

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
- 3σ 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

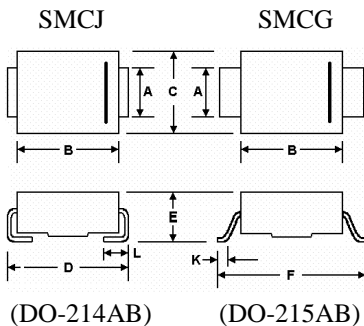
MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25 °C: 1500 watts at 10/1000 μ 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)

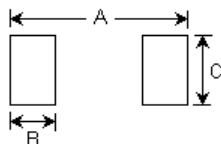
PACKAGE DIMENSIONS



| DIMENSIONS IN INCHES | | | | | | | | |
|---------------------------|------|------|------|------|------|-------|-------|-------|
| | A | B | C | D | E | F | K | L |
| MIN | .115 | .260 | .220 | .305 | .077 | .380 | .025 | .030 |
| MAX | .121 | .280 | .245 | .320 | .104 | .400 | .040 | .060 |
| DIMENSIONS IN MILLIMETERS | | | | | | | | |
| | A | B | C | D | E | F | K | L |
| MIN | 2.92 | 6.60 | 5.59 | 7.75 | 1.95 | 9.65 | 0.635 | .760 |
| MAX | 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 |
|---|--------|------|
| A | 0.390 | 9.90 |
| B | 0.110 | 2.79 |
| C | 0.150 | 3.81 |

SMCG (DO-215AB)

| | INCHES | mm |
|---|--------|-------|
| A | 0.510 | 12.95 |
| B | 0.110 | 2.79 |
| C | 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 | μA |
| 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.

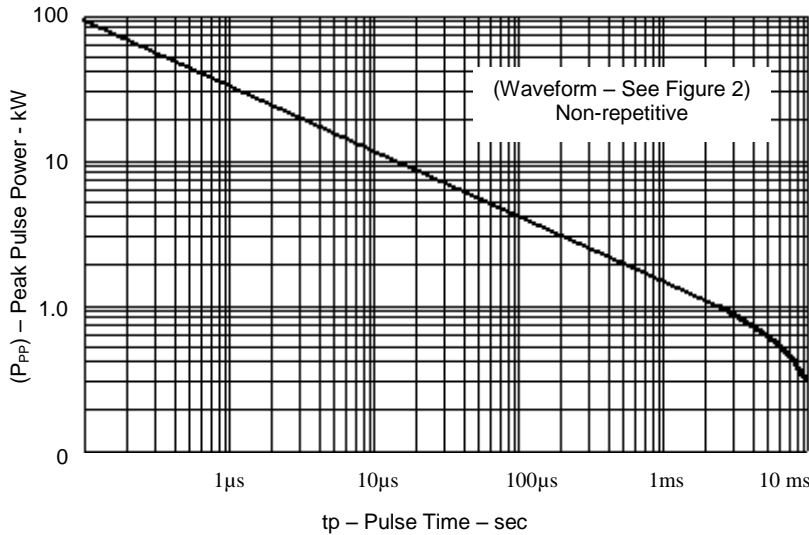
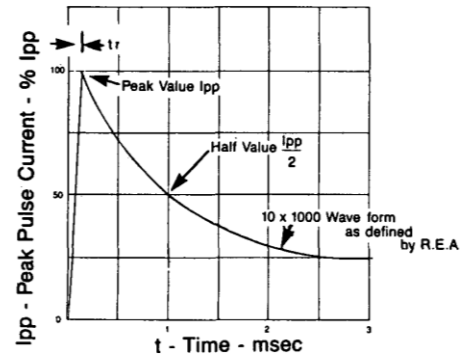
GRAPHS


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

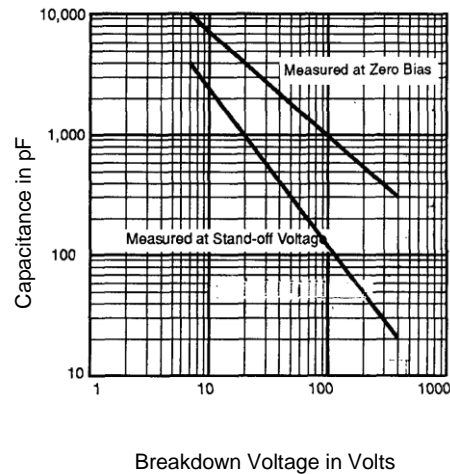


FIGURE 4 – Typical Capacitance vs. Breakdown