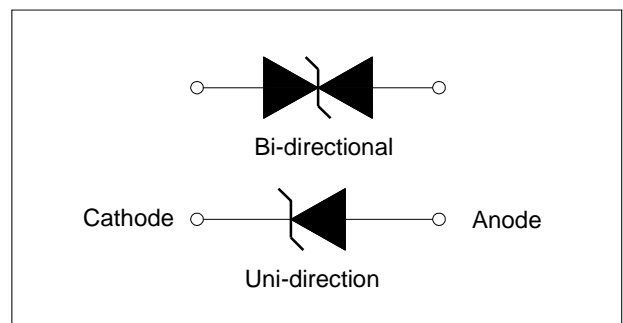


## Features

1. For surface mounted applications in order to optimize board space
2. Low leakage
3. Uni and Bidirectional unit
4. Glass passivated junction
5. Low inductance
6. Excellent clamping capability
7. 600W Peak power capability at  $10 \times 1000\mu\text{s}$  waveform Repetition rate (duty cycle):0.01%
8. Fast response time: typically less than 1.0ps from 0 Volts to  $V_{BR}$  min
9. Typical  $I_R$  less than  $5\mu\text{A}$  above 12V.
10. High Temperature soldering:  $260^\circ\text{C}/40$  seconds at terminals
11. Typical maximum temperature coefficient  $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
12. Plastic package has Underwriters Laboratory Flammability 94V-0
13. Matte tin lead-free Plated
14. Halogen free and RoHS compliant
15. Typical failure mode is short from over-specified voltage or current
16. Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
17. IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
18. ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
19. EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)



## Applications

TVS devices are ideal for the protection of I/O interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with a 10/1000 $\mu\text{s}$ waveform (Fig.1)(Note 1), (Note 2)	$P_{PPM}$	300	Watts
Peak Pulse Current with a 10/1000 $\mu\text{s}$ waveform.(Note1, Fig.3)	$I_{PP}$	See Next Table	Amps
Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$	$P_{M(AV)}$	5.0	Watt
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	$I_{FSM}$	100	Amps
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)	$V_F$	3.5/5.0	Voltage
Operating junction and Storage Temperature Range.	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### Notes:

- 1.Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2.
- 2.Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.
- 3.8.3ms single half sine-wave, or equivalent square wave, Duty cycle = 4 pulses per minutes maximum.
4. $V_F < 3.5\text{V}$  for  $V_{BR} < 200\text{V}$  and  $V_F < 6.5\text{V}$  for  $V_{BR} > 201\text{V}$ .

Electrical Characteristics (T <sub>a</sub> =25°C unless otherwise noted)												
Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V <sub>R</sub> (Volts)	Breakdown Voltage V <sub>BR</sub> (Volts) @ I <sub>T</sub>		Test Current I <sub>T</sub> (mA)	Maximum Clamping Voltage V <sub>C</sub> @ I <sub>CP</sub> (V) at 10/1000	Maximum Peak Pulse Current I <sub>PP</sub> (A) at 10/1000	Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (μA)	Maximum Temperature coefficient of V <sub>BR</sub> (%/C)	
		UNI	BI		MIN	MAX						
SMBJ5.0A	SMBJ5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	32.6	800	0.041	
SMBJ6.0A	SMBJ6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	29.1	800	0.046	
SMBJ6.5A	SMBJ6.5CA	KK	AK	6.5	7.22	7.98	10	11.2	26.8	500	0.052	
SMBJ7.0A	SMBJ7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	25.0	200	0.058	
SMBJ7.5A	SMBJ7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	23.3	100	0.061	
SMBJ8.0A	SMBJ8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	22.1	50	0.064	
SMBJ8.5A	SMBJ8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	20.8	20	0.066	
SMBJ9.0A	SMBJ9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	19.5	10	0.069	
SMBJ10A	SMBJ10CA	KX	AX	10.0	11.10	12.30	1	17.0	17.6	5	0.071	
SMBJ11A	SMBJ11CA	KZ	AZ	11.0	12.20	13.50	1	18.2	16.5	1	0.074	
SMBJ12A	SMBJ12CA	LE	BE	12.0	13.30	14.70	1	19.9	15.1	1	0.075	
SMBJ13A	SMBJ13CA	LG	BG	13.0	14.40	15.90	1	21.5	14.0	1	0.076	
SMBJ14A	SMBJ14CA	LK	BK	14.0	15.60	17.20	1	23.2	12.9	1	0.08	
SMBJ15A	SMBJ15CA	LM	BM	15.0	16.70	18.50	1	24.4	12.3	1	0.083	
SMBJ16A	SMBJ16CA	LP	BP	16.0	17.80	19.70	1	26.0	11.5	1	0.084	
SMBJ17A	SMBJ17CA	LR	BR	17.0	18.90	20.90	1	27.6	10.9	1	0.085	
SMBJ18A	SMBJ18CA	LT	BT	18.0	20.00	22.10	1	29.2	10.3	1	0.088	
SMBJ20A	SMBJ20CA	LV	BV	20.0	22.20	24.50	1	32.4	9.30	1	0.091	
SMBJ22A	SMBJ22CA	LX	BX	22.0	24.40	26.90	1	35.5	8.45	1	0.092	
SMBJ24A	SMBJ24CA	LZ	BZ	24.0	26.70	29.50	1	38.9	7.75	1	0.092	
SMBJ26A	SMBJ26CA	ME	CE	26.0	28.90	31.90	1	42.1	7.15	1	0.093	
SMBJ28A	SMBJ28CA	MG	CG	28.0	31.10	34.40	1	45.4	6.65	1	0.094	
SMBJ30A	SMBJ30CA	MK	CK	30.0	33.30	36.80	1	48.4	6.20	1	0.096	
SMBJ33A	SMBJ33CA	MM	CM	33.0	36.70	40.60	1	53.3	5.65	1	0.097	
SMBJ36A	SMBJ36CA	MP	CP	36.0	40.00	44.20	1	58.1	5.20	1	0.098	
SMBJ40A	SMBJ40CA	MR	CR	40.0	44.40	49.10	1	64.5	4.65	1	0.099	
SMBJ43A	SMBJ43CA	MT	CT	43.0	47.80	52.80	1	69.4	4.35	1	0.1	
SMBJ45A	SMBJ45CA	MV	CV	45.0	50.00	55.30	1	72.7	4.15	1	0.101	
SMBJ48A	SMBJ48CA	MX	CX	48.0	53.30	58.90	1	77.4	3.9	1	0.101	
SMBJ51A	SMBJ51CA	MZ	CZ	51.0	56.70	62.70	1	82.4	3.65	1	0.101	
SMBJ54A	SMBJ54CA	NE	DE	54.0	60.00	66.30	1	87.1	3.45	1	0.102	
SMBJ58A	SMBJ58CA	NG	DG	58.0	64.40	71.20	1	93.6	3.25	1	0.103	
SMBJ60A	SMBJ60CA	NK	DK	60.0	66.70	73.70	1	96.8	3.10	1	0.103	
SMBJ64A	SMBJ64CA	NM	DM	64.0	71.10	78.60	1	103.0	2.95	1	0.104	
SMBJ70A	SMBJ70CA	NP	DP	70.0	77.80	86.00	1	113.0	2.65	1	0.105	
SMBJ75A	SMBJ75CA	NR	DR	75.0	83.30	92.10	1	121.0	2.50	1	0.106	
SMBJ78A	SMBJ78CA	NT	DT	78.0	86.70	95.80	1	126.0	2.4	1	0.106	
SMBJ85A	SMBJ85CA	NV	DV	85.0	94.40	104.00	1	137.0	2.2	1	0.106	
SMBJ90A	SMBJ90CA	NX	DX	90.0	100.00	111.00	1	146.0	2.05	1	0.107	
SMBJ100A	SMBJ100CA	NZ	DZ	100.0	111.00	123.00	1	162.0	1.85	1	0.107	
SMBJ110A	SMBJ110CA	PE	EE	110.0	122.00	135.00	1	177.0	1.70	1	0.107	
SMBJ120A	SMBJ120CA	PG	EG	120.0	133.00	147.00	1	193.0	1.55	1	0.108	
SMBJ130A	SMBJ130CA	PK	EK	130.0	144.00	159.00	1	209.0	1.45	1	0.108	
SMBJ150A	SMBJ150CA	PM	EM	150.0	167.00	185.00	1	243.0	1.25	1	0.108	
SMBJ160A	SMBJ160CA	PP	EP	160.0	178.00	197.00	1	259.0	1.15	1	0.108	
SMBJ170A	SMBJ170CA	PR	ER	170.0	189.00	209.00	1	275.0	1.10	1	0.108	
SMBJ180A	SMBJ180CA	PT	ET	180.0	201.00	222.00	1	292.0	1.05	1	0.108	
SMBJ188A	SMBJ188CA	PB	EB	188.0	209.00	231.00	1	304.0	0.95	1	0.11	
SMBJ200A	SMBJ200CA	PV	EV	200.0	224.00	247.00	1	324.0	0.95	1	0.11	
SMBJ220A	SMBJ220CA	PX	EX	220.0	246.00	272.00	1	356.0	0.85	1	0.11	
SMBJ250A	SMBJ250CA	PZ	EZ	250.0	279.00	309.00	1	405.0	0.75	1	0.11	
SMBJ300A*	SMBJ300CA*	QE	FE	300.0	335.00	371.00	1	486.0	0.65	1	0.112	
SMBJ350A*	SMBJ350CA*	QG	FG	350.0	391.00	432.00	1	567.0	0.55	1	0.112	
SMBJ400A*	SMBJ400CA*	OK	FK	400.0	447.00	494.00	1	648.0	0.45	1	0.112	
SMBJ440A*	SMBJ440CA*	QM	FM	440.0	492.00	543.00	1	713.0	0.45	1	0.112	

For bidirectional type having V<sub>R</sub> of 10 volts and less, the I<sub>R</sub> limit is double. Components marked with "\*" use stacked-die, therefore they have a higher surge capability (typical 1.8\*I<sub>PP</sub>).

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

Figure 1 - Peak Pulse Power Derating Curve

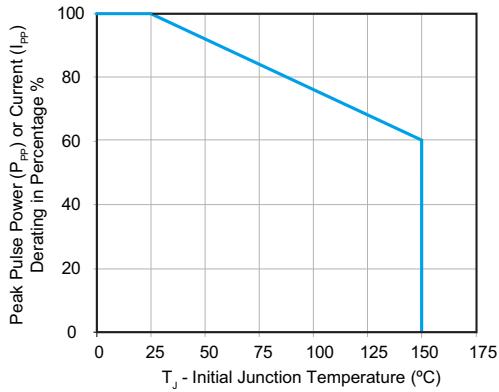


Figure 2 - Pulse Waveform

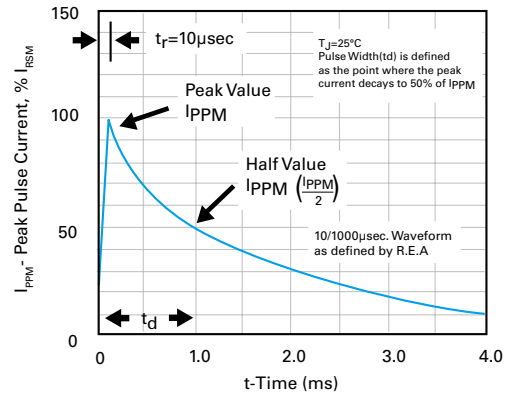


Figure 3 - Typical Junction Capacitance

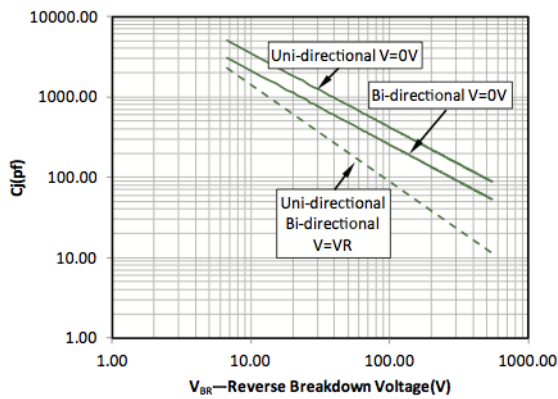


Figure 4 - Typical Transient Thermal Impedance

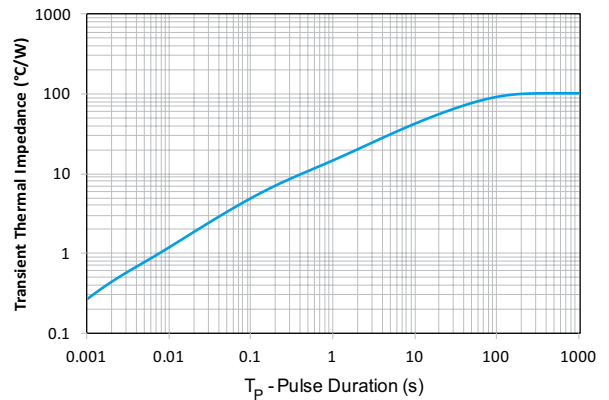


Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

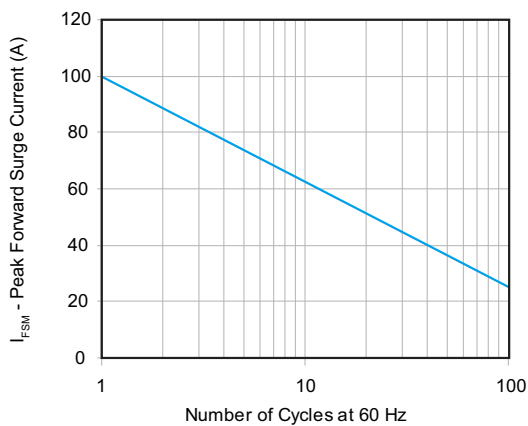
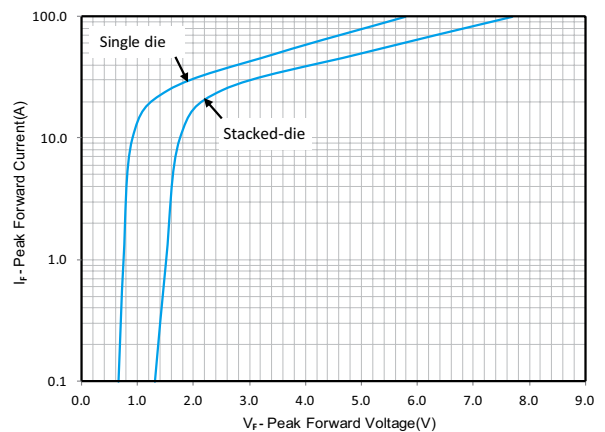
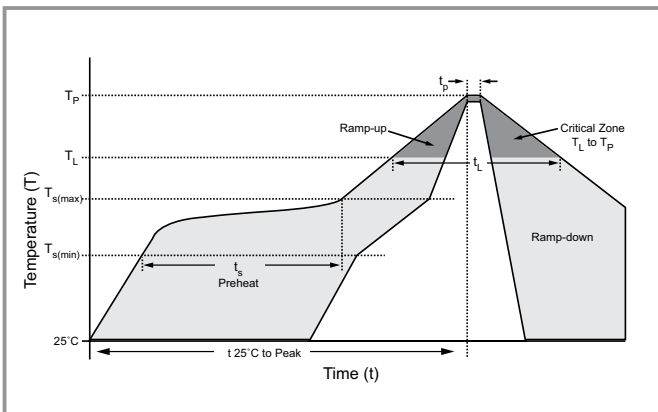


Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



## 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) ( $t_s$ )	60-180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		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 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20-40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		260°C



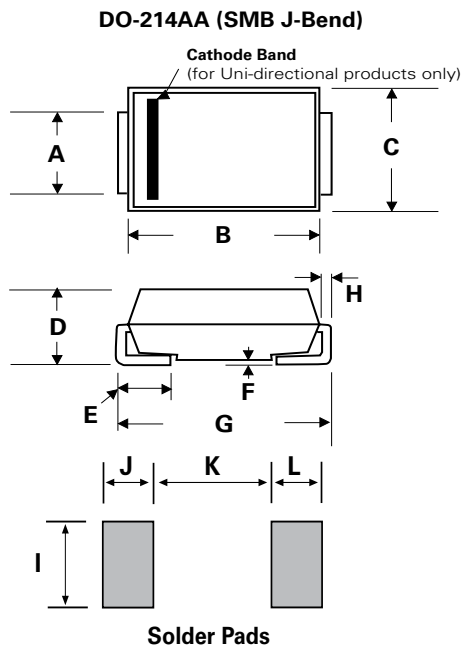
## Physical Specifications

Weight	0.003 ounce, 0.093grams
Case	JEDEC DO-214AA. Molded plastic body over glass passivated junction
Polarity	Color band denotes cathode except Bidirectional.
Termination	Matte Tin-plated leads, Solderable per JESD22-B102

## Environmental Specifications

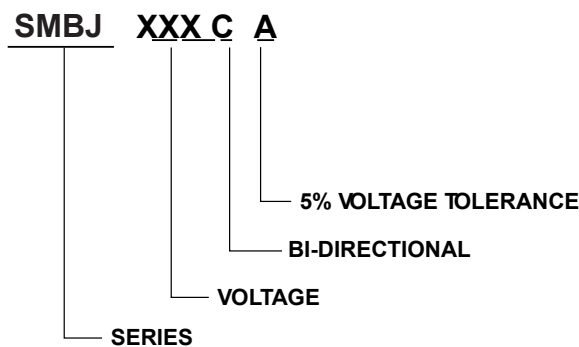
High Temp. Storage	JESD22-A103
HTRB	JESD 22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-A111

## Dimensions



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.076	0.086	1.930	2.200
B	0.160	0.187	4.060	4.750
C	0.130	0.155	3.300	3.940
D	0.078	0.103	1.990	2.610
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.205	0.220	5.210	5.590
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

## Part Numbering System



## Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMBJxxxXX	DO-214AA	750	Tape & Reel-16mm/13"tape	EIA STD RS-481