

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 mm²
- Supplied in 12 mm Tape and Reel
- Lead Orientation in Tape: Cathode (Short) Lead to Sprocket Holes
- 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

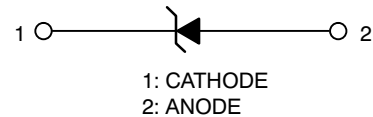
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds



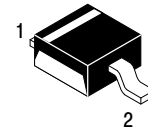
ON Semiconductor®

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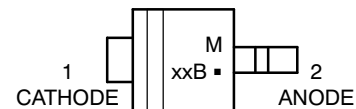
PLASTIC SURFACE MOUNT 3.2 WATT ZENER DIODES 6.2 – 47 VOLTS



**POWERMITE
CASE 457
PLASTIC**



MARKING DIAGRAM



- M = Date Code
- xxB = Specific Device Code
(See Table on Page 2)
- = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|------------------------|----------------|
| 1PMT59xxBT1G | POWERMITE (Pb-Free) | 3000/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

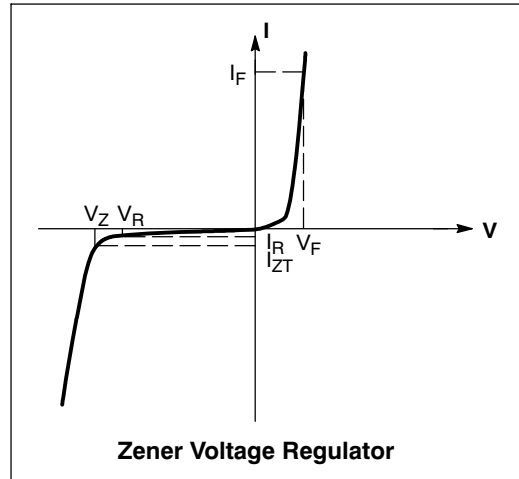
| Rating | Symbol | Value | Unit |
|---|---------------------------------------|-------------|--------------------------------|
| DC Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C | P_D | 500 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 4.0 | $\text{mW}/^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Lead (Anode) | $R_{\theta J\text{anode}}$ | 248 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Lead (Anode) | $R_{\theta J\text{anode}}$ | 35 | $^\circ\text{C}/\text{W}$ |
| Maximum DC Power Dissipation (Note 2) Thermal Resistance from Junction-to-Tab (Cathode) | P_D $R_{\theta J\text{cathode}}$ | 3.2 23 | W $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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.

- Mounted with recommended minimum pad size, PC board FR-4.
- At Tab (Cathode) temperature, $T_{\text{tab}} = 75^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_L = 25^\circ\text{C}$ unless otherwise noted, $V_F = 1.5\text{ V Max.}$ @ $I_F = 200\text{ mA}$ 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 |



ELECTRICAL CHARACTERISTICS ($T_L = 30^\circ\text{C}$ unless otherwise noted, $V_F = 1.25\text{ Volts}$ @ 200 mA)

| Device* | Device Marking | Zener Voltage (Note 3) | | | 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) |
|--------------|----------------|------------------------|-----|-------|------------------|----------------------------------|--------------|---|---|------------------|
| | | $V_Z @ I_{ZT}$ (Volts) | | | | | | | | |
| | | Min | Nom | Max | | | | | | |
| 1PMT5920BT1G | 20B | 5.89 | 6.2 | 6.51 | 60.5 | 5.0 | 4.0 | 2.0 | 200 | 1.0 |
| 1PMT5921BT1G | 21B | 6.46 | 6.8 | 7.14 | 55.1 | 5.0 | 5.2 | 2.5 | 200 | 1.0 |
| 1PMT5924BT1G | 24B | 8.64 | 9.1 | 9.56 | 41.2 | 5.0 | 7.0 | 4.0 | 500 | 0.5 |
| 1PMT5927BT1G | 27B | 11.4 | 12 | 12.6 | 31.2 | 1.0 | 9.1 | 6.5 | 550 | 0.25 |
| 1PMT5929BT1G | 29B | 14.25 | 15 | 15.75 | 25 | 1.0 | 11.4 | 9.0 | 600 | 0.25 |
| 1PMT5933BT1G | 33B | 20.9 | 22 | 23.1 | 17 | 1.0 | 16.7 | 17.5 | 650 | 0.25 |
| 1PMT5934BT1G | 34B | 22.8 | 24 | 25.2 | 15.6 | 1.0 | 18.2 | 19 | 700 | 0.25 |
| 1PMT5935BT1G | 35B | 25.65 | 27 | 28.35 | 13.9 | 1.0 | 20.6 | 23 | 700 | 0.25 |
| 1PMT5941BT1G | 41B | 44.65 | 47 | 49.35 | 8.0 | 1.0 | 35.8 | 67 | 1000 | 0.25 |

- Zener voltage is measured with the device junction in thermal equilibrium with an ambient temperature of 25°C .
- 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 $I_Z(\text{ac}) = 0.1 I_Z(\text{dc})$ with the ac frequency = 60 Hz .

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TYPICAL CHARACTERISTICS

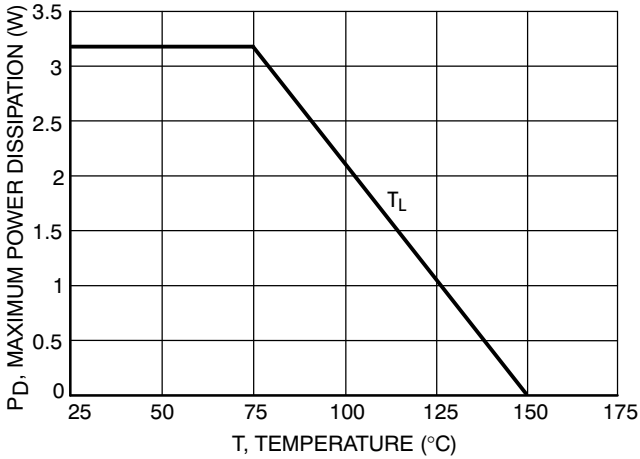


Figure 1. Steady State Power Derating

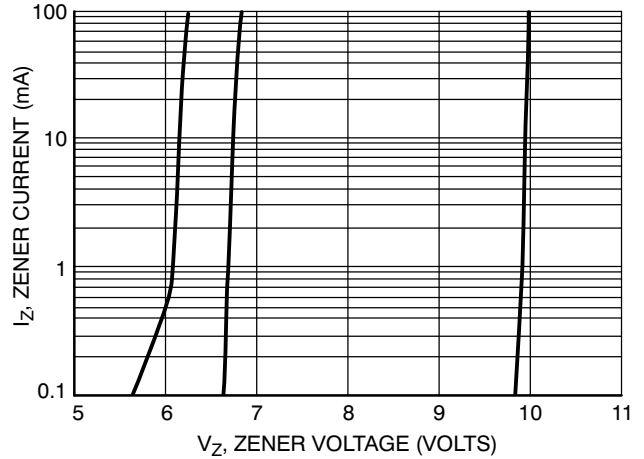


Figure 2. V_Z to 10 Volts

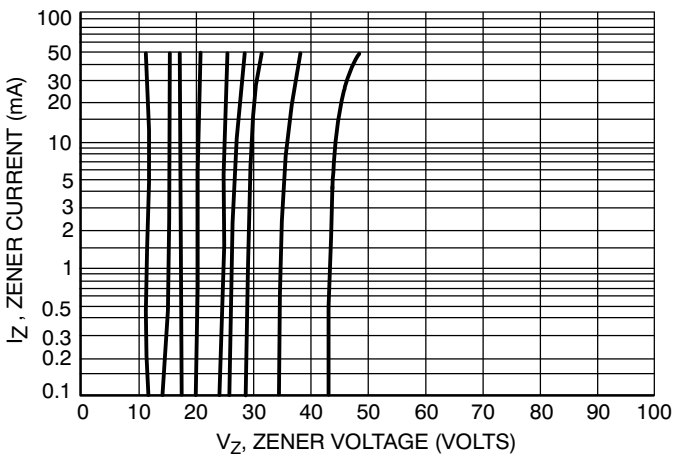


Figure 3. $V_Z = 12$ thru 47 Volts

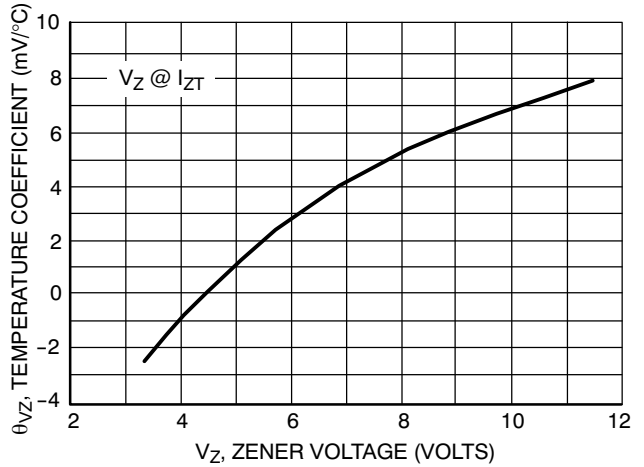


Figure 4. Zener Voltage - To 12 Volts

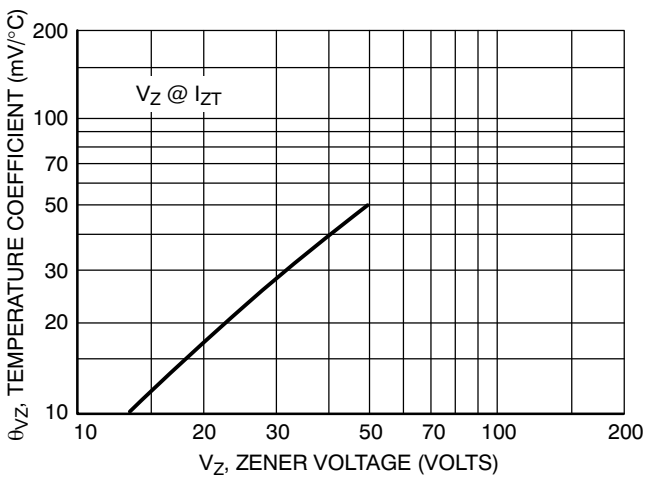


Figure 5. Zener Voltage - 14 To 47 Volts

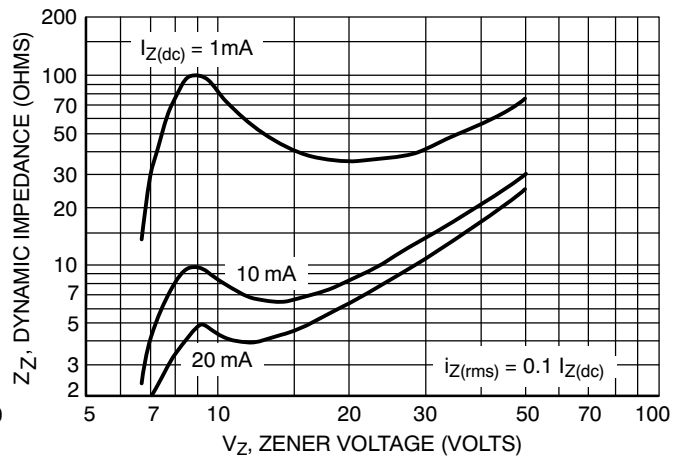


Figure 6. Effect of Zener Voltage

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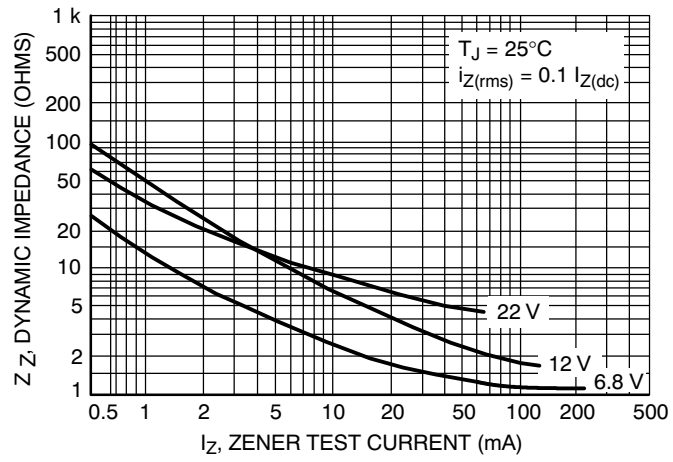


Figure 7. Effect of Zener Current

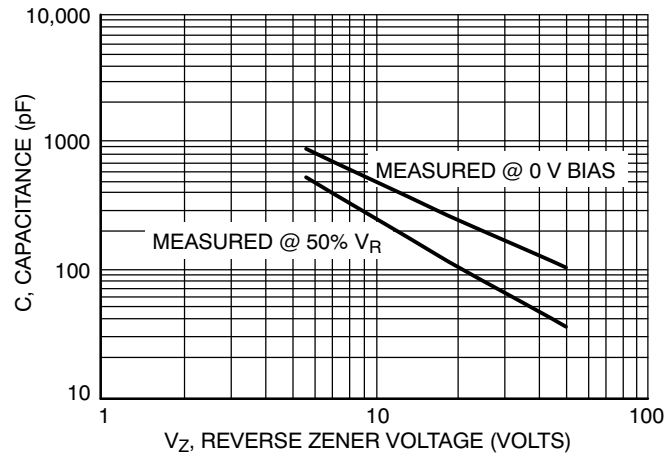
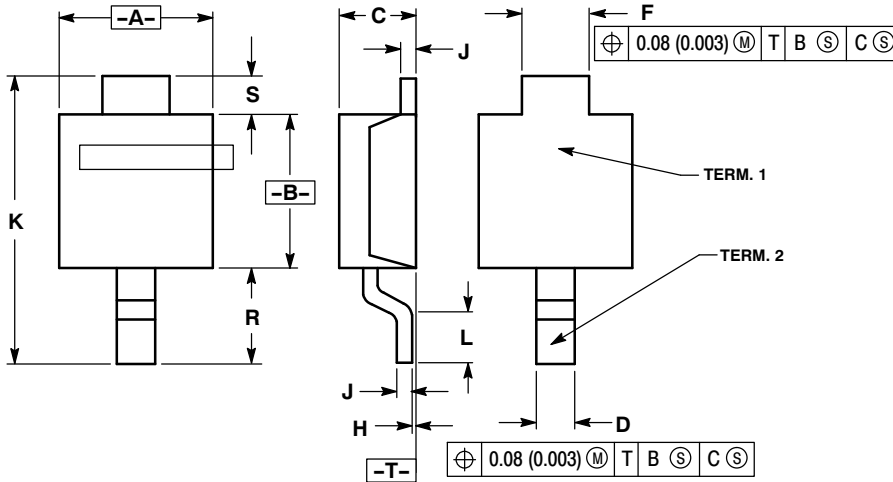


Figure 8. Capacitance versus Reverse Zener Voltage

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PACKAGE DIMENSIONS

POWERMITE®
CASE 457-04
ISSUE D

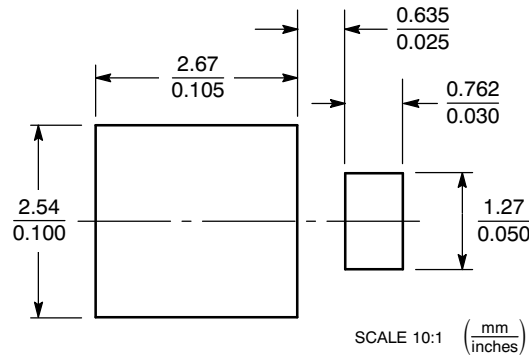


NOTES:

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.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|--------|
| | 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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