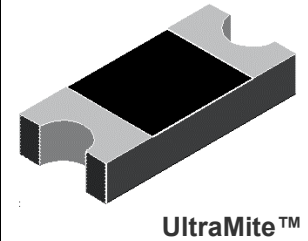


**DESCRIPTION**

These 500 watt transient voltage suppressors offer capabilities only found in larger packages. They are used for protecting against a variety of transients from inductive switching environments or lower levels of induced secondary lightning effects of IEC61000-4-5. It offers the same size footprint as the popular DO-214AC or BA package outlines except with a much lower profile height. Its robust configuration in a "2010" style MELF package prevents damage to extended-lead terminals and virtually eliminates inductive parasitics from fast rise-time transients with very short internal/external conduction paths. They are also very effective in protection from ESD or EFT per IEC61000-4-2 and IEC61000-4-4.

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

**PACKAGE**



**FEATURES**

- Available as a unidirectional or bidirectional device (bidirectional with CA suffix)
- Fast response time
- Suppresses transients up to 500 W @ 10/1000  $\mu$ s (see Figure 1, 2, and 3).
- Robust 2010 MELF style flat package configuration for accurate pick-and-place handling
- Fits same small narrow PCB pad layouts as "SMAJ" packages in JEDEC DO-214AC (or BA)
- Very low height profile (approximately 1 mm)
- Available on Tape and Reel
- Built-in stress relief with similar COE as PC boards
- Optional Lead-Free design/finish (UMAF5.0A-170CA)
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers.

**APPLICATIONS / BENEFITS**

- Protects sensitive components such as IC's, CMOS, Bipolar, BiCMOS, ECL, DTL, T<sup>2</sup>L, 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: UMA5.0 to UMA100A or CA
  - Class 2: UMA5.0 to UMA51A or CA
  - Class 3: UMA5.0 to UMA24A or CA
  - Class 4: UMA5.0 to UMA12A or CA
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1: UMA5.0 to UMA30A or CA
  - Class 2: UMA5.0 to UMA16A or CA
- Virtually zero inductive parasitics with minimal Ldi/dt voltage overshoots for fast-rise-time transients

**MAXIMUM RATINGS**

- Peak Pulse Power dissipation at 25°C: 500 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: -55°C to +150°C
- Thermal resistance: 50°C/W junction to lead, or 115°C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended 5 mm<sup>2</sup> pads (see last page)
- Steady-State Power: 2.5 watts at  $T_L = 25^\circ\text{C}$ , or 1.08 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC board with recommended 5 mm<sup>2</sup> footprint pads
- Forward Surge Current at 25°C: 40 amps peak, 8.3 ms half-sine wave. Maximum voltage of 3.50 V (unidirectional only)
- Solder temperatures: 260°C for 10 s (maximum)

**MECHANICAL AND PACKAGING**

- FRP substrate material and epoxy under-fill package meeting UL94V-0
- Terminals solder plated (solderable per MIL-STD-750, Method 2026)
- Body marked with part number without UMA prefix (ie. 05, 15A, 33A, 58, 150CA, etc.)
- Cathode designated with band (no band on bidirectional)
- Weight: 0.020 grams (approximate)
- Tape & Reel packaging per EIA-481-2 with 12 mm tape and 3000 units/reel (7 inch) or 10,000 units/reel (13 inch)
- See package dimensions on last page

**ELECTRICAL CHARACTERISTICS @25°C**

| MICROSEMI<br>PART NUMBER* | RATED<br>WORKING<br>PEAK<br>STANDOFF<br>VOLTAGE<br>V <sub>WM</sub><br>(V) | BREAKDOWN<br>VOLTAGE<br>V <sub>(BR)</sub> MIN<br>@ I <sub>(BR)</sub><br>(V) | BREAKDOWN<br>CURRENT<br>I <sub>(BR)</sub><br>(mA) | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>V <sub>C</sub> @ I <sub>PP</sub><br>(V) | PEAK<br>PULSE<br>CURRENT<br>I <sub>PP</sub><br>(A) | MAXIMUM<br>STANDBY<br>CURRENT<br>I <sub>D</sub> @ V <sub>WM</sub><br>(μA) |
|---------------------------|---|---|---|---|--|---|
| UMA5.0A                   | 5.0   | 6.40  | 10  | 9.2   | 54.3   | 800   |
| UMA6.0A                   | 6.0   | 6.67  | 10  | 10.3  | 48.5   | 800   |
| UMA6.5A                   | 6.5   | 7.22  | 10  | 11.2  | 44.7   | 500   |
| UMA7.0A                   | 7.0   | 7.78  | 10  | 12.0  | 41.7   | 200   |
| UMA7.5A                   | 7.5   | 8.33  | 1   | 12.9  | 38.8   | 100   |
| UMA8.0A                   | 8.0   | 8.89  | 1   | 13.6  | 36.7   | 50  |
| UMA8.5A                   | 8.5   | 9.44  | 1   | 14.4  | 34.7   | 10  |
| UMA9.0A                   | 9.0   | 10.0  | 1   | 15.4  | 32.6   | 5   |
| UMA10A                    | 10  | 11.1  | 1   | 17.0  | 29.4   | 5   |
| UMA11A                    | 11  | 12.2  | 1   | 18.2  | 27.4   | 5   |
| UMA12A                    | 12  | 13.3  | 1   | 19.9  | 25.1   | 5   |
| UMA13A                    | 13  | 14.4  | 1   | 21.5  | 23.2   | 5   |
| UMA14A                    | 14  | 15.6  | 1   | 23.2  | 21.5   | 5   |
| UMA15A                    | 15  | 16.7  | 1   | 24.4  | 20.6   | 5   |
| UMA16A                    | 16  | 17.8  | 1   | 26.0  | 19.2   | 5   |
| UMA17A                    | 17  | 18.9  | 1   | 27.6  | 18.1   | 5   |
| UMA18A                    | 18  | 20.0  | 1   | 29.2  | 17.2   | 5   |
| UMA20A                    | 20  | 22.2  | 1   | 32.4  | 15.4   | 5   |
| UMA22A                    | 22  | 24.4  | 1   | 35.5  | 14.1   | 5   |
| UMA24A                    | 24  | 26.7  | 1   | 38.9  | 12.8   | 5   |
| UMA26A                    | 26  | 28.9  | 1   | 42.1  | 11.9   | 5   |
| UMA28A                    | 28  | 31.1  | 1   | 45.4  | 11.0   | 5   |
| UMA30A                    | 30  | 33.3  | 1   | 48.4  | 10.3   | 5   |
| UMA33A                    | 33  | 36.7  | 1   | 53.3  | 9.4  | 5   |
| UMA36A                    | 36  | 40.0  | 1   | 58.1  | 8.6  | 5   |
| UMA40A                    | 40  | 44.4  | 1   | 64.5  | 7.8  | 5   |
| UMA43A                    | 43  | 47.8  | 1   | 69.4  | 7.2  | 5   |
| UMA45A                    | 45  | 50.0  | 1   | 72.7  | 6.9  | 5   |
| UMA48A                    | 48  | 53.3  | 1   | 77.4  | 6.5  | 5   |
| UMA51A                    | 51  | 56.7  | 1   | 82.4  | 6.1  | 5   |
| UMA54A                    | 54  | 60.0  | 1   | 87.1  | 5.7  | 5   |
| UMA58A                    | 58  | 64.4  | 1   | 93.6  | 5.3  | 5   |
| UMA60A                    | 60  | 66.7  | 1   | 96.8  | 5.2  | 5   |
| UMA64A                    | 64  | 71.1  | 1   | 103.0   | 4.9  | 5   |
| UMA70A                    | 70  | 77.8  | 1   | 113   | 4.4  | 5   |
| UMA75A                    | 75  | 83.3  | 1   | 121   | 4.1  | 5   |
| UMA78A                    | 78  | 86.7  | 1   | 126   | 4.0  | 5   |
| UMA85A                    | 85  | 94.4  | 1   | 137   | 3.6  | 5   |
| UMA90A                    | 90  | 100   | 1   | 146   | 3.4  | 5   |
| UMA100A                   | 100   | 111   | 1   | 162   | 3.1  | 5   |
| UMA110A                   | 110   | 122   | 1   | 177   | 2.8  | 5   |
| UMA120A                   | 120   | 133   | 1   | 193   | 2.6  | 5   |
| UMA130A                   | 130   | 144   | 1   | 209   | 2.4  | 5   |
| UMA150A                   | 150   | 167   | 1   | 243   | 2.1  | 5   |
| UMA160A                   | 160   | 178   | 1   | 259   | 1.9  | 5   |
| UMA170A                   | 170   | 189   | 1   | 275   | 1.8  | 5   |

\* Order with "CA" suffix for bi-directional types. Capacitance will be ½ that shown in figure 4.

**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**

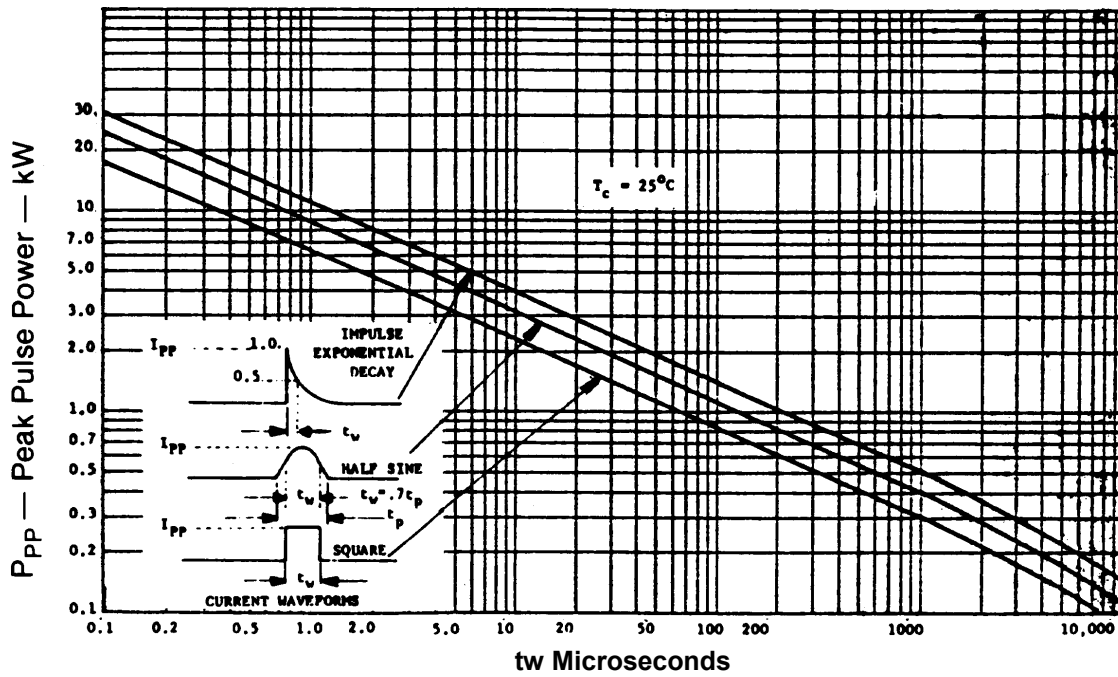
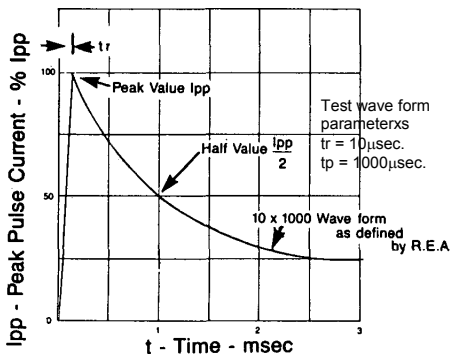
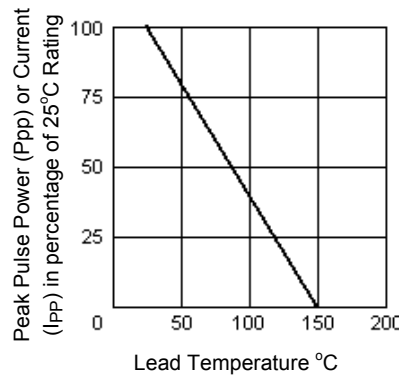


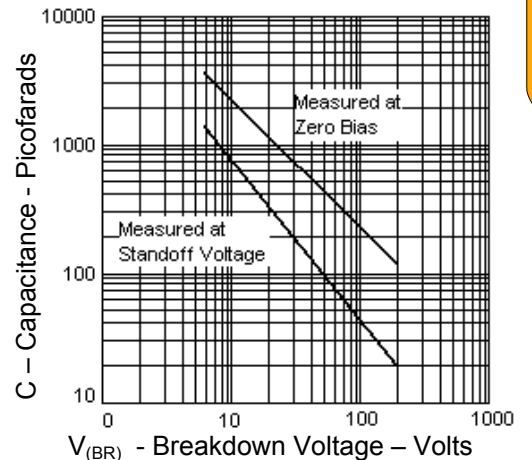
Figure 1 – Peak Pulse Power ( $P_{PP}$ ) – Kilowatts versus Pulse Width ( $t_w$ ) - Microseconds



**FIGURE 2**  
Pulse Waveform for Exponential Surge

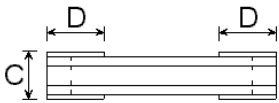
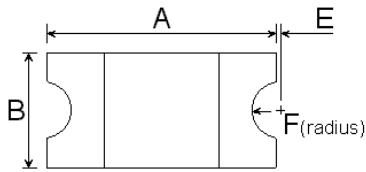


**FIGURE 3**  
Derating Curve



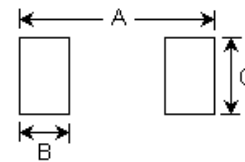
**FIGURE 4**  
Typical Capacitance vs. Breakdown Voltage

**PACKAGE DIMENSIONS & PAD LAYOUT**



| DIM | INCHES |      | MM   |      |
|-----|--------|------|------|------|
|     | MIN    | MAX  | MIN  | MAX  |
| A   | .173   | .181 | 4.40 | 4.60 |
| B   | .083   | .091 | 2.10 | 2.30 |
| C   | .033   | .045 | .85  | 1.15 |
| D   | .033   | .045 | .85  | 1.15 |
| E   | .002   | .002 | .05  | .05  |
| F   | .020   | .020 | .50  | .50  |

**PAD LAYOUT**



|          | INCHES | mm   |
|----------|--------|------|
| <b>A</b> | .245   | 6.22 |
| <b>B</b> | .075   | 1.90 |
| <b>C</b> | .103   | 2.62 |