



SYNSEMI SEMICONDUCTOR

SMBJ5.0 thru 188CA

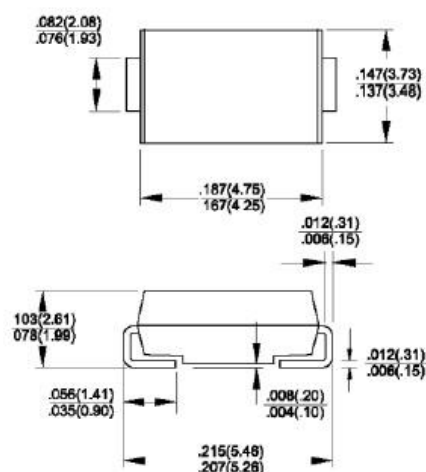
Surface Mount Transient Voltage Suppressors
Peak Pulse Power 600W Stand-off Voltage 5.0 to 188V

Features

- ◆ Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- ◆ Low profile package with built-in strain relief for surface mounted applications
- ◆ Glass passivated junction
- ◆ Low incremental surge resistance, excellent clamping capability
- ◆ 600W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01%
- ◆ Very fast response time
- ◆ High temperature soldering guaranteed: 250°C/10 seconds at terminals



DO-214AA (SMB)



Mechanical Data

- ◆ Case: JEDEC DO-214AA(SMB J-Bend) molded plastic over passivated junction
- ◆ Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- ◆ Polarity: For unidirectional types the band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- ◆ Weight: 0.003oz., 0.093g

Devices for Bidirectional Applications

For bi-directional devices, use suffix CA (e.g. SMBJ10CA). Electrical characteristics apply in both directions.

Maximum Ratings and Thermal Characteristics

(Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation with a 10/1000us waveform ^(1,2) (see Fig. 1)	P_{PPM}	Minimum 600	W
Peak pulse current with a 10/1000us waveform ⁽¹⁾	I_{PPM}	See Next Table	A
Peak forward surge current 8.3ms single half sine-wave uni-directional only ⁽³⁾	I_{FSM}	100	A
Typical thermal resistance, junction to ambient ⁽⁴⁾	$R_{\theta JA}$	100	°C/W
Typical thermal resistance, junction to lead	$R_{\theta JL}$	20	°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 5.0 mm) copper pads to each terminal
 3. Mounted on minimum recommended pad layout

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Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. $V_F=3.5V$ at $I_F=50A$ (uni-directional only)

Device Type	Device marking code		Breakdown voltage $V_{(BR)}$ (Volts) ⁽¹⁾		Test current at I_T (mA)	Stand-off voltage V_{WM} (Volts)	Maximum reverse leakage at V_{WM} $I_D^{(3)}$ (uA)	Maximum peak pulse surge current $I_{PPM}^{(2)}$ (A)	Maximum clamping voltage at I_{PPM} V_C (Volts)
	UNI	BI	Min.	Max.					
SMBJ5.0	KD	AD	6.40	7.82	10	5.0	800	62.5	9.6
SMBJ5.0A ⁽⁴⁾	KE	AE	6.40	7.07	10	5.0	800	65.2	9.2
SMBJ6.0	KF	AF	6.67	8.15	10	6.0	800	52.6	11.4
SMBJ6.0A	KG	AG	6.67	7.37	10	6.0	800	58.3	10.3
SMBJ6.5	KH	AH	7.22	8.82	10	6.5	500	48.8	12.3
SMBJ6.5A	KK	AK	7.22	7.98	10	6.5	500	63.6	11.2
SMBJ7.0	KL	AL	7.78	9.51	10	7.0	200	46.1	13.3
SMBJ7.0A	KM	AM	7.78	8.60	10	7.0	200	50.0	12.0
SMBJ7.5	KN	AN	8.33	10.2	1.0	7.5	100	42.0	14.3
SMBJ7.5A	KP	AP	8.33	9.21	1.0	7.5	100	46.5	12.9
SMBJ8.0	KQ	AQ	8.89	10.9	1.0	8.0	50	40.0	15.0
SMBJ8.0A	KR	AR	8.89	9.83	1.0	8.0	50	44.1	13.6
SMBJ8.5	KS	AS	9.44	11.5	1.0	8.5	20	37.7	15.9
SMBJ8.5A	KT	AT	9.44	10.4	1.0	8.5	20	41.7	14.4
SMBJ9.0	KU	AU	10.0	12.2	1.0	9.0	10	35.5	16.9
SMBJ9.0A	KV	AV	10.0	11.1	1.0	9.0	10	39.0	15.4
SMBJ10	KW	AW	11.1	13.6	1.0	10	5.0	31.9	18.8
SMBJ10A	KX	AX	11.1	12.3	1.0	10	5.0	35.3	17.0
SMBJ11	KY	AY	12.2	14.9	1.0	11	5.0	29.9	20.1
SMBJ11A	KZ	AZ	12.2	13.5	1.0	11	5.0	33.0	18.2
SMBJ12	LD	BD	13.3	16.3	1.0	12	5.0	27.3	22.0
SMBJ12A	LE	BE	13.3	14.7	1.0	12	5.0	30.2	19.9
SMBJ13	LF	BF	14.4	17.6	1.0	13	1.0	25.2	23.8
SMBJ13A	LG	BG	14.4	15.9	1.0	13	1.0	27.9	21.5
SMBJ14	LH	BH	15.6	19.1	1.0	14	1.0	23.3	25.8
SMBJ14A	LK	BK	15.6	17.2	1.0	14	1.0	25.9	23.2
SMBJ15	LL	BL	16.7	20.4	1.0	15	1.0	22.3	26.9
SMBJ15A	LM	BM	16.7	18.5	1.0	15	1.0	24.6	24.4
SMBJ16	LN	BN	17.8	21.8	1.0	16	1.0	20.8	28.8
SMBJ16A	LP	BP	17.8	19.7	1.0	16	1.0	23.1	26.0
SMBJ17	LQ	BQ	18.9	23.1	1.0	17	1.0	19.7	30.5
SMBJ17A	LR	BR	18.9	20.9	1.0	17	1.0	21.7	27.6
SMBJ18	LS	BS	20.0	24.4	1.0	18	1.0	18.6	32.2
SMBJ18A	LT	BT	20.0	22.1	1.0	18	1.0	20.5	29.2
SMBJ20	LU	BU	22.2	27.1	1.0	20	1.0	16.8	35.8
SMBJ20A	LV	BV	22.2	24.5	1.0	20	1.0	18.5	32.4
SMBJ22	LW	BW	24.4	29.8	1.0	22	1.0	15.2	39.4
SMBJ22A	LX	BX	24.4	26.9	1.0	22	1.0	16.9	36.5
SMBJ24	LY	BY	26.7	32.6	1.0	24	1.0	14.0	43.0
SMBJ24A	LZ	BZ	26.7	29.5	1.0	24	1.0	15.4	38.9
SMBJ26	MD	CD	28.9	35.3	1.0	26	1.0	12.9	46.6
SMBJ26A	ME	CE	28.9	31.9	1.0	26	1.0	14.3	42.1
SMBJ28	MF	CF	31.1	38.0	1.0	28	1.0	12.0	50.0
SMBJ28A	MG	CG	31.1	34.4	1.0	28	1.0	13.2	45.4
SMBJ30	MH	CH	33.3	40.7	1.0	30	1.0	11.2	53.5
SMBJ30A	MK	CK	33.3	36.8	1.0	30	1.0	12.4	48.4

- Notes:**
1. $V_{(BR)}$ measured after I_T applied for 300us square wave pulse or equivalent
 2. Surge current waveform per Fig. 3 and derate per Fig. 2
 3. For bi-directional types having V_{WM} of 10 Volts and less, the I_D limit is doubled
 4. All terms and symbols are consistent with ANSI/IEEE C62.35
 5. For the bidirectional SMBJ5.0CA, the maximum $V_{(BR)}$ is 7.25V.

SMBJ5.0 thru 188CA

Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. $V_F = 3.5V$ at $I_F = 50A$ (uni-directional only)

Device type	Device marking code		Breakdown voltage V_{BR} (Volts) ⁽¹⁾		Test current at I_T (mA)	Stand-off voltage V_{WM} (Volts)	Maximum reverse leakage at V_{WM} $I_{R0}^{(2)}$ (μA)	Maximum peak pulse surge current $I_{PPM}^{(2)}$ (A)	Maximum clamping voltage at I_{PPM} V_C (Volts)
	UNI	BI	Min.	Max.					
SMBJ33	ML	CL	36.7	44.9	1.0	33	1.0	10.2	59.0
SMBJ33A	MM	CM	36.7	40.6	1.0	33	1.0	11.3	53.3
SMBJ36	MN	CN	40.0	48.9	1.0	36	1.0	9.3	64.3
SMBJ36A	MP	CP	40.0	44.2	1.0	36	1.0	10.3	58.1
SMBJ40	MQ	CQ	44.4	54.3	1.0	40	1.0	8.4	71.4
SMBJ40A	MR	CR	44.4	49.1	1.0	40	1.0	9.3	64.5
SMBJ43	MS	CS	47.8	58.4	1.0	43	1.0	7.8	76.7
SMBJ43A	MT	CT	47.8	52.8	1.0	43	1.0	8.6	69.4
SMBJ45	MU	CU	50.0	61.1	1.0	45	1.0	7.5	80.3
SMBJ45A	MV	CV	50.0	55.3	1.0	45	1.0	8.3	72.7
SMBJ48	MW	CW	53.3	65.1	1.0	48	1.0	7.0	85.5
SMBJ48A	MX	CX	53.3	58.9	1.0	48	1.0	7.8	77.4
SMBJ51	MY	CY	56.7	69.3	1.0	51	1.0	6.6	91.1
SMBJ51A	MZ	CZ	56.7	62.7	1.0	51	1.0	7.3	82.4
SMBJ54	ND	DD	60.0	73.3	1.0	54	1.0	6.2	96.3
SMBJ54A	NE	DE	60.0	66.3	1.0	54	1.0	6.9	87.1
SMBJ58	NF	DF	64.4	78.7	1.0	58	1.0	5.8	103
SMBJ58A	NG	DG	64.4	71.2	1.0	58	1.0	6.4	93.6
SMBJ60	NH	DH	66.7	81.5	1.0	60	1.0	5.6	107
SMBJ60A	NK	DK	66.7	73.7	1.0	60	1.0	6.2	96.8
SMBJ64	NL	DL	71.1	86.9	1.0	64	1.0	5.3	114
SMBJ64A	NM	DM	71.1	78.6	1.0	64	1.0	5.8	103
SMBJ70	NN	DN	77.8	95.1	1.0	70	1.0	4.8	125
SMBJ70A	NP	DP	77.8	86.0	1.0	70	1.0	5.3	113
SMBJ75	NQ	DQ	83.3	102	1.0	75	1.0	4.5	134
SMBJ75A	NR	DR	83.3	92.1	1.0	75	1.0	5.0	121
SMBJ78	NS	DS	86.7	106	1.0	78	1.0	4.3	139
SMBJ78A	NT	DT	86.7	95.8	1.0	78	1.0	4.8	126
SMBJ85	NU	DU	94.4	115	1.0	85	1.0	4.0	151
SMBJ85A	NV	DV	94.4	104	1.0	85	1.0	4.4	137
SMBJ90	NW	DW	100	122	1.0	90	1.0	3.8	160
SMBJ90A	NX	DX	100	111	1.0	90	1.0	4.1	146
SMBJ100	NY	DY	111	136	1.0	100	1.0	3.4	179
SMBJ100A	NZ	DZ	111	123	1.0	100	1.0	3.7	162
SMBJ110	PD	FD	122	149	1.0	110	1.0	3.1	196
SMBJ110A	PE	FE	122	135	1.0	110	1.0	3.4	177
SMBJ120	PF	FF	133	163	1.0	120	1.0	2.8	214
SMBJ120A	PG	FG	133	147	1.0	120	1.0	3.1	193
SMBJ130	PH	FH	144	176	1.0	130	1.0	2.6	231
SMBJ130A	PK	FK	144	159	1.0	130	1.0	2.9	209
SMBJ150	PL	FL	167	204	1.0	150	1.0	2.2	268
SMBJ150A	PM	FM	167	185	1.0	150	1.0	2.5	243
SMBJ160	PN	FN	178	218	1.0	160	1.0	2.1	287
SMBJ160A	PP	FP	178	197	1.0	160	1.0	2.3	259
SMBJ170	PQ	FQ	189	231	1.0	170	1.0	2.0	304
SMBJ170A	PR	FR	189	209	1.0	170	1.0	2.2	275
SMBJ188	PS	FS	209	255	1.0	188	1.0	1.7	344
SMBJ188A	PT	FT	209	231	1.0	188	1.0	2.0	328

- Notes:**
1. V_{BR} measured after I_F applied for 300 μs square wave pulse or equivalent
 2. Surge current waveform per Fig. 3 and derate per Fig. 2
 3. For bi-directional types having V_{WM} of 10 Volts and less, the I_{PPM} limit is doubled
 4. All terms and symbols are consistent with ANSI/IEEE C62.35

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RATINGS AND CHARACTERISTIC CURVES

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

Fig. 1 – Peak Pulse Power Rating Curve

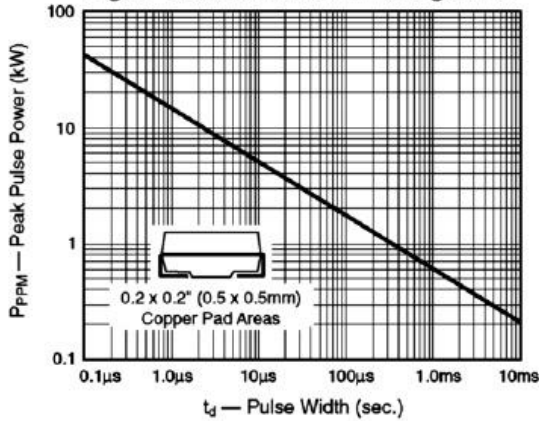


Fig. 2 – Pulse Derating Curve

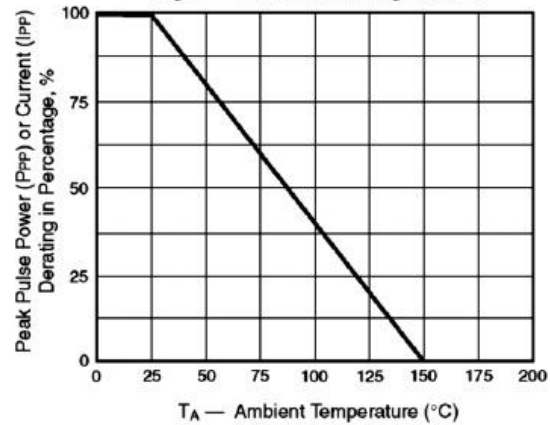


Fig. 3 – Pulse Waveform

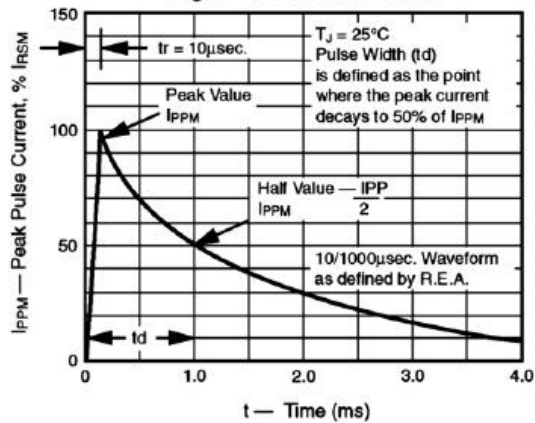


Fig. 4 – Typical Junction Capacitance

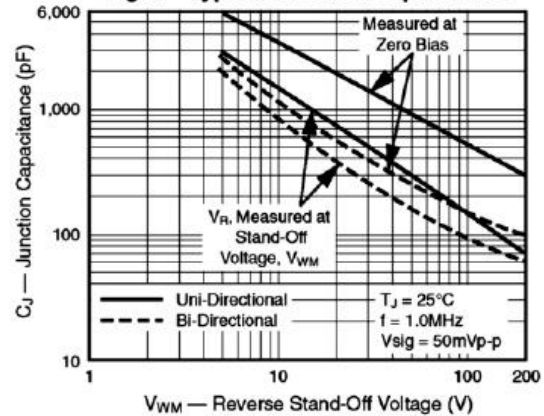


Fig. 5 – Typical Transient Thermal Impedance

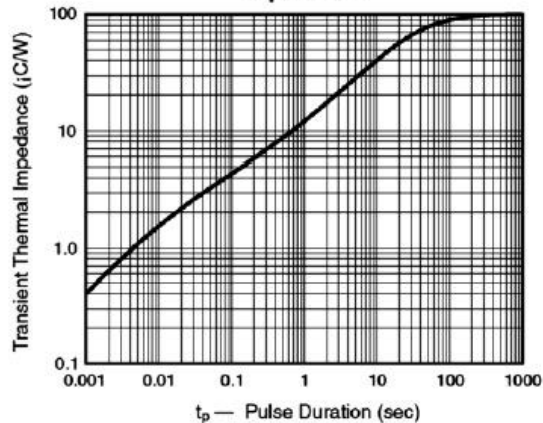


Fig. 6 – Maximum Non-Repetitive Peak Forward Surge Current

