DIMENSIONS

Item	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.300	-	0.129	-
B	2.400	-	0.094	-
C	-	4.200	-	0.165
D	2.400	-	0.094	-
E	8.13 REF		0.320 REF	

**TAPE AND REEL SPECIFICATION**



**ORDERING INFORMATION**

Part Number	Component Package	QTY/Reel	Reel Size
SMDJxx(C)A	DO-214AB(SMC)	3000PCS	13"

## CONTACT US

### Headquarters

No.3387 Shendu Road Pujiang I&E Park Minhang Shanghai  
China

### Hotline

400-021-5756

### Web

[Http://www.semiware.com.cn](http://www.semiware.com.cn)

### By Telephone

General: 86-21-3463-7172

Sales: 86-21-3463-7345

Technical Support: 86-21-34637172-8811

### By Email

General: [china@semiware.com.cn](mailto:china@semiware.com.cn)

Sales: [sales33@semiware.com.cn](mailto:sales33@semiware.com.cn)

Technical Support: [fae01@semiware.com.cn](mailto:fae01@semiware.com.cn)

### By Fax

General: 86-21-3965-0654

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