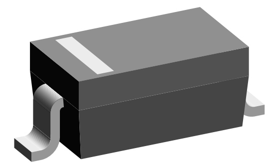
# Small Signal Zener Diodes

## Features

- Silicon planar Zener diodes
- Standard Zener voltage tolerance is ± 5 %.
- High temperature soldering guaranteed: 260 °C/4x10 s set terminals
- These diodes are also available in DO35 case with the type designation 1N4681...1N4717 and SOT23 case with the type designation MMBZ4681-V... MMBZ4717-V
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC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## Mechanical Data

**Case:** SOD123 plastic case

**Weight:** approx. 9.3 mg

**Packaging codes/options:**

GS18/10K per 13" reel (8 mm tape), 10K/box

GS08/3K per 7" reel (8 mm tape), 15K/box

## Absolute Maximum Ratings

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test conditions | Symbol | Value | Unit |
|---|---|---|---|---|
| Zener current (see Table "Characteristics") | | | | |
| Power dissipation | $T_L$ = 75 °C | $P_{tot}$ | 500 [1)] | mW |

**Note**

1) On FR - 4 or FR - 5 board with minimum recommended solder pad layout

## Thermal Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test conditions | Symbol | Value | Unit |
|---|---|---|---|---|
| Thermal resistance junction to ambient air | | $R_{thJA}$ | 340 [1)] | K/W |
| Maximum junction temperature | | $T_j$ | 150 | °C |
| Storage temperature range | | $T_{stg}$ | - 55 to + 150 | °C |

**Note**

1) On FR - 4 or FR - 5 board with minimum recommended solder pad layout

## Electrical Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

Maximum $V_F$ = 0.9 V at $I_F$ = 10 mA

| Partnumber | Marking code | Zener voltage [1) ] | | | Max. reverse current | Test voltage |
|---|---|---|---|---|---|---|
| | | $V_Z$ at $I_{ZT}$ = 50 µA | | | $I_R$ | $V_R$ |
| | | V | | | µA | V |
| | | typ. | min. | max. | | |
| MMSZ4681-V | CF | 2.4 | 2.28 | 2.52 | 2 | 1 |
| MMSZ4682-V | CH | 2.7 | 2.57 | 2.84 | 1 | 1 |
| MMSZ4683-V | CJ | 3 | 2.85 | 3.15 | 0.8 | 1 |
| MMSZ4684-V | CK | 3.3 | 3.14 | 3.47 | 7.5 | 1.5 |
| MMSZ4685-V | CM | 3.6 | 3.42 | 3.78 | 7.5 | 2 |
| MMSZ4686-V | CN | 3.9 | 3.71 | 4.1 | 5 | 2 |
| MMSZ4687-V | CP | 4.3 | 4.09 | 4.52 | 4 | 2 |
| MMSZ4688-V | CT | 4.7 | 4.47 | 4.94 | 10 | 3 |
| MMSZ4689-V | CU | 5.1 | 4.85 | 5.36 | 10 | 3 |
| MMSZ4690-V | CV | 5.6 | 5.32 | 5.88 | 10 | 4 |
| MMSZ4691-V | CA | 6.2 | 5.89 | 6.51 | 10 | 5 |
| MMSZ4692-V | CX | 6.8 | 6.46 | 7.14 | 10 | 5.1 |
| MMSZ4693-V | CY | 7.5 | 7.13 | 7.88 | 10 | 5.7 |
| MMSZ4694-V | CZ | 8.2 | 7.79 | 8.61 | 1 | 6.2 |
| MMSZ4695-V | DC | 8.7 | 8.27 | 9.14 | 1 | 6.6 |
| MMSZ4696-V | DD | 9.1 | 8.65 | 9.56 | 1 | 6.9 |
| MMSZ4697-V | DE | 10 | 9.5 | 10.5 | 1 | 7.6 |
| MMSZ4698-V | DF | 11 | 10.5 | 11.6 | 0.05 | 8.4 |
| MMSZ4699-V | DH | 12 | 11.4 | 12.6 | 0.05 | 9.1 |
| MMSZ4700-V | DJ | 13 | 12.4 | 13.7 | 0.05 | 9.8 |
| MMSZ4701-V | DK | 14 | 13.3 | 14.7 | 0.05 | 10.6 |
| MMSZ4702-V | DM | 15 | 14.3 | 15.8 | 0.05 | 11.4 |
| MMSZ4703-V | DN | 16 | 15.2 | 16.8 | 0.05 | 12.1 |
| MMSZ4704-V | DP | 17 | 16.2 | 17.9 | 0.05 | 12.9 |
| MMSZ4705-V | DT | 18 | 17.1 | 18.9 | 0.05 | 13.6 |
| MMSZ4706-V | DU | 19 | 18.1 | 20 | 0.05 | 14.4 |
| MMSZ4707-V | DV | 20 | 19 | 21 | 0.01 | 15.2 |
| MMSZ4708-V | DA | 22 | 20.9 | 23.1 | 0.01 | 16.7 |
| MMSZ4709-V | DZ | 24 | 22.8 | 25.2 | 0.01 | 18.2 |
| MMSZ4710-V | DY | 25 | 23.8 | 26.3 | 0.01 | 19 |
| MMSZ4711-V | EA | 27 | 25.7 | 28.4 | 0.01 | 20.4 |
| MMSZ4712-V | EC | 28 | 26.6 | 29.4 | 0.01 | 21.2 |
| MMSZ4713-V | ED | 30 | 28.5 | 31.5 | 0.01 | 22.8 |
| MMSZ4714-V | EE | 33 | 31.4 | 34.7 | 0.01 | 25 |
| MMSZ4715-V | EF | 36 | 34.2 | 37.8 | 0.01 | 27.3 |
| MMSZ4716-V | EH | 39 | 37.1 | 41 | 0.01 | 29.6 |
| MMSZ4717-V | EJ | 43 | 40.9 | 45.2 | 0.01 | 32.6 |

**Note**

[1)] Measured with device junction in thermal equilibrium

## Typical Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

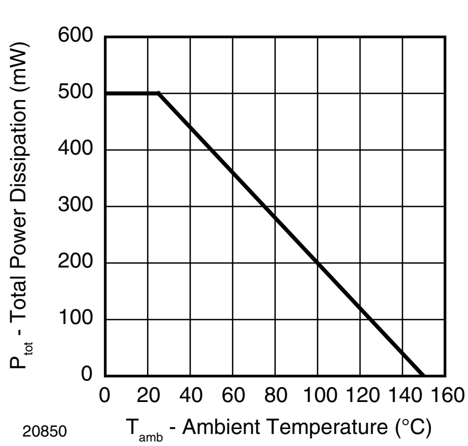



Figure 1. Total Power Dissipation vs. Ambient Temperature

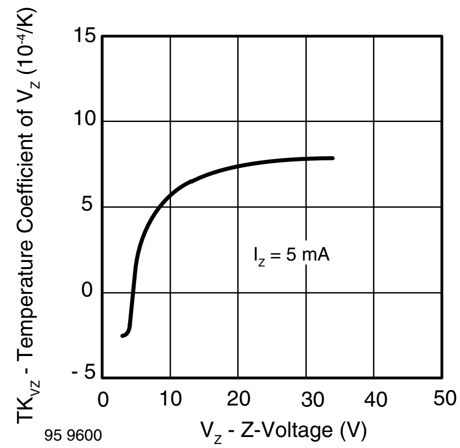



Figure 4. Temperature Coefficient of Vz vs. Z-Voltage

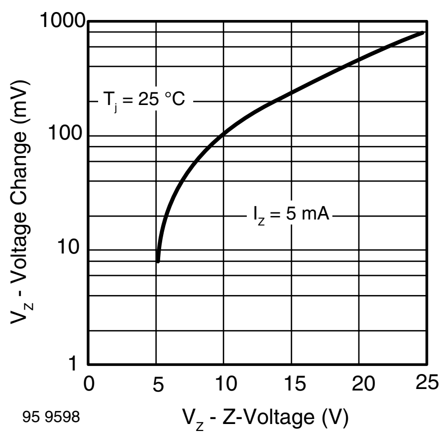



Figure 2. Typical Change of Working Voltage under Operating Conditions at $T_{amb}$=25°C

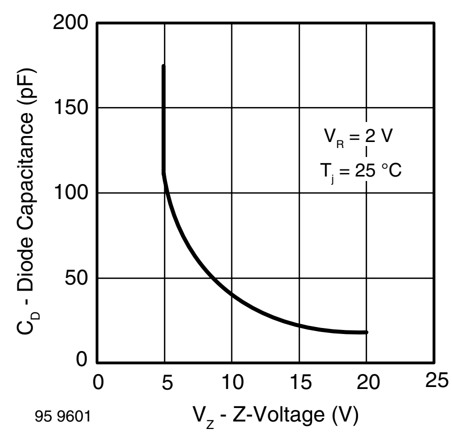



Figure 5. Diode Capacitance vs. Z-Voltage

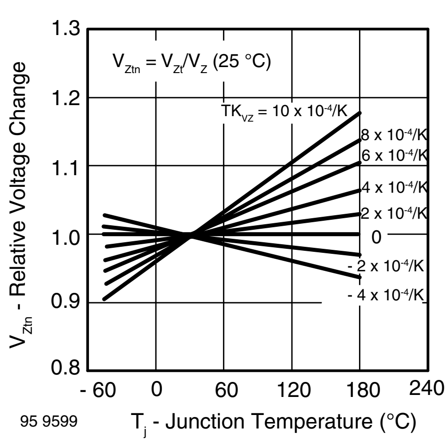



Figure 3. Typical Change of Working Voltage vs. Junction Temperature

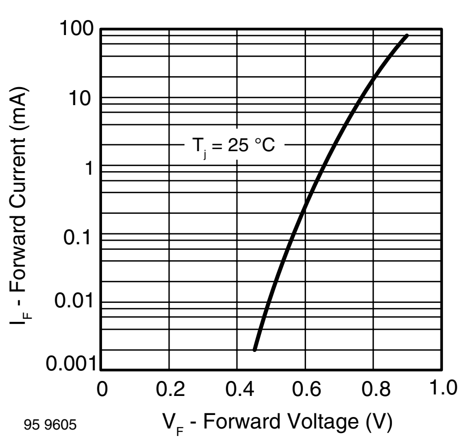



Figure 6. Forward Current vs. Forward Voltage

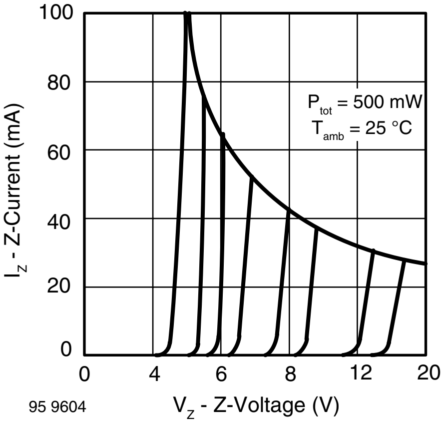



Figure 7. Z-Current vs. Z-Voltage

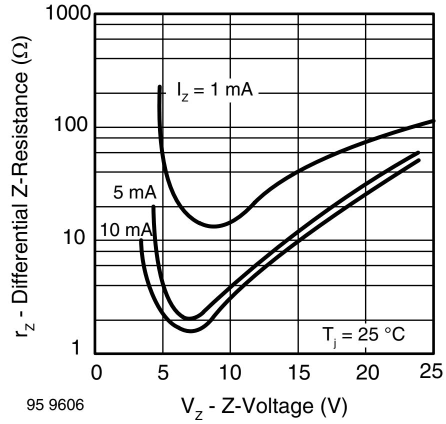



Figure 9. Differential Z-Resistance vs. Z-Voltage

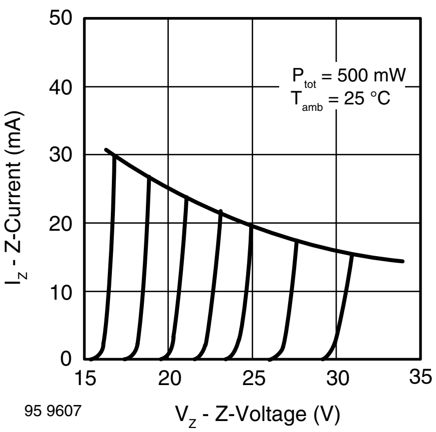



Figure 8. Z-Current vs. Z-Voltage

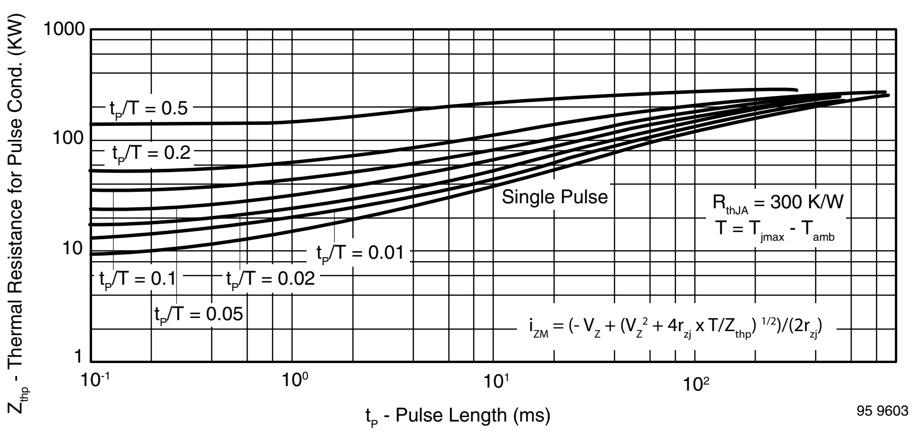
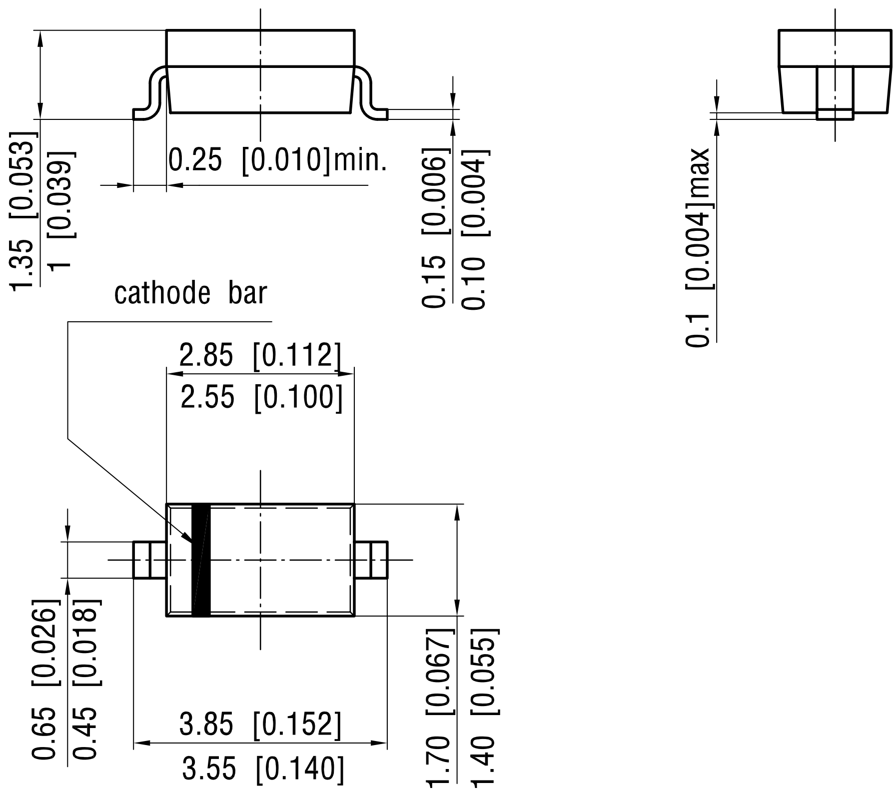
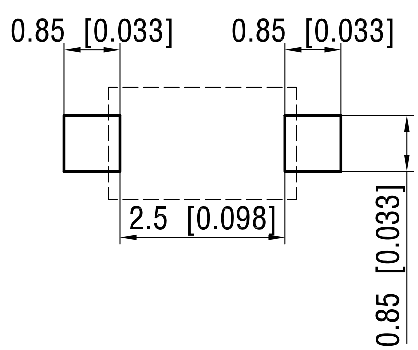



Figure 10. Thermal Response

**Package Dimensions** in millimeters (inches): **SOD123**




foot print recommendation:

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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.



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