# 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 ±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 ±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 mA | | - | - | 1 | V |
| $P_{tot}$ | total power dissipation | | | | | | |
| | | $T_{amb}$ = 25 °C; lead length 10 mm | [1] | - | - | 1 | W |
| | | | [2] | - | - | 1.3 | W |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | square wave; $t_p$ = 100 µs | [3] | - | - | 60 | W |

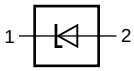
[1] Device mounted on a Printed-Circuit Board (PCB) with 1 $cm^2$ copper area per lead.

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

[3] $T_j$ = 25 °C prior to surge

## 2. Pinning information

Table 2. Pinning

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

006aaa152

[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; $t_p$ = 100 µs | [1] | - | see Table 8 | |
| | | half sine wave; $t_p$ = 10 ms | [1] | - | see Table 8 | |
| $P_{tot}$ | total power dissipation | | | | | |
| | | $T_{amb}$ = 25 °C; lead length 10 mm | [2] | - | 1 | W |
| | | | [3] | - | 1.3 | W |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | square wave; $t_p$ = 100 µs | [1] | - | 60 | W |
| $T_j$ | junction temperature | | | - | 200 | °C |
| $T_{stg}$ | storage temperature | | | –65 | +200 | °C |

[1] $T_j$ = 25 °C prior to surge

[2] Device mounted on a PCB with 1 $cm^2$ copper area per lead.

[3] If the leads are kept at $T_{tp}$ = 55 °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 | [1] | - | - | 175 | K/W |

[1] Device mounted on a PCB with 1 $cm^2$ copper area per lead.

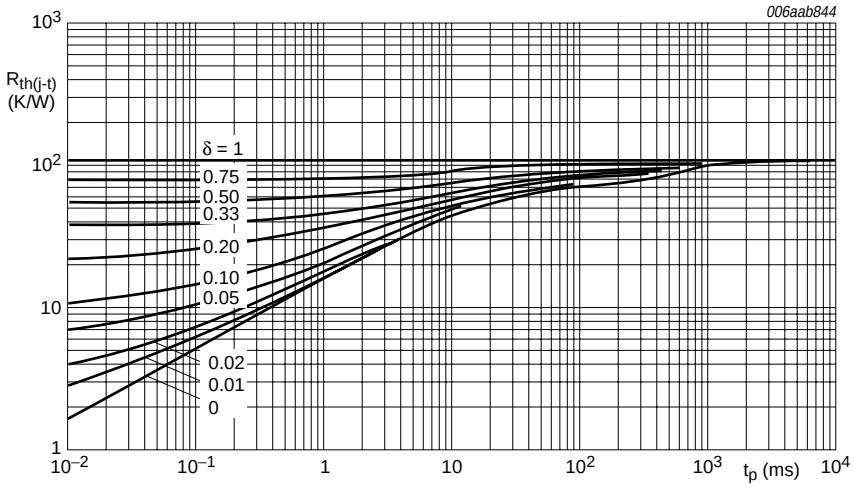



**Fig 1. Thermal resistance from junction to tie-point as a function of pulse duration; lead length 4 mm**

## 7. Characteristics

**Table 7. Characteristics**

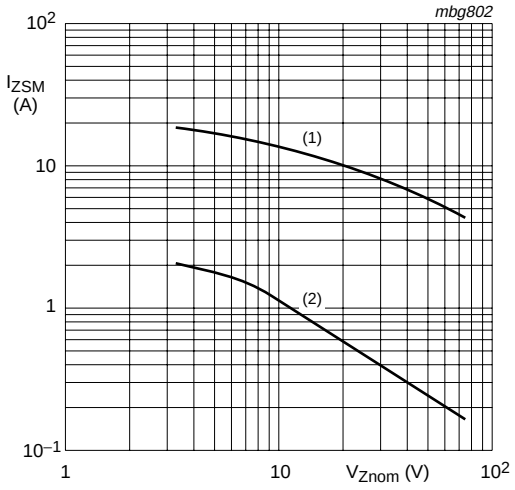
*$T_j$ = 25 °C unless otherwise specified.*

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

**Table 8. Characteristics per type**

*$T_j$ = 25 °C unless otherwise specified.*

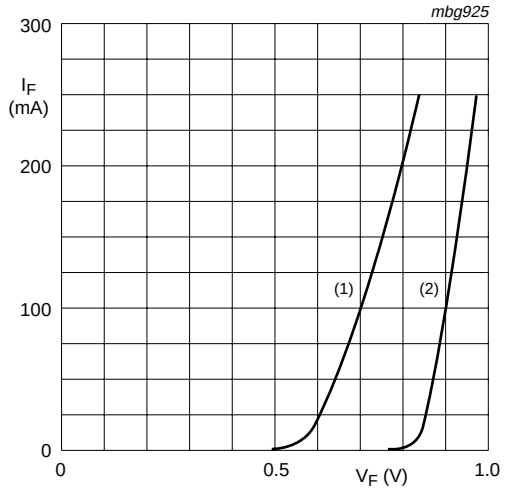
| BZV85-Cxxx | Working voltage $V_Z$ (V) at $I_{test}$ | | Differential resistance $r_{dif}$ (Ω) at $I_{test}$ | Temperature coefficient $S_Z$ (mV/K) at $I_{test}$ | | Test current $I_{test}$ (mA) | Diode capacitance $C_d$ (pF) at f = 1 MHz; $V_R$ = 0 V | Reverse current $I_R$ (μA) | | Non-repetitive peak reverse current $I_{ZSM}$ at $t_p$ = 100 μs; $T_{amb}$ = 25 °C | Non-repetitive peak reverse current $I_{ZSM}$ at $t_p$ = 10 ms; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Max | Min | Max | | Max | Max | $V_R$ (V) | 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 µs; half sine wave; $T_{amb}$ = 25 °C

(2) $t_p$ = 10 ms; half sine wave; $T_{amb}$ = 25 °C

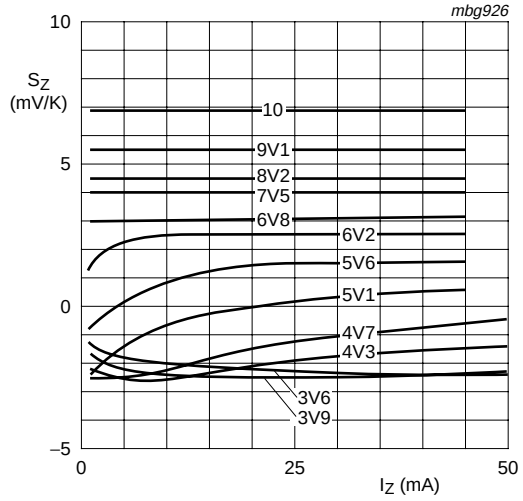
**Fig 2. Non-repetitive peak reverse current as a function of the nominal working voltage**




(1) $T_j$ = 200 °C

(2) $T_j$ = 25 °C

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

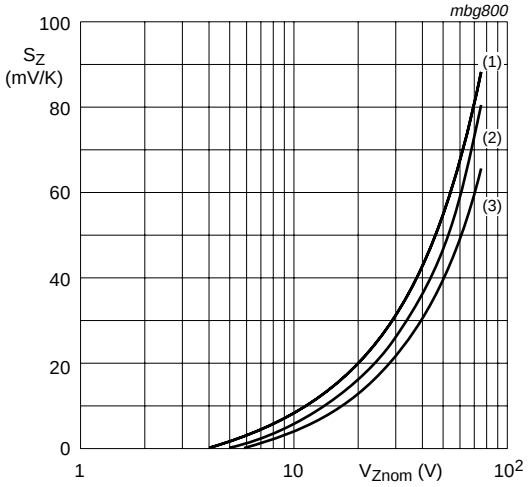



BZV85-C3V6 to BZV85-C10

$T_j$ = 25 °C to 150 °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 °C to 150 °C

(1) Maximum values

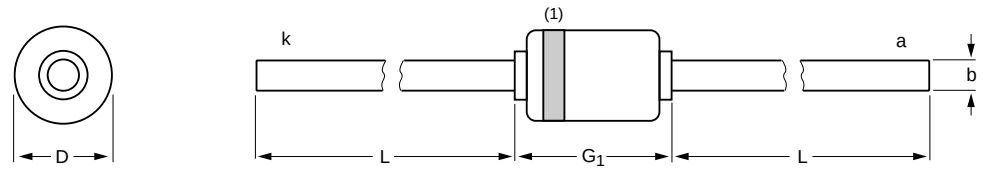
(2) Typical values

(3) Minimum values

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

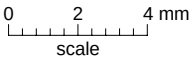
## 8. Package outline

**Hermetically sealed glass package; axial leaded; 2 leads** **SOD66**




Dimensions

| Unit | | b | D | $G_1$ | L |
|---|---|---|---|---|---|
| mm | max | 0.81 | 2.6 | 4.8 | |
| | nom | | | | |
| | min | | | | 25.4 |




Note
1. The marking band indicates the cathode.

*sod066_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD66 | | DO-41 | | | | ~~97-06-20~~ 09-10-09 |

**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.*[1]

| Type number | Package | Description | Packing quantity |
|---|---|---|---|
| | | | 10000 |
| BZV85 series[2] | 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: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Table 6: $R_{th(j-tp)}$ redefined to $R_{th(j-t)}$ thermal resistance from junction to tie-point<br>• Figure 1: $R_{th(j-tp)}$ redefined to $R_{th(j-t)}$ thermal resistance from junction to tie-point<br>• Table 8 “Characteristics per type”: $I_{Ztest}$ redefined to $I_{test}$ test current<br>• Figure 6 “Package outline SOD66 (DO-41)”: updated | | | |
| BZV85_2 | 19990511 | Product specification | - | BZV85_1 |
| BZV85_1 | 19960426 | Product specification | - | - |

# 11. Legal information

## 11.1 Data sheet status

| Document status[1][2] | Product status[3] | 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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