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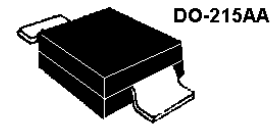


### DESCRIPTION

This SMBJ5.0-170A or SMBG5.0-170A series of surface mount 600 W Transient Voltage Suppressors (TVSs) protects a variety of voltage-sensitive components from destruction or degradation. It is available in J-bend design (SMBJ) with the DO-214AA package for greater PC board mounting density or in a Gull-wing design (SMBG) in the DO-215AA for visible solder connections. It is also available in both unidirectional and bidirectional configurations with a C or CA suffix part number as well as RoHS Compliant with an e3 suffix. Their response time is virtually instantaneous. As a result, they can be used for protection from ESD or EFT per IEC61000-4-2 and IEC61000-4-4, or for inductive switching environments and induced RF protection. They can also protect from secondary lightning effects per IEC61000-4-5 and class levels defined herein. Microsemi also offers numerous other TVS products to meet higher and lower power demands and special applications.

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

### APPEARANCE



NOTE: All SMB series are equivalent to prior SMS package identifications.

### FEATURES

- Available in both unidirectional and bidirectional construction (add C or CA suffix for bidirectional)
- Selections for 5.0 to 170 volts standoff voltages ( $V_{WM}$ )
- Optional 100% **screening for avionics grade** is available by adding MA prefix to part number for 100% temperature cycle -55°C to +125°C (10X) as well as surge (3X) and 24 hours HTRB with post test  $V_Z$  &  $I_R$  (in operating direction for unidirectional or both directions for bidirectional)
- Options for screening in accordance with MIL-PRF-19500 for JANTX are available by adding MX prefix to the part number.
- Axial-lead equivalent packages for thru-hole mounting available as P6KE6.8 to P6KE200CA (consult factory for other surface mount options)
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- RoHS compliant devices available by adding an "e3" suffix

### MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25°C: 600 watts at 10/1000  $\mu$ s (also see Fig 1,2, and 3).
- Impulse repetition rate (duty factor): 0.01%
- $t_{clamping}$  (0 volts to  $V_{(BR)}$  min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating and Storage temperature: -65°C to +150°C
- Thermal resistance: 25°C/W junction to lead, or 90°C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended footprint (see last page)
- Steady-State Power dissipation: 5 watts at  $T_L = 25^\circ\text{C}$ , or 1.38 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC board with recommended footprint
- Forward Surge at 25°C: 100 Amps peak impulse of 8.3 ms half-sine wave (unidirectional only)
- Solder temperatures: 260°C for 10 s (maximum)

### APPLICATIONS / BENEFITS

- Economical surface mount design in both J-bend or Gull-wing terminations
- Protects sensitive components such as IC's, CMOS, Bipolar, BiCMOS, ECL, DTL,  $T^2L$ , etc.
- Protection from switching transients & induced RF
- Compliant to IEC61000-4-2 and IEC61000-4-4 for ESD and EFT protection respectively
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1: SMB 5.0 to SMB 120A or CA
  - Class 2: SMB 5.0 to SMB 60A or CA
  - Class 3: SMB 5.0 to SMB 30A or CA
  - Class 4: SMB 5.0 to SMB 15A or CA
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1: SMB 5.0 to SMB 36A or CA
  - Class 2: SMB 5.0 to SMB 18A or CA

### MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Gull-wing or C-bend (modified J-bend) tin-lead or RoHS compliant annealed matte-tin plating solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band. No marking on bi-directional devices
- MARKING: Part number without standard prefix (e.g. 5.0, 5.0A, 5.0CA, 5.0Ae3, 36, MX36A, 36CAe3, etc.)
- TAPE & REEL option: Standard per EIA-481-1-A with 12 mm tape, 750 per 7 inch reel or 2500 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.1 grams
- See package dimension on last page

**ELECTRICAL CHARACTERISTICS @25°C**

MICROSEMI PART NUMBER		REVERSE STAND-OFF VOLTAGE $V_{WM}$ Volts	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$ Volts		MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$ Volts	PEAK PULSE CURRENT (See Fig. 2) $I_{PP}$ Amps	MAXIMUM STANDBY CURRENT @ $V_{WM}$ $I_D$ $\mu A$
GULL-WING LEAD	MODIFIED "J" BEND LEAD		MIN.	MAX.			
SMBG5.0	SMBJ5.0	5.0	6.40 - 7.30	10	9.6	62.5	800
SMBG5.0A	SMBJ5.0A	5.0	6.40 - 7.00	10	9.2	65.2	800
SMBG6.0	SMBJ6.0	6.0	6.67 - 8.15	10	11.4	52.6	800
SMBG6.0A	SMBJ6.0A	6.0	6.67 - 7.37	10	10.3	58.3	800
SMBG6.5	SMBJ6.5	6.5	7.22 - 8.82	10	12.3	48.7	500
SMBG6.5A	SMBJ6.5A	6.5	7.22 - 7.98	10	11.2	53.6	500
SMBG7.0	SMBJ7.0	7.0	7.78 - 9.51	10	13.3	45.1	200
SMBG7.0A	SMBJ7.0A	7.0	7.78 - 8.60	10	12.0	50.0	200
SMBG7.5	SMBJ7.5	7.5	8.33 - 10.2	1	14.3	42.0	100
SMBG7.5A	SMBJ7.5A	7.5	8.33 - 9.21	1	12.9	46.5	100
SMBG8.0	SMBJ8.0	8.0	8.89 - 10.9	1	15.0	40.0	50
SMBG8.0A	SMBJ8.0A	8.0	8.89 - 9.83	1	13.6	44.1	50
SMBG8.5	SMBJ8.5	8.5	9.44 - 11.5	1	15.9	37.7	10
SMBG8.5A	SMBJ8.5A	8.5	9.44 - 10.4	1	14.4	41.7	10
SMBG9.0	SMBJ9.0	9.0	10.0 - 12.2	1	16.9	35.5	5
SMBG9.0A	SMBJ9.0A	9.0	10.0 - 11.1	1	15.4	39.0	5
SMBG10	SMBJ10	10	11.1 - 13.6	1	18.8	31.9	5
SMBG10A	SMBJ10A	10	11.1 - 12.3	1	17.0	35.3	5
SMBG11	SMBJ11	11	12.2 - 14.9	1	20.1	29.9	5
SMBG11A	SMBJ11A	11	12.2 - 13.5	1	18.2	33.0	5
SMBG12	SMBJ12	12	13.3 - 16.3	1	22.0	27.3	5
SMBG12A	SMBJ12A	12	13.3 - 14.7	1	19.9	30.2	5
SMBG13	SMBJ13	13	14.4 - 17.6	1	23.8	25.2	1
SMBG13A	SMBJ13A	13	14.4 - 15.9	1	21.5	27.9	1
SMBG14	SMBJ14	14	15.6 - 19.1	1	25.8	23.3	1
SMBG14A	SMBJ14A	14	15.6 - 17.2	1	23.2	25.8	1
SMBG15	SMBJ15	15	16.7 - 20.4	1	26.9	22.3	1
SMBG15A	SMBJ15A	15	16.7 - 18.5	1	24.4	24.0	1
SMBG16	SMBJ16	16	17.8 - 21.8	1	28.8	20.8	1
SMBG16A	SMBJ16A	16	17.8 - 19.7	1	26.0	23.1	1
SMBG17	SMBJ17	17	18.9 - 23.1	1	30.5	19.7	1
SMBG17A	SMBJ17A	17	18.9 - 20.9	1	27.6	21.7	1
SMBG18	SMBJ18	18	20.0 - 24.4	1	32.2	18.6	1
SMBG18A	SMBJ18A	18	20.0 - 22.1	1	29.2	20.5	1
SMBG20	SMBJ20	20	22.2 - 27.1	1	35.8	16.7	1
SMBG20A	SMBJ20A	20	22.2 - 24.5	1	32.4	18.5	1
SMBG22	SMBJ22	22	24.4 - 29.8	1	39.4	15.2	1
SMBG22A	SMBJ22A	22	24.4 - 26.9	1	35.5	16.9	1
SMBG24	SMBJ24	24	26.7 - 32.6	1	43.0	14.0	1
SMBG24A	SMBJ24A	24	26.7 - 29.5	1	38.9	15.4	1
SMBG26	SMBJ26	26	28.9 - 35.3	1	46.6	12.4	1
SMBG26A	SMBJ26A	26	28.9 - 31.9	1	42.1	14.2	1
SMBG28	SMBJ28	28	31.1 - 38.0	1	50.0	12.0	1
SMBG28A	SMBJ28A	28	31.1 - 34.4	1	45.4	13.2	1
SMBG30	SMBJ30	30	33.3 - 40.7	1	53.5	11.2	1
SMBG30A	SMBJ30A	30	33.3 - 36.8	1	48.4	12.4	1
SMBG33	SMBJ33	33	36.7 - 44.9	1	59.0	10.2	1
SMBG33A	SMBJ33A	33	36.7 - 40.6	1	53.3	11.3	1
SMBG36	SMBJ36	36	40.0 - 48.9	1	64.3	9.3	1
SMBG36A	SMBJ36A	36	40.0 - 44.2	1	58.1	10.3	1
SMBG40	SMBJ40	40	44.4 - 54.3	1	71.4	8.4	1
SMBG40A	SMBJ40A	40	44.4 - 49.1	1	64.5	9.3	1
SMBG43	SMBJ43	43	47.8 - 58.4	1	76.7	7.8	1
SMBG43A	SMBJ43A	43	47.8 - 52.8	1	69.4	8.6	1
SMBG45	SMBJ45	45	50.0 - 61.1	1	80.3	7.5	1
SMBG45A	SMBJ45A	45	50.0 - 55.3	1	72.7	8.3	1



**SMBJ5.0 thru SMBJ170A, CA, e3  
and SMBG5.0 thru SMBG170A, CA, e3**

**SURFACE MOUNT 600 Watt  
Transient Voltage Suppressor**

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SMB5.0-170AC, e3

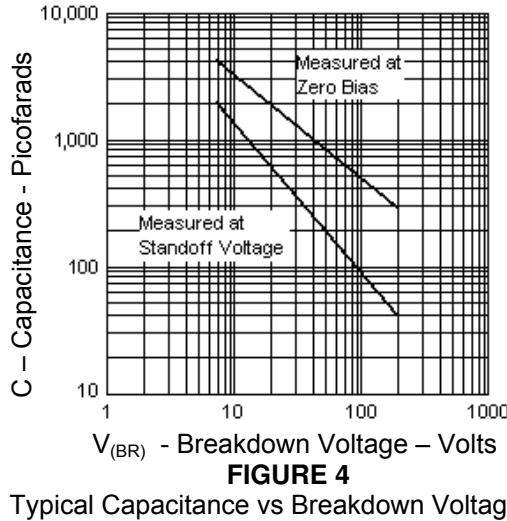
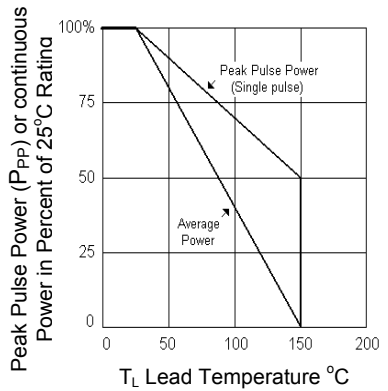
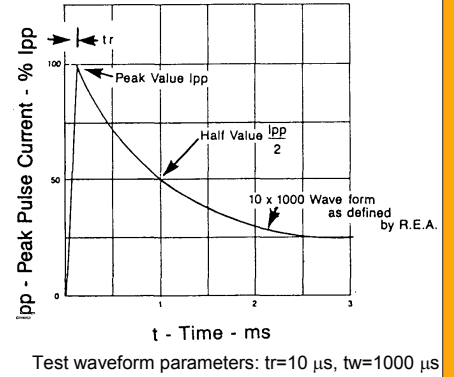
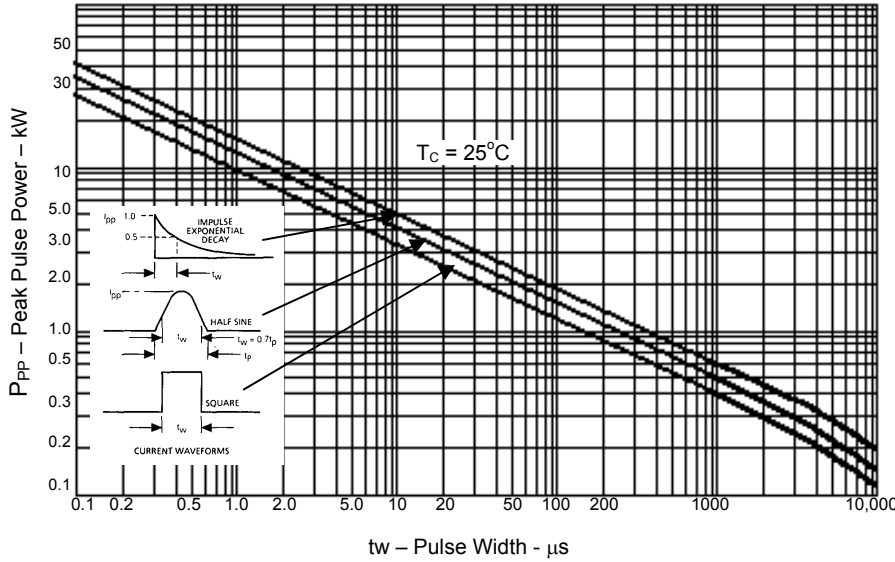
MICROSEMI PART NUMBER		REVERSE STAND-OFF VOLTAGE $V_{WM}$	BREAKDOWN VOLTAGE $V_{(BR)}$ @ $I_{(BR)}$ Volts		MAXIMUM CLAMPING VOLTAGE @ $I_{PP}$	PEAK PULSE CURRENT (See Fig. 2) $I_{PP}$	MAXIMUM STANDBY CURRENT @ $V_{WM}$ $I_D$ $\mu A$	
GULL-WING LEAD	MODIFIED "J" BEND LEAD		MIN.	MAX.				$I_{(BR)}$ mA
SMBG48	SMBJ48	48	53.3	65.1	1	85.5	7.0	1
SMBG48A	SMBJ48A	48	53.3	58.9	1	77.4	7.7	1
SMBG51	SMBJ51	51	56.7	69.3	1	91.1	6.6	1
SMBG51A	SMBJ51A	51	56.7	62.7	1	82.4	7.3	1
SMBG54	SMBJ54	54	60.0	73.3	1	96.3	6.2	1
SMBG54A	SMBJ54A	54	60.0	66.3	1	87.1	6.9	1
SMBG58	SMBJ58	58	64.4	78.7	1	103	5.8	1
SMBG58A	SMBJ58A	58	64.4	71.2	1	93.6	6.4	1
SMBG60	SMBJ60	60	66.7	81.5	1	107	5.6	1
SMBG60A	SMBJ60A	60	66.7	73.7	1	96.8	6.2	1
SMBG64	SMBJ64	64	71.1	86.9	1	114	5.3	1
SMBG64A	SMBJ64A	64	71.1	78.6	1	103	5.8	1
SMBG70	SMBJ70	70	77.8	95.1	1	125	4.8	1
SMBG70A	SMBJ70A	70	77.8	86.0	1	113	5.3	1
SMBG75	SMBJ75	75	83.3	102	1	134	4.5	1
SMBG75A	SMBJ75A	75	83.3	92.1	1	121	4.9	1
SMBG78	SMBJ78	78	86.7	106	1	139	4.3	1
SMBG78A	SMBJ78A	78	86.7	95.8	1	126	4.7	1
SMBG85	SMBJ85	85	94.4	115	1	151	3.9	1
SMBG85A	SMBJ85A	85	94.4	104	1	137	4.4	1
SMBG90	SMBJ90	90	100	122	1	160	3.8	1
SMBG90A	SMBJ90A	90	100	111	1	146	4.1	1
SMBG100	SMBJ100	100	111	136	1	179	3.4	1
SMBG100A	SMBJ100A	100	111	123	1	162	3.7	1
SMBG110	SMBJ110	110	122	149	1	196	3.0	1
SMBG110A	SMBJ110A	110	122	135	1	177	3.4	1
SMBG120	SMBJ120	120	133	163	1	214	2.8	1
SMBG120A	SMBJ120A	120	133	147	1	193	3.1	1
SMBG130	SMBJ130	130	144	176	1	231	2.6	1
SMBG130A	SMBJ130A	130	144	159	1	209	2.9	1
SMBG150	SMBJ150	150	167	204	1	268	2.2	1
SMBG150A	SMBJ150A	150	167	185	1	243	2.5	1
SMBG160	SMBJ160	160	178	218	1	287	2.1	1
SMBG160A	SMBJ160A	160	178	197	1	259	2.3	1
SMBG170	SMBJ170	170	189	231	1	304	2.0	1
SMBG170A	SMBJ170A	170	189	209	1	275	2.2	1

- For Bidirectional device types indicate a C or CA suffix after the part number. (i.e.: SMBG170CA or SMBJ170C). Bidirectional capacitance is half that shown in figure 4 at zero volts.
- Microsemi Corp's SMB series (600 W) 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.

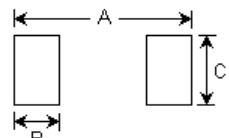
**SYMBOLS & DEFINITIONS**

Symbol	Definition	Symbol	Definition
$V_{WM}$	Working Peak (Standoff) Voltage	$I_{PP}$	Peak Pulse Current
$P_{PP}$	Peak Pulse Power	$V_C$	Clamping Voltage
$V_{(BR)}$	Breakdown Voltage	$I_{(BR)}$	Breakdown Current for $V_{(BR)}$
$I_D$	Standby Current		

**GRAPHS**

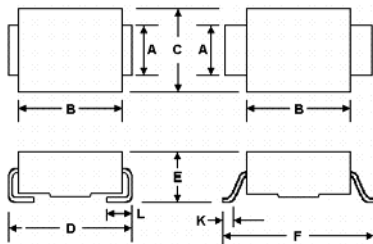


**PAD LAYOUT**



	INCHES	mm
<b>SMBJ</b>		
A	.260	6.60
B	.085	2.16
C	.110	2.79
<b>SMBG</b>		
A	0.320	8.13
B	0.085	2.16
C	0.110	2.79

**PACKAGE DIMENSIONS**



	A	B	C	D	E	F	K	L
<b>MIN</b>	.077	.160	.130	.205	.077	.235	.015	.030
<b>MAX</b>	.083	.180	.155	.220	.104	.255	.030	.060
<b>DIMENSIONS IN MILLIMETERS</b>								
<b>MIN</b>	1.96	4.06	3.30	5.21	1.95	5.97	.381	.760
<b>MAX</b>	2.10	4.57	3.94	5.59	2.65	6.48	.762	1.520