1PMT5920B Series

3.2 Watt Plastic Surface Mount POWERMITE® Package

This complete new line of 3.2 Watt Zener Diodes are offered in highly efficient micro miniature, space saving surface mount with its unique heat sink design. The POWERMITE package 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 and many other industrial/consumer applications.

Features

- Zener Breakdown Voltage: 6.2 − 47 V
- DC Power Dissipation: 3.2 W with Tab 1 (Cathode) @ 75°C
- Low Leakage < 5 μA
- 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
- Supplied in 12 mm Tape and Reel
  T1 = 3,000 Units per Reel
  T3 = 12,000 Units per Reel
- POWERMITE is JEDEC Registered as DO−216AA
- Cathode Indicated by Polarity Band
- Pb−Free Packages are Available

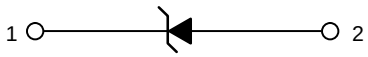
Mechanical Characteristics

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

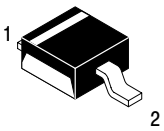
ON Semiconductor®

http://onsemi.com

PLASTIC SURFACE MOUNT
3.2 WATT ZENER DIODES
6.2 − 47 VOLTS

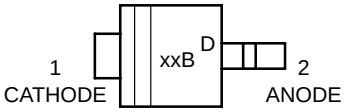


1: CATHODE
2: ANODE



POWERMITE
CASE 457
PLASTIC

MARKING DIAGRAM



xxB = Specific Device Code
xx = 20 − 41
(See Table Next Page)
D = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
1PMT59xxBT1	POWERMITE	3,000/Tape&Reel
1PMT59xxBT1G	POWERMITE (Pb−Free)	3,000/Tape&Reel
1PMT59xxBT3	POWERMITE	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.

Individual devices are listed on page 2 of this data sheet.

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

MAXIMUM RATINGS

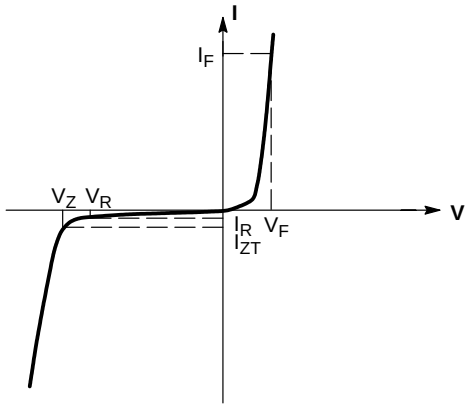
Rating	Symbol	Value	Unit
DC Power Dissipation @ T_A = 25°C (Note 1) Derate above 25°C Thermal Resistance from Junction−to−Ambient	P_D $R_{\theta JA}$	500 4.0 248	mW mW/°C °C/W
Thermal Resistance from Junction−to−Lead (Anode)	$R_{\theta Janode}$	35	°C/W
Maximum DC Power Dissipation (Note 2) Thermal Resistance 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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Mounted with recommended minimum pad size, PC board FR−4.
2. At Tab (Cathode) temperature, T_{tab} = 75°C

ELECTRICAL CHARACTERISTICS (T_L = 25°C unless otherwise noted, V_F = 1.5 V Max. @ I_F = 200 mAdc for all types)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F



Zener Voltage Regulator

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

Device	Device Marking	Zener Voltage (Note 3) V_Z @ I_{ZT} (Volts) Min	Nom	Max	I_{ZT} (mA)	I_R @ V_R (μA)	V_R (V)	Z_{ZT} @ I_{ZT} (Note 4) (Ω)	Z_{ZK} @ I_{ZK} (Note 4) (Ω)	I_{ZK} (mA)
1PMT5920BT1, G*, T3	20B	5.89	6.2	6.51	60.5	5.0	4.0	2.0	200	1.0
1PMT5921BT1, T3	21B	6.46	6.8	7.14	55.1	5.0	5.2	2.5	200	1.0
1PMT5922BT1, T3	22B	7.12	7.5	7.88	50	5.0	6.0	3.0	400	0.5
1PMT5923BT1, T3	23B	7.79	8.2	8.61	45.7	5.0	6.5	3.5	400	0.5
1PMT5924BT1, T3	24B	8.64	9.1	9.56	41.2	5.0	7.0	4.0	500	0.5
1PMT5925BT1, T3	25B	9.5	10	10.5	37.5	5.0	8.0	4.5	500	0.25
1PMT5927BT1, T3	27B	11.4	12	12.6	31.2	1.0	9.1	6.5	550	0.25
1PMT5929BT1, G*, T3	29B	14.25	15	15.75	25	1.0	11.4	9.0	600	0.25
1PMT5930BT1, T3	30B	15.2	16	16.8	23.4	1.0	12.2	10	600	0.25
1PMT5931BT1, T3	31B	17.1	18	18.9	20.8	1.0	13.7	12	650	0.25
1PMT5933BT1, T3	33B	20.9	22	23.1	17	1.0	16.7	17.5	650	0.25
1PMT5934BT1, T3	34B	22.8	24	25.2	15.6	1.0	18.2	19	700	0.25
1PMT5935BT1, T3	35B	25.65	27	28.35	13.9	1.0	20.6	23	700	0.25
1PMT5936BT1, G*, T3	36B	28.5	30	31.5	12.5	1.0	22.8	28	750	0.25
1PMT5939BT1, T3	39B	37.05	39	40.95	9.6	1.0	29.7	45	900	0.25
1PMT5941BT1, T3	41B	44.65	47	49.35	8.0	1.0	35.8	67	1000	0.25

3. Zener voltage is measured with the device junction in thermal equilibrium with an ambient temperature of 25°C.
4. Zener Impedance Derivation Z_{ZT} and Z_{ZK} are measured by dividing the AC voltage drop across the device by the AC current applied. The specified limits are for I_Z(ac) = 0.1 I_Z(dc) with the ac frequency = 60 Hz.

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

TYPICAL CHARACTERISTICS

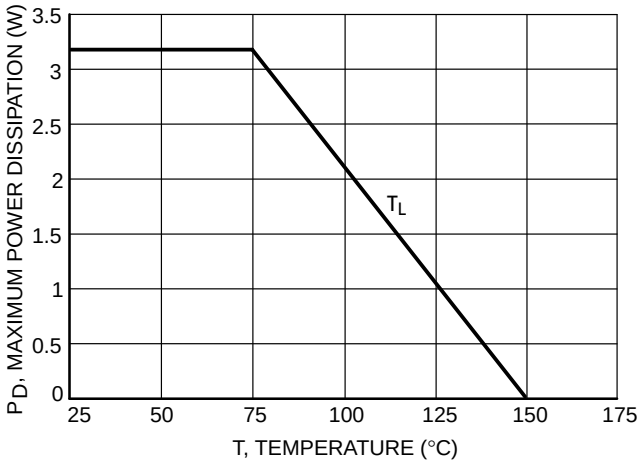


Figure 1. Steady State Power Derating

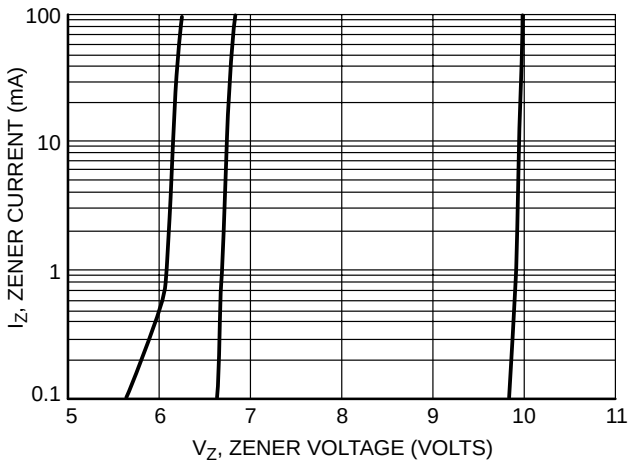


Figure 2. V_Z to 10 Volts

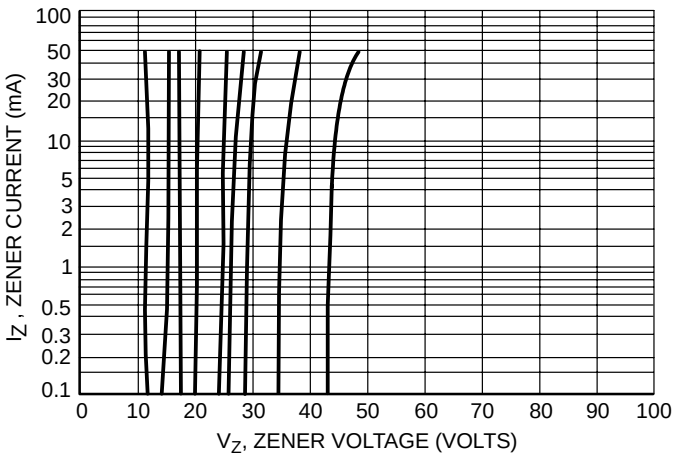


Figure 3. V_Z = 12 thru 47 Volts

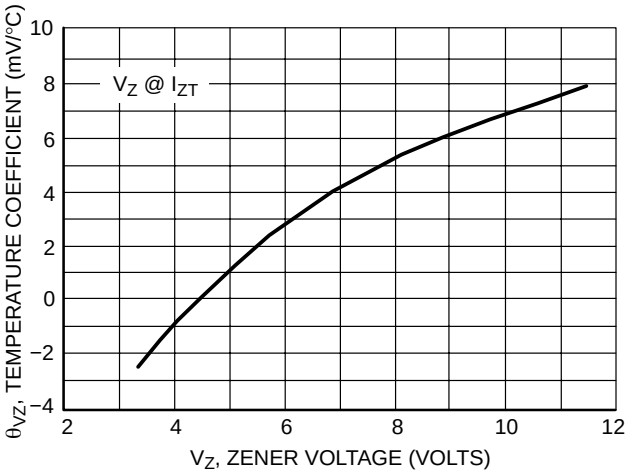


Figure 4. Zener Voltage − To 12 Volts

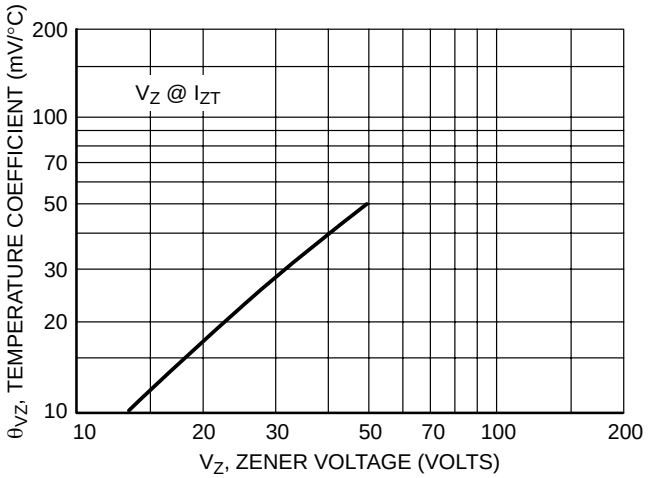


Figure 5. Zener Voltage − 14 To 47 Volts

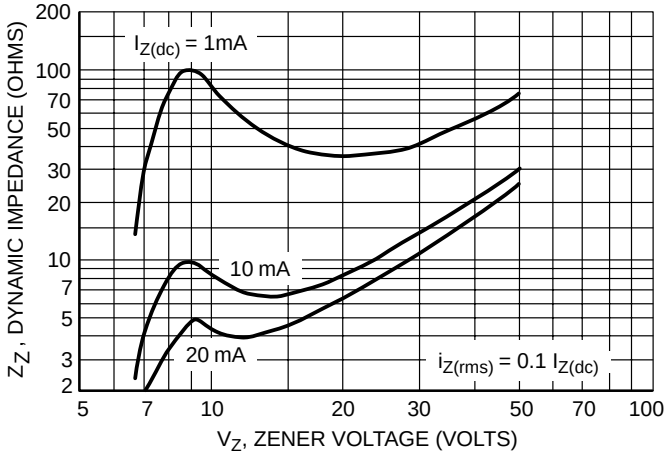


Figure 6. Effect of Zener Voltage

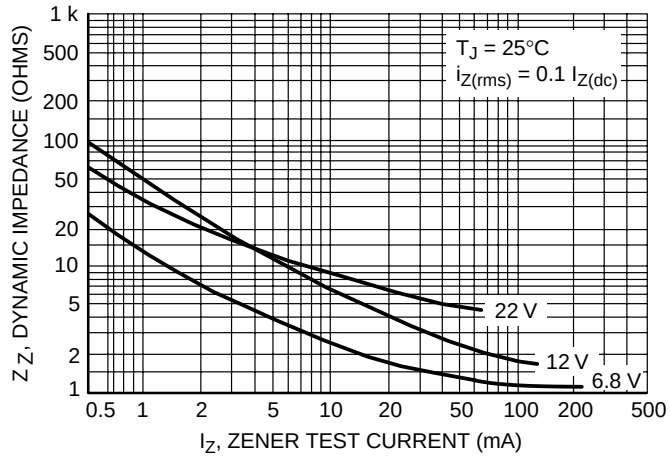


Figure 7. Effect of Zener Current

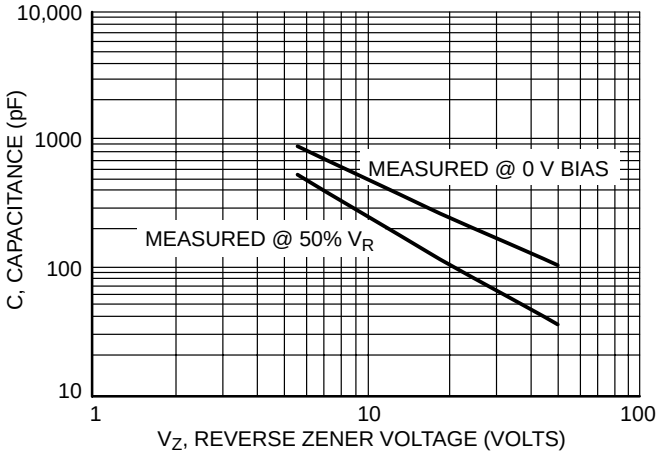
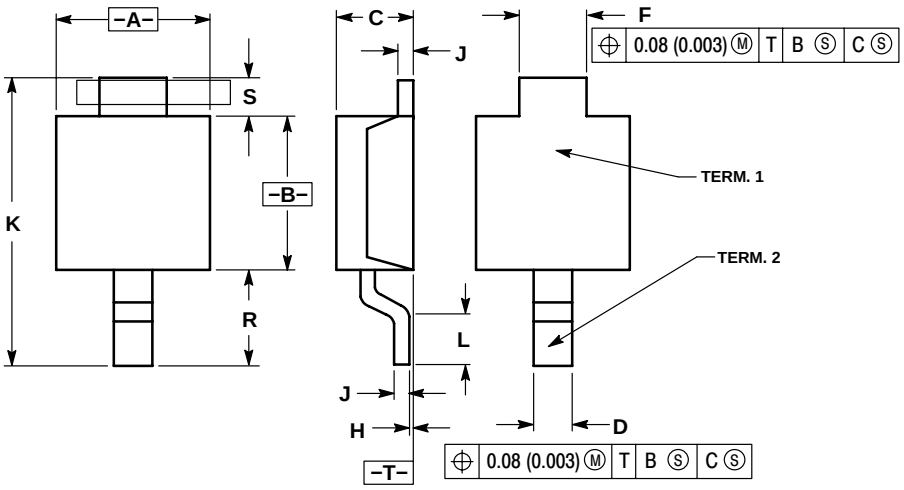


Figure 8. Capacitance versus Reverse Zener Voltage

OUTLINE DIMENSIONS

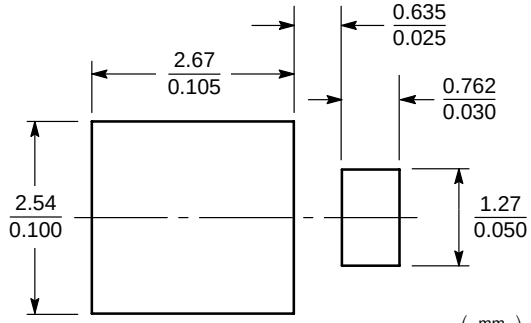
POWERMITE®
CASE 457−04
ISSUE D



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*



*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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PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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