

***SMBJ SERIES***

***TRANSIENT VOLTAGE SUPPRESSORS***

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# SMBJ SERIES

## TRANSIENT VOLTAGE SUPPRESSORS

**STAND OFF VOLTAGE:** 5.0 to 188 VOLTS

**PEAK PULSE POWER:** 600 WATTS

### FEATURES

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- 600W peak pulse power capability on 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time: typically less than 1.0 ps from 0 volts to BV min
- Low profile package with built-in strain relief for surface mounted applications

### MECHANICAL DATA

Case: Molded plastic, DO-214AA(SMB)

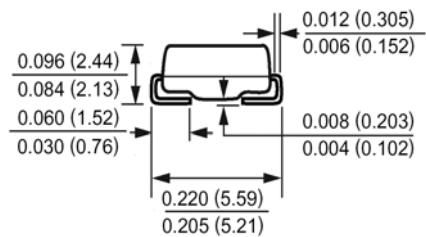
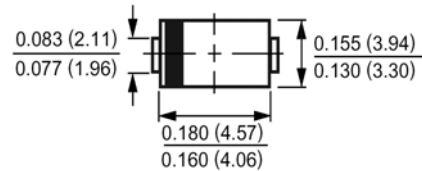
Terminals: Axial leads, solderable per MIL-STD-750, method 2026 guaranteed

Polarity: Color band denotes cathode except bipolar

Packaging: 12mm tape per EIA STD RS-481

Weight: 0.003 ounce, 0.093 gram

### DO-214AA(SMB)



Dimensions in inches and (millimeters)

### Maximum Ratings and Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

	Symbols	Limit	Units
Peak power dissipation with a 10/1000 $\mu$ s waveform (Note 1, 2) (Fig. 1)	$P_{PPM}$	Minimum 600	Watts
Peak pulse current with a 10/1000 $\mu$ s waveform (Note 1)	$I_{PPM}$	See Next Table	Amp
Peak forward surge current, 8.3ms single half sine-wave unidirectional only (Note 2)	$I_{FSM}$	100	Amp
Maximum instantaneous forward voltage at 50A for unidirectional only	$V_F$	3.5	Volts
Typical thermal resistance junction-to-lead	$R_{\theta JL}$	20	°C/W
Thermal resistance junction to ambient air (Note 3)	$R_{\theta JA}$	100	°C/W
Operating junction and storage temperature range	$T_J, T_{stg}$	-55 to +150	°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 0.2 x 0.2" (5.0 x 5.0mm) copper pads to each terminal
- 3- Mounted on minimum recommended pad layout

#### Devices for Bidirectional Applications:

- 1- For bi-directional, use C or CA suffix for types SMBJ5.0 thru types SMBJ188A(e.g. SMBJ5.0C, SMBJ188CA).
- 2- Electrical characteristics apply in both directions.

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### Maximum Ratings and Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Device Type	Breakdown Voltage		Test Current	Reverse Stand off Voltage	Maximum Reverse Leakage at $V_{WM}$	Maximum Peak Pulse Current	Maximum Clamping Voltage at $I_{PPM}$
	$V_{BR}$ at $I_T$ (Note 1)		$I_T$	$V_{WM}$	$I_D$ (Note 3)	$I_{PPM}$ (Note 2)	$V_C$
	Volts (min.)	Volts (max.)	mAmps	Volts	uAmps	Amps	Volts
SMBJ5.0	6.40	7.30	10	5.0	800	62.5	9.6
SMBJ5.0A( Note 4 )	6.40	7.00	10	5.0	800	65.2	9.2
SMBJ6.0	6.67	8.15	10	6.0	800	52.6	11.4
SMBJ6.0A	6.67	7.37	10	6.0	800	58.3	10.3
SMBJ6.5	7.22	8.82	10	6.5	500	48.8	12.3
SMBJ6.5A	7.22	7.98	10	6.5	500	53.6	11.2
SMBJ7.0	7.78	9.51	10	7.0	200	45.1	13.3
SMBJ7.0A	7.78	8.60	10	7.0	200	50.0	12.0
SMBJ7.5	8.33	10.2	1.0	7.5	100	42.0	14.3
SMBJ7.5A	8.33	9.21	1.0	7.5	100	46.5	12.9
SMBJ8.0	8.89	10.9	1.0	8.0	50	40.0	15.0
SMBJ8.0A	8.89	9.83	1.0	8.0	50	44.1	13.6
SMBJ8.5	9.44	11.5	1.0	8.5	20	37.7	15.9
SMBJ8.5A	9.44	10.4	1.0	8.5	20	41.7	14.4
SMBJ9.0	10.0	12.2	1.0	9.0	10	35.5	16.9
SMBJ9.0A	10.0	11.1	1.0	9.0	10	39.0	15.4
SMBJ10	11.1	13.6	1.0	10.0	5.0	31.9	18.8
SMBJ10A	11.1	12.3	1.0	10.0	5.0	35.3	17.0
SMBJ11	12.2	14.9	1.0	11.0	5.0	29.9	20.1
SMBJ11A	12.2	13.5	1.0	11.0	5.0	33.0	18.2
SMBJ12	13.3	16.3	1.0	12.0	5.0	27.3	22.0
SMBJ12A	13.3	14.7	1.0	12.0	5.0	30.2	19.9
SMBJ13	14.4	17.6	1.0	13.0	1.0	25.2	23.8
SMBJ13A	14.4	15.9	1.0	13.0	1.0	27.9	21.5
SMBJ14	15.6	19.1	1.0	14.0	1.0	23.3	25.8
SMBJ14A	15.6	17.2	1.0	14.0	1.0	25.9	23.2
SMBJ15	16.7	20.4	1.0	15.0	1.0	22.3	26.9
SMBJ15A	16.7	18.5	1.0	15.0	1.0	24.6	24.4
SMBJ16	17.8	21.8	1.0	16.0	1.0	20.8	28.8
SMBJ16A	17.8	19.7	1.0	16.0	1.0	23.1	26.0
SMBJ17	18.9	23.1	1.0	17.0	1.0	19.7	30.5
SMBJ17A	18.9	20.9	1.0	17.0	1.0	21.7	27.6
SMBJ18	20.0	24.4	1.0	18.0	1.0	18.6	32.2
SMBJ18A	20.0	22.1	1.0	18.0	1.0	20.5	29.2
SMBJ20	22.2	27.1	1.0	20.0	1.0	16.8	35.8
SMBJ20A	22.2	24.5	1.0	20.0	1.0	18.5	32.4
SMBJ22	24.4	29.8	1.0	22.0	1.0	15.2	39.4
SMBJ22A	24.4	26.9	1.0	22.0	1.0	16.9	35.5
SMBJ24	26.7	32.6	1.0	24.0	1.0	14.0	43.0
SMBJ24A	26.7	29.5	1.0	24.0	1.0	15.4	38.9
SMBJ26	28.9	35.3	1.0	26.0	1.0	12.9	46.6
SMBJ26A	28.9	31.9	1.0	26.0	1.0	14.3	42.1
SMBJ28	31.1	38.0	1.0	28.0	1.0	12.0	50.1
SMBJ28A	31.1	34.4	1.0	28.0	1.0	13.2	45.4
SMBJ30	33.3	40.7	1.0	30.0	1.0	11.2	53.5
SMBJ30A	33.3	36.8	1.0	30.0	1.0	12.4	48.4
SMBJ33	36.7	44.9	1.0	33.0	1.0	10.2	59.0
SMBJ33A	36.7	40.6	1.0	33.0	1.0	11.3	53.3
SMBJ36	40.0	48.9	1.0	36.0	1.0	9.3	64.3
SMBJ36A	40.0	44.2	1.0	36.0	1.0	10.3	58.1

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### Maximum Ratings and Electrical Characteristics

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Device Type	Breakdown Voltage		Test Current	Reverse Stand off Voltage	Maximum Reverse Leakage at $V_{WM}$	Maximum Peak Pulse Current	Maximum Clamping Voltage at $I_{PPM}$
	$V_{BR}$ at $I_T$ (Note 1)		$I_T$	$V_{WM}$	$I_D$ (Note 3)	$I_{PPM}$ (Note 2)	$V_C$
	Volts (min.)	Volts (max.)	mAmps	Volts	uAmps	Amps	Volts
SMBJ40	44.4	54.3	1.0	40	1.0	8.4	71.4
SMBJ40A	44.4	49.1	1.0	40	1.0	9.3	64.5
SMBJ43	47.8	58.4	1.0	43	1.0	7.8	76.7
SMBJ43A	47.8	52.8	1.0	43	1.0	8.6	69.4
SMBJ45	50.0	61.1	1.0	45	1.0	7.5	80.3
SMBJ45A	50.0	55.3	1.0	45	1.0	8.3	72.7
SMBJ48	53.3	65.2	1.0	48	1.0	7.0	85.5
SMBJ48A	53.3	58.9	1.0	48	1.0	7.8	77.4
SMBJ51	56.7	69.3	1.0	51	1.0	6.6	91.1
SMBJ51A	56.7	62.7	1.0	51	1.0	7.3	82.4
SMBJ54	60.0	73.3	1.0	54	1.0	6.2	96.3
SMBJ54A	60.0	66.3	1.0	54	1.0	6.9	87.1
SMBJ58	64.4	78.7	1.0	58	1.0	5.8	103
SMBJ58A	64.4	71.2	1.0	58	1.0	6.4	93.6
SMBJ60	66.7	81.5	1.0	60	1.0	5.6	107
SMBJ60A	66.7	73.7	1.0	60	1.0	6.2	96.8
SMBJ64	71.1	86.9	1.0	64	1.0	5.3	114
SMBJ64A	71.1	78.6	1.0	64	1.0	5.8	103
SMBJ70	77.8	95.1	1.0	70	1.0	4.8	125
SMBJ70A	77.8	86.0	1.0	70	1.0	5.3	113
SMBJ75	83.3	102	1.0	75	1.0	4.5	134
SMBJ75A	83.3	92.1	1.0	75	1.0	5.0	121
SMBJ78	86.7	106	1.0	78	1.0	4.3	139
SMBJ78A	86.7	95.8	1.0	78	1.0	4.8	126
SMBJ85	94.4	115	1.0	85	1.0	4.0	151
SMBJ85A	94.4	104	1.0	85	1.0	4.4	137
SMBJ90	100	122	1.0	90	1.0	3.8	160
SMBJ90A	100	111	1.0	90	1.0	4.1	146
SMBJ100	111	136	1.0	100	1.0	3.4	179
SMBJ100A	111	123	1.0	100	1.0	3.7	162
SMBJ110	122	149	1.0	110	1.0	3.1	196
SMBJ110A	122	135	1.0	110	1.0	3.4	177
SMBJ120	133	163	1.0	120	1.0	2.8	214
SMBJ120A	133	147	1.0	120	1.0	3.1	193
SMBJ130	144	176	1.0	130	1.0	2.6	230
SMBJ130A	144	159	1.0	130	1.0	2.9	209
SMBJ150	167	204	1.0	150	1.0	2.2	268
SMBJ150A	167	185	1.0	150	1.0	2.5	243
SMBJ160	178	218	1.0	160	1.0	2.1	287
SMBJ160A	178	197	1.0	160	1.0	2.3	259
SMBJ170	189	231	1.0	170	1.0	2.0	304
SMBJ170A	189	209	1.0	170	1.0	2.2	275
SMBJ188	209	255	1.0	188	1.0	1.7	344
SMBJ188A	209	231	1.0	188	1.0	2.0	328

#### NOTES:

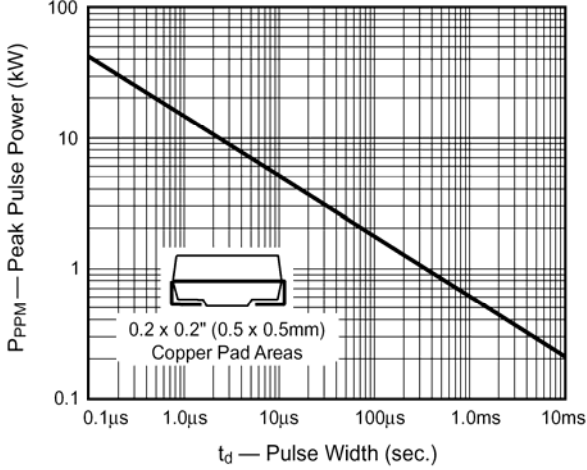
- 1- Pulse test:  $t_p \leq 50ms$
- 2- Surge current waveform per Fig. 3 and derated per Fig. 2
- 3- For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled
- 4- For the bidirectional SMBJ5.0CA, the maximum  $V_{BR}$  is 7.25V
- 5- All terms and symbols are consistent with ANSI/IEEE C62.35

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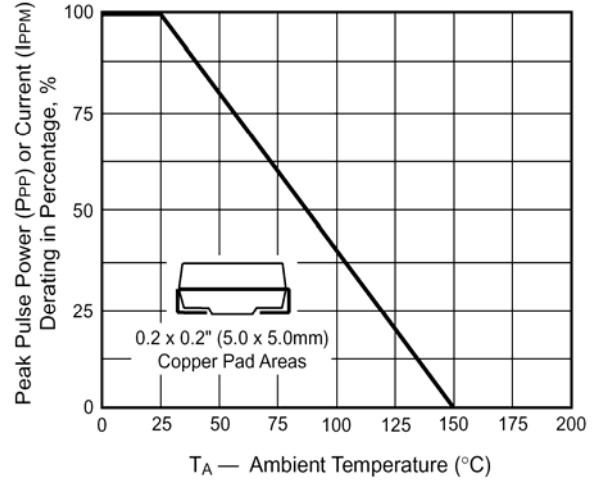
## TRANSIENT VOLTAGE SUPPRESSORS

### RATINGS AND CHARACTERISTIC CURVES

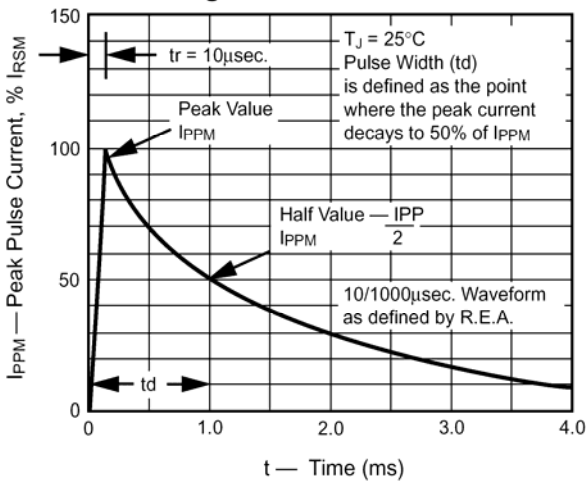
**Fig. 1 – Peak Pulse Power Rating Curve**



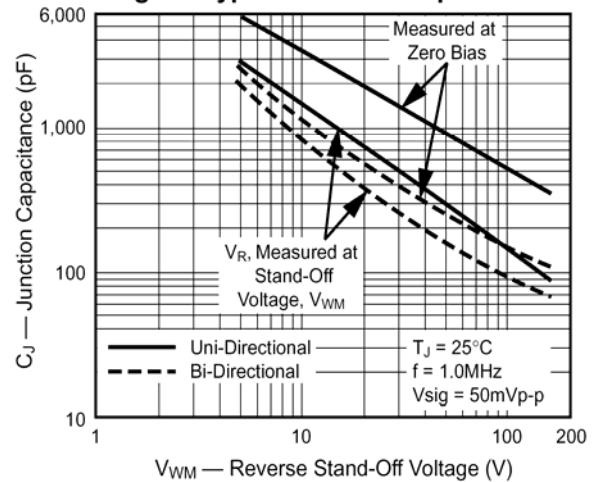
**Fig. 2 – Pulse Derating Curve**



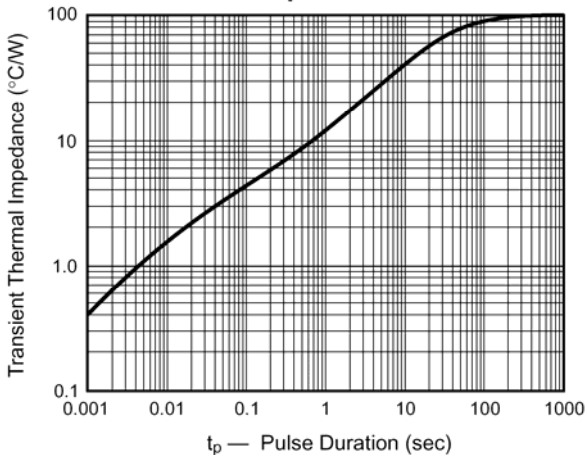
**Fig. 3 – Pulse Waveform**



**Fig. 4 – Typical Junction Capacitance**



**Fig. 5 – Typical Transient Thermal Impedance**



**Fig. 6 – Maximum Non-Repetitive Peak Forward Surge Current**

