

## 3.2 Watt Plastic Surface Mount POWERMITE Package

### 1PMT5920B Series

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
- These Devices are Pb-Free and are RoHS Compliant

#### Mechanical Characteristics

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

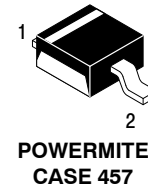
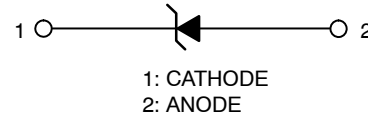
**FINISH:** All external surfaces are corrosion resistant and leads are readily solderable

**MOUNTING POSITION:** Any

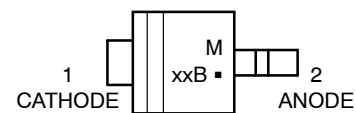
**MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:**

260°C for 10 Seconds

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



#### 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 &<br>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

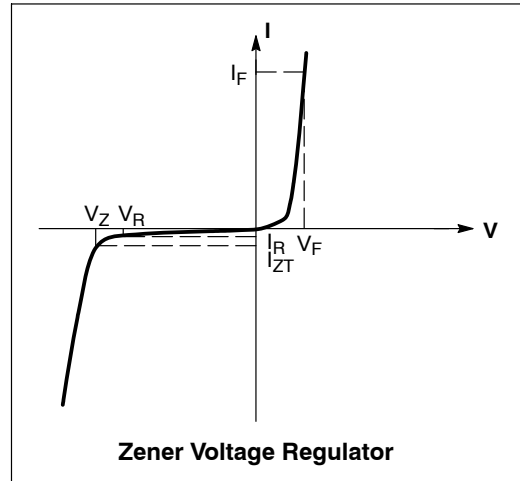
| Rating                                                                                      | Symbol                                 | Value       | Unit                                                    |
|---------------------------------------------------------------------------------------------|----------------------------------------|-------------|---------------------------------------------------------|
| 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<br>248  | $\text{mW}/^\circ\text{C}$<br>$^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Lead (Anode)                                                | $R_{\theta JA\text{anode}}$            | 35          | $^\circ\text{C}/\text{W}$                               |
| Maximum DC Power Dissipation (Note 2)<br>Thermal Resistance from Junction-to-Tab (Cathode)  | $P_D$<br>$R_{\theta JC\text{cathode}}$ | 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 those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

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



**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 <sub>ZT</sub> | I <sub>R</sub> @ V <sub>R</sub> | V <sub>R</sub> | Z <sub>ZT</sub> @ I <sub>ZT</sub><br>(Note 4) | Z <sub>ZK</sub> @ I <sub>ZK</sub><br>(Note 4) | I <sub>ZK</sub> |
|--------------|----------------|------------------------------------------|-----|-------|-----------------|---------------------------------|----------------|-----------------------------------------------|-----------------------------------------------|-----------------|
|              |                | V <sub>Z</sub> @ I <sub>ZT</sub> (Volts) |     |       |                 |                                 |                |                                               |                                               |                 |
|              |                | Min                                      | Nom | Max   | (mA)            | (μA)                            | (V)            | (Ω)                                           | (Ω)                                           | (mA)            |
| 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            |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

TYPICAL CHARACTERISTICS

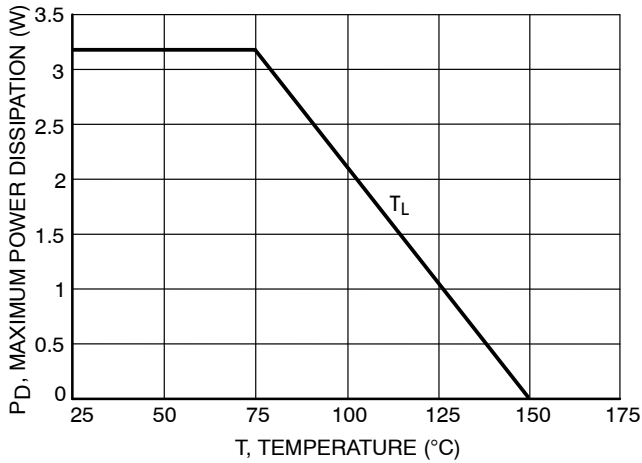


Figure 1. Steady State Power Derating

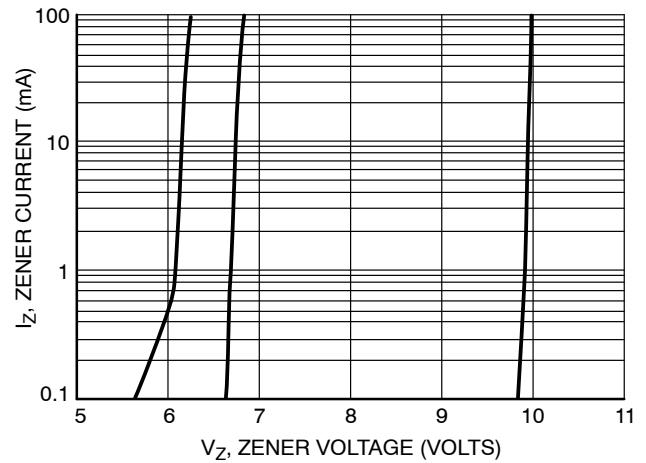


Figure 2.  $V_Z$  to 10 Volts

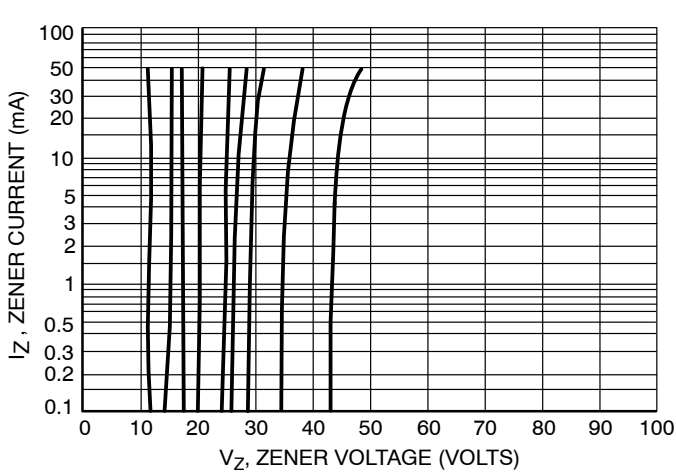


Figure 3.  $V_Z = 12$  thru 47 Volts

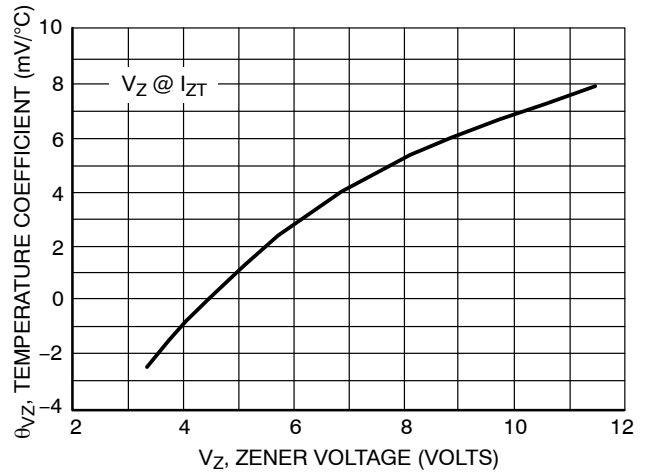


Figure 4. Zener Voltage - To 12 Volts

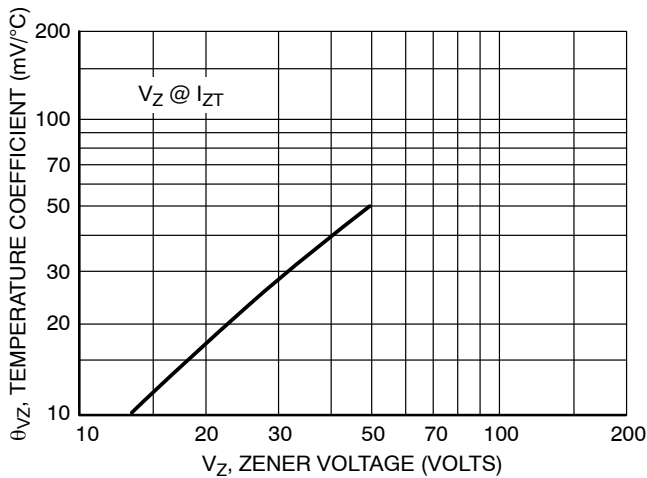


Figure 5. Zener Voltage - 14 To 47 Volts

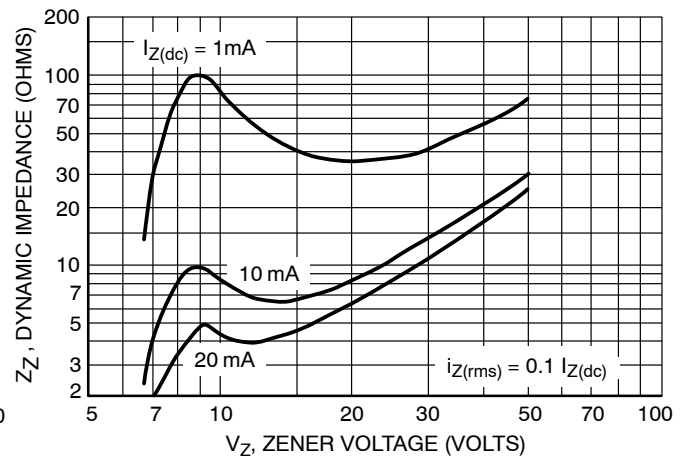


Figure 6. Effect of Zener Voltage

# 1PMT5920B Series

## TYPICAL CHARACTERISTICS

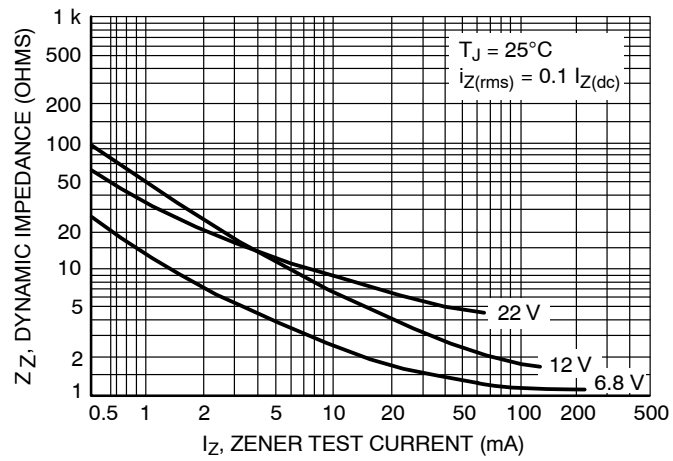


Figure 7. Effect of Zener Current

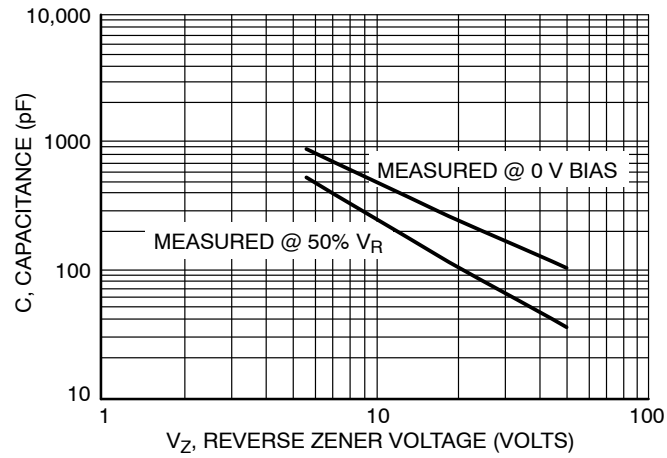
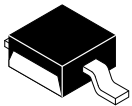


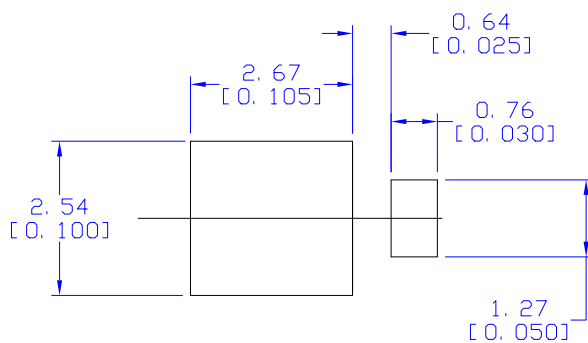
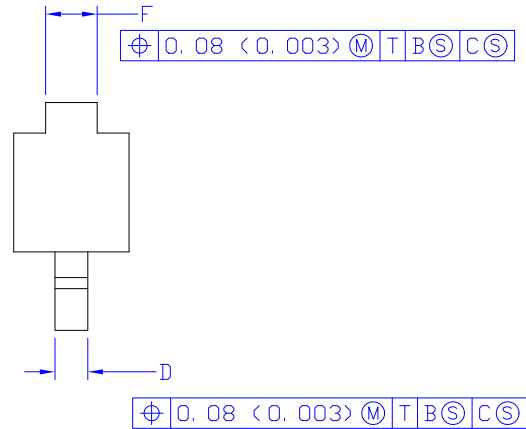
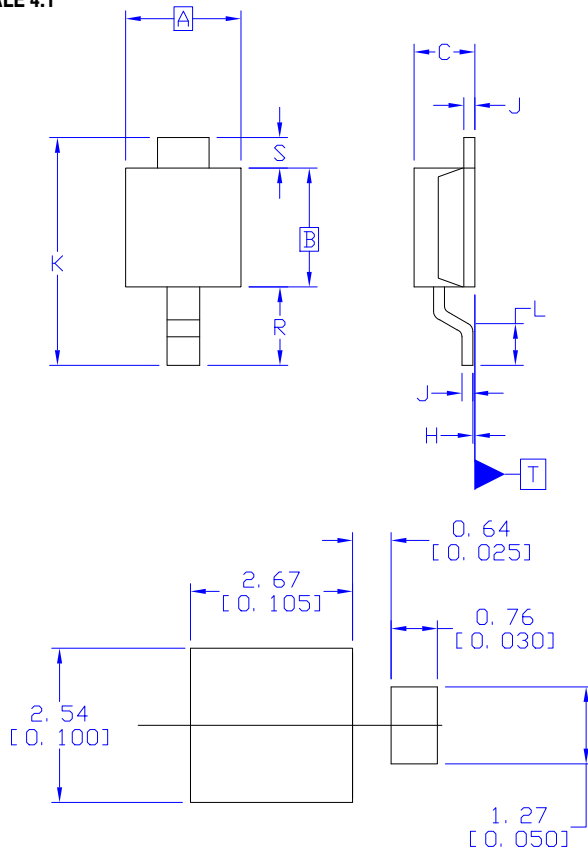
Figure 8. Capacitance versus Reverse Zener Voltage



SCALE 4:1

**POWERMITE**  
**CASE 457**  
**ISSUE G**

DATE 12 JAN 2022



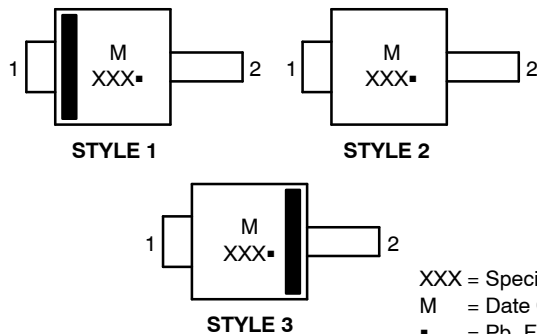
RECOMMENDED  
MOUNTING FOOTPRINT

| 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 |       |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.

**GENERIC  
MARKING DIAGRAMS\***



STYLE 1

STYLE 2

STYLE 3

XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

STYLE 1:  
PIN 1. CATHODE  
2. ANODE

STYLE 2:  
PIN 1. ANODE OR CATHODE  
2. CATHODE OR ANODE  
(BI-DIRECTIONAL)

STYLE 3:  
PIN 1. ANODE  
2. CATHODE

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

|                         |                    |                                                                                                                                                                                     |
|-------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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