RoHS Available

5V – 48V Powermite1, Surface Mount Transient Voltage Suppressors

High-Reliability Screening available in reference to MIL-PRF-19500

Tested in accordance with the requirements of AEC-Q101

DO-216AA Package

DESCRIPTION

Microsemi's unique and new Powermite MUPT series of transient voltage suppressors feature oxide-passivated chips with high-temperature solder bonds for high surge capability and negligible electrical degradation under repeated surge conditions. Both unidirectional and bidirectional configurations are available. In addition to its size advantages, the Powermite package includes a fully metallic bottom (anode) side that eliminates the possibility of solder flux entrapment at assembly and a unique locking tab design serves as an integral heat sink. Its innovative design makes this device fully compatible for use with automatic insertion equipment.

Important: For the latest information, visit our website http://www.microsemi.com.

FEATURES

- Powermite package with standoff voltages 5 to 48 V.
- Both unidirectional and bidirectional polarities:
  -Anode to case bottom (MUPT5e3 thru MUPT48e3)
  -Bidirectional (MUPTB5e3 thru MUPTB48e3)
- Clamping time less than 100 pico-seconds for unidirectional and 5 nano-seconds for bidirectional.
- 100% surge current testing of all parts.
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B.
- Both RoHS and non-RoHS compliant versions available.

APPLICATIONS / BENEFITS

- Protects sensitive components such as IC's, CMOS, Bipolar, BiCMOS, ECL, DTL, T^2L, etc.
- Protection from switching and induced RF transients.
  -Integral heat sink / locking tabs
  -Fully metallic bottom side eliminates flux entrapment
- 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: MUPT5 /MUPTB8 to 17
  Class 2: MUPT5 /MUPTB5 to 12

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value		Unit
Junction and Storage Temperature	T_J / T_{STG}	-65 to +150		°C
Thermal Resistance Junction-to-Ambient (1)	$R_{\Theta JA}$	240		°C/W
Thermal Resistance Junction-to-Case (base tab)	$R_{\Theta JC}$	15		°C/W
Peak Pulse Power (see Figure 1 and Figure 2)		@ 8/20 µs	@10/1000µs	
MUPT5e3 thru MUPT48e3:	P_{PP}	1000	150	W
MUPTB5e3 thru MUPTB48e3:		1000	150	
Rated Average Power Dissipation (base tab ≤ 112 °C)	$P_{M(AV)}$	2.5		W
Impulse Repetition Rate (duty factor)		0.01		%
Solder Temperature @ 10 s	T_{SP}	260		°C

Notes: 1. When mounted on FR4 PC board with 1 oz copper.

Power Discretes & Modules Business Unit
Discrete Products Group
Microsemi Corporation

PDM – Lawrence
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or (978) 620-2600
Fax: (978) 689-0803

PDM – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

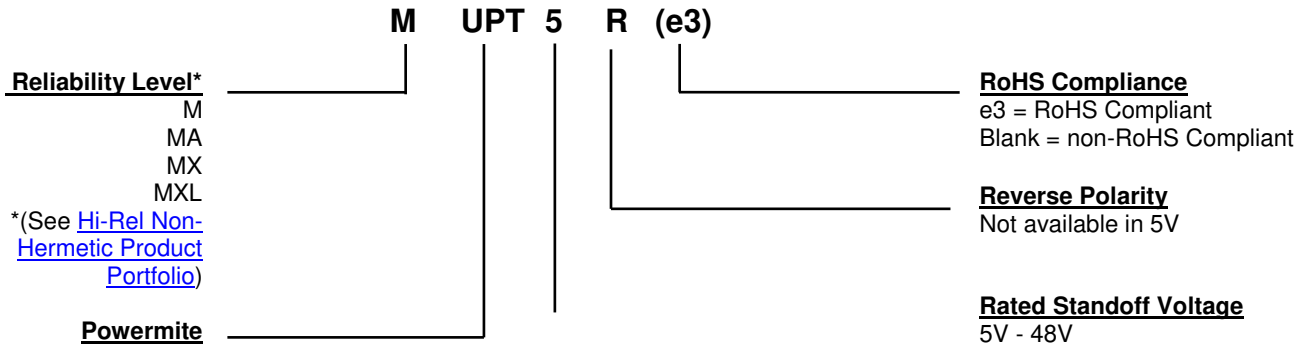
Website:
www.microsemi.com

MECHANICAL and PACKAGING

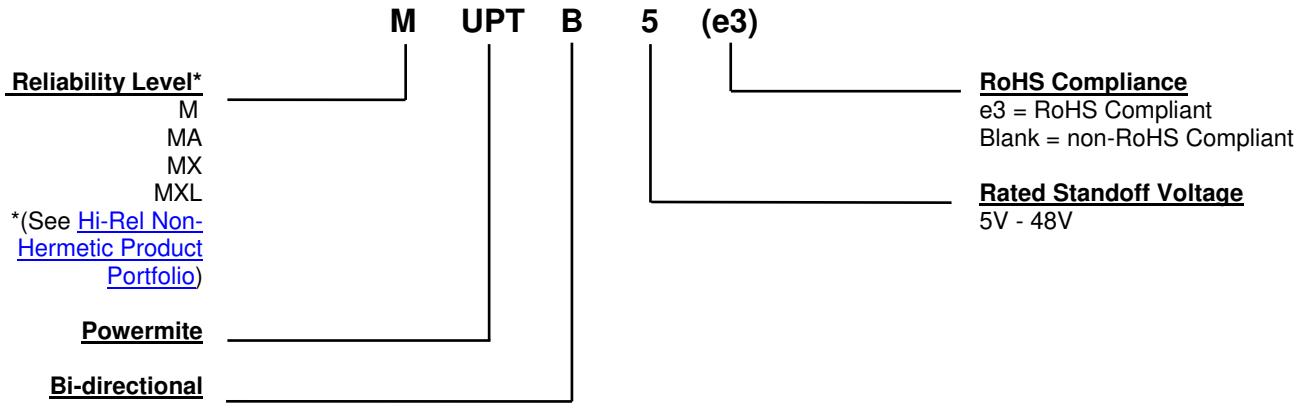
- CASE: Void-free transfer molded thermosetting epoxy compound meeting UL94V-0.
- TERMINALS: Annealed matte-tin plating over copper and readily solderable per MIL-STD-750, method 2026.
- MARKING:
  Anode to TAB 1: "T" plus the last two digits of part number underlined, e.g. MUPT5e3 is T05▪, MUPT12e3 is T12▪
  Bipolar: "B" plus the last two digits of part number underlined, e.g. MUPTB8e3 is B08▪, MUPTB12e3 is B12▪, etc.
  Please note dot suffix (for e3 suffix)
- POLARITY: Anode to TAB 1 (bottom) as described in marking above and on last page.
- TAPE & REEL option: Standard per EIA-481-B using 12 mm tape. Consult factory for quantities.
- WEIGHT: Approximately 0.016 gram.
- See package dimensions on last page.

PART NOMENCLATURE

Applicable to unidirectional MUPT5e3 – MUPT48e3 only:



Applicable to bidirectional MUPTB5e3 – MUPTB48e3 only:



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.

ELECTRICAL CHARACTERISTICS

DEVICE TYPE		RATED STANDOFF VOLTAGE V_{WM}	MINIMUM BREAKDOWN VOLTAGE $V_{(BR)}$ @ 1 mA	MAXIMUM STANDBY CURRENT I_D @ V_{WM}	MAXIMUM PEAK PULSE CURRENT* I_{PP} @ 10/1000 µs	MAXIMUM CLAMPING VOLTAGE V_C @ I_{PP}	MAXIMUM TEMPERATURE COEFFICIENT of $V_{(BR)}$ $\alpha_{V(BR)}$
Uni-directional	**Bi-directional**	**V**	**V**	**µA**	**A**	**V**	**%/°C**
MUPT5	MUPTB5	5	6.0	50	15.7	9.5	0.030
MUPT8	MUPTB8	8	9.0	2	10.9	13.7	0.040
MUPT10	MUPTB10	10	11.0	2	8.33	18.0	0.045
MUPT12	MUPTB12	12	13.8	1	6.94	21.6	0.050
MUPT15	MUPTB15	15	16.7	1	5.77	26.0	0.055
MUPT17	MUPTB17	17	19.0	1	5.14	29.2	0.060
MUPT24	MUPTB24	24	28.4	1	3.47	43.2	0.070
MUPT28	MUPTB28	28	31.0	1	3.13	47.8	0.075
MUPT33	MUPTB33	33	36.8	1	2.65	56.7	0.080
MUPT48	MUPTB48	48	54.0	1	1.78	84.3	0.090

* See Figure 2 for I_{PP} waveform of 10/1000 µs test pulse.

GRAPHS

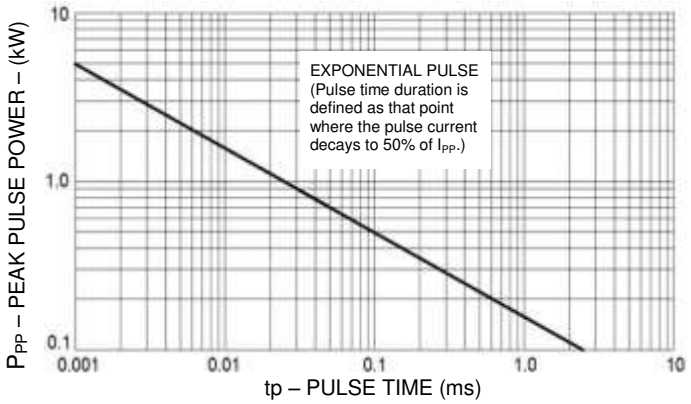


FIGURE 1
Peak Pulse Power vs. Pulse Duration

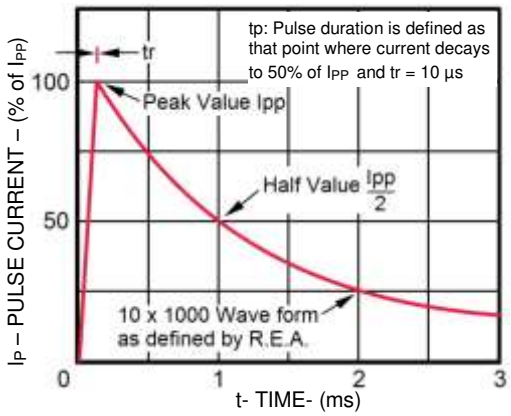


FIGURE 2
Pulse Waveform for 10/1000 µs Exponential Surge

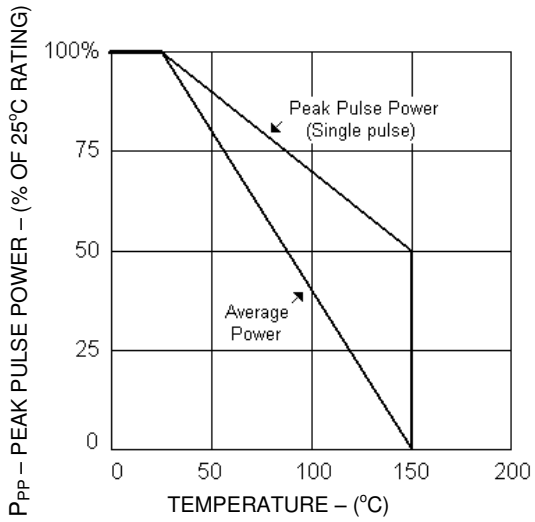


FIGURE 3
Derating Curve

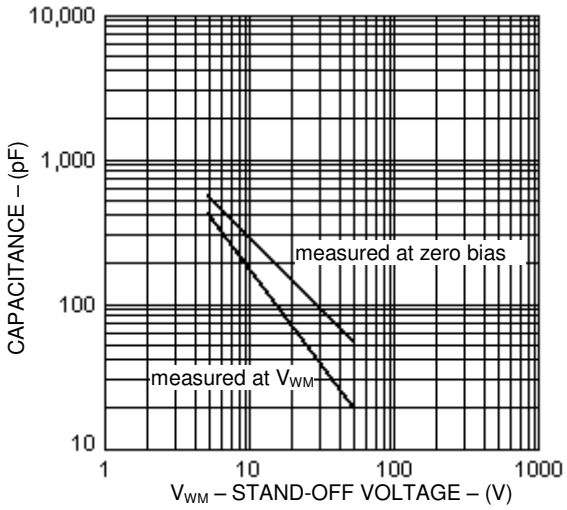
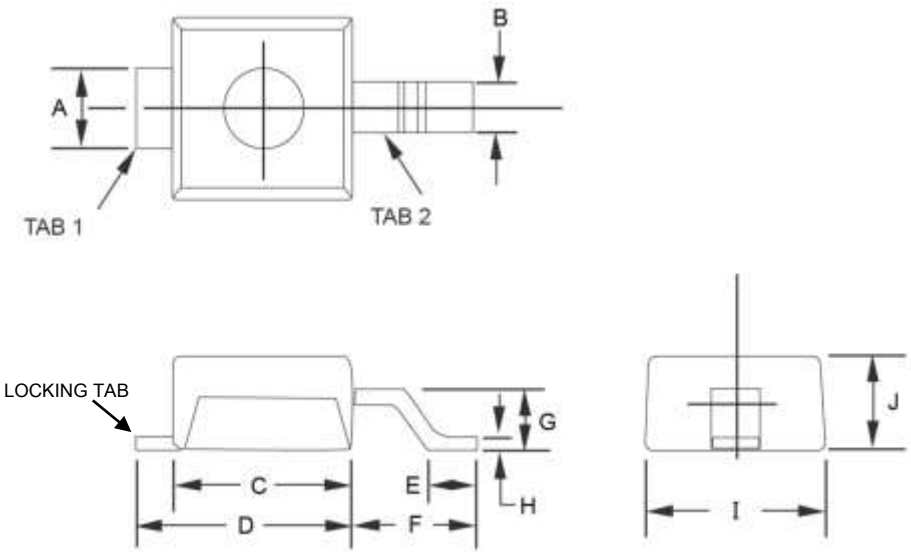


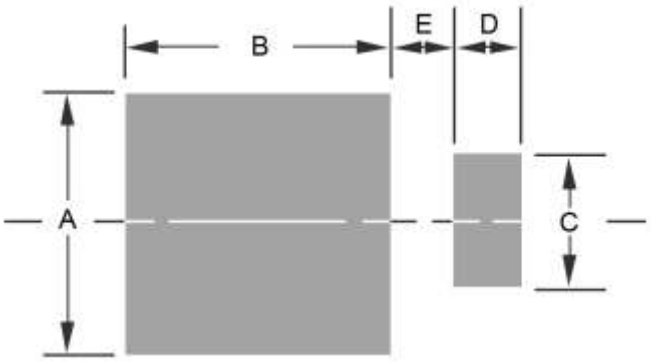
FIGURE 4
Typical Capacitance vs. Stand-Off Voltage

PACKAGE DIMENSIONS



Ltr	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	0.029	0.039	0.73	0.99
B	0.016	0.026	0.40	0.66
C	0.070	0.080	1.77	2.03
D	0.087	0.097	2.21	2.46
E	0.020	0.030	0.50	0.76
F	0.051	0.061	1.29	1.54
G	0.021	0.031	0.53	0.78
H	0.004	0.008	0.10	0.20
I	0.070	0.080	1.77	2.03
J	0.035	0.045	0.89	1.14

PAD LAYOUT



Ltr	Dimensions	
	Inch	Millimeters
A	0.100	2.54
B	0.105	2.67
C	0.050	1.27
D	0.030	0.76
E	0.025	0.64