



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

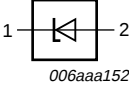
[1] Device mounted on a Printed-Circuit Board (PCB) with 1 cm<sup>2</sup> copper area per lead.

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

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

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline                                                                  | Graphic symbol                                                                                   |
|-----|-------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1   | cathode     |  | <br>006aaa152 |
| 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>$t_p = 100 \mu s$                            | [1] - | see<br><a href="#">Table 8</a> |                  |
|           |                                               | half sine wave;<br>$t_p = 10 ms$                             | [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>$t_p = 100 \mu s$                            | [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.

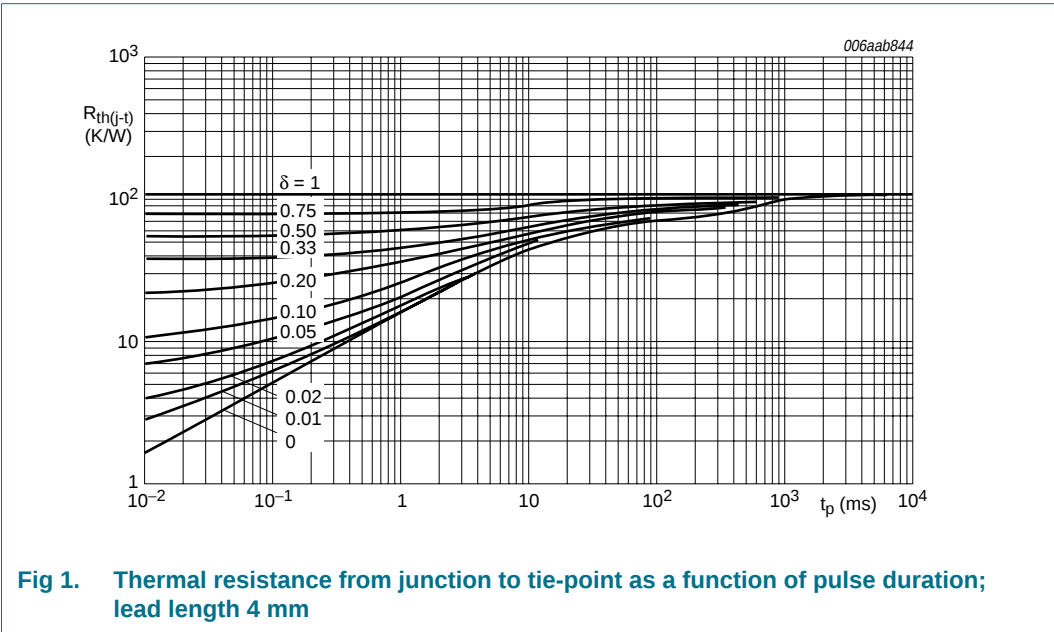
[3] If the leads are kept at  $T_{tp} = 55 \text{ }^\circ\text{C}$  at 4 mm from body.

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

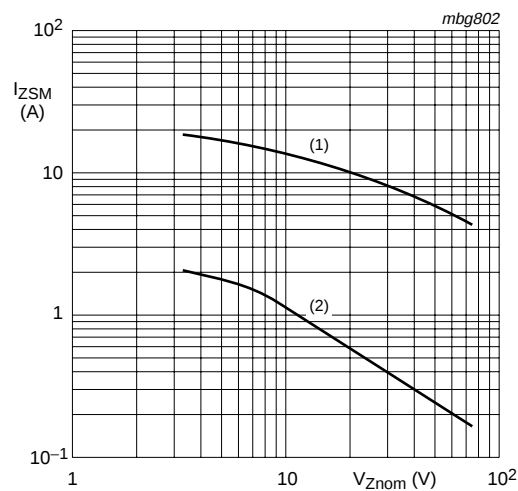
Table 7. Characteristics

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

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

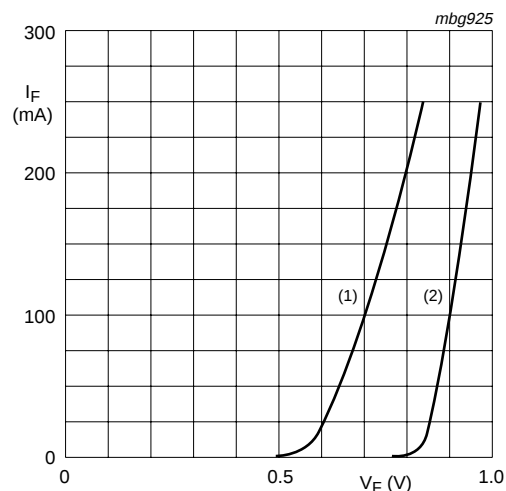
**Table 8. Characteristics per type***T<sub>J</sub> = 25 °C unless otherwise specified.*

| BZV85-Cxxx | Working voltage<br>V <sub>Z</sub> (V)<br>at I <sub>test</sub> |      | Differential resistance<br>r <sub>dif</sub> (Ω)<br>at I <sub>test</sub> | Temperature coefficient<br>S <sub>Z</sub> (mV/K)<br>at I <sub>test</sub> |      | Test current<br>I <sub>test</sub> (mA) | Diode capacitance<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>V <sub>R</sub> = 0 V | Reverse current<br>I <sub>R</sub> (μA) |                    | Non-repetitive peak reverse current<br>I <sub>ZSM</sub><br>at t <sub>p</sub> = 100 μs;<br>T <sub>amb</sub> = 25 °C |          | at t <sub>p</sub> = 10 ms;<br>T <sub>amb</sub> = 25 °C |
|------------|---------------------------------------------------------------|------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|------|----------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------|
|            | Min                                                           | Max  | Max                                                                     | Min                                                                      | Max  |                                        | Max                                                                               | Max                                    | V <sub>R</sub> (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      |                                                        |



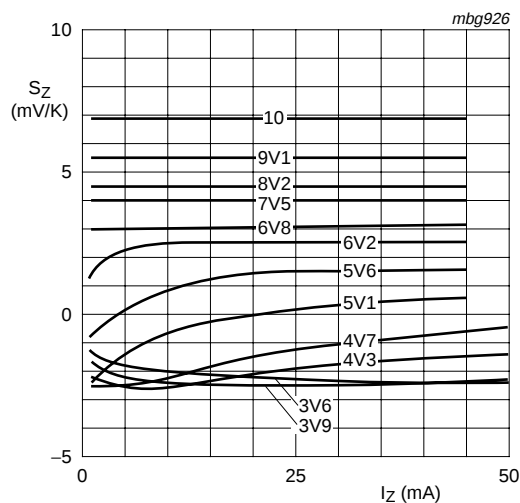
- (1)  $t_p = 10 \mu s$ ; half sine wave;  $T_{amb} = 25^\circ C$
- (2)  $t_p = 10 ms$ ; half sine wave;  $T_{amb} = 25^\circ C$

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



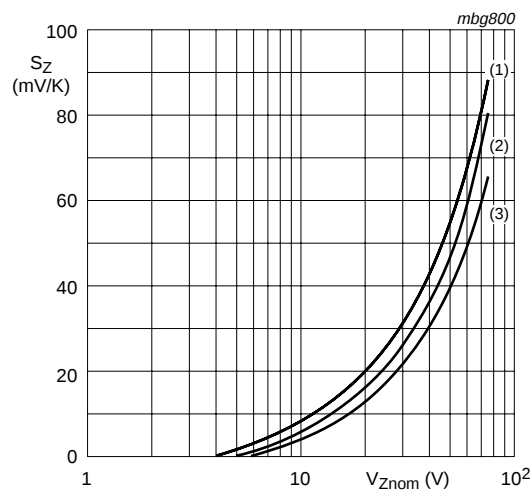
- (1)  $T_j = 200^\circ C$
- (2)  $T_j = 25^\circ C$

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

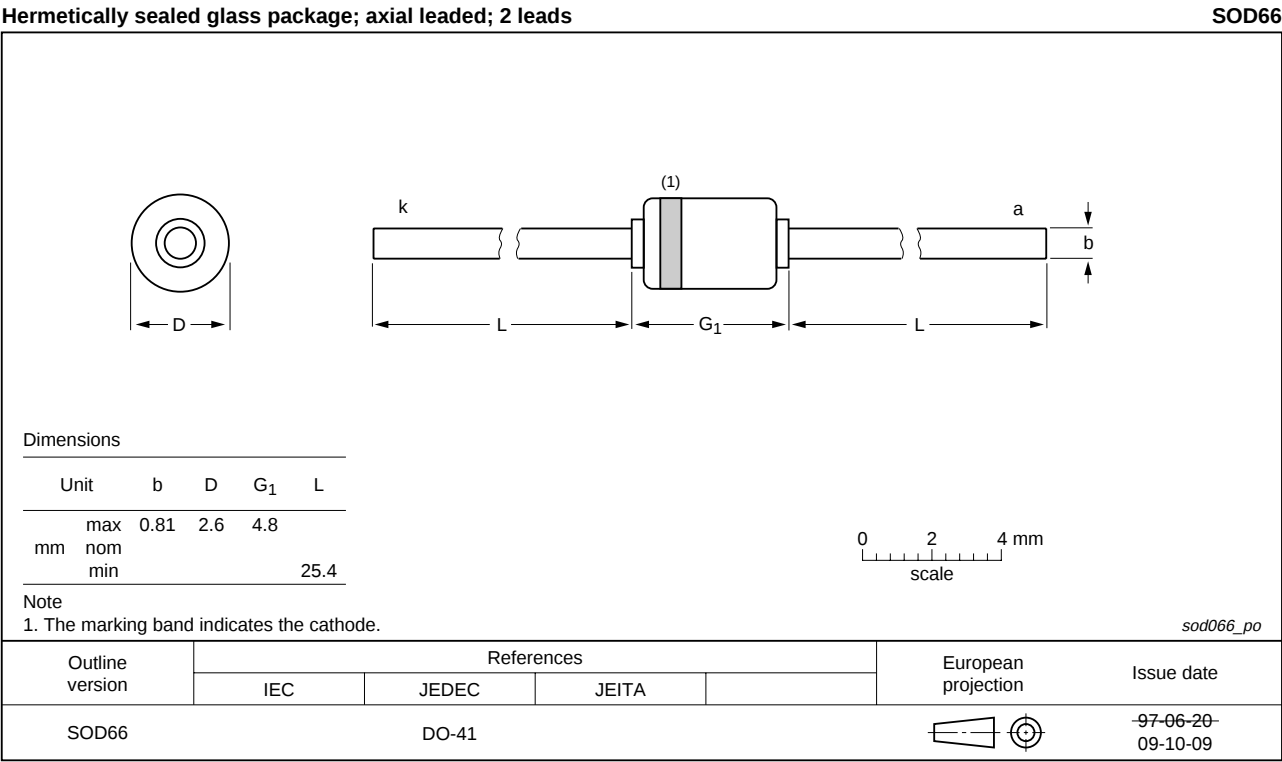


Fig 6. Package outline SOD66 (DO-41)

9. Packing information

Please refer to packing information on [www.nexperia.com](http://www.nexperia.com).

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

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Date of release: 10 November 2009  
Document identifier: BZV85\_SER