1PMT5.0AT1/T3 Series

Zener Transient Voltage Suppressor POWERMITE® Package

The 1PMT5.0AT1/T3 Series is designed to protect voltage sensitive components from high voltage, high energy transients. Excellent clamping capability, high surge capability, low zener impedance and fast response time. The advanced packaging technique provides for a highly efficient micro miniature, space saving surface mount with its unique heat sink design. The POWERMITE has the same thermal performance as the SMA while being 50% smaller in footprint area, and delivering one of the lowest height profiles (1.1 mm) in the industry. Because of its small size, it is ideal for use in cellular phones, portable devices, business machines, power supplies and many other industrial/consumer applications.

Specification Features:

- Stand−off Voltage: 5 − 58 V
- Peak Power − 200 W @ 1 ms (1PMT5.0A − 1PMT36A)
  − 175 W @ 1 ms (1PMT40A − 1PMT58A)
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage
- Response Time is Typically < 1 ns
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Low Profile − Maximum Height of 1.1 mm
- Integral Heat Sink/Locking Tabs
- Full Metallic Bottom Eliminates Flux Entrapment
- Small Footprint − Footprint Area of 8.45 mm^2
- POWERMITE is JEDEC Registered as DO−216AA
- Cathode Indicated by Polarity Band
- Pb−Free Package is Available

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic

FINISH: All external surfaces are corrosion resistant and leads are readily solderable

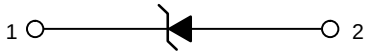
MOUNTING POSITION: Any

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds

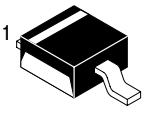
ON Semiconductor®

http://onsemi.com

PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSOR 5 − 58 V 200 W PEAK POWER

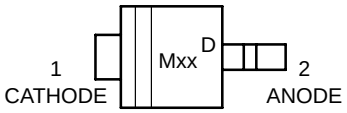


1: CATHODE
2: ANODE



POWERMITE
CASE 457
PLASTIC

MARKING DIAGRAM



Mxx = Specific Device Code
xx = 5 − 58
(See Table Next Page)
D = Date Code

LEAD ORIENTATION IN TAPE:
Cathode (Short) Lead to Sprocket Holes

ORDERING INFORMATION

Device	Package	Shipping†
1PMT5.0AT1	POWERMITE	3,000/Tape & Reel
1PMT5.0AT3	POWERMITE	12,000/Tape & Reel
1PMT5.0AT3G	POWERMITE (Pb−Free)	12,000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

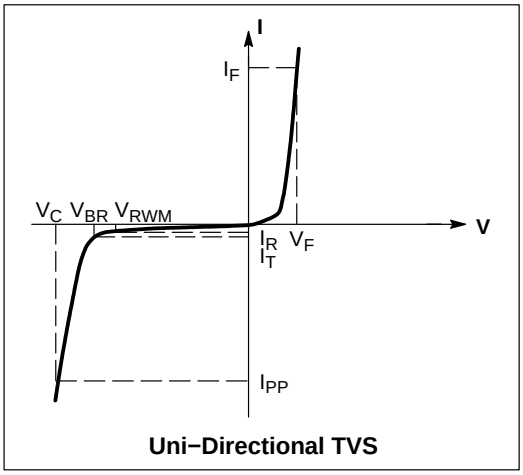
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Maximum P_{pk} Dissipation, (PW−10/1000 μs) (Note 1) (1PMT5.0A − 1PMT36A)	P_{pk}	200	W
Maximum P_{pk} Dissipation, (PW−10/1000 μs) (Note 1) (1PMT40A − 1PMT58A)	P_{pk}	175	W
Maximum P_{pk} Dissipation, (PW−8/20 μs) (Note 1)	P_{pk}	1000	W
DC Power Dissipation @ T_A = 25°C (Note 2) Derate above 25°C Thermal Resistance from Junction−to−Ambient	P_D $R_{\theta JA}$	500 4.0 248	mW mW/°C °C/W
Thermal Resistance from Junction−to−Lead (Anode)	$R_{\theta Janode}$	35	°C/W
Maximum DC Power Dissipation (Note 3) Thermal Resistance from Junction to Tab (Cathode)	P_D $R_{\theta Jcathode}$	3.2 23	W °C/W
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

1. Non−repetitive current pulse at T_A = 25°C.
2. Mounted with recommended minimum pad size, DC board FR−4.
3. At Tab (Cathode) temperature, T_{tab} = 75°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 3.5 V Max. @ I_F (Note 4) = 35 A)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F



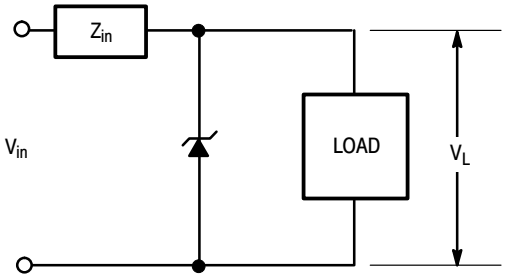
Uni−Directional TVS

ELECTRICAL CHARACTERISTICS (T_L = 30°C unless otherwise noted, V_F = 1.25 Volts @ 200 mA)

Device	Marking	V_{RWM} (Note 5)	V_{BR} @ I_T (V) (Note 6) Min	Nom	Max	I_T (mA)	I_R @ V_{RWM} (μA)	V_C @ I_{PP} (V)	I_{PP} (A) (Note 7)
1PMT5.0AT1, T3	MKE	5.0	6.4	6.7	7.0	10	800	9.2	21.7
1PMT7.0AT1, T3	MKM	7.0	7.78	8.2	8.6	10	500	12	16.7
1PMT12AT1, T3	MLE	12	13.3	14.0	14.7	1.0	5.0	19.9	10.1
1PMT16AT1, T3	MLP	16	17.8	18.75	19.7	1.0	5.0	26	7.7
1PMT18AT1, T3	MLT	18	20.0	21.0	22.1	1.0	5.0	29.2	6.8
1PMT22AT1, T3	MLX	22	24.4	25.6	26.9	1.0	5.0	35.5	5.6
1PMT24AT1, T3	MLZ	24	26.7	28.1	29.5	1.0	5.0	38.9	5.1
1PMT26AT1, T3	MME	26	28.9	30.4	31.9	1.0	5.0	42.1	4.8
1PMT28AT1, T3	MMG	28	31.1	32.8	34.4	1.0	5.0	45.4	4.4
1PMT30AT1, T3	MMK	30	33.3	35.1	36.8	1.0	5.0	48.4	4.1
1PMT33AT1, T3	MMM	33	36.7	38.7	40.6	1.0	5.0	53.3	3.8
1PMT36AT1, T3	MMP	36	40.0	42.1	44.2	1.0	5.0	58.1	3.4
1PMT40AT1, T3	MMR	40	44.4	46.8	49.1	1.0	5.0	64.5	2.7
1PMT48AT1, T3	MMX	48	53.3	56.1	58.9	1.0	5.0	77.4	2.3
1PMT51AT1, T3	MMZ	51	56.7	59.7	62.7	1.0	5.0	82.4	2.1
1PMT58AT1, T3	MNG	58	64.4	67.8	71.2	1.0	5.0	93.6	1.9

4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.
5. A transient suppressor is normally selected according to the Working Peak Reverse Voltage (V_{RWM}) which should be equal to or greater than the DC or continuous peak operating voltage level.
6. V_{BR} measured at pulse test current I_T at ambient temperature of 25°C.
7. Surge current waveform per Figure 2 and derate per Figure 4.

TYPICAL PROTECTION CIRCUIT



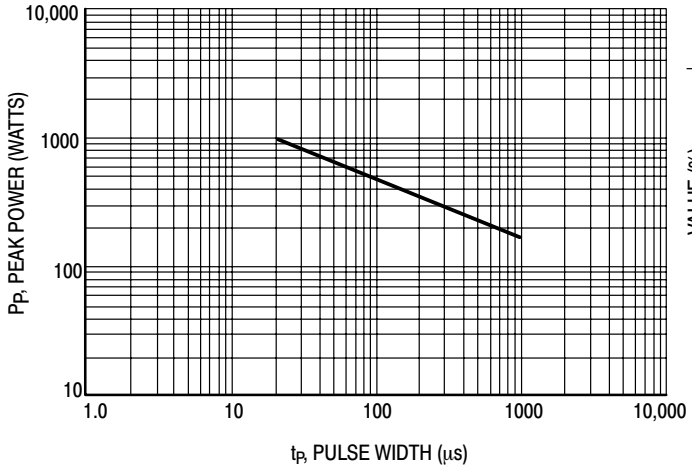


Figure 1. Pulse Rating Curve

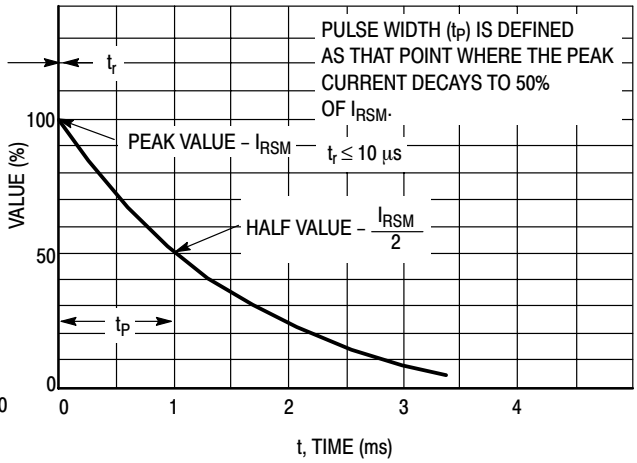


Figure 2. 10 X 1000 μs Pulse Waveform

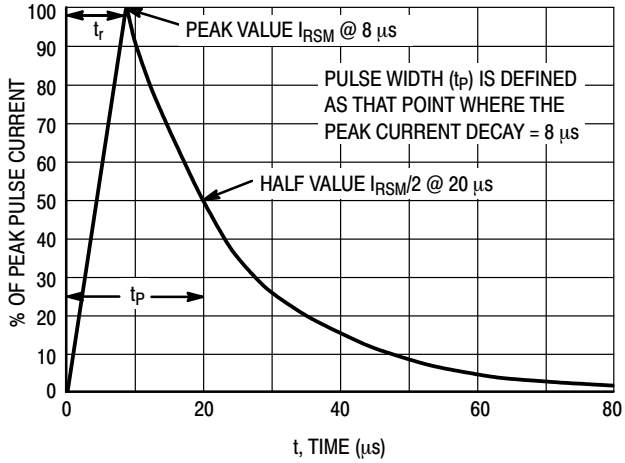


Figure 3. 8 X 20 μs Pulse Waveform

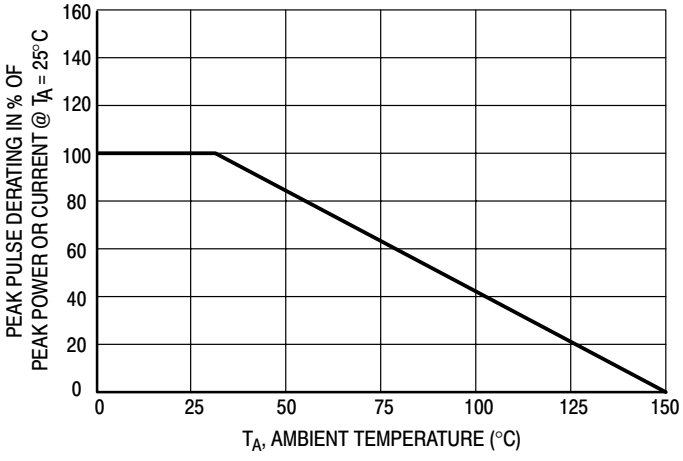


Figure 4. Pulse Derating Curve

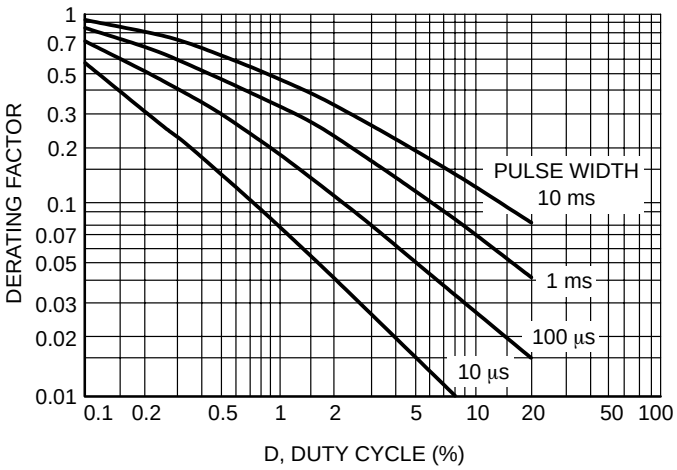


Figure 5. Typical Derating Factor for Duty Cycle

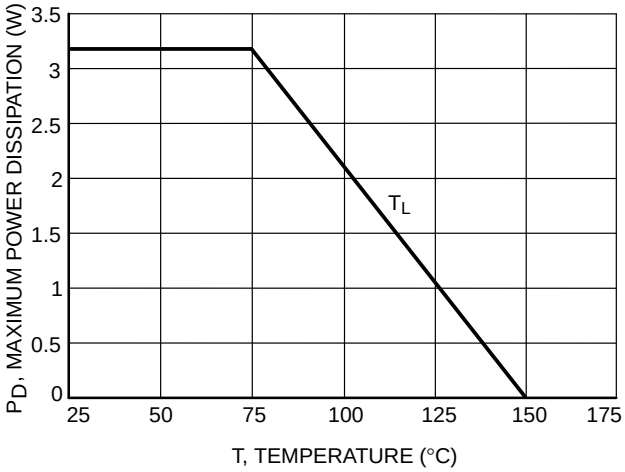


Figure 6. Steady State Power Derating

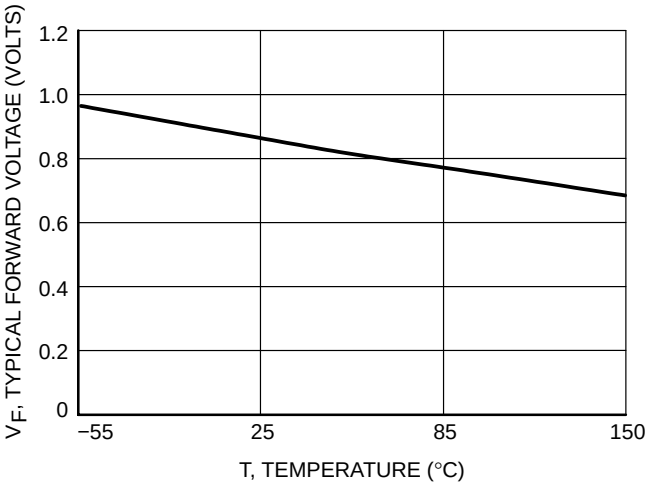


Figure 7. Forward Voltage

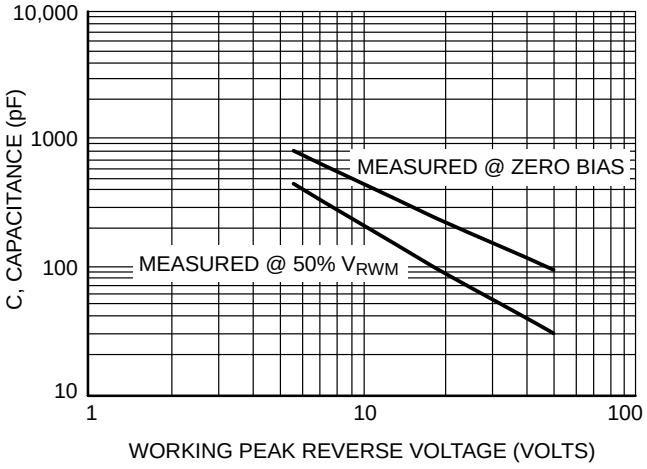
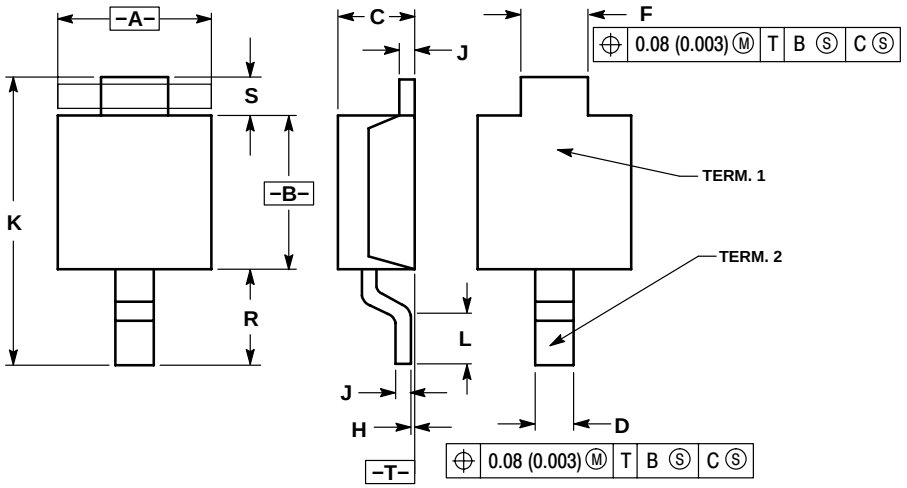


Figure 8. Capacitance versus Working Peak Reverse Voltage

OUTLINE DIMENSIONS

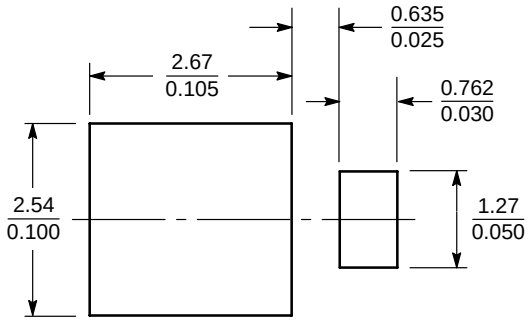
POWERMITE
CASE 457−04
ISSUE D



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	1.75	2.05	0.069	0.081
B	1.75	2.18	0.069	0.086
C	0.85	1.15	0.033	0.045
D	0.40	0.69	0.016	0.027
F	0.70	1.00	0.028	0.039
H	−0.05	+0.10	−0.002	+0.004
J	0.10	0.25	0.004	0.010
K	3.60	3.90	0.142	0.154
L	0.50	0.80	0.020	0.031
R	1.20	1.50	0.047	0.059
S	0.50 REF		0.019 REF	

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

POWERMITE®

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

POWERMITE and COOLPACK are registered trademarks of and used under a license from Microsemi Corporation.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

1PMT5.0AT3/D