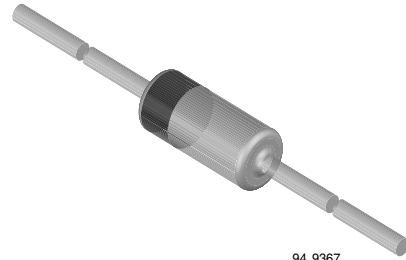


## Small Signal Zener Diodes

### Features

- Silicon Planar Power Zener Diodes
- Standard Zener voltage tolerance is  $\pm 5\%$
- These diodes are also available in Mini-MELF case with the type designation TZM5221 ...TZM5267, SOT-23 case with the type designation MMBZ5225 ...MMBZ5267 and SOD-123 case with the types designation MMSZ5225 ...MMSZ5267
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



94 9367

### Applications

- Voltage stabilization

### Mechanical Data

**Case:** DO-35 Glass case

**Weight:** approx. 125 mg

**Packaging codes/options:**

TAP / 10 k per Ammopack (52 mm tape), 30 k/box

TR / 10 k per 13" reel, 30 k/box

### Absolute Maximum Ratings

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

| Parameter         | Test condition                        | Symbol | Value     | Unit |
|-------------------|---------------------------------------|--------|-----------|------|
| Power dissipation | $T_L \leq 25\text{ }^{\circ}\text{C}$ | $P_V$  | 500       | mW   |
| Z-current         |                                       | $I_Z$  | $P_V/V_Z$ | mA   |

### Thermal Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

| Parameter                                  | Test condition                              | Symbol     | Value         | Unit               |
|--|---|------------|---------------|--------------------|
| Thermal resistance junction to ambient air | $l = 4\text{ mm}$ , $T_L = \text{constant}$ | $R_{thJA}$ | 300           | K/W                |
| Junction temperature                       |   | $T_j$      | 175           | $^{\circ}\text{C}$ |
| Storage temperature range                  |   | $T_{stg}$  | - 65 to + 175 | $^{\circ}\text{C}$ |

### Electrical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

| Parameter       | Test condition        | Symbol | Min | Typ. | Max | Unit |
|-----------------|-----------------------|--------|-----|------|-----|------|
| Forward voltage | $I_F = 200\text{ mA}$ | $V_F$  |     |      | 1.1 | V    |

# 1N5221B to 1N5267B



Vishay Semiconductors

## Electrical Characteristics

1N5221B...1N5267B

| Partnumber | Nominal Zener Voltage <sup>1)</sup> | Test Current | Maximum Dynamic Impedance <sup>1)</sup> | Maximum Dynamic Impedance | Typical Temperature of Coefficient | Maximum Reverse Leakage Current |          |
|------------|-------------------------------------|--------------|---|---------------------------|------------------------------------|---------------------------------|----------|
|            | at $I_{ZT}$ , $V_Z$                 |              |   |                           |                                    | $I_{RT}$                        | $V_{RT}$ |
|            | V                                   | mA           | $\Omega$                                | $\Omega$                  | $\alpha$ (%/K)                     | $\mu A$                         | V        |
| 1N5221B    | 2.4                                 | 20           | 30                                      | 1200                      | -0.085                             | 100                             | 1        |
| 1N5222B    | 2.5                                 | 20           | 30                                      | 1250                      | -0.085                             | 100                             | 1        |
| 1N5223B    | 2.7                                 | 20           | 30                                      | 1300                      | -0.080                             | 75                              | 1        |
| 1N5224B    | 2.8                                 | 20           | 30                                      | 1400                      | -0.080                             | 75                              | 1        |
| 1N5225B    | 3                                   | 20           | 29                                      | 1600                      | -0.075                             | 50                              | 1        |
| 1N5226B    | 3.3                                 | 20           | 28                                      | 1600                      | -0.070                             | 25                              | 1        |
| 1N5227B    | 3.6                                 | 20           | 24                                      | 1700                      | -0.065                             | 15                              | 1        |
| 1N5228B    | 3.9                                 | 20           | 23                                      | 1900                      | -0.060                             | 10                              | 1        |
| 1N5229B    | 4.3                                 | 20           | 22                                      | 2000                      | +0.055                             | 5                               | 1        |
| 1N5230B    | 4.7                                 | 20           | 19                                      | 1900                      | +0.030                             | 5                               | 2        |
| 1N5231B    | 5.1                                 | 20           | 17                                      | 1600                      | +0.030                             | 5                               | 2        |
| 1N5232B    | 5.6                                 | 20           | 11                                      | 1600                      | +0.038                             | 5                               | 3        |
| 1N5233B    | 6                                   | 20           | 7                                       | 1600                      | +0.038                             | 5                               | 3.5      |
| 1N5234B    | 6.2                                 | 20           | 7                                       | 1000                      | +0.045                             | 5                               | 4        |
| 1N5235B    | 6.8                                 | 20           | 5                                       | 750                       | +0.050                             | 3                               | 5        |
| 1N5236B    | 7.5                                 | 20           | 6                                       | 500                       | +0.058                             | 3                               | 6        |
| 1N5237B    | 8.2                                 | 20           | 8                                       | 500                       | +0.062                             | 3                               | 6.5      |
| 1N5238B    | 8.7                                 | 20           | 8                                       | 600                       | +0.065                             | 3                               | 6.5      |
| 1N5239B    | 9.1                                 | 20           | 10                                      | 600                       | +0.068                             | 3                               | 7        |
| 1N5240B    | 10                                  | 20           | 17                                      | 600                       | +0.075                             | 3                               | 8        |
| 1N5241B    | 11                                  | 20           | 22                                      | 600                       | +0.076                             | 2                               | 8.4      |
| 1N5242B    | 12                                  | 20           | 30                                      | 600                       | +0.077                             | 1                               | 9.1      |
| 1N5243B    | 13                                  | 9.5          | 13                                      | 600                       | +0.079                             | 0.5                             | 9.9      |
| 1N5244B    | 14                                  | 9            | 15                                      | 600                       | +0.082                             | 0.1                             | 10       |
| 1N5245B    | 15                                  | 8.5          | 16                                      | 600                       | +0.082                             | 0.1                             | 11       |
| 1N5246B    | 16                                  | 7.8          | 17                                      | 600                       | +0.083                             | 0.1                             | 12       |
| 1N5247B    | 17                                  | 7.4          | 19                                      | 600                       | +0.084                             | 0.1                             | 13       |
| 1N5248B    | 18                                  | 7            | 21                                      | 600                       | +0.085                             | 0.1                             | 14       |
| 1N5249B    | 19                                  | 6.6          | 23                                      | 600                       | +0.086                             | 0.1                             | 14       |
| 1N5250B    | 20                                  | 6.2          | 25                                      | 600                       | +0.086                             | 0.1                             | 15       |
| 1N5251B    | 22                                  | 5.6          | 29                                      | 600                       | +0.087                             | 0.1                             | 17       |
| 1N5252B    | 24                                  | 5.2          | 33                                      | 600                       | +0.088                             | 0.1                             | 18       |
| 1N5253B    | 25                                  | 5            | 35                                      | 600                       | +0.089                             | 0.1                             | 19       |
| 1N5254B    | 27                                  | 4.6          | 41                                      | 600                       | +0.090                             | 0.1                             | 21       |
| 1N5255B    | 28                                  | 4.5          | 44                                      | 600                       | +0.091                             | 0.1                             | 21       |
| 1N5256B    | 30                                  | 4.2          | 49                                      | 600                       | +0.091                             | 0.1                             | 23       |
| 1N5257B    | 33                                  | 3.8          | 58                                      | 700                       | +0.092                             | 0.1                             | 25       |
| 1N5258B    | 36                                  | 3.4          | 70                                      | 700                       | +0.093                             | 0.1                             | 27       |
| 1N5259B    | 39                                  | 3.2          | 80                                      | 800                       | +0.094                             | 0.1                             | 30       |
| 1N5260B    | 43                                  | 3            | 93                                      | 900                       | +0.095                             | 0.1                             | 33       |
| 1N5261B    | 47                                  | 2.7          | 105                                     | 1000                      | +0.095                             | 0.1                             | 36       |
| 1N5262B    | 51                                  | 2.5          | 125                                     | 1100                      | +0.096                             | 0.1                             | 39       |
| 1N5263B    | 56                                  | 2.2          | 150                                     | 1300                      | +0.096                             | 0.1                             | 43       |
| 1N5264B    | 60                                  | 2.1          | 170                                     | 1400                      | +0.097                             | 0.1                             | 46       |

| Partnumber | Nominal Zener Voltage <sup>1)</sup> | Test Current | Maximum Dynamic Impedance <sup>1)</sup> | Maximum Dynamic Impedance | Typical Temperature of Coefficient | Maximum Reverse Leakage Current |       |
|------------|-------------------------------------|--------------|---|---------------------------|------------------------------------|---------------------------------|-------|
|            | at $I_{ZT}$ , $V_Z$                 |              |   |                           |                                    | $I_{RT}$                        | $V_R$ |
|            | V                                   | mA           | $\Omega$                                | $\Omega$                  | $\alpha$ (%/K)                     | $\mu A$                         | V     |
| 1N5265B    | 62                                  | 2            | 185                                     | 1400                      | + 0.097                            | 0.1                             | 47    |
| 1N5266B    | 68                                  | 1.8          | 230                                     | 1600                      | + 0.097                            | 0.1                             | 52    |
| 1N5267B    | 75                                  | 1.7          | 270                                     | 1700                      | + 0.098                            | 0.1                             | 56    |

<sup>1)</sup> Based on dc-measurement at thermal equilibrium; lead length = 9.5 (3/8 "); thermal resistance of heat sink = 30 K/W

## Typical Characteristics (Tamb = 25 °C unless otherwise specified)

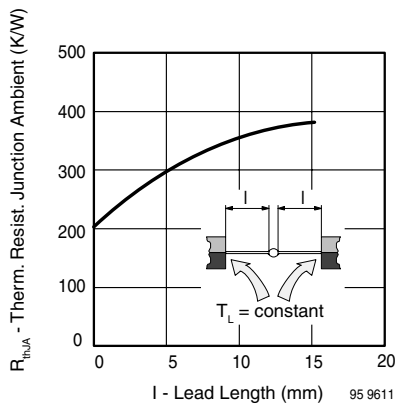


Figure 1. Thermal Resistance vs. Lead Length

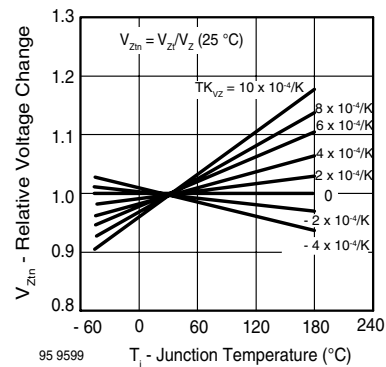


Figure 3. Typical Change of Working Voltage vs. Junction Temperature

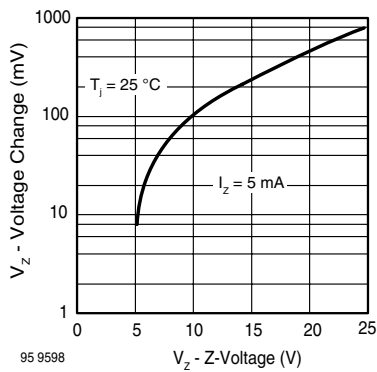


Figure 2. Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25 \text{ }^\circ\text{C}$

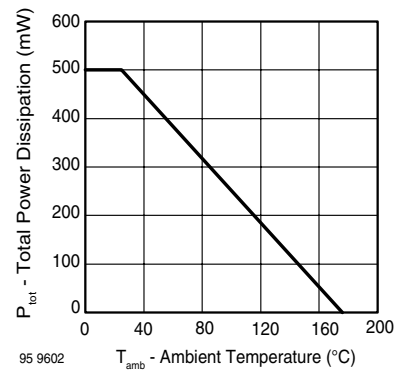


Figure 4. Total Power Dissipation vs. Ambient Temperature

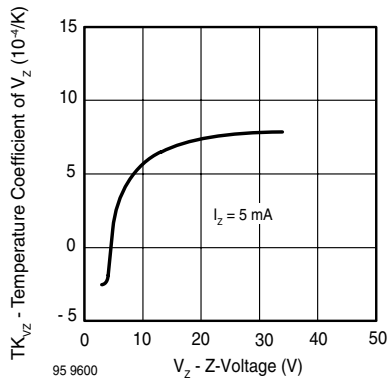


Figure 5. Temperature Coefficient of Vz vs. Z-Voltage

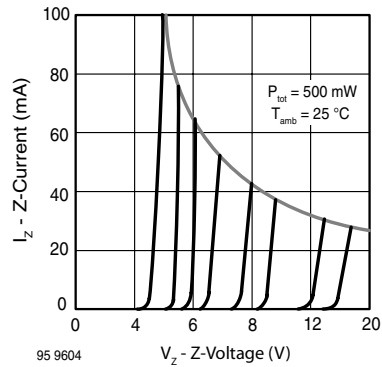


Figure 8. Z-Current vs. Z-Voltage

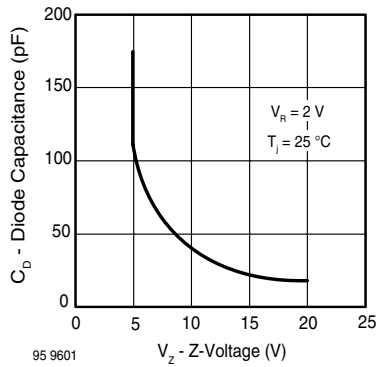


Figure 6. Diode Capacitance vs. Z-Voltage

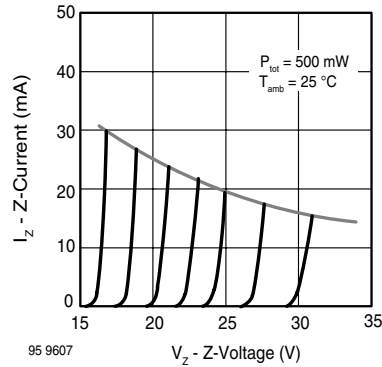


Figure 9. Z-Current vs. Z-Voltage

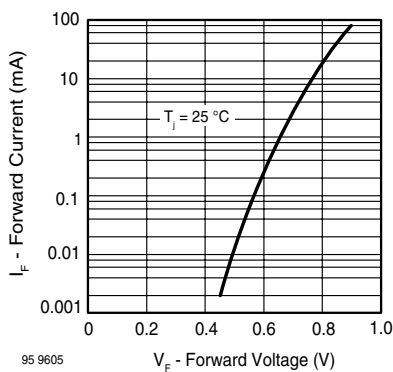


Figure 7. Forward Current vs. Forward Voltage

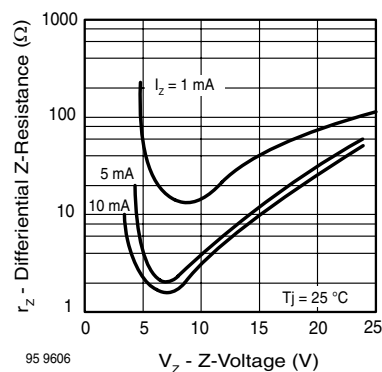


Figure 10. Differential Z-Resistance vs. Z-Voltage

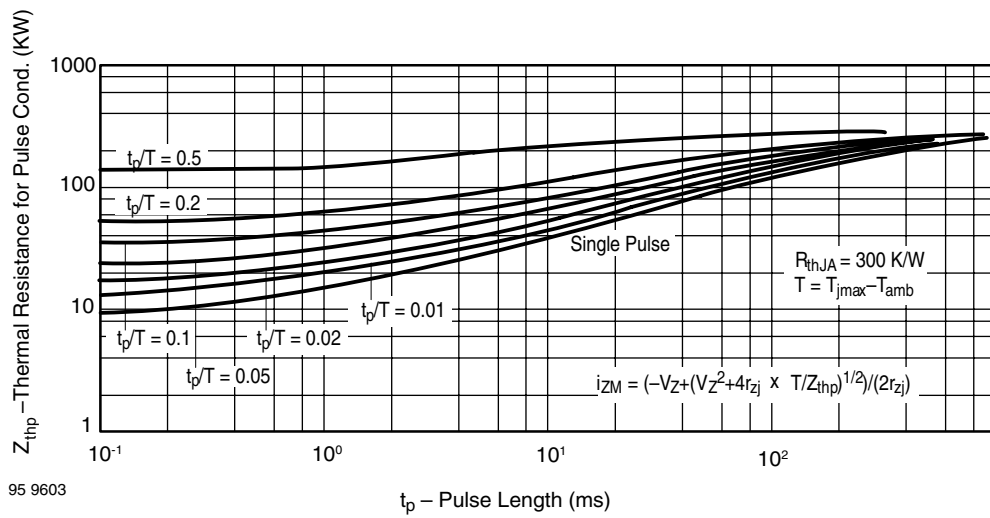
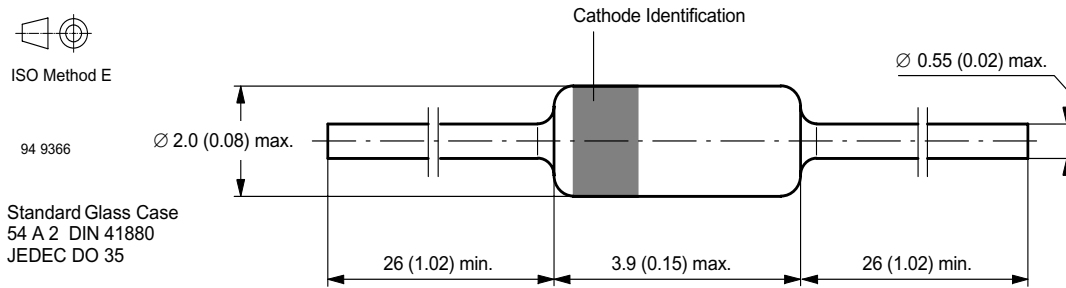


Figure 11. Thermal Response

## Package Dimensions in mm (Inches)



### Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design  
and may do so without further notice.

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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



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