

Website: <http://www.microsemi.com>

**SURFACE MOUNT 1500 Watt  
Transient Voltage Suppressor**

- High Reliability controlled devices
- Unidirectional (A) and Bidirectional (CA) construction
- Available in both J-bend and Gull-wing terminations
- Selections for 5.0 to 170 V standoff voltages ( $V_{WM}$ )

**DEVICES MSMCJ5.0A thru MSMCJ170CA, e3  
and MSMCG5.0A thru MSMCG170CA, e3**

**LEVELS  
M, MA, MX, MXL**

### FEATURES

- High reliability controlled devices with fabrication and assembly lot traceability
- 100 % surge tested devices
- Optional upscreening available by replacing the M prefix with MA, MX or MXL prefixes. These prefixes specify various screening and conformance inspection options based on MIL-PRF-19500. Refer to [MicroNote 129](#) for more details on the screening options.
- Axial-lead equivalent packages for thru-hole mounting available as 1.5KE6.8A to 1.5KE200CA or 1N6267 thru 1N6303A and 1N5908 (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
- $3\sigma$  lot norm screening performed on Standby Current  $I_D$



### APPLICATIONS / BENEFITS

- Protection from switching transients and induced RF
- Protection from ESD and EFT per IEC 61000-4-2 and IEC 61000-4-4
- Secondary lightning protection per IEC 61000-4-5 with 42 Ohms source impedance:
  - Class 1: MSMC5.0A to MSMC170CA
  - Class 2: MSMC5.0A to MSMC150CA
  - Class 3: MSMC5.0A to MSMC75CA
  - Class 4: MSMC5.0A to MSMC36CA
- Secondary lightning protection per IEC 61000-4-5 with 12 Ohms source impedance:
  - Class 1: MSMC5.0A to MSMC90CA
  - Class 2: MSMC5.0A to MSMC45CA
  - Class 3: MSMC5.0A to MSMC24CA
  - Class 4: MSMC5.0A to MSMC11CA
- Secondary lightning protection per IEC 61000-4-5 with 2 Ohms source impedance:
  - Class 2: MSMC5.0A to MSMC22CA
  - Class 3: MSMC5.0A to MSMC10CA

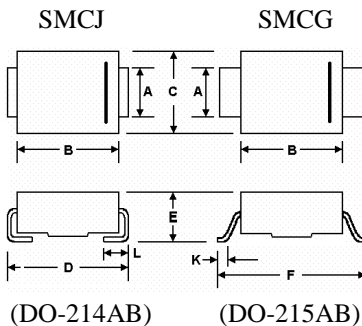
### MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 °C: 1500 watts at 10/1000  $\mu$ s (also see Figures 1,2, and 3) with impulse repetition rate (duty factor) of 0.01 % or less
- $t_{clamping}$  (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: 20 °C/W junction to lead, or 80 °C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended footprint (see page 2)
- Steady-State Power dissipation: 6 watts at  $T_L = 30$  °C, or 1.56 watts at  $T_A = 25$  °C when mounted on FR4 PC board with recommended footprint (see page 2)
- Forward Surge: 200 Amps peak impulse of 8.3 ms half-sine wave at 25 °C (unidirectional only)
- Solder temperatures: 260 °C for 10 s (maximum)

## MECHANICAL AND PACKAGING

- Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- Gull-wing or J-bend tin-lead (90 % Sn, 10 % Pb) or RoHS (100 % Sn) compliant annealed matte-tin plating solderable per MIL-STD-750, method 2026
- Cathode indicated by band. No cathode band on bi-directional devices.
- Part number marked on package
- Available in bulk or custom tape-and-reel packaging
- TAPE-AND-REEL option available with up to 750 devices on 7 inch reel or up to 2500 devices on 13 inch reel per EIA-481-1-A with 12 mm tape. Add "TR" suffix to part number.
- Weight: 0.25 grams (approximately)

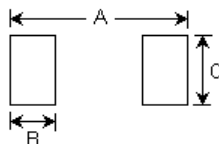
## PACKAGE DIMENSIONS



DIMENSIONS IN INCHES								
	A	B	C	D	E	F	K	L
<b>MIN</b>	.115	.260	.220	.305	.077	.380	.025	.030
<b>MAX</b>	.121	.280	.245	.320	.104	.400	.040	.060
DIMENSIONS IN MILLIMETERS								
	A	B	C	D	E	F	K	L
<b>MIN</b>	2.92	6.60	5.59	7.75	1.95	9.65	0.635	.760
<b>MAX</b>	3.07	7.11	6.22	8.13	2.65	10.16	1.016	1.520

Typical Standoff Height: 0.004" – 0.008" (0.1mm – 0.2mm)

## PAD LAYOUT



SMCJ (DO-214AB)

	INCHES	mm
<b>A</b>	0.390	9.90
<b>B</b>	0.110	2.79
<b>C</b>	0.150	3.81

SMCG (DO-215AB)

	INCHES	mm
<b>A</b>	0.510	12.95
<b>B</b>	0.110	2.79
<b>C</b>	0.150	3.81

## SYMBOLS & DEFINITIONS

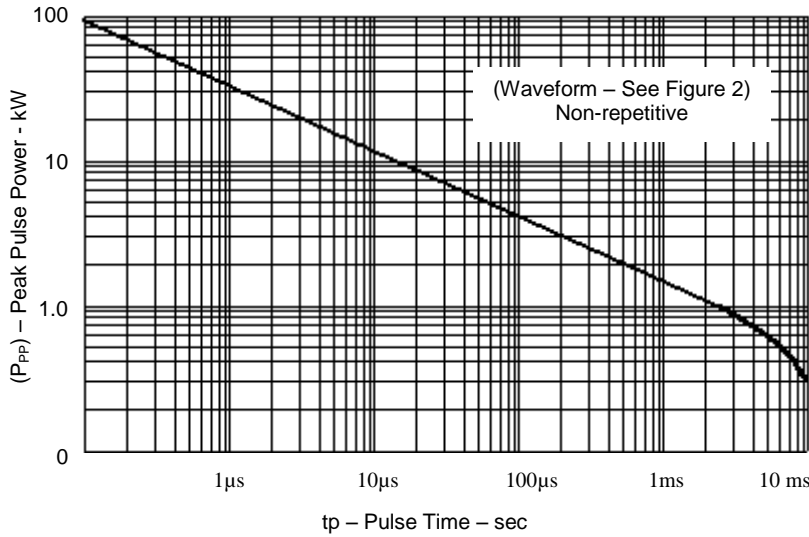
Symbol	Definition	Symbol	Definition
$V_{WM}$	Working Peak (Standoff) Voltage	$I_{PP}$	Peak Pulse Current
$P_{PP}$	Peak Pulse Power	$V_C$	Clamping Voltage
$V_{BR}$	Breakdown Voltage	$I_{BR}$	Breakdown Current for $V_{BR}$
$I_D$	Standby Current		

## ELECTRICAL CHARACTERISTICS @ 25°C

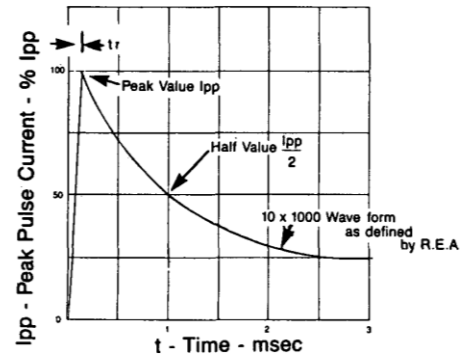
MICROSEMI PART NUMBER		REVERSE STAND-OFF VOLTAGE $V_{WM}$	BREAKDOWN VOLTAGE $V_{BR}$ @ $I_{BR}$		MAXIMUM CLAMPING VOLTAGE $V_C$ @ $I_{PP}$	PEAK PULSE CURRENT (see Fig. 2) $I_{PP}$	MAXIMUM STANDBY CURRENT $I_D$ @ $V_{WM}$
GULL-WING	J- BEND	V	V	mA	V	A	$\mu A$
MSMCG5.0A	MSMCJ5.0A	5.0	6.40 – 7.00	10	9.2	163.0	1000
MSMCG6.0A	MSMCJ6.0A	6.0	6.67 – 7.37	10	10.3	145.6	1000
MSMCG6.5A	MSMCJ6.5A	6.5	7.22 – 7.98	10	11.2	133.9	500
MSMCG7.0A	MSMCJ7.0A	7.0	7.78 – 8.60	10	12.0	125.0	200
MSMCG7.5A	MSMCJ7.5A	7.5	8.33 – 9.21	1	12.9	116.3	100
MSMCG8.0A	MSMCJ8.0A	8.0	8.89 – 9.83	1	13.6	110.3	50
MSMCG8.5A	MSMCJ8.5A	8.5	9.44 – 10.4	1	14.4	104.2	20
MSMCG9.0A	MSMCJ9.0A	9.0	10.0 – 11.1	1	15.4	97.4	10
MSMCG10A	MSMCJ10A	10	11.1 – 12.3	1	17.0	88.2	5
MSMCG11A	MSMCJ11A	11	12.2 – 13.5	1	18.2	82.4	5
MSMCG12A	MSMCJ12A	12	13.3 – 14.7	1	19.9	75.3	5
MSMCG13A	MSMCJ13A	13	14.4 – 15.9	1	21.5	69.7	1
MSMCG14A	MSMCJ14A	14	15.6 – 17.2	1	23.2	64.7	1
MSMCG15A	MSMCJ15A	15	16.7 – 18.5	1	24.4	61.5	1
MSMCG16A	MSMCJ16A	16	17.8 – 19.7	1	26.0	57.7	1
MSMCG17A	MSMCJ17A	17	18.9 – 20.9	1	27.6	53.3	1
MSMCG18A	MSMCJ18A	18	20.0 – 22.1	1	29.2	51.4	1
MSMCG20A	MSMCJ20A	20	22.2 – 24.5	1	32.4	46.3	1
MSMCG22A	MSMCJ22A	22	24.4 – 26.9	1	35.5	42.2	1
MSMCG24A	MSMCJ24A	24	26.7 – 29.5	1	38.9	38.6	1
MSMCG26A	MSMCJ26A	26	28.9 – 31.9	1	42.1	35.6	1
MSMCG28A	MSMCJ28A	28	31.1 – 34.4	1	45.4	33.0	1
MSMCG30A	MSMCJ30A	30	33.3 – 36.8	1	48.4	31.0	1
MSMCG33A	MSMCJ33A	33	36.7 – 40.6	1	53.3	28.1	1
MSMCG36A	MSMCJ36A	36	40.0 – 44.2	1	58.1	25.8	1
MSMCG40A	MSMCJ40A	40	44.4 – 49.1	1	64.5	23.2	1
MSMCG43A	MSMCJ43A	43	47.8 – 52.8	1	69.4	21.6	1
MSMCG45A	MSMCJ45A	45	50.0 – 55.3	1	72.7	20.6	1
MSMCG48A	MSMCJ48A	48	53.3 – 58.9	1	77.4	19.4	1
MSMCG51A	MSMCJ51A	51	56.7 – 62.7	1	82.4	18.2	1
MSMCG54A	MSMCJ54A	54	60.0 – 66.3	1	87.1	17.2	1
MSMCG58A	MSMCJ58A	58	64.4 – 71.2	1	93.6	16.0	1
MSMCG60A	MSMCJ60A	60	66.7 – 73.7	1	96.8	15.5	1
MSMCG64A	MSMCJ64A	64	71.1 – 78.6	1	103.0	14.6	1
MSMCG70A	MSMCJ70A	70	77.8 – 86.0	1	113	13.3	1
MSMCG75A	MSMCJ75A	75	83.3 – 92.1	1	121	12.4	1
MSMCG78A	MSMCJ78A	78	86.7 – 95.8	1	126	11.4	1
MSMCG85A	MSMCJ85A	85	94.4 – 104.0	1	137	10.4	1
MSMCG90A	MSMCJ90A	90	100 – 111	1	146	10.3	1
MSMCG100A	MSMCJ100A	100	111 – 123	1	162	9.3	1
MSMCG110A	MSMCJ110A	110	122 – 135	1	177	8.4	1
MSMCG120A	MSMCJ120A	120	133 – 147	1	193	7.8	1
MSMCG130A	MSMCJ130A	130	144 – 159	1	209	7.2	1
MSMCG150A	MSMCJ150A	150	167 – 185	1	243	6.2	1
MSMCG160A	MSMCJ160A	160	178 – 197	1	259	5.8	1
MSMCG170A	MSMCJ170A	170	189 – 209	1	275	5.5	1

**NOTE 1:** For Bidirectional device types indicate CA suffix after the part number. (i.e. MSMCJ170CA). Bidirectional capacitance is half that shown in Figure 4 at zero volts.

**NOTE 2:** Microsemi Corp's MSMC series (1500 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 device.

**GRAPHS**


**FIGURE 1** – Peak Pulse Power vs. Pulse Time

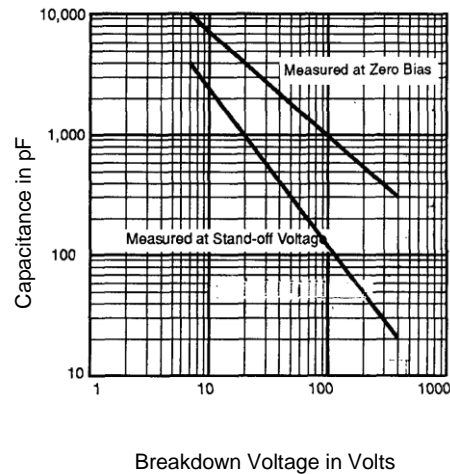


Test waveform parameters  
 $t_r = 10\mu s$ ,  $t_p = 1000\mu s$

**FIGURE 2** – Pulse Waveform



**FIGURE 3** – Derating Curve



**FIGURE 4** – Typical Capacitance vs. Breakdown