

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

## SURFACE MOUNT 3000 Watt Transient Voltage Suppressor

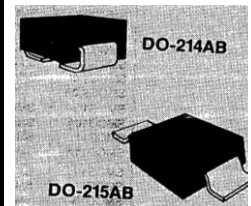
- High Reliability controlled devices
- Unidirectional (A) and Bidirectional (CA) construction
- Available in both J-bend and Gull-wing terminations
- Selections for 5.0 to 170 V standoff voltages (VWM)

DEVICES **MSMLJ5.0A thru MSMLJ170CA, e3  
and MSMLG5.0A thru MSMLG170CA, e3**

LEVELS  
M, MA, MX, MXL

### FEATURES

- High reliability controlled devices with wafer fabrication and assembly lot traceability
- 100 % surge tested devices
- Optional upscreening available by replacing the M prefix with MA, MX or MXL. 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 M5KP5.0A to M5KP110CA with 5000 W rating, (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<sub>D</sub>



### APPLICATIONS / BENEFITS

- Suppresses transients up to 3000 watts @ 10/1000  $\mu$ s
- 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 IEC61000-4-5 with 42 Ohms source impedance:
  - Class 1 & 2: MSML5.0A to MSML 170ACA
  - Class 3: MSML5.0A to MSML150CA
  - Class 4: MSML5.0A to MSML75CA
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1: MSML5.0A to MSML170CA
  - Class 2: MSML5.0A to MSML90CA
  - Class 3: MSML5.0A to MSML48CA
  - Class 4: MSML5.0A to MSML24CA
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
  - Class 2: MSML5.0A to MSML43CA
  - Class 3: MSML5.0A to MSML22CA
  - Class 4: MSML5.0A to MSML10CA

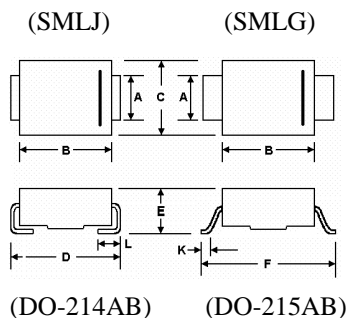
### MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 °C: 3000 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<sub>clamping</sub> (0 V to V<sub>BR</sub> min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating and Storage temperature: -65 °C to +150 °C
- Thermal resistance: 17.5 °C/W junction to lead, or 77.5 °C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint Steady-State Power dissipation: 6 watts at TL = 45 °C, or 1.61 watts at TA = 25 °C when mounted on FR4 PC board with recommended footprint (see page 2)
- Forward Surge at 25 °C: 200 Amps peak impulse of 8.3 ms half-sine wave (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 per 7 inch reel or up to 2500 per 13 inch reel EIA-481-B with 16 mm tape. Add "TR" suffix to part number.
- Weight: 0.25 gram (approximately)

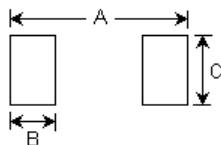
## PACKAGE DIMENSIONS



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



SMLJ (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

SMLG (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		

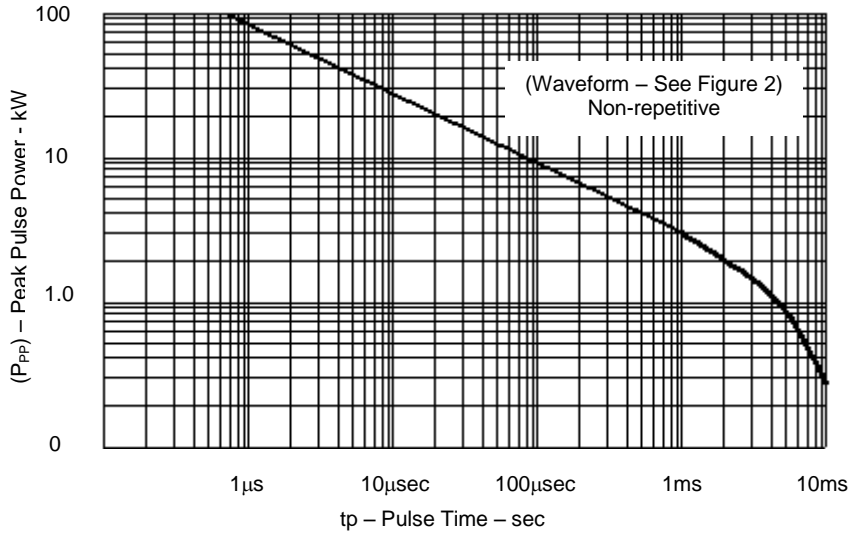
## ELECTRICAL CHARACTERISTICS @ 25°C

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	mA			
MSMLG5.0A	MSMLJ5.0A	5.0	6.40 – 7.00	10	9.2	326.0	1000
MSMLG6.0A	MSMLJ6.0A	6.0	6.67 – 7.37	10	10.3	291.3	1000
MSMLG6.5A	MSMLJ6.5A	6.5	7.22 – 7.98	10	11.2	267.9	500
MSMLG7.0A	MSMLJ7.0A	7.0	7.78 – 8.60	10	12.0	250.0	200
MSMLG7.5A	MSMLJ7.5A	7.5	8.33 – 9.21	1	12.9	232.6	100
MSMLG8.0A	MSMLJ8.0A	8.0	8.89 – 9.83	1	13.6	220.6	50
MSMLG8.5A	MSMLJ8.5A	8.5	9.44 – 10.4	1	14.4	208.4	25
MSMLG9.0A	MSMLJ9.0A	9.0	10.0 – 11.1	1	15.4	194.8	10
MSMLG10A	MSMLJ10A	10	11.1 – 12.3	1	17.0	176.4	5
MSMLG11A	MSMLJ11A	11	12.2 – 13.5	1	18.2	164.8	5
MSMLG12A	MSMLJ12A	12	13.3 – 14.7	1	19.9	150.6	5
MSMLG13A	MSMLJ13A	13	14.4 – 15.9	1	21.5	139.4	5
MSMLG14A	MSMLJ14A	14	15.6 – 17.2	1	23.2	129.4	2
MSMLG15A	MSMLJ15A	15	16.7 – 18.5	1	24.4	123.0	2
MSMLG16A	MSMLJ16A	16	17.8 – 19.7	1	26.0	115.4	2
MSMLG17A	MSMLJ17A	17	18.9 – 20.9	1	27.6	106.6	2
MSMLG18A	MSMLJ18A	18	20.0 – 22.1	1	29.2	102.8	2
MSMLG20A	MSMLJ20A	20	22.2 – 24.5	1	32.4	92.6	2
MSMLG22A	MSMLJ22A	22	24.4 – 26.9	1	35.5	84.4	2
MSMLG24A	MSMLJ24A	24	26.7 – 29.5	1	38.9	77.2	2
MSMLG26A	MSMLJ26A	26	28.9 – 31.9	1	42.1	71.2	2
MSMLG28A	MSMLJ28A	28	31.1 – 34.4	1	45.4	66.0	2
MSMLG30A	MSMLJ30A	30	33.3 – 36.8	1	48.4	62.0	2
MSMLG33A	MSMLJ33A	33	36.7 – 40.6	1	53.3	56.2	2
MSMLG36A	MSMLJ36A	36	40.0 – 44.2	1	58.1	51.6	2
MSMLG40A	MSMLJ40A	40	44.4 – 49.1	1	64.5	46.4	2
MSMLG43A	MSMLJ43A	43	47.8 – 52.8	1	69.4	43.2	2
MSMLG45A	MSMLJ45A	45	50.0 – 55.3	1	72.7	41.2	2
MSMLG48A	MSMLJ48A	48	53.3 – 58.9	1	77.4	38.8	2
MSMLG51A	MSMLJ51A	51	56.7 – 62.7	1	82.4	36.4	2
MSMLG54A	MSMLJ54A	54	60.0 – 66.3	1	87.1	34.4	2
MSMLG58A	MSMLJ58A	58	64.4 – 71.2	1	93.6	32.0	2
MSMLG60A	MSMLJ60A	60	66.7 – 73.7	1	96.8	31.0	2
MSMLG64A	MSMLJ64A	64	71.1 – 78.6	1	103.0	29.2	2
MSMLG70A	MSMLJ70A	70	77.8 – 86.0	1	113	26.6	2
MSMLG75A	MSMLJ75A	75	83.3 – 92.1	1	121	24.8	2
MSMLG78A	MSMLJ78A	78	86.7 – 95.8	1	126	22.8	2
MSMLG85A	MSMLJ85A	85	94.4 – 104.0	1	137	20.8	2
MSMLG90A	MSMLJ90A	90	100 – 111	1	146	20.6	2
MSMLG100A	MSMLJ100A	100	111 – 123	1	162	18.6	2
MSMLG110A	MSMLJ110A	110	122 – 135	1	177	16.8	2
MSMLG120A	MSMLJ120A	120	133 – 147	1	193	15.6	2
MSMLG130A	MSMLJ130A	130	144 – 159	1	209	14.4	2
MSMLG150A	MSMLJ150A	150	167 – 185	1	243	12.4	2
MSMLG160A	MSMLJ160A	160	178 – 197	1	259	11.6	2
MSMLG170A	MSMLJ170A	170	189 – 209	1	275	11.0	2

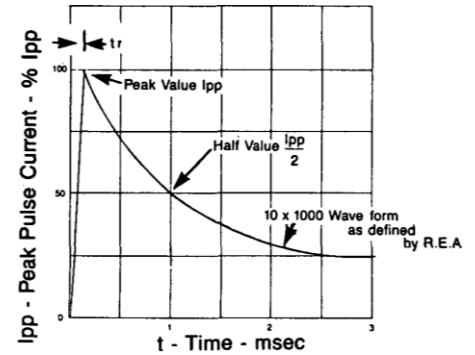
**NOTE 1:** For Bidirectional device types indicate a CA suffix after the part number (i.e. MSMLG170CA). Bidirectional capacitance is half that shown in Figure 4 at zero volts.

**NOTE 2:** Microsemi Corp's SML series (3000W) 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.

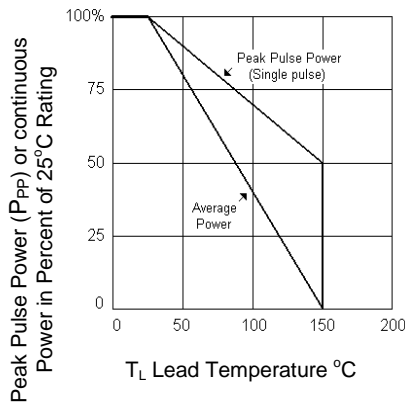
## GRAPHS



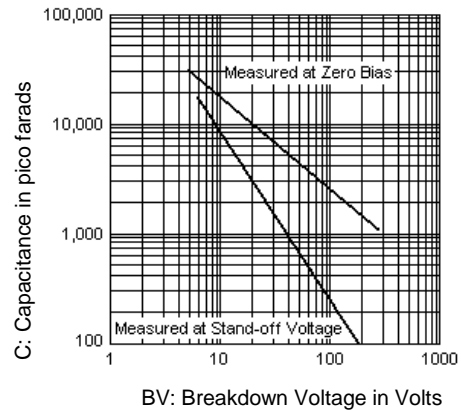
**FIGURE 1 – Peak Pulse Power vs. Pulse Time**



**FIGURE 2 – Pulse waveform**



**FIGURE 3 – Derating Curve**



**FIGURE 4 Typical Capacitance vs. Breakdown**