

**SURFACE MOUNT TRANSIENT  
VOLTAGE SUPPRESSORS**

**DESCRIPTION**

Microsemi's new Powermite UPT series transient voltage suppressors feature oxide-passivated chips, with high-temperature solder bonds for high surge capability, and negligible electrical degradation under repeated surge conditions.

In addition to its size advantages, Powermite package includes a full metallic bottom that eliminates the possibility of solder flux entrapment at assembly and a unique locking tab serving as an integral heat sink.

Innovative design makes this device fully compatible for use with automatic insertion equipment.

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

**APPEARANCE**



**DO-216**

**FEATURES**

- Powermite Package with standoff voltages 5 to 48 V
- Both unidirectional and Bidirectional Versions Available as "UPT" and "UPTB" respectively
- Peak Pulse Power 1000 W for 8/20  $\mu$ s pulse
- Clamping Time in pico-seconds
- Integral heat sink / locking tabs
- Full metallic bottom eliminates flux entrapment
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, or JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers, e.g. MXUPT15, MVUPTB28, MSPUPT10, etc.

**APPLICATIONS / BENEFITS**

- 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: UPT/UPTB5 to 17
  - Class 2: UPT/UPTB5 to 12
  - Class 3: UPT/UPTB5
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  - Class 1: UPT/UPTB5 to 8

**MAXIMUM RATINGS**

- Operating and Storage Temperature:  $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Peak Pulse Power: 1000 W at 8/20  $\mu$ s pulse (See Figure 1 and 2).
- Peak Pulse Power: 150 W at 10/1000  $\mu$ s pulse (See Figure 2).
- Impulse Repetition Rate (duty factor): 0.01%
- Thermal resistance:  $15^{\circ}\text{C/W}$  junction to base tab or  $85^{\circ}\text{C/W}$  junction to ambient when mounted on FR4 PC board with 1 oz copper
- Steady-State Power: 2.5 Watts
- Solder Temperatures:  $260^{\circ}\text{C}$  for 10 s (maximum)

**MECHANICAL AND PACKAGING**

- CASE: Void-free transfer molded thermosetting epoxy compound meeting UL94V-0
- FINISH: Tin-Lead plated over copper and readily solderable per MIL-STD-750, method 2026
- POLARITY: Cathode designated by TAB 1
- MARKING: The last three digits of part number, e.g. UPT5 is T05, UPT12 is T12, UPT24 is T24, UPTB5 is B05, UPTB12 is B12, UPTB24 is B24, etc.
- WEIGHT: 0.016 gram (approximate)
- See package dimension on last page
- Tape & Reel option: Standard per EIA-481-B 7 inch 3,000 pieces and 13 inch 12,000 pieces

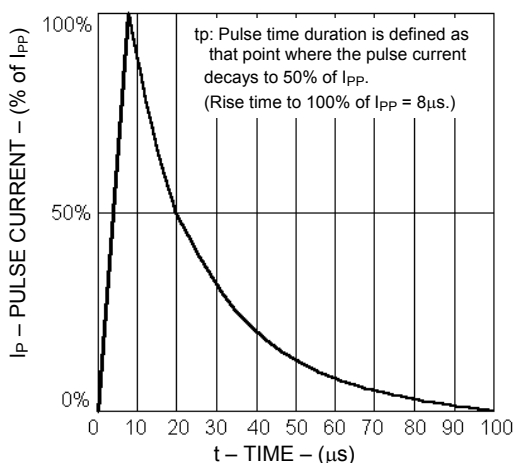
**SURFACE MOUNT TRANSIENT  
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**ELECTRICAL CHARACTERISTICS @ 25°C**

DEVICE TYPE		RATED STANDOFF VOLTAGE  $V_{WM}$	MINIMUM BREAKDOWN VOLTAGE  $V_{(BR)} @ 1 \text{ mA}$	MAXIMUM STANDBY CURRENT  $I_D @ V_{WM}$	MAXIMUM PEAK PULSE CURRENT*  $I_{PP}$	MAXIMUM CLAMPING VOLTAGE  $V_C @ 10A$	MAXIMUM TEMP. COEFFICIENT of $V_{(BR)}$  $\alpha_{V(BR)}$
Unidirectional	Bi-directional	V	V	$\mu A$	A	V	$\%/^{\circ}C$
UPT5	UPTB5	5	6.0	50	89.4	9.5	.030
UPT8	UPTB8	8	9.0	2	62.1	13.7	.040
UPT10	UPTB10	10	11.0	2	47.2	18.0	.045
UPT12	UPTB12	12	13.8	1	40.3	21.6	.050
UPT15	UPTB15	15	16.7	1	33.9	26.0	.055
UPT17	UPTB17	17	19.0	1	30.8	29.2	.060
UPT24	UPTB24	24	28.4	1	22.0	43.2	.070
UPT28	UPTB28	28	31.0	1	19.2	47.8	.075
UPT33	UPTB33	33	36.8	1	16.4	56.7	.080
UPT48	UPTB48	48	54.0	1	11.2	84.3	.090

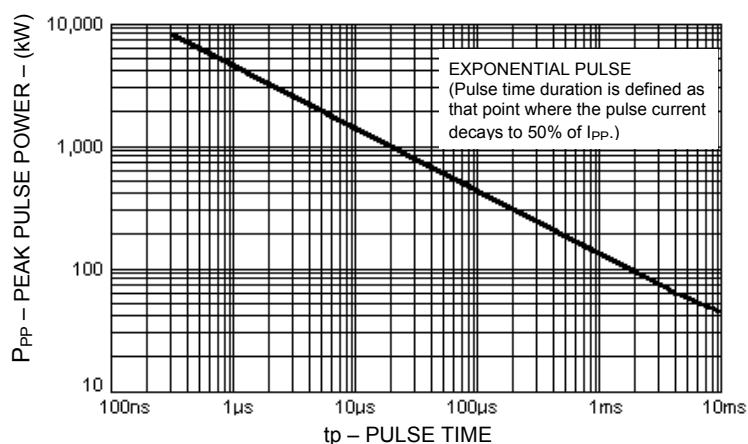
\* See Figure 1 for  $I_{PP}$  waveform

**SYMBOLS & DEFINITIONS**

Symbol	Definition
$V_{(BR)}$	Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
$V_{WM}$	Working Peak Standoff Voltage: The maximum peak voltage that can be applied over the operating temperature range.
$P_{PP}$	Peak Pulse Power: The peak power that can be applied for a specified pulse width and waveform.
$I_D$	Standby Current: The maximum current that will flow at the specified voltage and temperature.
$I_{PP}$	Peak Pulse Current: The peak current that can be applied for a specified pulse width and waveform.
C	Capacitance: The capacitance in picofarads of the TVS as defined @ 0 volts at a frequency of 1 MHz.

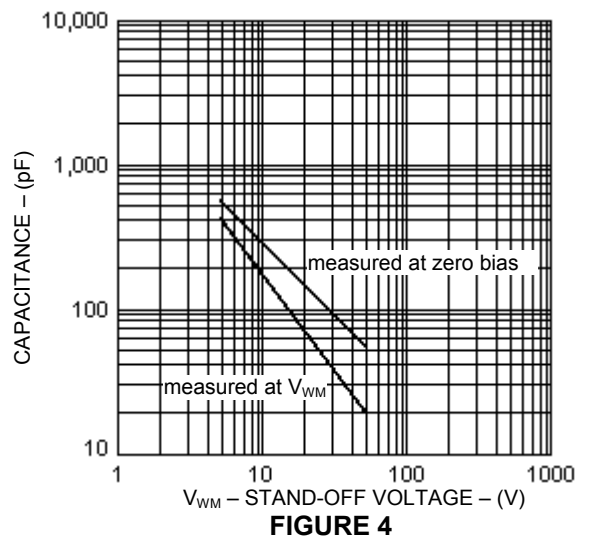
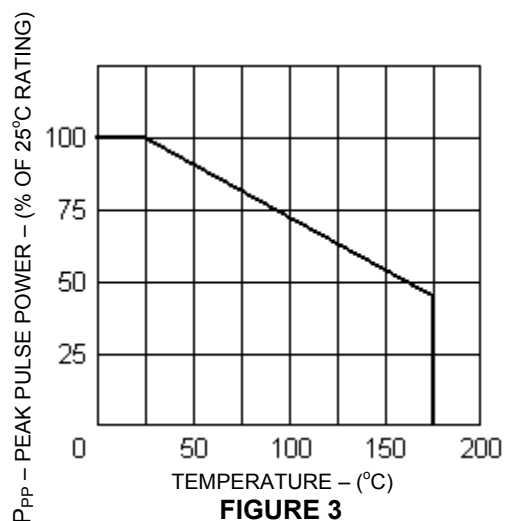
**OUTLINE AND CIRCUIT**

**FIGURE 1**

Pulse Waveform for Exponential Surge

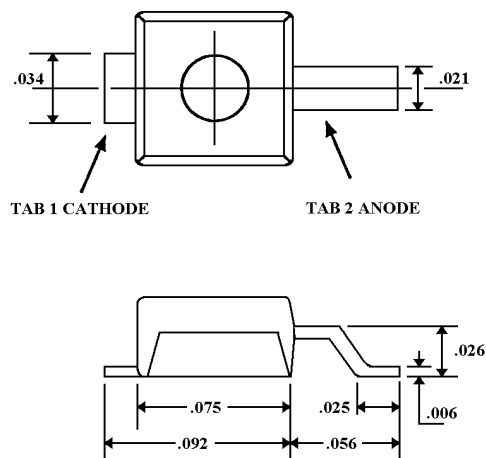

**FIGURE 2**

Peak Pulse Power vs. Pulse Duration

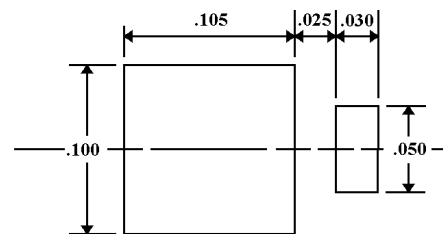
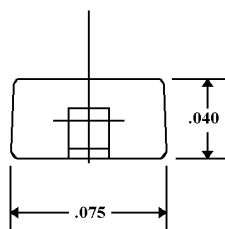
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**DIMENSIONS**



All dimensions +/- .005 inches



MOUNTING PAD in inches