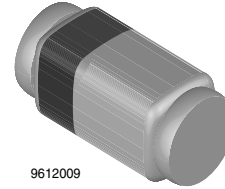


## Small Signal Zener Diodes

### Features

- Zener voltage specified at 50  $\mu$ A
- Maximum delta  $V_Z$  given from 10  $\mu$ A to 100  $\mu$ A
- Very high stability
- Low noise
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



9612009

### Applications

- Voltage stabilization

### Packaging Codes/Options:

GS08 / 2.5 k per 7" reel 12.5 k/box

### Mechanical Data

**Case:** QuadroMELF Glass case SOD80

**Weight:** approx. 34 mg

### Absolute Maximum Ratings

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

| Parameter                 | Test condition                 | Symbol    | Value         | Unit               |
|---------------------------|--------------------------------|-----------|---------------|--------------------|
| Power dissipation         | $R_{thJA} \leq 300\text{ K/W}$ | $P_{tot}$ | 500           | mW                 |
| Z-current                 |                                | $I_Z$     | $P_{tot}/V_Z$ | mA                 |
| Junction temperature      |                                | $T_j$     | 175           | $^{\circ}\text{C}$ |
| Storage temperature range |                                | $T_{stg}$ | - 65 to + 175 | $^{\circ}\text{C}$ |

### Thermal Characteristics

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

| Parameter               | Test condition                     | Symbol     | Value | Unit |
|-------------------------|------------------------------------|------------|-------|------|
| Junction to ambient air | on PC board 50 mm x 50 mm x 1.6 mm | $R_{thJA}$ | 500   | K/W  |

### Electrical Characteristics

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

| Parameter       | Test condition        | Symbol | Min | Typ. | Max | Unit |
|-----------------|-----------------------|--------|-----|------|-----|------|
| Forward voltage | $I_F = 100\text{ mA}$ | $V_F$  |     |      | 1.5 | V    |

### Electrical Characteristics

| Partnumber | Zener Voltage                   |       |       | Max. Zener Current | Max. Voltage Change | Max. Reverse Current | Test Voltage |
|------------|---------------------------------|-------|-------|--------------------|---------------------|----------------------|--------------|
|            | $V_Z$ at $I_Z = 50 \mu\text{A}$ |       |       |                    |                     |                      |              |
|            | typ <sup>1)</sup>               | min   | max   | mA                 | V                   | $\mu\text{A}$        | V            |
| TZS4678    | 1.8                             | 1.71  | 1.89  | 120                | 0.7                 | 7.5                  | 1            |
| TZS4679    | 2                               | 1.9   | 2.1   | 110                | 0.7                 | 5                    | 1            |
| TZS4680    | 2.2                             | 2.09  | 2.31  | 100                | 0.75                | 4                    | 1            |
| TZS4681    | 2.4                             | 2.28  | 2.52  | 95                 | 0.80                | 2                    | 1            |
| TZS4682    | 2.7                             | 2.565 | 2.835 | 90                 | 0.85                | 1                    | 1            |
| TZS4683    | 3                               | 2.85  | 3.15  | 85                 | 0.90                | 0.80                 | 1            |
| TZS4684    | 3.3                             | 3.135 | 3.465 | 80                 | 0.95                | 7.5                  | 1.5          |
| TZS4685    | 3.6                             | 3.42  | 3.78  | 75                 | 0.95                | 7.5                  | 2            |
| TZS4686    | 3.9                             | 3.705 | 4.095 | 70                 | 0.97                | 5                    | 2            |
| TZS4687    | 4.3                             | 4.085 | 4.515 | 65                 | 0.99                | 4                    | 2            |
| TZS4688    | 4.7                             | 4.465 | 4.935 | 60                 | 0.99                | 10                   | 3            |
| TZS4689    | 5.1                             | 4.845 | 5.355 | 55                 | 0.97                | 10                   | 3            |
| TZS4690    | 5.6                             | 5.32  | 5.88  | 50                 | 0.96                | 10                   | 4            |
| TZS4691    | 6.2                             | 5.89  | 6.51  | 45                 | 0.95                | 10                   | 5            |
| TZS4692    | 6.8                             | 6.46  | 7.14  | 35                 | 0.90                | 10                   | 5.1          |
| TZS4693    | 7.5                             | 7.125 | 7.875 | 31.8               | 0.75                | 10                   | 5.7          |
| TZS4694    | 8.2                             | 7.79  | 8.61  | 29                 | 0.5                 | 1                    | 6.2          |
| TZS4695    | 8.7                             | 8.265 | 9.135 | 27.4               | 0.1                 | 1                    | 6.6          |
| TZS4696    | 9.1                             | 8.645 | 9.555 | 26.2               | 0.08                | 1                    | 6.9          |
| TZS4697    | 10                              | 9.5   | 10.5  | 24.8               | 0.1                 | 1                    | 7.6          |
| TZS4698    | 11                              | 10.45 | 11.55 | 21.6               | 0.11                | 0.05                 | 8.4          |
| TZS4699    | 12                              | 11.4  | 12.6  | 20.4               | 0.12                | 0.05                 | 9.1          |
| TZS4700    | 13                              | 12.35 | 13.65 | 19                 | 0.13                | 0.05                 | 9.8          |
| TZS4701    | 14                              | 13.3  | 14.7  | 17.5               | 0.14                | 0.05                 | 10.6         |
| TZS4702    | 15                              | 14.25 | 15.75 | 16.3               | 0.15                | 0.05                 | 11.4         |
| TZS4703    | 16                              | 15.2  | 16.8  | 15.4               | 0.16                | 0.05                 | 12.1         |
| TZS4704    | 17                              | 16.15 | 17.85 | 14.5               | 0.17                | 0.05                 | 12.9         |
| TZS4705    | 18                              | 17.1  | 18.9  | 13.2               | 0.18                | 0.05                 | 13.6         |
| TZS4706    | 19                              | 18.05 | 19.95 | 12.5               | 0.19                | 0.05                 | 14.4         |
| TZS4707    | 20                              | 19    | 21    | 11.9               | 0.2                 | 0.01                 | 15.2         |
| TZS4708    | 22                              | 20.9  | 23.1  | 10.8               | 0.22                | 0.01                 | 16.7         |
| TZS4709    | 24                              | 22.8  | 25.2  | 9.9                | 0.24                | 0.01                 | 18.2         |
| TZS4710    | 25                              | 23.75 | 26.25 | 9.5                | 0.25                | 0.01                 | 19           |
| TZS4711    | 27                              | 25.65 | 28.35 | 8.8                | 0.27                | 0.01                 | 20.4         |
| TZS4712    | 28                              | 26.6  | 29.4  | 8.5                | 0.28                | 0.01                 | 21.2         |
| TZS4713    | 30                              | 28.5  | 31.5  | 7.9                | 0.3                 | 0.01                 | 22.8         |
| TZS4714    | 33                              | 31.35 | 34.65 | 7.2                | 0.33                | 0.01                 | 25           |
| TZS4715    | 36                              | 34.2  | 37.8  | 6.6                | 0.36                | 0.01                 | 27.3         |
| TZS4716    | 39                              | 37.05 | 40.95 | 6.1                | 0.39                | 0.01                 | 29.6         |
| TZS4717    | 43                              | 40.85 | 45.15 | 5.5                | 0.43                | 0.01                 | 32.6         |

<sup>1)</sup> Tolerancing and voltage designation ( $V_Z$ ). The type numbers shown have a standard tolerance of  $\pm 5\%$  on the nominal zener voltage.

<sup>2)</sup> Maximum zener current ratings ( $I_{ZM}$ ). Maximum zener current ratings are based on maximum zener voltage of the individual units.

<sup>3)</sup> Reverse leakage current ( $I_R$ ). Reverse leakage currents are guaranteed and measured at  $V_R$  as shown on the table.

<sup>4)</sup> Maximum voltage change ( $\Delta V_Z$ ). Voltage change is equal to the difference between  $V_Z$  at  $100 \mu\text{A}$  and  $V_Z$  at  $10 \mu\text{A}$ .

## Typical Characteristics

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

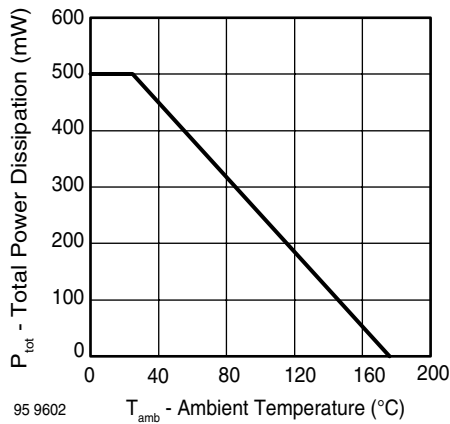


Figure 1. Total Power Dissipation vs. Ambient Temperature

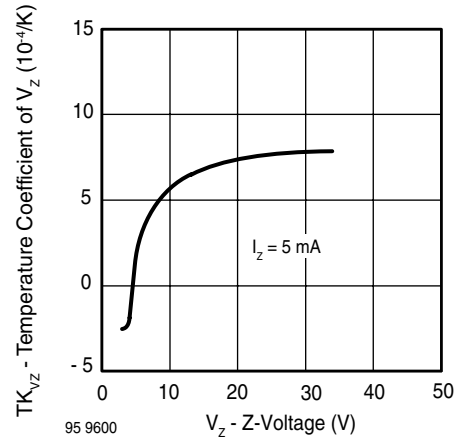


Figure 4. Temperature Coefficient of  $V_z$  vs. Z-Voltage

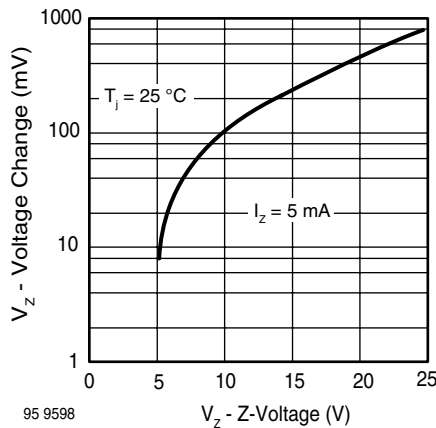


Figure 2. Typical Change of Working Voltage under Operating Conditions at  $T_{amb}=25\text{ }^{\circ}\text{C}$

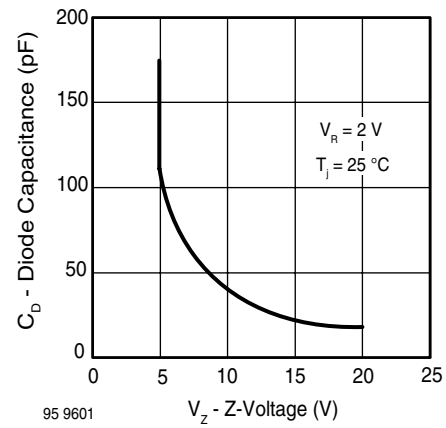


Figure 5. Diode Capacitance vs. Z-Voltage

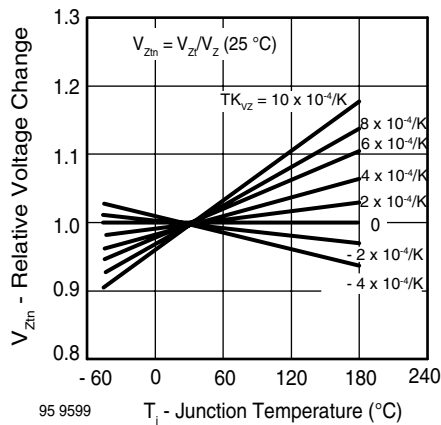


Figure 3. Typical Change of Working Voltage vs. Junction Temperature

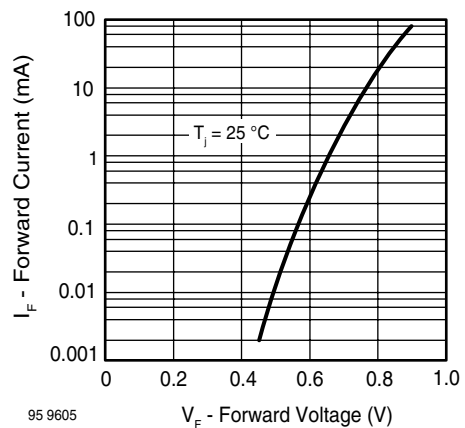


Figure 6. Forward Current vs. Forward Voltage

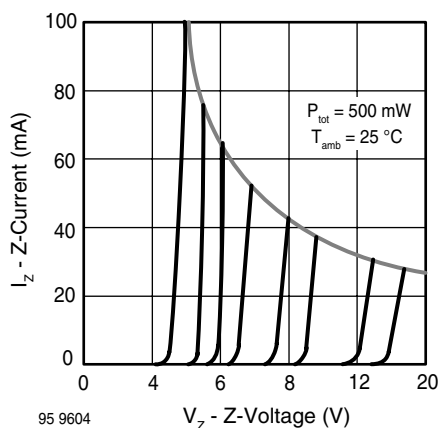


Figure 7. Z-Current vs. Z-Voltage

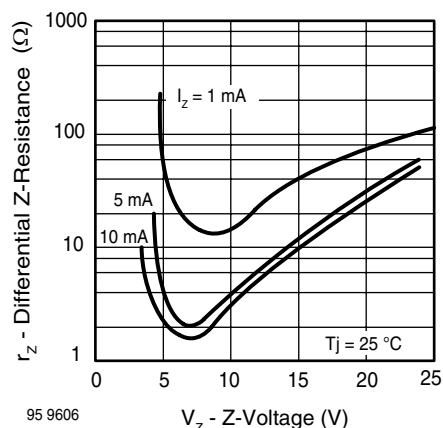


Figure 9. Differential Z-Resistance vs. Z-Voltage

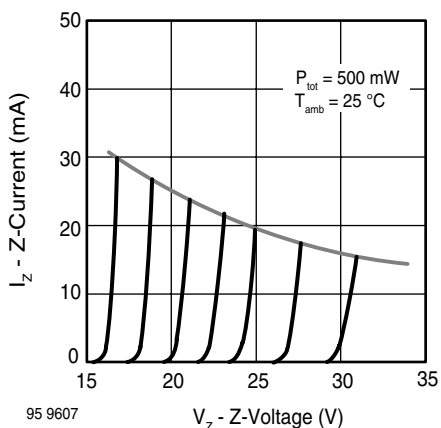


Figure 8. Z-Current vs. Z-Voltage

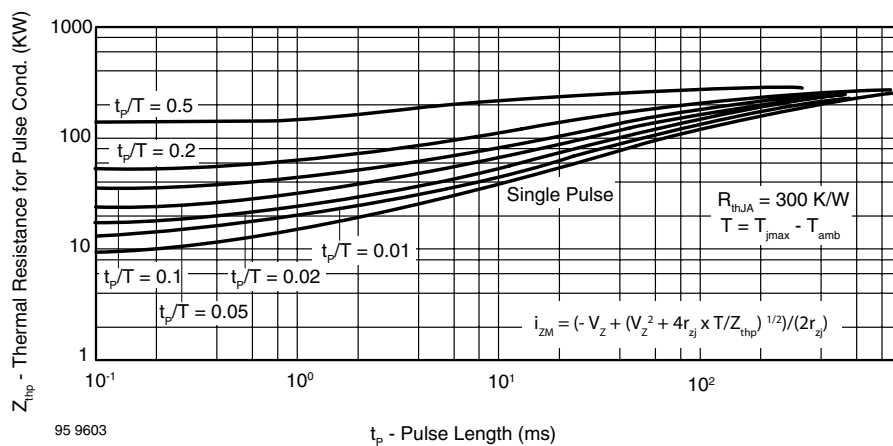
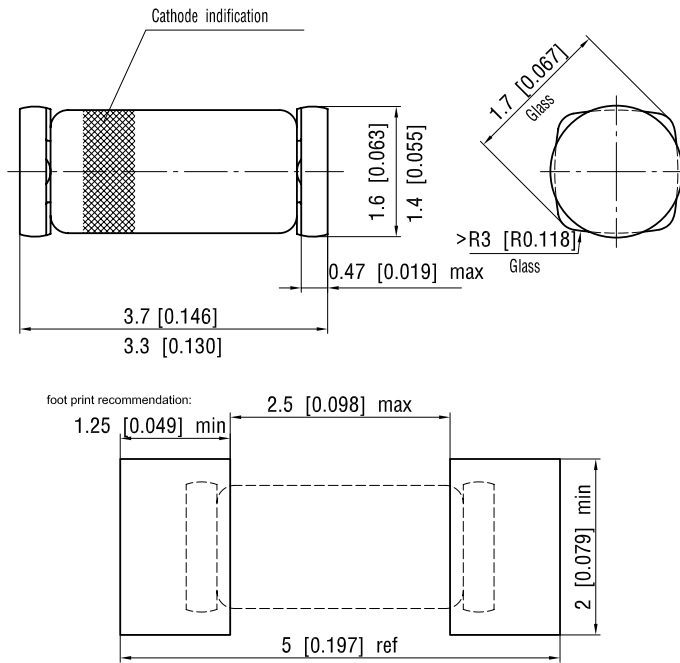


Figure 10. Thermal Response

## Package Dimensions in mm (Inches)



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### 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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