

SMBG AND SMBJ 5.0 THRU 170,A SERIES

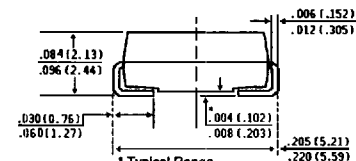
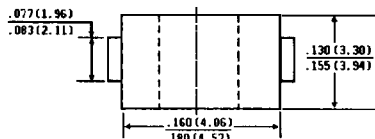
UNIDIRECTIONAL SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR VOLTAGE - 5.0 - 170 Volts Peak Pulse Power - 600 Watts

FEATURES

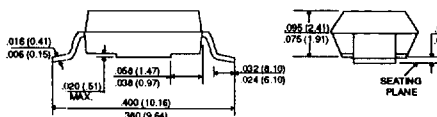
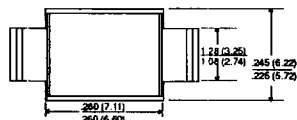
- ◆ For surface mounted applications in order to optimize board space
- ◆ Low profile package
- ◆ Built-in strain relief
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ Repetition Rate (duty cycle): 0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 volts to BV for unidirectional types
- ◆ Typical I_D less than $1\mu A$ above 10V
- ◆ High temperature soldering: 250°C/10 seconds at terminals
- ◆ Plastic package has Underwriters Laboratory Flammability Classification 94V-0



DO-214AA MODIFIED J-BEND



DO-215AA GULL WING



Dimensions in inches and (millimeters)

MECHANICAL DATA

Case: JEDEC DO214 / DO215 Molded plastic over passivated junction

Terminals: Solder plated, solderable per MIL-STD-750, Method 2026

Polarity: Color band denotes positive end (cathode)

Standard Packaging: 12mm tape (EIA STD RS-481)

Weight: 0.003 ounces, 0.093 gram



Schematic Symbol

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

	SYMBOLS	VALUE	UNITS
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Notes 1, 2, Fig. 1)	P _{PPM}	Minimum 600	Watts
Peak Pulse Current on 10/1000 μ s waveform (Note 1, Fig. 3)	I _{PPM}	See Table 1	Amps
Peak forward Surge Current 8.3ms single half sine-wave superimposed on rated load (JEDEC Method) (Notes 2,3)	I _{FSM}	100.0	Amps
Maximum Instantaneous Forward Voltage at 50A (Note 3, 4)	V _{FM}	See Note 3, 4	Volts
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 $T_A=25^\circ C$ per Fig. 2.
2. Mounted on 5.0mm² (.013mm thick) land areas.
3. Measured on 8.3ms, single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
4. $V_F=3.5V$ for SMB-5.0 thru SMB-90 devices and $V_F=5.0V$ for SMB-100 thru SMB-170 devices.

ELECTRICAL CHARACTERISTICS AT T_A=25°C (unless otherwise noted)

Guill Wing Lead	Modified 1/2" Band Lead	Device Marking Code	Breakdown Voltage V _{BR} (Volts) (NOTE 1)	Reverse Stand-off Voltage V _{RRM} (Volts)	Maximum Reverse Leakage at V _{RRM} I _{RM} (mA)	Maximum Peak Pulse Surge Current I _{PPM} (Amps)	Maximum Clamping Voltage at I _{PPM} V _C (Volts)	
			(Min / Max)	at I _T (mA)		(NOTE 2)		
SMBG5.0	SMBJ5.0	KD	6.40/7.55	10	5.0	800.0	62.5	9.6
SMBG5.0A	SMBJ5.0A	KE	6.40/7.25	10	5.0	800.0	65.2	9.2
SMBG6.0	SMBJ6.0	KF	6.67/8.45	10	6.0	800.0	52.6	11.4
SMBG6.0A	SMBJ6.0A	KG	6.67/7.67	10	6.0	800.0	58.3	10.3
SMBG6.5	SMBJ6.5	KH	7.22/9.14	10	6.5	500.0	48.7	12.3
SMBG6.5A	SMBJ6.5A	KK	7.22/8.30	10	6.5	500.0	53.6	11.2
SMBG7.0	SMBJ7.0	KL	7.78/9.86	10	7.0	200.0	45.1	13.3
SMBG7.0A	SMBJ7.0A	KM	7.78/8.95	10	7.0	200.0	50.0	12.0
SMBG7.5	SMBJ7.5	KN	8.33/10.67	1.0	7.5	100.0	42.0	14.3
SMBG7.5A	SMBJ7.5A	KP	8.33/9.58	1.0	7.5	100.0	46.5	12.9
SMBG8.0	SMBJ8.0	KQ	8.89/11.3	1.0	8.0	50.0	40.0	15.0
SMBG8.0A	SMBJ8.0A	KR	8.89/10.2	1.0	8.0	50.0	44.1	13.6
SMBG8.5	SMBJ8.5	KS	9.44/11.9	1.0	8.5	20.0	37.7	15.9
SMBG8.5A	SMBJ8.5A	KT	9.44/10.8	1.0	8.5	20.0	41.7	14.4
SMBG9.0	SMBJ9.0	KU	10.0/12.6	1.0	9.0	10.0	35.5	16.9
SMBJ9.0A	SMBJ9.0A	KV	10.0/11.5	1.0	9.0	10.0	39.0	15.4
SMBG10	SMBJ10	KW	11.1/14.1	1.0	10	5.0	31.9	18.8
SMBG10A	SMBJ10A	KX	11.1/12.8	1.0	10	5.0	35.3	17.0
SMBG11	SMBJ11	KY	12.2/15.4	1.0	11	5.0	29.9	20.1
SMBG11A	SMBJ11A	KZ	12.2/14.0	1.0	11	5.0	33.0	18.2
SMBG12	SMBJ12	LD	13.3/16.9	1.0	12	5.0	27.3	22.0
SMBG12A	SMBJ12A	LE	13.3/15.3	1.0	12	5.0	30.2	19.9
SMBG13	SMBJ13	LF	14.4/18.2	1.0	13	5.0	25.2	23.8
SMBG13A	SMBJ13A	LG	14.4/16.5	1.0	13	5.0	27.9	21.5
SMBG14	SMBJ14	LH	15.6/19.8	1.0	14	5.0	23.3	25.8
SMBG14A	SMBJ14A	LK	15.6/17.9	1.0	14	5.0	25.8	23.2
SMBG15	SMBJ15	LL	16.7/21.1	1.0	15	5.0	22.3	26.9
SMBG15A	SMBJ15A	LM	16.7/19.2	1.0	15	5.0	24.0	24.4
SMBG16	SMBJ16	LN	17.8/22.6	1.0	16	5.0	20.8	28.8
SMBG16A	SMBJ16A	LP	17.8/20.5	1.0	16	5.0	23.1	26.0
SMBG17	SMBJ17	LQ	18.9/23.9	1.0	17	5.0	19.7	30.5
SMBG17A	SMBJ17A	LR	18.9/21.7	1.0	17	5.0	21.7	27.6
SMBG18	SMBJ18	LS	20.0/25.3	1.0	18	5.0	18.6	32.2
SMBG18A	SMBJ18A	LT	20.0/23.3	1.0	18	5.0	20.5	29.2
SMBG20	SMBJ20	LU	22.2/28.1	1.0	20	5.0	16.7	35.8
SMBG20A	SMBJ20A	LV	22.2/25.5	1.0	20	5.0	18.5	32.4
SMBG22	SMBJ22	LW	24.4/30.9	1.0	22	5.0	15.2	39.4
SMBG22A	SMBJ22A	LX	24.4/28.0	1.0	22	5.0	16.9	35.5
SMBG24	SMBJ24	LY	26.7/33.8	1.0	24	5.0	14.0	43.0
SMBG24A	SMBJ24A	LZ	26.7/30.7	1.0	24	5.0	15.4	38.9
SMBG26	SMBJ26	MD	28.9/36.6	1.0	26	5.0	12.4	46.6
SMBG26A	SMBJ26A	ME	28.9/33.2	1.0	26	5.0	14.2	42.1
SMBG28	SMBJ28	MF	31.1/39.4	1.0	28	5.0	12.0	50.0
SMBG28A	SMBJ28A	MG	31.1/35.8	1.0	28	5.0	13.2	45.4
SMBG30	SMBJ30	MH	33.3/42.2	1.0	30	5.0	11.2	53.5
SMBG30A	SMBJ30A	MK	33.1/38.3	1.0	30	5.0	12.4	46.6
SMBG33	SMBJ33	ML	36.7/46.5	1.0	33	5.0	10.2	59.0
SMBG33A	SMBJ33A	MM	36.7/42.2	1.0	33	5.0	11.3	53.3
SMBG36	SMBJ36	MN	40.0/50.7	1.0	36	5.0	9.3	64.3
SMBG36A	SMBJ36A	MP	40.0/46.0	1.0	36	5.0	10.3	58.1
SMBG40	SMBJ40	MQ	44.4/56.3	1.0	40	5.0	8.4	71.4
SMBG40A	SMBJ40A	MR	44.4/51.1	1.0	40	5.0	9.3	64.5
SMBG43	SMBJ43	MS	47.8/60.5	1.0	43	5.0	7.8	76.7
SMBG43A	SMBJ43A	MT	47.8/54.9	1.0	43	5.0	8.6	69.4
SMBG45	SMBJ45	MU	50.0/63.3	1.0	45	5.0	7.5	80.3
SMBG45A	SMBJ45A	MV	50.0/57.5	1.0	45	5.0	8.3	72.7
SMBG48	SMBJ48	MW	53.3/67.5	1.0	48	5.0	7.0	85.5
SMBG48A	SMBJ48A	MX	53.3/61.3	1.0	48	5.0	7.7	77.4
SMBG51	SMBJ51	MY	56.7/71.8	1.0	51	5.0	6.6	91.1
SMBG51A	SMBJ51A	MZ	56.7/65.2	1.0	51	5.0	7.3	82.4
SMBG54	SMBJ54	ND	60.0/78.0	1.0	54	5.0	6.2	96.3
SMBG54A	SMBJ54A	NE	60.0/69.0	1.0	54	5.0	6.9	87.1

ELECTRICAL CHARACTERISTICS AT 25°C

Gull-Wing Lead	Modified "J" Bend Lead	Device Marking Code	Breakdown Voltage V_{BR} Volts (NOTE 1) (Min. / Max.)	I_T mA	Reverse Stand-off Voltage V_{WM} (Volts)	Maximum Reverse Leakage at V_{WM} (µA)	Maximum Peak Pulse Surge Current I_{PP} (NOTE 2) (Amps)	Maximum Clamping Voltage at I_{PP} V_C (Volts)
SMBG58	SMBJ58	NF	64.4/81.8	1.0	58	5	5.8	103.0
SMBG58A	SMBJ58A	NG	64.4/74.1	1.0	58	5	6.4	93.8
SMBG60	SMBJ60	NH	66.7/84.5	1.0	60	5	5.6	107.0
SMBG60A	SMBJ60A	NK	66.7/76.7	1.0	60	5	6.2	96.8
SMBG64	SMBJ64	NL	71.1/90.1	1.0	64	5	5.3	114.0
SMBG64A	SMBJ64A	NM	71.1/81.8	1.0	64	5	5.8	103.0
SMBG70	SMBJ70	NN	77.8/98.6	1.0	70	5	4.8	125
SMBG70A	SMBJ70A	NP	77.8/89.5	1.0	70	5	5.3	113
SMBG75	SMBJ75	NQ	83.3/105.7	1.0	75	5	4.5	134
SMBG75A	SMBJ75A	NR	83.3/95.8	1.0	75	5	4.9	121
SMBG78	SMBJ78	NS	86.7/109.9	1.0	78	5	4.3	139
SMBG78A	SMBJ78A	NT	86.7/99.7	1.0	78	5	4.7	128
SMBG85	SMBJ85	NU	94.4/119.2	1.0	85	5	3.9	151
SMBG85A	SMBJ85A	NV	94.4/108.2	1.0	85	5	4.4	137
SMBG90	SMBJ90	NW	100/126.5	1.0	90	5	3.8	160
SMBG90A	SMBJ90A	NX	100/115.5	1.0	90	5	4.1	146
SMBG100	SMBJ100	NY	111/141.0	1.0	100	5	3.4	179
SMBG100A	SMBJ100A	NZ	111/128.0	1.0	100	5	3.7	162
SMBG110	SMBJ110	PD	122/154.5	1.0	110	5	3.0	196
SMBG110A	SMBJ110A	PE	122/140.5	1.0	110	5	3.4	177
SMBG120	SMBJ120	PF	133/169.0	1.0	120	5	2.8	214
SMBG120A	SMBJ120A	PG	133/153.0	1.0	120	5	3.1	193
SMBG130	SMBJ130	PH	144/182.5	1.0	130	5	2.6	231
SMBG130A	SMBJ130A	PK	144/165.5	1.0	130	5	2.9	209
SMBG150	SMBJ150	PL	167/211.5	1.0	150	5	2.2	268
SMBG150A	SMBJ150A	PM	167/192.5	1.0	150	5	2.5	243
SMBG160	SMBJ160	PN	178/226.0	1.0	160	5	2.1	287
SMBG160A	SMBJ160A	PP	178/205.0	1.0	160	5	2.3	259
SMBG170	SMBJ170	PQ	189/239.5	1.0	170	5	2.0	304
SMBG170A	SMBJ170A	PR	189/217.5	1.0	170	5	2.2	275

NOTES:

- V_{BR} measured after I_T applied for 300µs I_T = Square Wave Pulse or equivalent.
- Surge Current Waveform per Figure 3 and Derate per Figure 2.
- A TransZorb TVS is normally selected according to the reverse "Stand Off Voltage" (V_{WM}) which should be equal to or greater than the D.C. or continuous peak operating voltage level.
- All terms and symbols are consistent with ANSI / IEEE C.62.35 specifications.

APPLICATION NOTES

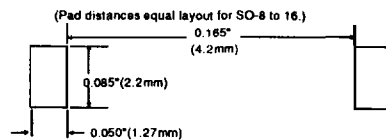
These surface mountable packages are designed specifically for transient voltage suppression. The wide leads assure a large surface contact for good heat dissipation, and a low resistance path for surge current flow to ground. These high speed transient voltage suppressors can be used to effectively protect sensitive components such as integrated circuits and MOS devices.

A 600W (SMB) device is normally selected when the threat of transients is from lightning-induced transients conducted via external leads or I/O lines. It is also used to protect against switching transients induced by large coils or industrial motors. System impedance at component level in a system is usually high enough to limit the current to within the peak pulse current (I_{pp}) rating of this series.

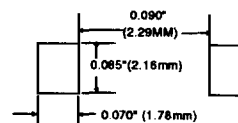
RECOMMENDED PAD SIZES

The pad dimensions should be 0.010" (.25mm) longer than the contact size, in the lead axis. This allows a solder fillet to form, see figure below. Contact factory for soldering methods.

GULL-WING



MODIFIED J-BEND



MAXIMUM RATINGS AND CHARACTERISTIC CURVES SMBG AND SMBJ SERIES

FIG. 1 - PEAK PULSE POWER RATING CURVE

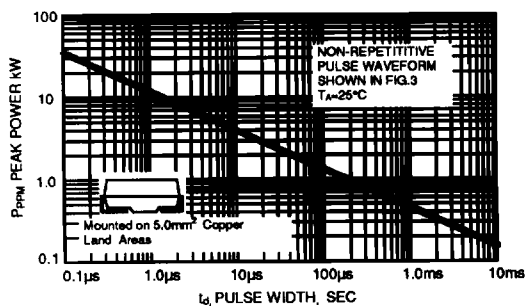


FIG. 2 - PULSE RATING CURVE

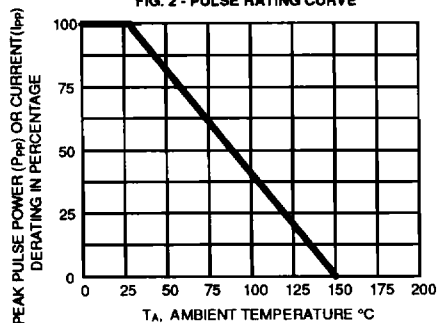


FIG. 3 - PULSE WAVEFORM

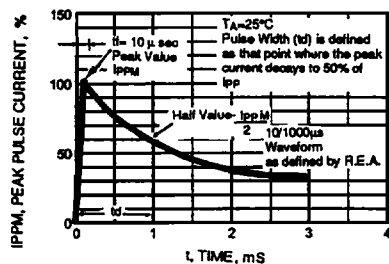


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

