

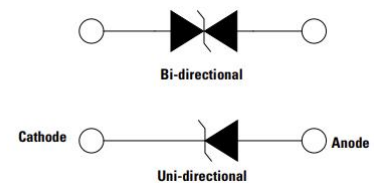
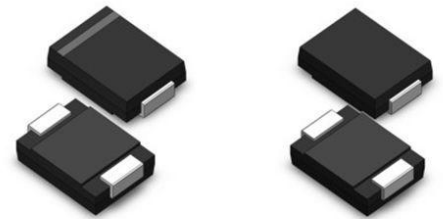


# TVS Diodes SMDJ series

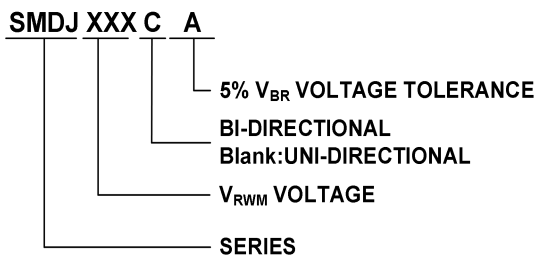
## Transient Voltage Suppressors

### Features

- ◆ 3000W peak pulse power capability at 10/1000  $\mu$  s waveform,
- ◆ repetition rate (duty cycle): 0.01%
- ◆ For surface mounted applications to optimize Board space
- ◆ Low incremental surge impedance
- ◆ Excellent clamping capability
- ◆ Typical IR less than 2  $\mu$  A when VBR min>12V
- ◆ High Temperature soldering guaranteed: 260°C/30 sec
- ◆ Plastic package has underwriters laboratory flammability 94V-0
- ◆ Meets MSL level 1, per J-STD-020
- ◆ Halogen free and RoHS compliant



### Part Number Coding System



### Applications

- ◆ I/O interface
- ◆ AC/DC power supply
- ◆ Low frequency signal transmission line(RS232,RS485,etc.)

## Dimensions(SMC)

Ref.	Millimeters		Inches	
	Min	Max	Min.	Max.
A	2.90	3.20	0.114	0.126
B	6.60	7.11	0.260	0.280
C	5.59	6.22	0.220	0.245
D	2.06	2.62	0.079	0.103
E	0.76	1.52	0.030	0.060
F	-	0.203	-	0.008
G	7.75	8.130	0.305	0.320
H	0.152	0.305	0.006	0.012
I	3.30	-	0.129	-
J	2.40	-	0.094	-
K	-	4.20	-	0.165

## Maximum Rating and Thermal Characteristics

Parameters at 25°C ambient temperature unless otherwise Noted.

Rating	Symbol	Value	Unit
Peak Pulse power Dissipation at 10/1000μs Waveform (Note1, Note2, Fig.1)	$P_{PPM}$	Minimum 3000	Watts
Peak pulse current of at 10/1000μs waveform (Note 1, Fig.1)	$I_{PPM}$	See Table	Amps
Steady state power dissipation at $T_A=50^{\circ}\text{C}$	$P_{M(AV)}$	6.5	Watts
Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only	$V_F$	3.5/5.0	V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.5)	$I_{FSM}$	300	Amps
Operating Temperature Range	$T_J$	-65 to +150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to +175	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	$^{\circ}\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	$^{\circ}\text{C/W}$

## Notes:

1. Non-repetitive current pulse, per Fig.2 and derated above  $T_A=25^{\circ}\text{C}$  per Fig.1.
2. Mounted on 8.0mm×8.0mm copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.\

4.For stacked die component details, please refer to part numbers labeled by \* in Electrical Characteristics.

## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$	Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_{RWM}$
Unidirectional	Bidirectional	UNI	BI	$V_{RWM}(V)$	$V_{BR}(V)$	$I_T(mA)$	$V_C(V)$	$I_{PP}(A)$	$I_R(\mu A)$
SMDJ5.0A	SMDJ5.0CA	RDE	DDE	5.0	6.40~7.00	10	9.2	326.1	800
SMDJ6.0A	SMDJ6.0CA	RDG	DDG	6.0	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	7.0	7.78~8.60	10	12.0	250.0	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	8.0	8.89~9.83	1	13.6	220.6	50
SMDJ8.5A	SMDJ8.5CA	PDT	DDT	8.5	9.44~10.40	1	14.4	208.3	20
SMDJ9.0A	SMDJ9.0CA	PDV	DDV	9.0	10.00~11.10	1	15.4	194.8	10
SMDJ10A	SMDJ10CA	PDX	DDX	10.0	11.10~12.30	1	17.0	176.5	5
SMDJ11A	SMDJ11CA	PDZ	DDZ	11.0	12.20~13.50	1	18.2	164.8	2
SMDJ12A	SMDJ12CA	PEE	DEE	12.0	13.30~14.70	1	19.9	150.8	2
SMDJ13A	SMDJ13CA	PEG	DEG	13.0	14.40~15.90	1	21.5	139.5	2
SMDJ14A	SMDJ14CA	PEK	DEK	14.0	15.60~17.20	1	23.2	129.3	2
SMDJ15A	SMDJ15CA	PEM	DEM	15.0	16.70~18.50	1	24.4	123.0	2
SMDJ16A	SMDJ16CA	PEP	DEP	16.0	17.80~19.70	1	26.0	115.4	2
SMDJ17A	SMDJ17CA	PER	DER	17.0	18.90~20.90	1	27.6	108.7	2
SMDJ18A	SMDJ18CA	PET	DET	18.0	20.00~22.10	1	29.2	102.7	2
SMDJ20A	SMDJ20CA	PEV	DEV	20.0	22.20~24.50	1	32.4	92.6	2
SMDJ22A	SMDJ22CA	PEX	DEX	22.0	24.40~26.90	1	35.5	84.5	2
SMDJ24A	SMDJ24CA	PEZ	DEZ	24.0	26.70~29.50	1	38.9	77.1	2
SMDJ26A	SMDJ26CA	PFE	DFE	26.0	28.90~31.90	1	42.1	71.3	2
SMDJ28A	SMDJ28CA	PFG	DFG	28.0	31.10~34.40	1	45.4	66.1	2
SMDJ30A	SMDJ30CA	PFK	DFK	30.0	33.30~36.80	1	48.4	62.0	2
SMDJ33A	SMDJ33CA	PFM	DFM	33.0	36.70~40.60	1	53.3	56.3	2
SMDJ36A	SMDJ36CA	PFP	DFP	36.0	40.00~44.20	1	58.1	51.6	2
SMDJ40A	SMDJ40CA	PFR	DFR	40.0	44.40~49.10	1	64.5	46.5	2
SMDJ43A	SMDJ43CA	PFT	DFT	43.0	47.80~52.80	1	69.4	43.2	2
SMDJ45A	SMDJ45CA	PFV	DFV	45.0	50.00~55.30	1	72.7	41.3	2
SMDJ48A	SMDJ48CA	PFX	DFX	48.0	53.30~58.90	1	77.4	38.8	2
SMDJ51A	SMDJ51CA	PFZ	DFZ	51.0	56.70~62.70	1	82.4	36.4	2
SMDJ54A	SMDJ54CA	PGE	DGE	54.0	60.00~66.30	1	87.1	34.4	2
SMDJ58A	SMDJ58CA	PGG	DGG	58.0	64.40~71.20	1	93.6	32.1	2
SMDJ60A	SMDJ60CA	PGK	DGK	60.0	66.70~73.70	1	96.8	31.0	2
SMDJ64A	SMDJ64CA	PGM	DGM	64.0	71.10~78.60	1	103.0	29.1	2
SMDJ70A	SMDJ70CA	PGP	DGP	70.0	77.80~86.00	1	113.0	26.5	2
SMDJ75A	SMDJ75CA	PGR	DGR	75.0	83.30~92.10	1	121.0	24.8	2
SMDJ78A	SMDJ78CA	PGT	DGT	78.0	86.70~95.80	1	126.0	23.8	2

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @IT	Test Current	Maximum Clamping Voltage @IPP	Peak Pulse Current	Reverse Leakage @VRWM
Unidirectional	Bidirectional	UNI	BI	V <sub>RWM</sub> (V)	V <sub>BR</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
SMDJ85A	SMDJ85CA	PGV	DGV	85.0	94.40~104.00	1	137.0	21.9	2
SMDJ90A	SMDJ90CA	PGX	DGX	90.0	100.00~111.00	1	146.0	20.5	2
SMDJ100A	SMDJ100CAA	PGZ	DGZ	100.0	111.00~123.00	1	162.0	18.5	2
SMDJ110A	SMDJ110CA	PHE	DHE	110.0	122.00~135.00	1	177.0	16.9	2
SMDJ120A	SMDJ120CA	PHG	DHG	120.0	133.00~147.00	1	193.0	15.5	2
SMDJ130A	SMDJ130CA	PHK	DHK	130.0	144.00~159.00	1	209.0	14.4	2
SMDJ150A	SMDJ150CA	PHM	DHM	150.0	167.00~185.00	1	243.0	12.3	2
SMDJ160A	SMDJ160CA	PHP	DHP	160.0	178.00~197.00	1	259.0	11.6	2
SMDJ170A	SMDJ170CA	PHR	DHR	170.0	189.00~209.00	1	275.0	10.9	2
SMDJ180A	SMDJ180CA	PHT	DHT	180.0	200.00~221.00	1	292.0	13.7	2
SMDJ200A	SMDJ200CA	PHV	DHV	200.0	224.00~247.00	1	324.0	12.4	2
SMDJ220A	SMDJ220CA	PKE	DKE	220.0	244.00~270.00	1	356.0	11.3	2
SMDJ250A	SMDJ250CA	PKG	DKG	250.0	279.00~309.00	1	405.0	9.9	2
SMDJ300A	SMDJ300CA	PKI	DKI	300.0	335.00~371.00	1	486.0	8.3	2
SMDJ350A	SMDJ350CA	PKJ	DKJ	350.0	391.00~432.00	1	567.0	7.1	2
SMDJ400A	SMDJ400CA	PKL	DKL	400.0	447.00~494.00	1	648.0	6.2	2
SMDJ440A	SMDJ440CA	PKN	DKN	440.0	492.00~543.00	1	713.0	5.7	2

- Notes:** 1.For bidirectional type having VRWM of 10V and less, the IR limit is double.  
2.For stack-die parts, use \* to label the part number.

Ratings and Characteristic Curves ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Figure 1. Peak Pulse Power Derating Curve

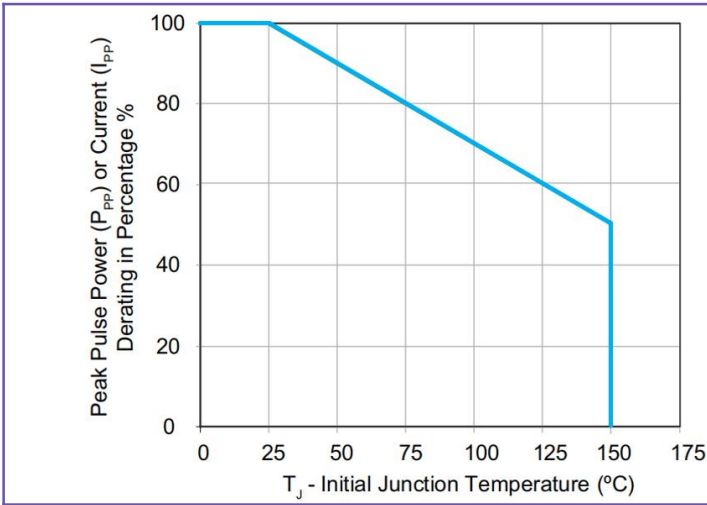


Figure 2. Pulse Waveform

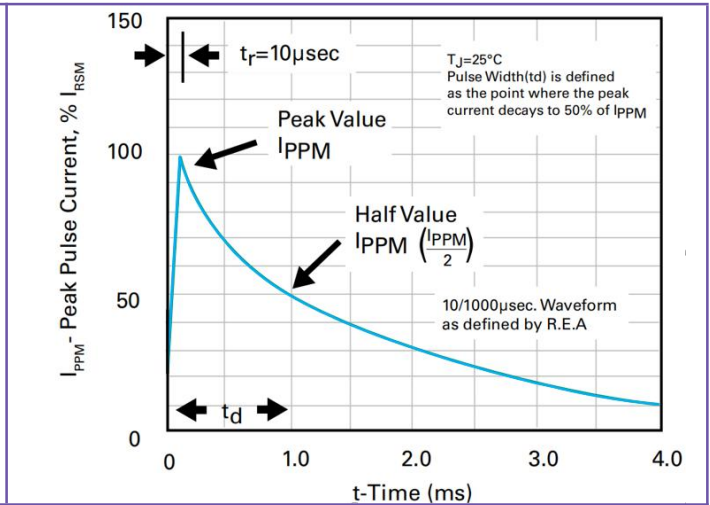


Figure 3. Typical Junction Capacitance

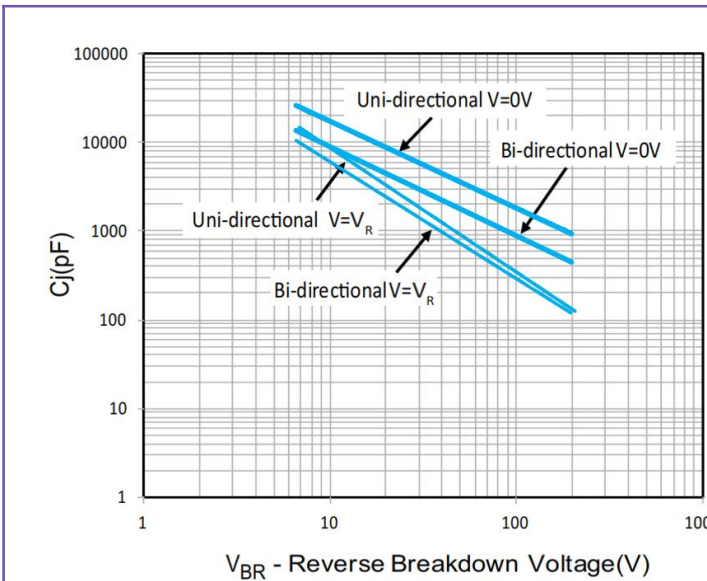


Figure 4. Typical Transient Thermal Impedance

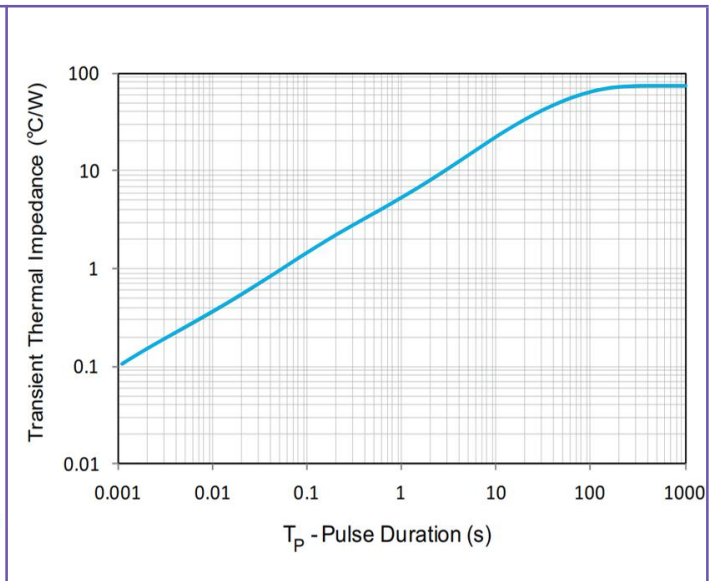


Figure 5. Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

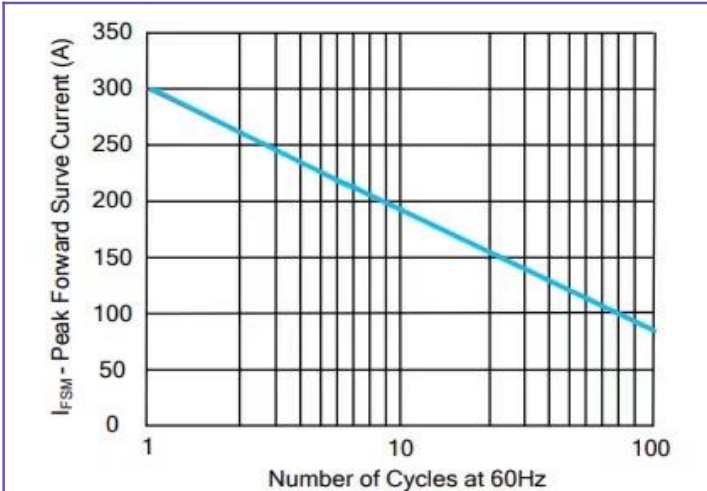
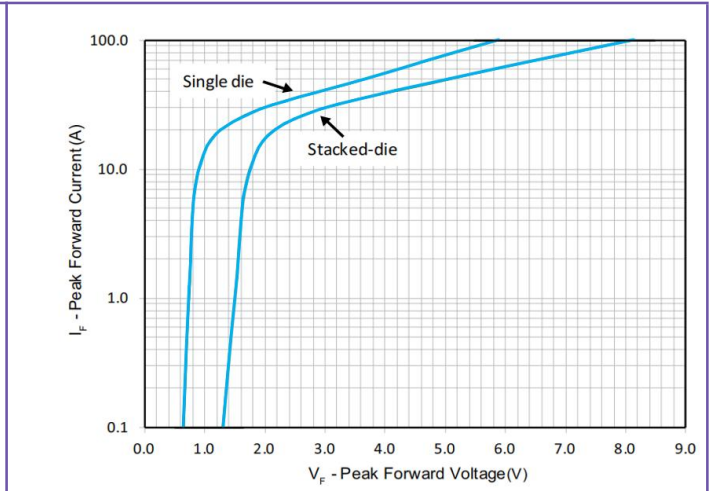
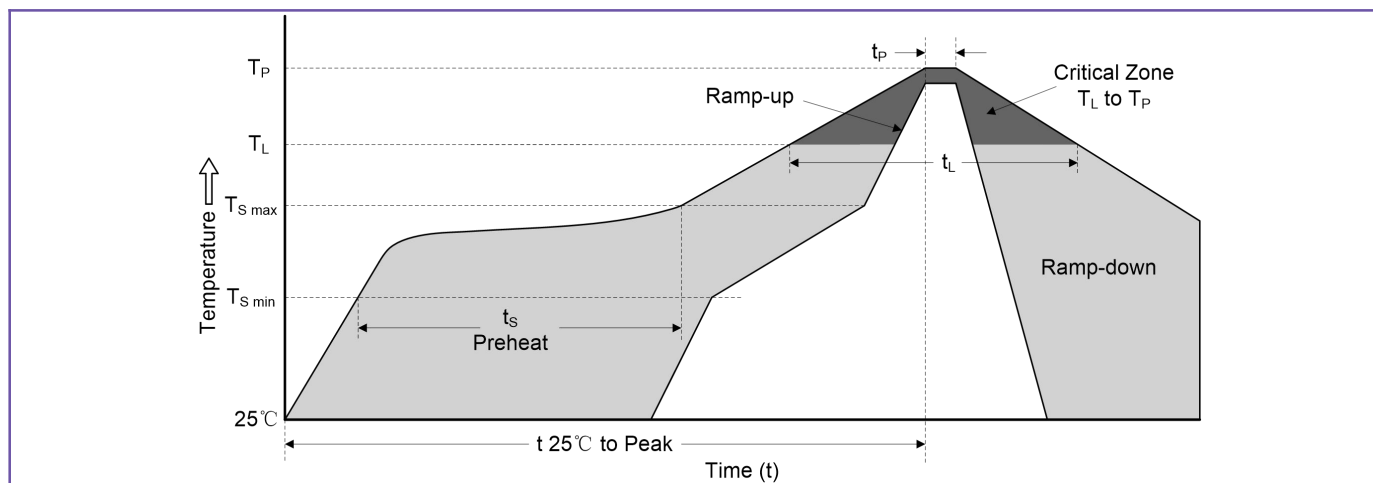


Figure 6. Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



## Reflow Soldering Parameters



Reflow Condition		Lead-free Assembly
Pre heat	-Temperature Min ( $T_{S\ min}$ )	150°C
	-Temperature Max ( $T_{S\ max}$ )	200°C
	-Time (min to max) ( $t_s$ )	60-120 seconds
Average ramp-up rate ( $T_L$ to $T_P$ )		3°C/second max.
$T_{S\ max}$ to $T_L$ -Ramp-up Rate		3°C/second max.
Reflow	-Temperature ( $T_L$ ) (Liquidus)	217°C
	-Time (min to max) ( $t_s$ )	60-150 seconds
Peak Temperature ( $T_P$ )		260(+0/-5)°C
Time within 5°C of actual Peak Temperature ( $t_p$ )		30 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature( $T_p$ )		8 minutes max.
Do not exceed		260°C

## Reliability

Items	Standards
Terminal strength	MIL-STD-750 Method 2036
Mechanical shock	JESD22-B104
Vibration	JESD22-B103
High Temp. Storage	JESD22-A103
High Temp Reverse Bias	JESD22-A108
Temperature Cycling	JESD22-A104
High Temp High Humidity Reverse Bias	JESD22-A101
Resistance to solder heat	JESD22-A111(SMD)