

# 1PMT5920B Series

## 3.2 Watt Plastic Surface Mount POWERMITE<sup>®</sup> 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  $\mu$ A
- 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<sup>2</sup>
- 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

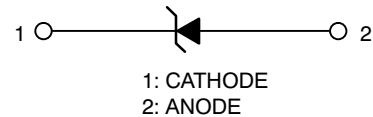
**MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:** 260°C for 10 Seconds



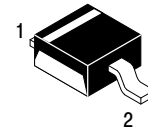
**ON Semiconductor<sup>®</sup>**

<http://onsemi.com>

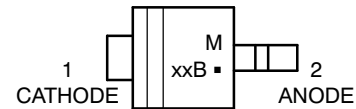
## PLASTIC SURFACE MOUNT 3.2 WATT ZENER DIODES 6.2 – 47 VOLTS



**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 <sup>†</sup> |
|--------------|------------------------|-----------------------|
| 1PMT59xxBT1G | POWERMITE<br>(Pb-Free) | 3000/Tape&Reel        |

<sup>†</sup>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.

# 1PMT5920B Series

## MAXIMUM RATINGS

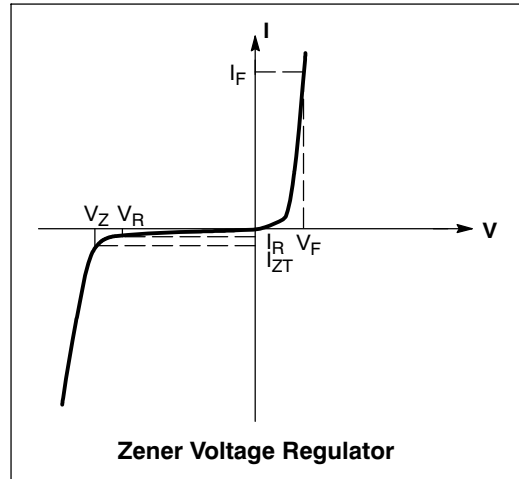
| Rating  | Symbol                                | Value       | Unit                           |
|---|---------------------------------------|-------------|--------------------------------|
| DC Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$                                 | 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)<br>Thermal Resistance from Junction-to-Tab (Cathode)  | $P_D$<br>$R_{\theta J\text{cathode}}$ | 3.2<br>23   | W<br>$^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range   | $T_J, T_{\text{stg}}$                 | -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,  $V_F = 1.5\text{ V Max.}$  @  $I_F = 200\text{ mA}$ dc 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,  $V_F = 1.25\text{ Volts}$  @  $200\text{ mA}$ )

| Device*      | Device Marking | Zener Voltage (Note 3) |     |       | $I_{ZT}$<br>(mA) | $I_R @ V_R$<br>( $\mu\text{A}$ ) | $V_R$<br>(V) | $Z_{ZT} @ I_{ZT}$<br>(Note 4)<br>( $\Omega$ ) | $Z_{ZK} @ I_{ZK}$<br>(Note 4)<br>( $\Omega$ ) | $I_{ZK}$<br>(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  $25^\circ\text{C}$ .
- 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 =  $60\text{ Hz}$ .

# 1PMT5920B Series

## TYPICAL CHARACTERISTICS

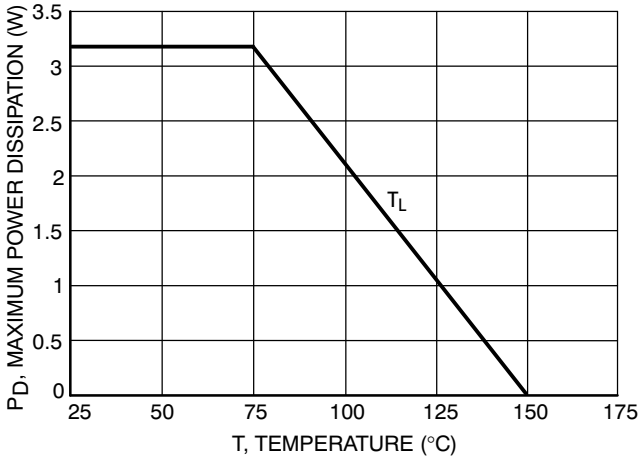


Figure 1. Steady State Power Derating

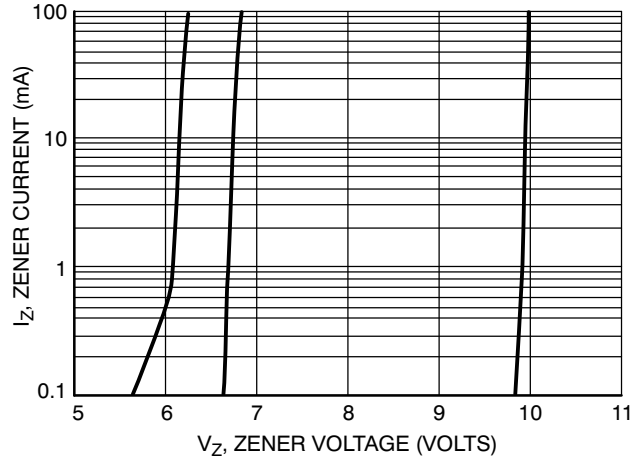


Figure 2.  $V_Z$  to 10 Volts

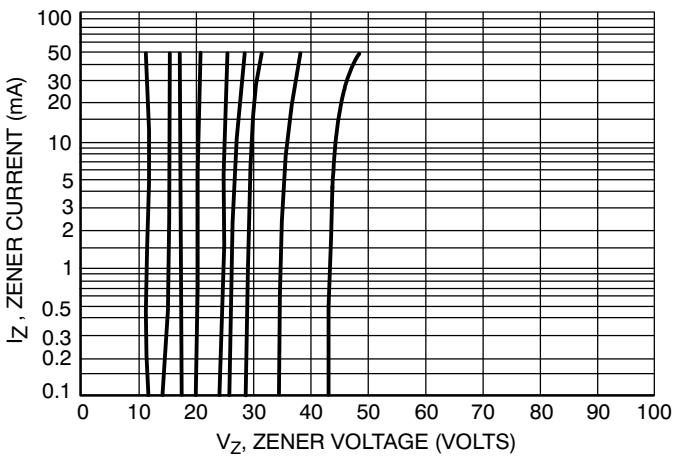


Figure 3.  $V_Z = 12$  thru 47 Volts

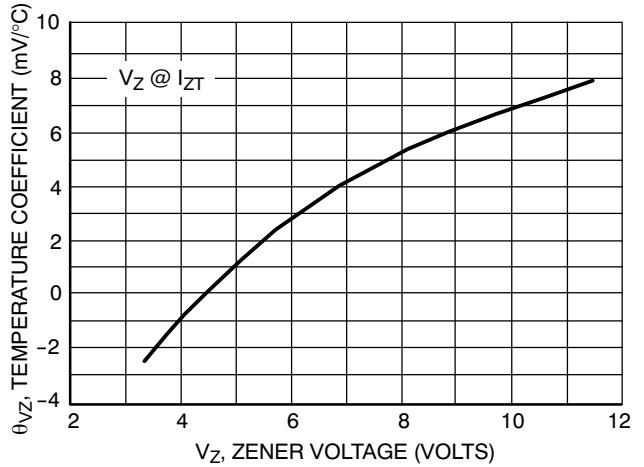


Figure 4. Zener Voltage - To 12 Volts

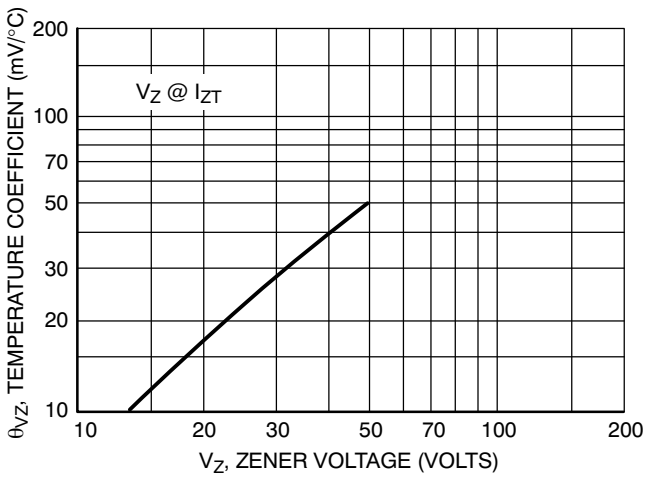


Figure 5. Zener Voltage - 14 To 47 Volts

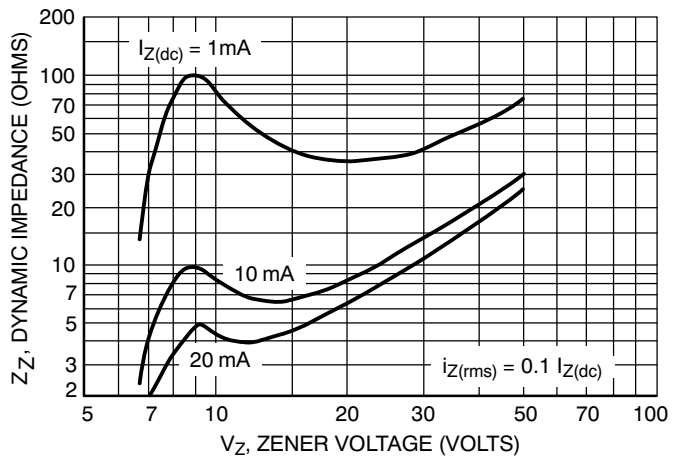


Figure 6. Effect of Zener Voltage

# 1PMT5920B Series

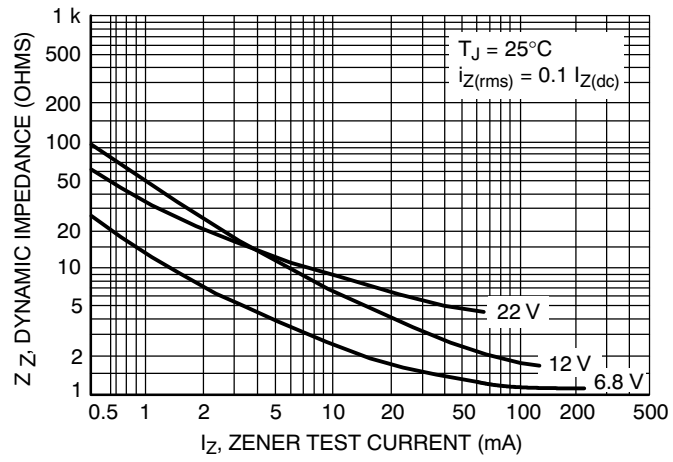


Figure 7. Effect of Zener Current

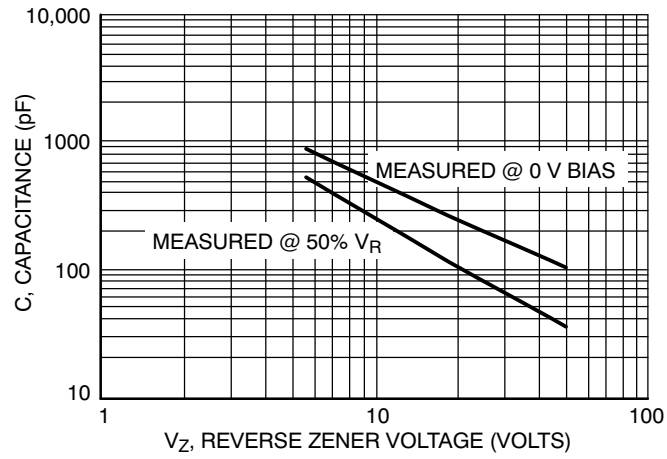
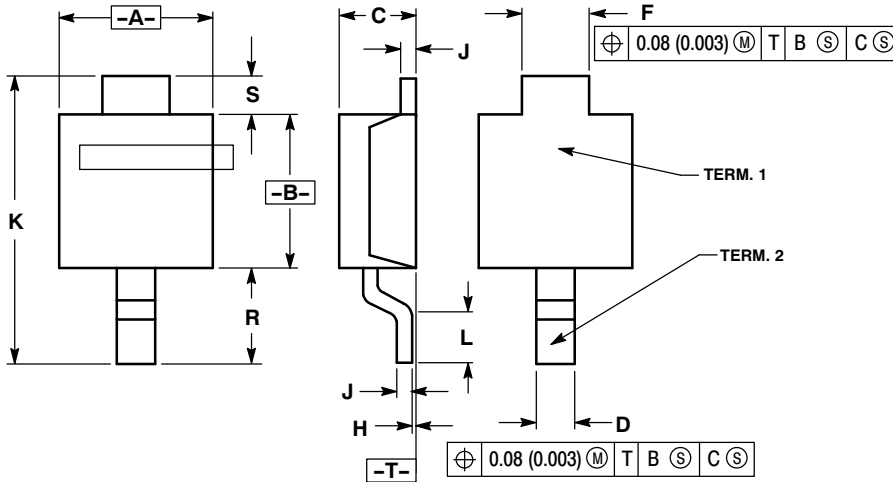


Figure 8. Capacitance versus Reverse Zener Voltage

# 1PMT5920B Series

## PACKAGE DIMENSIONS

POWERMITE®  
CASE 457-04  
ISSUE D

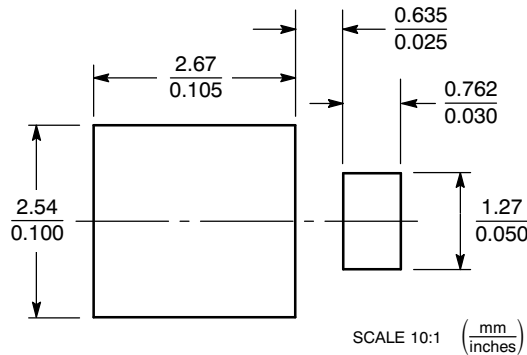


NOTES:

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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