1PMT5.0AT1G/T3G Series

Zener Transient Voltage Suppressor POWERMITE® Package

The 1PMT5.0AT1G/T3G 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 heatsink 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: 5.0 V – 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 Heatsink/Locking Tabs
- Full Metallic Bottom Eliminates Flux Entrapment
- Small Footprint – Footprint Area of 8.45 mm^2
- POWERMITE is JEDEC Registered as DO−216AA
- Lead Orientation in Tape: Cathode (Short) Lead to Sprocket Holes
- Cathode Indicated by Polarity Band
- These Devices are Pb−Free and are RoHS Compliant

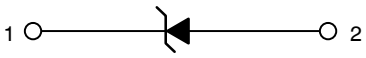
Mechanical Characteristics:

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

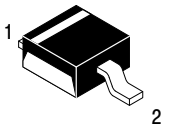
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PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSOR 5 – 58 V 200 W PEAK POWER

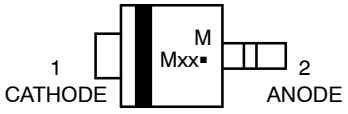


1: CATHODE
2: ANODE



POWERMITE CASE 457

MARKING DIAGRAM



M = Date Code
Mxx = Specific Device Code (See Table on Page 3)
▪ = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping†
1PMTxxAT1G	POWERMITE (Pb−Free)	3,000/Tape & Reel
1PMTxxAT3G	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.

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MAXIMUM RATINGS

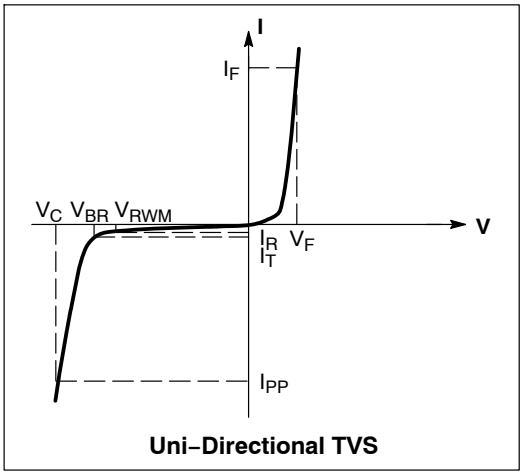
Rating	Symbol	Value	Unit
Maximum P_{pk} Dissipation, (PW−10/1000 μs) (Note 1) (1PMT5.0A − 1PMT36A)	P_{pk}	200	W
Maximum P_{pk} Dissipation, (PW−10/1000 μs) (Note 1) (1PMT40A − 1PMT58A)	P_{pk}	175	W
Maximum P_{pk} Dissipation, (PW−8/20 μs) (Note 1)	P_{pk}	1000	W
DC Power Dissipation @ T_A = 25°C (Note 2) Derate above 25°C Thermal Resistance, Junction−to−Ambient	P_D $R_{\theta JA}$	500 4.0 248	mW mW/°C °C/W
Thermal Resistance, Junction−to−Lead (Anode)	$R_{\theta Janode}$	35	°C/W
Maximum DC Power Dissipation (Note 3) Thermal Resistance, 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Nonrepetitive 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

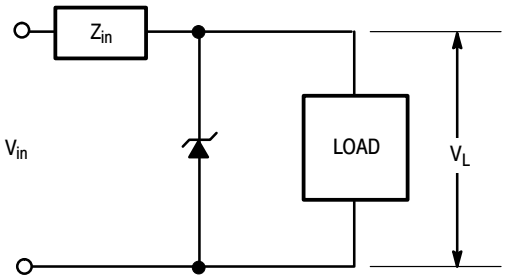
ELECTRICAL CHARACTERISTICS (T_L = 30°C unless otherwise noted, V_F = 1.25 Volts @ 200 mA)

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)
1PMT5.0AT1G, T3G	MKE	5.0	6.4	6.7	7.0	10	50	9.2	21.7
1PMT7.0AT1G, T3G	MKM	7.0	7.78	8.2	8.6	10	30	12	16.7
1PMT12AT1G, T3G	MLE	12	13.3	14.0	14.7	1.0	1.0	19.9	10.1
1PMT16AT1G, T3G	MLP	16	17.8	18.75	19.7	1.0	1.0	26	7.7
1PMT18AT1G, T3G	MLT	18	20.0	21.0	22.1	1.0	1.0	29.2	6.8
1PMT22AT1G, T3G	MLX	22	24.4	25.6	26.9	1.0	1.0	35.5	5.6
1PMT24AT1G, T3G	MLZ	24	26.7	28.1	29.5	1.0	1.0	38.9	5.1
1PMT26AT1G, T3G	MME	26	28.9	30.4	31.9	1.0	1.0	42.1	4.8
1PMT28AT1G, T3G	MMG	28	31.1	32.8	34.4	1.0	1.0	45.4	4.4
1PMT30AT1G, T3G	MMK	30	33.3	35.1	36.8	1.0	1.0	48.4	4.1
1PMT33AT1G, T3G	MMM	33	36.7	38.7	40.6	1.0	1.0	53.3	3.8
1PMT36AT1G, T3G	MMP	36	40.0	42.1	44.2	1.0	1.0	58.1	3.4
1PMT40AT1G, T3G	MMR	40	44.4	46.8	49.1	1.0	1.0	64.5	2.7
1PMT48AT1G, T3G	MMX	48	53.3	56.1	58.9	1.0	1.0	77.4	2.3
1PMT51AT1G, T3G	MMZ	51	56.7	59.7	62.7	1.0	1.0	82.4	2.1
1PMT58AT1G, T3G	MNG	58	64.4	67.8	71.2	1.0	1.0	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.

*The “G” suffix indicates Pb−Free package.

TYPICAL PROTECTION CIRCUIT



TYPICAL CHARACTERISTICS

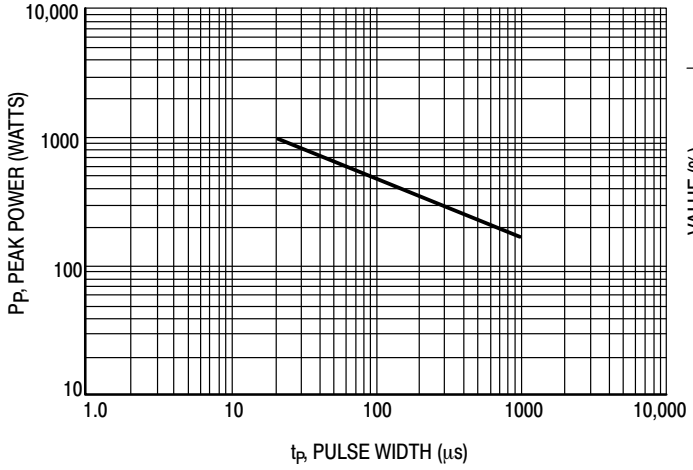


Figure 1. Pulse Rating Curve

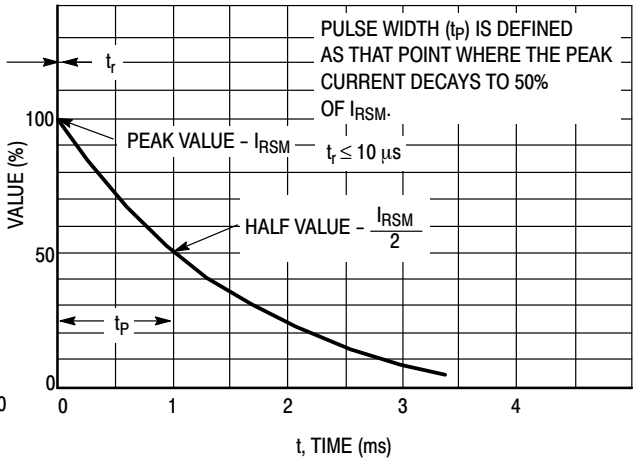


Figure 2. 10 X 1000 μs Pulse Waveform

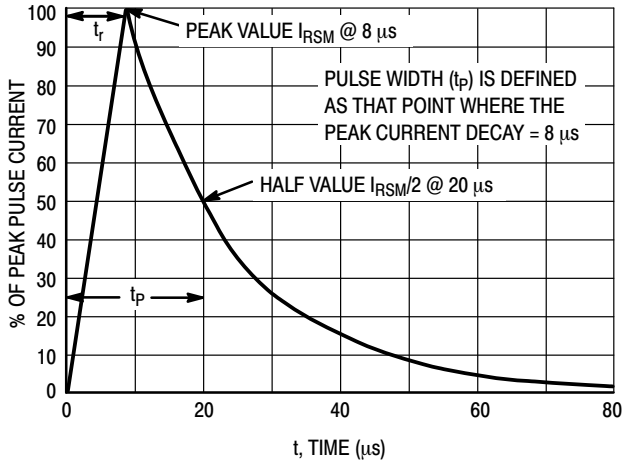


Figure 3. 8 X 20 μs Pulse Waveform

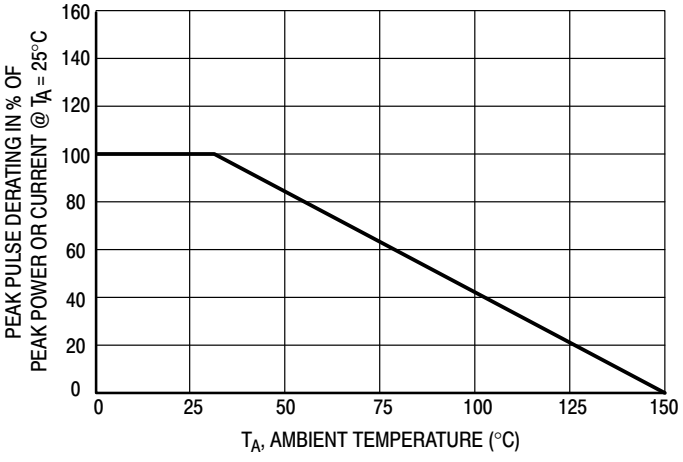


Figure 4. Pulse Derating Curve

TYPICAL CHARACTERISTICS

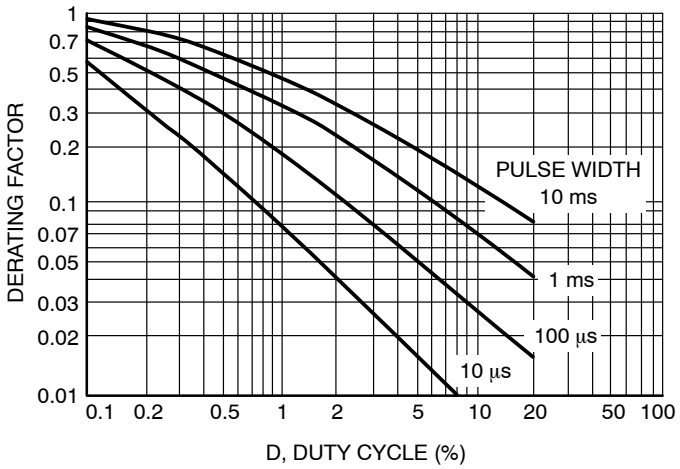


Figure 5. Typical Derating Factor for Duty Cycle

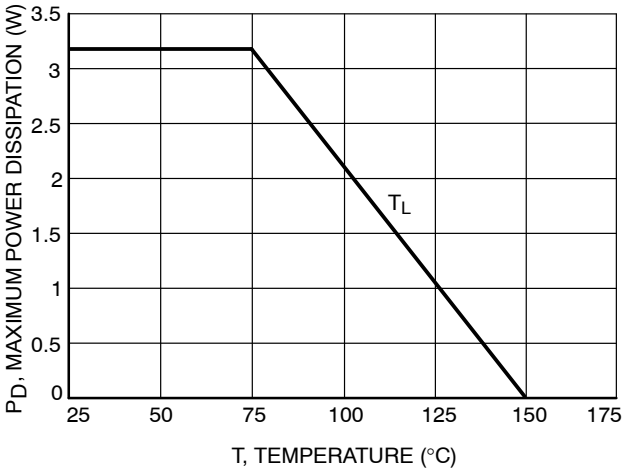


Figure 6. Steady State Power Derating

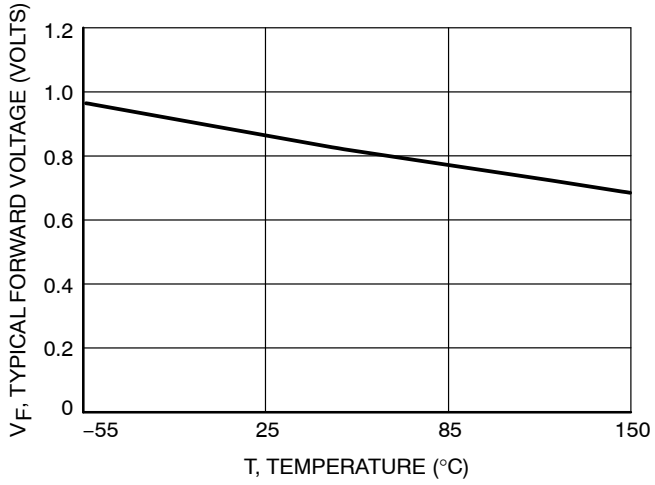


Figure 7. Forward Voltage

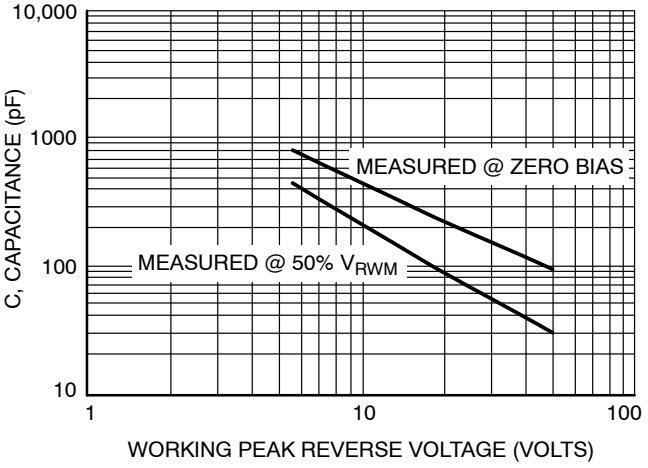
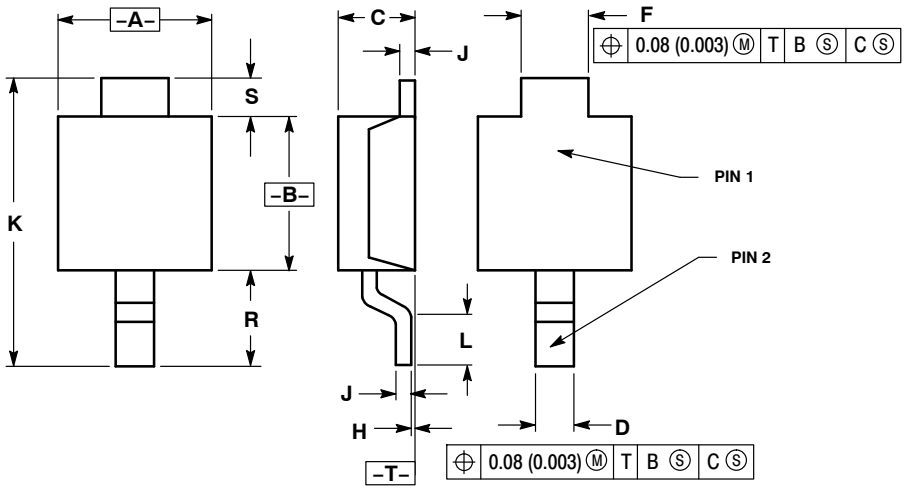


Figure 8. Capacitance versus Working Peak Reverse Voltage

1PMT5.0AT1G/T3G Series

PACKAGE DIMENSIONS

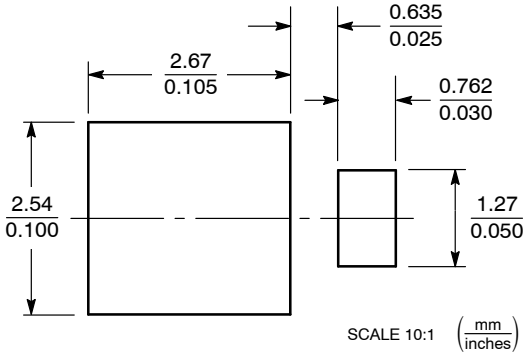
POWERMITE
CASE 457−04
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO 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*



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

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