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Kind regards,

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# BZV85 series

## Voltage regulator diodes

Rev. 03 — 10 November 2009

Product data sheet

## 1. Product profile

### 1.1 General description

Medium-power voltage regulator diodes in small hermetically sealed leaded SOD66 (DO-41) glass packages.

The diodes are available in the normalized E24 approximately  $\pm 5\%$  tolerance range. The series consists of 33 types with nominal working voltages from 3.6 V to 75 V.

### 1.2 Features

- Total power dissipation: max. 1.3 W
- Working voltage range: nominal 3.3 V to 75 V (E24 range)
- Small hermetically sealed glass package
- Tolerance series: approximately  $\pm 5\%$
- Non-repetitive peak reverse power dissipation: max. 60 W

### 1.3 Applications

- Stabilization purposes

### 1.4 Quick reference data

Table 1. Quick reference data

| Symbol           | Parameter                                     | Conditions  | Min | Typ | Max | Unit |
|------------------|---|---|-----|-----|-----|------|
| $V_F$            | forward voltage                               | $I_F = 50\text{ mA}$  | -   | -   | 1   | V    |
| $P_{\text{tot}}$ | total power dissipation                       | $T_{\text{amb}} = 25\text{ }^\circ\text{C};$<br>lead length 10 mm | [1] | -   | 1   | W    |
|                  |   |   | [2] | -   | 1.3 | W    |
| $P_{\text{ZSM}}$ | non-repetitive peak reverse power dissipation | square wave;<br>$t_p = 100\text{ }\mu\text{s}$                    | [3] | -   | 60  | W    |

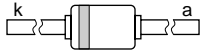
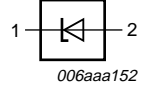
[1] Device mounted on a Printed-Circuit Board (PCB) with 1 cm<sup>2</sup> copper area per lead.

[2] If the leads are kept at  $T_{\text{tp}} = 55\text{ }^\circ\text{C}$  at 4 mm from body.

[3]  $T_j = 25\text{ }^\circ\text{C}$  prior to surge

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | Simplified outline   | Graphic symbol  |
|-----|-------------|--|---|
| 1   | cathode     | [1]  |  |
| 2   | anode       |  |   |

[1] The marking band indicates the cathode.

## 3. Ordering information

**Table 3. Ordering information**

| Type number     | Package |  |         |
|-----------------|---------|--|---------|
|                 | Name    | Description  | Version |
| BZV85 series[1] | -       | hermetically sealed glass package; axial leaded; 2 leads | SOD66   |

[1] The series consists of 33 types with nominal working voltages from 3.3 V to 75 V.

## 4. Marking

**Table 4. Marking codes**

| Type number  | Marking code                 |
|--------------|------------------------------|
| BZV85 series | The diodes are type branded. |

## 5. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol    | Parameter                                     | Conditions   | Min   | Max                            | Unit             |
|-----------|---|--|-------|--------------------------------|------------------|
| $I_F$     | forward current                               |  | -     | 500                            | mA               |
| $I_{ZSM}$ | non-repetitive peak reverse current           | square wave;<br>$t_p = 100 \mu\text{s}$                      | [1] - | see<br><a href="#">Table 8</a> |                  |
|           |   | half sine wave;<br>$t_p = 10 \text{ ms}$                     | [1] - | see<br><a href="#">Table 8</a> |                  |
| $P_{tot}$ | total power dissipation                       | $T_{amb} = 25 \text{ }^\circ\text{C}$ ;<br>lead length 10 mm | [2] - | 1                              | W                |
|           |   |  | [3] - | 1.3                            | W                |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | square wave;<br>$t_p = 100 \mu\text{s}$                      | [1] - | 60                             | W                |
| $T_j$     | junction temperature                          |  | -     | 200                            | $^\circ\text{C}$ |
| $T_{stg}$ | storage temperature                           |  | -65   | +200                           | $^\circ\text{C}$ |

[1]  $T_j = 25 \text{ }^\circ\text{C}$  prior to surge

[2] Device mounted on a PCB with 1 cm<sup>2</sup> copper area per lead.

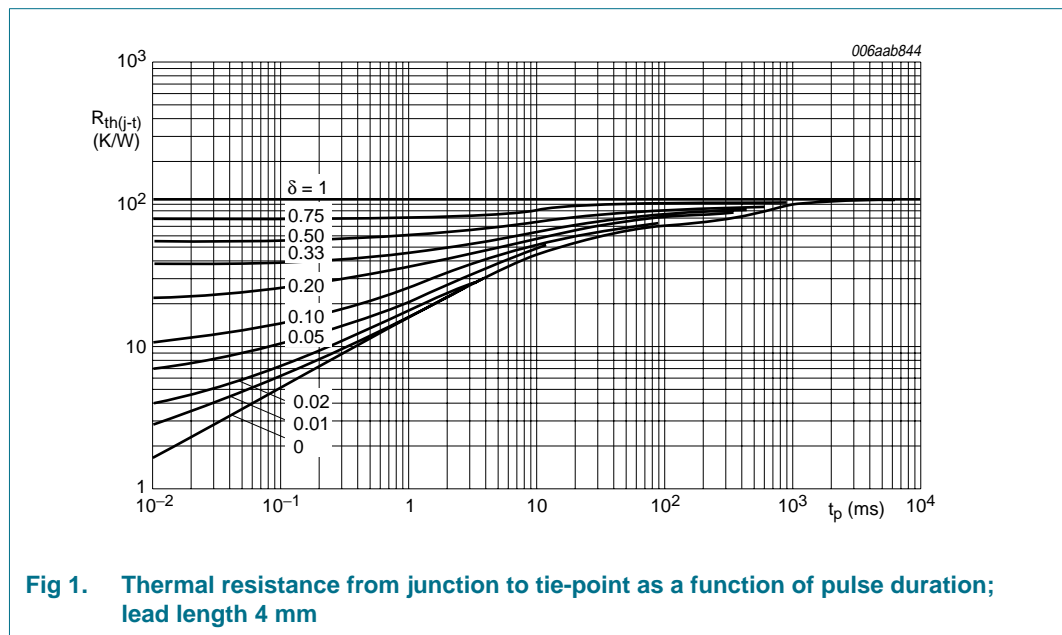
[3] If the leads are kept at  $T_{ip} = 55 \text{ }^\circ\text{C}$  at 4 mm from body.

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol        | Parameter                                     | Conditions                            | Min | Typ | Max | Unit |
|---------------|---|---------------------------------------|-----|-----|-----|------|
| $R_{th(j-t)}$ | thermal resistance from junction to tie-point | lead length 4 mm                      | -   | -   | 110 | K/W  |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient   | lead length 10 mm <a href="#">[1]</a> | -   | -   | 175 | K/W  |

[1] Device mounted on a PCB with 1 cm<sup>2</sup> copper area per lead.



## 7. Characteristics

**Table 7. Characteristics**

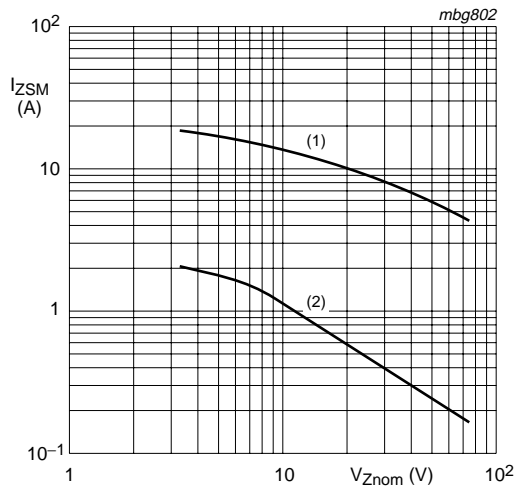
$T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

| Symbol | Parameter       | Conditions           | Min | Typ | Max | Unit |
|--------|-----------------|----------------------|-----|-----|-----|------|
| $V_F$  | forward voltage | $I_F = 50\text{ mA}$ | -   | -   | 1   | V    |

**Table 8. Characteristics per type**

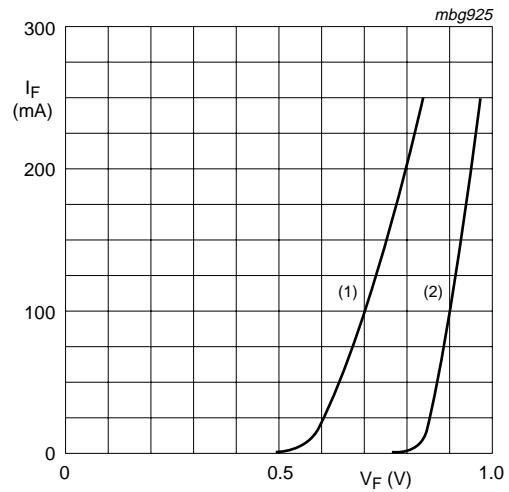
$T_J = 25\text{ }^\circ\text{C}$  unless otherwise specified.

| BZV85-Cxxx | Working voltage<br>$V_Z$ (V)<br>at $I_{test}$ |      | Differential resistance<br>$r_{dif}$ ( $\Omega$ )<br>at $I_{test}$ | Temperature coefficient<br>$S_Z$ (mV/K)<br>at $I_{test}$ |      | Test current<br>$I_{test}$ (mA) | Diode capacitance<br>$C_d$ (pF)               | Reverse current<br>$I_R$ ( $\mu$ A) |           | Non-repetitive peak reverse current<br>$I_{ZSM}$                            |   |
|------------|---|------|--|--|------|---------------------------------|---|-------------------------------------|-----------|---|---|
|            | Min   | Max  | Max  | Min  | Max  |                                 | at $f = 1\text{ MHz}$ ;<br>$V_R = 0\text{ V}$ | Max                                 | $V_R$ (V) | at $t_p = 100\text{ }\mu\text{s}$ ;<br>$T_{amb} = 25\text{ }^\circ\text{C}$ | at $t_p = 10\text{ ms}$ ;<br>$T_{amb} = 25\text{ }^\circ\text{C}$ |
|            |   |      |  |  |      |                                 | Max   |                                     |           | Max (A)   | Max (mA)  |
| 3V6        | 3.4   | 3.8  | 15   | -3.5   | -1.0 | 60                              | 450   | 50                                  | 1.0       | 8.0   | 2000  |
| 3V9        | 3.7   | 4.1  | 15   | -3.5   | -1.0 | 60                              | 450   | 10                                  | 1.0       | 8.0   | 1950  |
| 4V3        | 4.0   | 4.6  | 13   | -2.7   | 0    | 50                              | 450   | 5                                   | 1.0       | 8.0   | 1850  |
| 4V7        | 4.4   | 5.0  | 13   | -2.0   | 0.7  | 45                              | 300   | 3                                   | 1.0       | 8.0   | 1800  |
| 5V1        | 4.8   | 5.4  | 10   | -0.5   | 2.2  | 45                              | 300   | 3                                   | 2.0       | 8.0   | 1750  |
| 5V6        | 5.2   | 6.0  | 7  | 0  | 2.7  | 45                              | 300   | 2                                   | 2.0       | 8.0   | 1700  |
| 6V2        | 5.8   | 6.6  | 4  | 0.6  | 3.6  | 35                              | 200   | 2                                   | 3.0       | 7.0   | 1620  |
| 6V8        | 6.4   | 7.2  | 3.5  | 1.3  | 4.3  | 35                              | 200   | 2                                   | 4.0       | 7.0   | 1550  |
| 7V5        | 7.0   | 7.9  | 3  | 2.5  | 5.5  | 35                              | 150   | 1                                   | 4.5       | 5.0   | 1500  |
| 8V2        | 7.7   | 8.7  | 5  | 3.1  | 6.1  | 25                              | 150   | 0.7                                 | 5.0       | 5.0   | 1400  |
| 9V1        | 8.5   | 9.6  | 5  | 3.8  | 7.2  | 25                              | 150   | 0.7                                 | 6.5       | 4.0   | 1340  |
| 10         | 9.4   | 10.6 | 8  | 4.7  | 8.5  | 25                              | 90  | 0.2                                 | 7.0       | 4.0   | 1200  |
| 11         | 10.4  | 11.6 | 10   | 5.3  | 9.3  | 20                              | 85  | 0.2                                 | 7.7       | 3.0   | 1100  |
| 12         | 11.4  | 12.7 | 10   | 6.3  | 10.8 | 20                              | 85  | 0.2                                 | 8.4       | 3.0   | 1000  |
| 13         | 12.4  | 14.1 | 10   | 7.4  | 12.0 | 20                              | 80  | 0.2                                 | 9.1       | 3.0   | 900   |
| 15         | 13.8  | 15.6 | 15   | 8.9  | 13.6 | 15                              | 75  | 0.05                                | 10.5      | 2.5   | 760   |
| 16         | 15.3  | 17.1 | 15   | 10.7   | 15.4 | 15                              | 75  | 0.05                                | 11.0      | 1.75  | 700   |
| 18         | 16.8  | 19.1 | 20   | 11.8   | 17.1 | 15                              | 70  | 0.05                                | 12.5      | 1.75  | 600   |
| 20         | 18.8  | 21.2 | 24   | 13.6   | 19.1 | 10                              | 60  | 0.05                                | 14.0      | 1.75  | 540   |
| 22         | 20.8  | 23.3 | 25   | 16.6   | 22.1 | 10                              | 60  | 0.05                                | 15.5      | 1.5   | 500   |
| 24         | 22.8  | 25.6 | 30   | 18.3   | 24.3 | 10                              | 55  | 0.05                                | 17        | 1.5   | 450   |
| 27         | 25.1  | 28.9 | 40   | 20.1   | 27.5 | 8                               | 50  | 0.05                                | 19        | 1.2   | 400   |
| 30         | 28.0  | 32.0 | 45   | 22.4   | 32.0 | 8                               | 50  | 0.05                                | 21        | 1.2   | 380   |
| 33         | 31.0  | 35.0 | 45   | 24.8   | 35.0 | 8                               | 45  | 0.05                                | 23        | 1.0   | 350   |
| 36         | 34.0  | 38.0 | 50   | 27.2   | 39.9 | 8                               | 45  | 0.05                                | 25        | 0.9   | 320   |
| 39         | 37.0  | 41.0 | 60   | 29.6   | 43.0 | 6                               | 45  | 0.05                                | 27        | 0.8   | 296   |
| 43         | 40.0  | 46.0 | 75   | 34.0   | 48.3 | 6                               | 40  | 0.05                                | 30        | 0.7   | 270   |
| 47         | 44.0  | 50.0 | 100  | 37.4   | 52.5 | 4                               | 40  | 0.05                                | 33        | 0.6   | 246   |
| 51         | 48.0  | 54.0 | 125  | 40.8   | 56.5 | 4                               | 40  | 0.05                                | 36        | 0.5   | 226   |
| 56         | 52.0  | 60.0 | 150  | 46.8   | 63.0 | 4                               | 40  | 0.05                                | 39        | 0.4   | 208   |
| 62         | 58.0  | 66.0 | 175  | 52.2   | 72.5 | 4                               | 35  | 0.05                                | 43        | 0.4   | 186   |
| 68         | 64.0  | 72.0 | 200  | 60.5   | 81.0 | 4                               | 35  | 0.05                                | 48        | 0.35  | 171   |
| 75         | 70.0  | 80.0 | 225  | 66.5   | 88.0 | 4                               | 35  | 0.05                                | 53        | 0.3   | 161   |



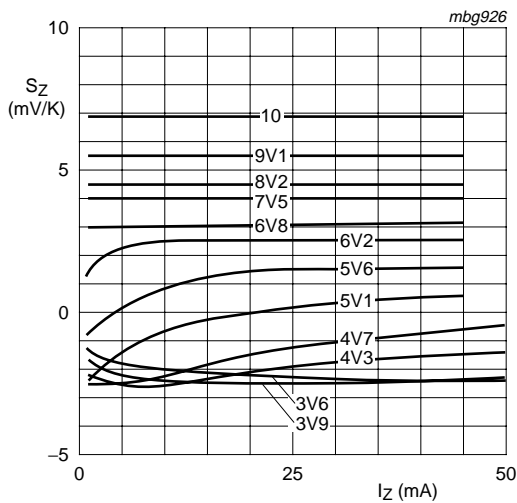
- (1)  $t_p = 10 \mu s$ ; half sine wave;  $T_{amb} = 25^\circ C$
- (2)  $t_p = 10 ms$ ; half sine wave;  $T_{amb} = 25^\circ C$

**Fig 2. Non-repetitive peak reverse current as a function of the nominal working voltage**



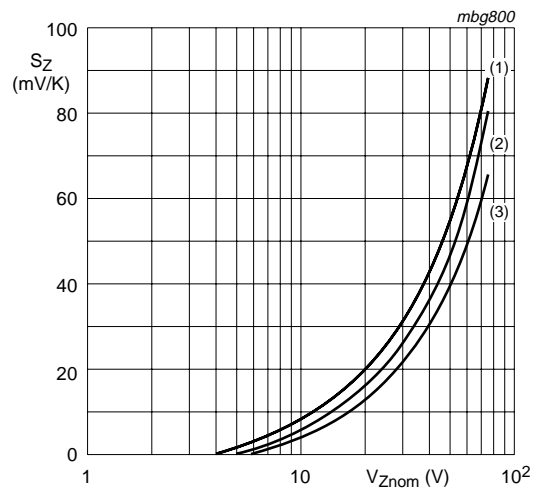
- (1)  $T_j = 200^\circ C$
- (2)  $T_j = 25^\circ C$

**Fig 3. Forward current as a function of forward voltage; typical values**



BZV85-C3V6 to BZV85-C10  
 $T_j = 25^\circ C$  to  $150^\circ C$   
 For types above 7.5 V the temperature coefficient is independent of current; see [Table 8](#).

**Fig 4. Temperature coefficient as a function of working current; typical values**



- $I_Z = I_{test}$   
 $T_j = 25^\circ C$  to  $150^\circ C$
- (1) Maximum values
  - (2) Typical values
  - (3) Minimum values

**Fig 5. Temperature coefficient as a function of working current; typical values**

## 8. Package outline

Hermetically sealed glass package; axial leaded; 2 leads

SOD66

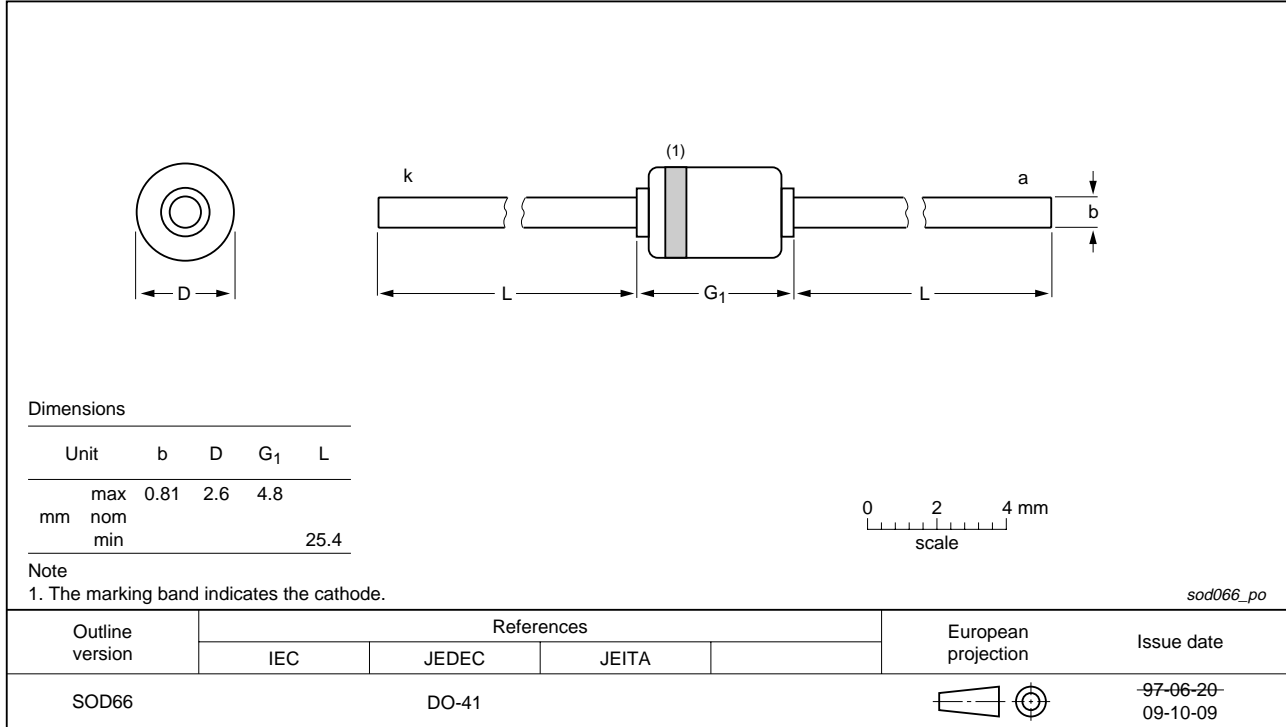


Fig 6. Package outline SOD66 (DO-41)

## 9. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number                 | Package | Description                | Packing quantity |
|-----------------------------|---------|----------------------------|------------------|
|                             |         |                            | 10000            |
| BZV85 series <sup>[2]</sup> | SOD66   | 52 mm tape ammopack, axial | -133             |
|                             |         | 52 mm reel pack, axial     | -113             |

[1] For further information and the availability of packing methods, see [Section 11](#).

[2] The series consists of 33 types with nominal working voltages from 3.3 V to 75 V.



## 10. Revision history

**Table 10. Revision history**

| Document ID    | Release date | Data sheet status   | Change notice | Supersedes |
|----------------|--------------|---|---------------|------------|
| BZV85_SER_3    | 20091110     | Product data sheet  | -             | BZV85_2    |
| Modifications: |              | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Table 6</a>: <math>R_{th(j-tp)}</math> redefined to <math>R_{th(j-t)}</math> thermal resistance from junction to tie-point</li> <li><a href="#">Figure 1</a>: <math>R_{th(j-tp)}</math> redefined to <math>R_{th(j-t)}</math> thermal resistance from junction to tie-point</li> <li><a href="#">Table 8 "Characteristics per type"</a>: <math>I_{Ztest}</math> redefined to <math>I_{test}</math> test current</li> <li><a href="#">Figure 6 "Package outline SOD66 (DO-41)"</a>: updated</li> </ul> |               |            |
| BZV85_2        | 19990511     | Product specification   | -             | BZV85_1    |
| BZV85_1        | 19960426     | Product specification   | -             | -          |

## 11. Legal information

### 11.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition  |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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