



# 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	$T_{\text{amb}} = 25\text{ }^\circ\text{C};$ lead length 10 mm	[1]	-	1	W
			[2]	-	1.3	W
$P_{\text{ZSM}}$	non-repetitive peak reverse power dissipation	square wave; $t_p = 100\text{ }\mu\text{s}$	[3]	-	60	W

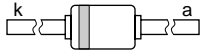

[1] Device mounted on a Printed-Circuit Board (PCB) with 1 cm<sup>2</sup> copper area per lead.

[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		
2	anode		

[1] The marking band indicates the cathode.

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BZV85 series <sup>[1]</sup>	-	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; $t_p = 100 \mu\text{s}$	[1] -	see <a href="#">Table 8</a>	
		half sine wave; $t_p = 10 \text{ ms}$	[1] -	see <a href="#">Table 8</a>	
$P_{tot}$	total power dissipation	$T_{amb} = 25 \text{ }^\circ\text{C}$ ; lead length 10 mm	[2] -	1	W
			[3] -	1.3	W
$P_{ZSM}$	non-repetitive peak reverse power dissipation	square wave; $t_p = 100 \mu\text{s}$	[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.

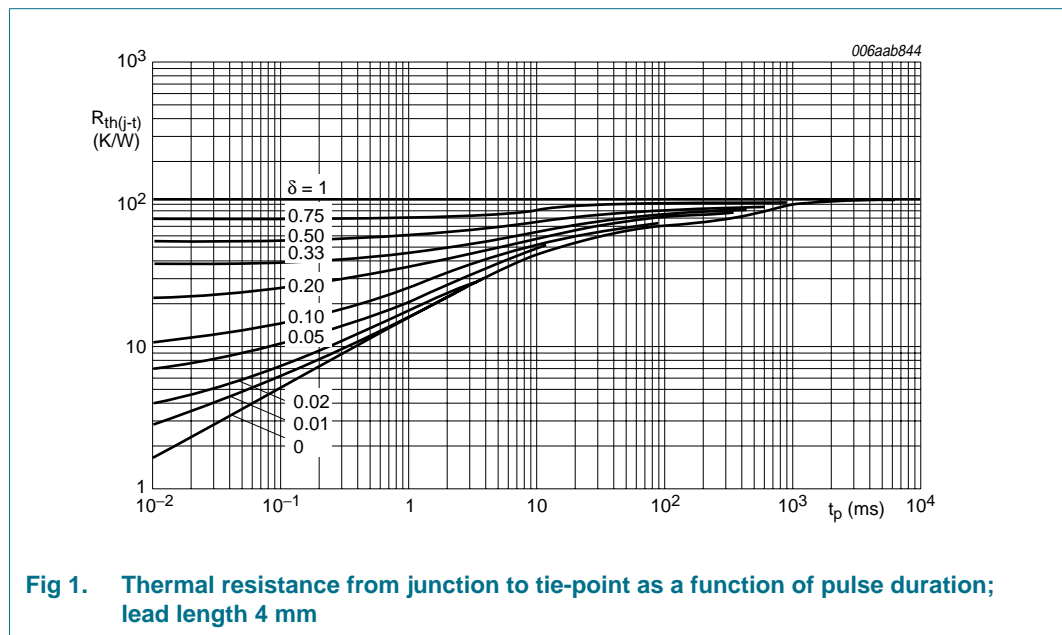
[3] If the leads are kept at  $T_{ip} = 55 \text{ }^\circ\text{C}$  at 4 mm from body.

## 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**

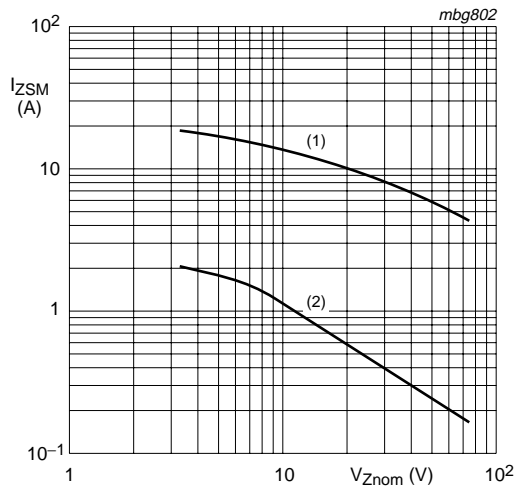
$T_j = 25\text{ °C}$  unless otherwise specified.

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

**Table 8. Characteristics per type**

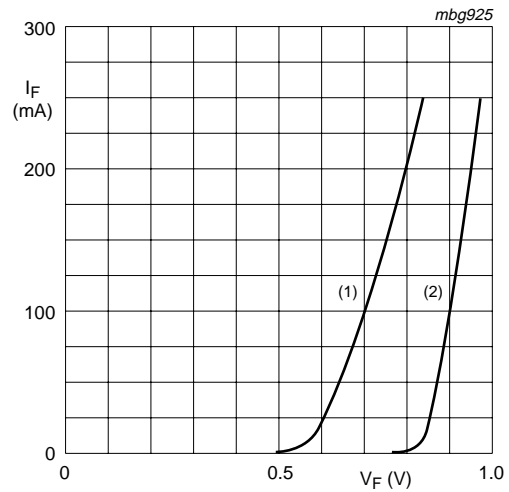
$T_J = 25\text{ }^\circ\text{C}$  unless otherwise specified.

BZV85-Cxxx	Working voltage $V_Z$ (V) at $I_{\text{test}}$		Differential resistance $r_{\text{dif}}$ ( $\Omega$ ) at $I_{\text{test}}$	Temperature coefficient $S_Z$ (mV/K) at $I_{\text{test}}$		Test current $I_{\text{test}}$ (mA)	Diode capacitance $C_d$ (pF) at $f = 1\text{ MHz}$ ; $V_R = 0\text{ V}$	Reverse current $I_R$ ( $\mu\text{A}$ )		Non-repetitive peak reverse current $I_{ZSM}$ at $t_p = 100\ \mu\text{s}$ ; $T_{\text{amb}} = 25\text{ }^\circ\text{C}$	
				Min	Max			Max	Max	Max	$V_R$ (V)
	Min	Max	Max	Min	Max		Max	Max	Max	$V_R$ (V)	Max (A)
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



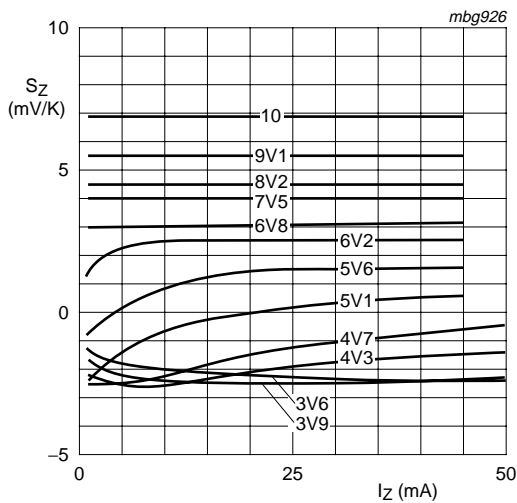
- (1)  $t_p = 10 \mu s$ ; half sine wave;  $T_{amb} = 25 \text{ }^\circ\text{C}$
- (2)  $t_p = 10 ms$ ; half sine wave;  $T_{amb} = 25 \text{ }^\circ\text{C}$

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



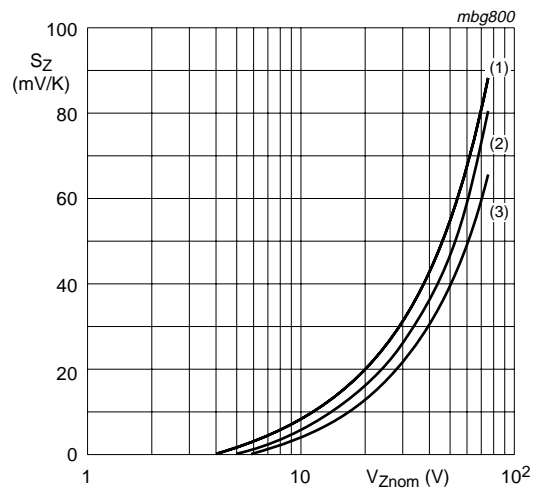
- (1)  $T_j = 200 \text{ }^\circ\text{C}$
- (2)  $T_j = 25 \text{ }^\circ\text{C}$

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



BZV85-C3V6 to BZV85-C10  
 $T_j = 25 \text{ }^\circ\text{C}$  to  $150 \text{ }^\circ\text{C}$   
 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**



- $I_Z = I_{test}$   
 $T_j = 25 \text{ }^\circ\text{C}$  to  $150 \text{ }^\circ\text{C}$
- (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

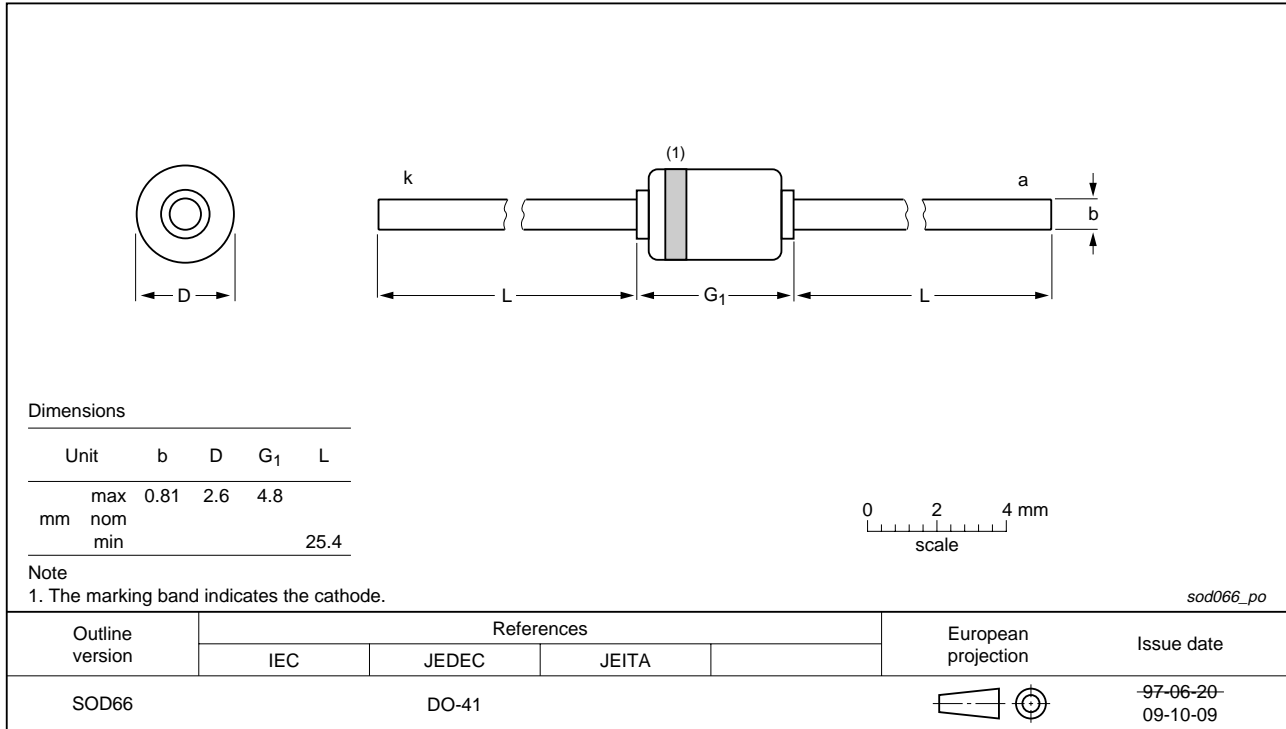


Fig 6. Package outline SOD66 (DO-41)

## 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".

[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>.

### 11.2 Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

**Short data sheet** — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

### 11.3 Disclaimers

**General** — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

**Right to make changes** — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

**Suitability for use** — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental

damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

**Limiting values** — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Terms and conditions of sale** — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

**Quick reference data** — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

### 11.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

## 12. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

**13. Contents**

**1 Product profile . . . . . 1**

1.1 General description . . . . . 1

1.2 Features . . . . . 1

1.3 Applications . . . . . 1

1.4 Quick reference data . . . . . 1

**2 Pinning information . . . . . 2**

**3 Ordering information . . . . . 2**

**4 Marking . . . . . 2**

**5 Limiting values . . . . . 3**

**6 Thermal characteristics . . . . . 4**

**7 Characteristics . . . . . 4**

**8 Package outline . . . . . 7**

**9 Packing information . . . . . 7**

**10 Revision history . . . . . 8**

**11 Legal information . . . . . 9**

11.1 Data sheet status . . . . . 9

11.2 Definitions . . . . . 9

11.3 Disclaimers . . . . . 9

11.4 Trademarks . . . . . 9

**12 Contact information . . . . . 9**

**13 Contents . . . . . 10**

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.



© NXP B.V. 2009.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

Date of release: 10 November 2009

Document identifier: BZV85\_SER\_3