



**THE DATASHEET OF  
BZX284-B10,115**



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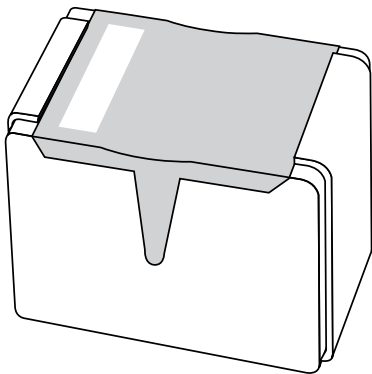
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Kind regards,

Team Nexperia

# DATA SHEET



## **BZX284 series** Voltage regulator diodes

Product data sheet  
Supersedes data of 1999 Apr 19

2002 May 28

# Voltage regulator diodes

# BZX284 series

## FEATURES

- Total power dissipation: max. 400 mW
- Two tolerance series:  $\pm 2\%$  and  $\pm 5\%$
- Working voltage range: nom. 2.4 to 75 V (E24 range).

## DESCRIPTION

Low-power voltage regulator diodes in a SOD110 very small ceramic SMD package. The diodes are available in the normalized E24  $\pm 2\%$  (BZX284-B) and  $\pm 5\%$  (BZX284-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V.

## APPLICATIONS

- General regulation functions.



Fig.1 Simplified outline (SOD110) and symbol.

## MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
| BZX284-B2V4 | WO           | BZX284-B15  | XH           | BZX284-C2V4 | YO           | BZX284-C15  | ZH           |
| BZX284-B2V7 | WP           | BZX284-B16  | XI           | BZX284-C2V7 | YP           | BZX284-C16  | ZI           |
| BZX284-B3V0 | WQ           | BZX284-B18  | XJ           | BZX284-C3V0 | YQ           | BZX284-C18  | ZJ           |
| BZX284-B3V3 | WR           | BZX284-B20  | XK           | BZX284-C3V3 | YR           | BZX284-C20  | ZK           |
| BZX284-B3V6 | WS           | BZX284-B22  | XL           | BZX284-C3V6 | YS           | BZX284-C22  | ZL           |
| BZX284-B3V9 | WT           | BZX284-B24  | XM           | BZX284-C3V9 | YT           | BZX284-C24  | ZM           |
| BZX284-B4V3 | WU           | BZX284-B27  | XN           | BZX284-C4V3 | YU           | BZX284-C27  | ZN           |
| BZX284-B4V7 | WV           | BZX284-B30  | XO           | BZX284-C4V7 | YV           | BZX284-C30  | ZO           |
| BZX284-B5V1 | WW           | BZX284-B33  | XP           | BZX284-C5V1 | YW           | BZX284-C33  | ZP           |
| BZX284-B5V6 | WX           | BZX284-B36  | XQ           | BZX284-C5V6 | YX           | BZX284-C36  | ZQ           |
| BZX284-B6V2 | WY           | BZX284-B39  | XR           | BZX284-C6V2 | YY           | BZX284-C39  | ZR           |
| BZX284-B6V8 | WZ           | BZX284-B43  | XS           | BZX284-C6V8 | YZ           | BZX284-C43  | ZS           |
| BZX284-B7V5 | XA           | BZX284-B47  | XT           | BZX284-C7V5 | ZA           | BZX284-C47  | ZT           |
| BZX284-B8V2 | XB           | BZX284-B51  | XU           | BZX284-C8V2 | ZB           | BZX284-C51  | ZU           |
| BZX284-B9V1 | XC           | BZX284-B56  | XV           | BZX284-C9V1 | ZC           | BZX284-C56  | ZV           |
| BZX284-B10  | XD           | BZX284-B62  | XW           | BZX284-C10  | ZD           | BZX284-C62  | ZW           |
| BZX284-B11  | XE           | BZX284-B68  | XX           | BZX284-C11  | ZE           | BZX284-C68  | ZX           |
| BZX284-B12  | XF           | BZX284-B75  | XY           | BZX284-C12  | ZF           | BZX284-C75  | ZY           |
| BZX284-B13  | XG           | —           | —            | BZX284-C13  | ZG           | —           | —            |

## Voltage regulator diodes

## BZX284 series

**LIMITING VALUES**

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

| SYMBOL           | PARAMETER                           | CONDITIONS                                                                                            | MIN.               | MAX. | UNIT             |
|------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------|------|------------------|
| $I_F$            | continuous forward current          |                                                                                                       | –                  | 250  | mA               |
| $I_{ZSM}$        | non-repetitive peak reverse current | $t_p = 100 \mu\text{s}$ ; square wave;<br>$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ prior to surge | see Tables 1 and 2 |      |                  |
| $P_{\text{tot}}$ | total power dissipation             | $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ ; note 1                                                 | –                  | 400  | mW               |
| $T_{\text{stg}}$ | storage temperature                 |                                                                                                       | –65                | +150 | $^\circ\text{C}$ |
| $T_j$            | junction temperature                |                                                                                                       | –                  | 150  | $^\circ\text{C}$ |

**Note**

1. Device mounted on a printed-circuit board:  $11 \times 25 \times 1.6 \text{ mm}$ .

**ELECTRICAL CHARACTERISTICS****Total BZX284-B and BZX284-C series**

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

| SYMBOL             | PARAMETER                  | CONDITIONS                         | MAX. | UNIT          |
|--------------------|----------------------------|------------------------------------|------|---------------|
| $V_F$              | forward voltage            | $I_F = 10 \text{ mA}$ ; see Fig.2  | 0.9  | V             |
|                    |                            | $I_F = 100 \text{ mA}$ ; see Fig.2 | 1.1  | V             |
| $I_R$              | reverse current            |                                    |      |               |
|                    | BZX284-B/C2V4              | $V_R = 1 \text{ V}$                | 50   | $\mu\text{A}$ |
|                    | BZX284-B/C2V7              | $V_R = 1 \text{ V}$                | 20   | $\mu\text{A}$ |
|                    | BZX284-B/C3V0              | $V_R = 1 \text{ V}$                | 10   | $\mu\text{A}$ |
|                    | BZX284-B/C3V3              | $V_R = 1 \text{ V}$                | 5    | $\mu\text{A}$ |
|                    | BZX284-B/C3V6              | $V_R = 1 \text{ V}$                | 5    | $\mu\text{A}$ |
|                    | BZX284-B/C3V9              | $V_R = 1 \text{ V}$                | 3    | $\mu\text{A}$ |
|                    | BZX284-B/C4V3              | $V_R = 1 \text{ V}$                | 3    | $\mu\text{A}$ |
|                    | BZX284-B/C4V7              | $V_R = 2 \text{ V}$                | 3    | $\mu\text{A}$ |
|                    | BZX284-B/C5V1              | $V_R = 2 \text{ V}$                | 2    | $\mu\text{A}$ |
|                    | BZX284-B/C5V6              | $V_R = 2 \text{ V}$                | 1    | $\mu\text{A}$ |
|                    | BZX284-B/C6V2              | $V_R = 4 \text{ V}$                | 3    | $\mu\text{A}$ |
|                    | BZX284-B/C6V8              | $V_R = 4 \text{ V}$                | 2    | $\mu\text{A}$ |
|                    | BZX284-B/C7V5              | $V_R = 5 \text{ V}$                | 1    | $\mu\text{A}$ |
|                    | BZX284-B/C8V2              | $V_R = 5 \text{ V}$                | 700  | nA            |
|                    | BZX284-B/C9V1              | $V_R = 6 \text{ V}$                | 500  | nA            |
|                    | BZX284-B/C10               | $V_R = 7 \text{ V}$                | 200  | nA            |
| BZX284-B/C11       | $V_R = 8 \text{ V}$        | 100                                | nA   |               |
| BZX284-B/C12       | $V_R = 8 \text{ V}$        | 100                                | nA   |               |
| BZX284-B/C13       | $V_R = 8 \text{ V}$        | 100                                | nA   |               |
| BZX284-B/C15 to 75 | $V_R = 0.7V_{Z\text{nom}}$ | 50                                 | nA   |               |

**Table 1** Per type BZX284-B/C2V4 to B/C24T<sub>J</sub> = 25 °C unless otherwise specified.

| BZX284-<br>Bxxx<br>Cxxx | WORKING VOLTAGE<br>V <sub>Z</sub> (V)<br>at I <sub>Ztest</sub> = 5 mA |       |              | DIFFERENTIAL RESISTANCE<br>r <sub>diff</sub> (Ω) |      |                              |      |      |      | TEMP. COEFF.<br>S <sub>Z</sub> (mV/K)<br>at I <sub>Ztest</sub> = 5 mA<br>(see Figs 3 and 4) | DIODE CAP.<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>V <sub>R</sub> = 0 V |
|-------------------------|-----------------------------------------------------------------------|-------|--------------|--------------------------------------------------|------|------------------------------|------|------|------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                         | V <sub>Z</sub> (V)<br>at I <sub>Ztest</sub> = 5 mA                    |       | Tol. ±5% (C) | at I <sub>Ztest</sub> = 1 mA                     |      | at I <sub>Ztest</sub> = 5 mA |      |      |      |                                                                                             |                                                                            |
|                         | Tol. ±2% (B)                                                          | MIN.  |              | MAX.                                             | TYP. | MAX.                         | TYP. | MAX. |      |                                                                                             |                                                                            |
| 2V4                     | 2.35                                                                  | 2.45  | 2.2          | 2.6                                              | 275  | 400                          | 70   | 100  | -1.6 | 450                                                                                         |                                                                            |
| 2V7                     | 2.65                                                                  | 2.75  | 2.5          | 2.9                                              | 300  | 450                          | 75   | 100  | -2.0 | 440                                                                                         |                                                                            |
| 3V0                     | 2.94                                                                  | 3.06  | 2.8          | 3.2                                              | 325  | 500                          | 80   | 95   | -2.1 | 425                                                                                         |                                                                            |
| 3V3                     | 3.23                                                                  | 3.37  | 3.1          | 3.5                                              | 350  | 500                          | 85   | 95   | -2.4 | 410                                                                                         |                                                                            |
| 3V6                     | 3.53                                                                  | 3.67  | 3.4          | 3.8                                              | 375  | 500                          | 85   | 90   | -2.4 | 390                                                                                         |                                                                            |
| 3V9                     | 3.82                                                                  | 3.98  | 3.7          | 4.1                                              | 400  | 500                          | 85   | 90   | -2.5 | 370                                                                                         |                                                                            |
| 4V3                     | 4.21                                                                  | 4.39  | 4.0          | 4.6                                              | 410  | 600                          | 80   | 90   | -2.5 | 350                                                                                         |                                                                            |
| 4V7                     | 4.61                                                                  | 4.79  | 4.4          | 5.0                                              | 425  | 500                          | 50   | 80   | -1.4 | 325                                                                                         |                                                                            |
| 5V1                     | 5.00                                                                  | 5.20  | 4.8          | 5.4                                              | 400  | 480                          | 40   | 60   | -0.8 | 300                                                                                         |                                                                            |
| 5V6                     | 5.49                                                                  | 5.71  | 5.2          | 6.0                                              | 80   | 400                          | 15   | 40   | 1.2  | 275                                                                                         |                                                                            |
| 6V2                     | 6.08                                                                  | 6.32  | 5.8          | 6.6                                              | 40   | 150                          | 6    | 10   | 2.3  | 250                                                                                         |                                                                            |
| 6V8                     | 6.66                                                                  | 6.94  | 6.4          | 7.2                                              | 30   | 80                           | 6    | 15   | 3.0  | 215                                                                                         |                                                                            |
| 7V5                     | 7.35                                                                  | 7.65  | 7.0          | 7.9                                              | 15   | 80                           | 2    | 10   | 4.0  | 170                                                                                         |                                                                            |
| 8V2                     | 8.04                                                                  | 8.36  | 7.7          | 8.7                                              | 20   | 80                           | 2    | 10   | 4.6  | 150                                                                                         |                                                                            |
| 9V1                     | 8.92                                                                  | 9.28  | 8.5          | 9.6                                              | 20   | 100                          | 2    | 10   | 5.5  | 120                                                                                         |                                                                            |
| 10                      | 9.80                                                                  | 10.20 | 9.4          | 10.6                                             | 20   | 150                          | 2    | 10   | 6.4  | 110                                                                                         |                                                                            |
| 11                      | 10.80                                                                 | 11.20 | 10.4         | 11.6                                             | 25   | 150                          | 2    | 10   | 7.4  | 108                                                                                         |                                                                            |
| 12                      | 11.80                                                                 | 12.20 | 11.4         | 12.7                                             | 25   | 150                          | 2    | 10   | 8.4  | 105                                                                                         |                                                                            |
| 13                      | 12.70                                                                 | 13.30 | 12.4         | 14.1                                             | 25   | 170                          | 2    | 10   | 9.4  | 103                                                                                         |                                                                            |
| 15                      | 14.70                                                                 | 15.30 | 13.8         | 15.6                                             | 25   | 200                          | 3    | 15   | 11.4 | 99                                                                                          |                                                                            |
| 16                      | 15.70                                                                 | 16.30 | 15.3         | 17.1                                             | 25   | 200                          | 4    | 20   | 12.4 | 97                                                                                          |                                                                            |
| 18                      | 17.60                                                                 | 18.40 | 16.8         | 19.1                                             | 25   | 225                          | 4    | 20   | 14.4 | 93                                                                                          |                                                                            |
| 20                      | 19.60                                                                 | 20.40 | 18.8         | 21.2                                             | 30   | 225                          | 4    | 20   | 16.4 | 88                                                                                          |                                                                            |
| 22                      | 21.60                                                                 | 22.40 | 20.8         | 23.3                                             | 30   | 250                          | 5    | 25   | 18.4 | 84                                                                                          |                                                                            |
| 24                      | 23.50                                                                 | 24.50 | 22.8         | 25.6                                             | 30   | 250                          | 6    | 30   | 20.4 | 80                                                                                          |                                                                            |

**Table 2** Per type BZX284-B/C27 to B/C75T<sub>J</sub> = 25 °C unless otherwise specified.

| BZX284-<br>Bxxx<br>Cxxx | WORKING VOLTAGE<br>V <sub>Z</sub> (V)<br>at I <sub>Ztest</sub> = 2 mA |       |              | DIFFERENTIAL RESISTANCE<br>r <sub>dif</sub> (Ω) |                                |      |                              |      |      | TEMP. COEFF.<br>S <sub>Z</sub> (mV/K)<br>at I <sub>Ztest</sub> = 2 mA | DIODE CAP.<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>V <sub>R</sub> = 0 V |
|-------------------------|-----------------------------------------------------------------------|-------|--------------|-------------------------------------------------|--------------------------------|------|------------------------------|------|------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|
|                         | Tol. ±2% (B)                                                          |       | Tol. ±5% (C) |                                                 | at I <sub>Ztest</sub> = 0.5 mA |      | at I <sub>Ztest</sub> = 2 mA |      |      |                                                                       |                                                                            |
|                         | MIN.                                                                  | MAX.  | MIN.         | MAX.                                            | TYP.                           | MAX. | TYP.                         | MAX. |      |                                                                       |                                                                            |
| 27                      | 26.50                                                                 | 27.50 | 25.1         | 28.9                                            | 35                             | 250  | 8                            | 40   | 23.4 | 73                                                                    |                                                                            |
| 30                      | 29.40                                                                 | 30.60 | 28.0         | 32.0                                            | 35                             | 250  | 10                           | 40   | 26.6 | 66                                                                    |                                                                            |
| 33                      | 32.30                                                                 | 33.70 | 31.0         | 35.0                                            | 40                             | 275  | 11                           | 40   | 29.7 | 60                                                                    |                                                                            |
| 36                      | 35.30                                                                 | 36.70 | 34.0         | 38.0                                            | 40                             | 300  | 15                           | 60   | 33.0 | 59                                                                    |                                                                            |
| 39                      | 38.20                                                                 | 39.80 | 37.0         | 41.0                                            | 40                             | 300  | 25                           | 75   | 36.4 | 58                                                                    |                                                                            |
| 43                      | 42.10                                                                 | 43.90 | 40.0         | 46.0                                            | 45                             | 325  | 30                           | 80   | 41.2 | 56                                                                    |                                                                            |
| 47                      | 46.10                                                                 | 47.90 | 44.0         | 50.0                                            | 45                             | 325  | 30                           | 90   | 46.1 | 55                                                                    |                                                                            |
| 51                      | 50.00                                                                 | 52.00 | 48.0         | 54.0                                            | 45                             | 350  | 35                           | 110  | 51.0 | 52                                                                    |                                                                            |
| 56                      | 54.90                                                                 | 57.10 | 52.0         | 60.0                                            | 50                             | 375  | 40                           | 120  | 57.0 | 49                                                                    |                                                                            |
| 62                      | 60.80                                                                 | 63.20 | 58.0         | 66.0                                            | 60                             | 400  | 50                           | 140  | 64.4 | 44                                                                    |                                                                            |
| 68                      | 66.60                                                                 | 69.40 | 64.0         | 72.0                                            | 75                             | 400  | 55                           | 160  | 71.7 | 40                                                                    |                                                                            |
| 75                      | 73.50                                                                 | 76.50 | 70.0         | 79.0                                            | 85                             | 400  | 70                           | 175  | 80.2 | 35                                                                    |                                                                            |

Voltage regulator diodes

BZX284 series

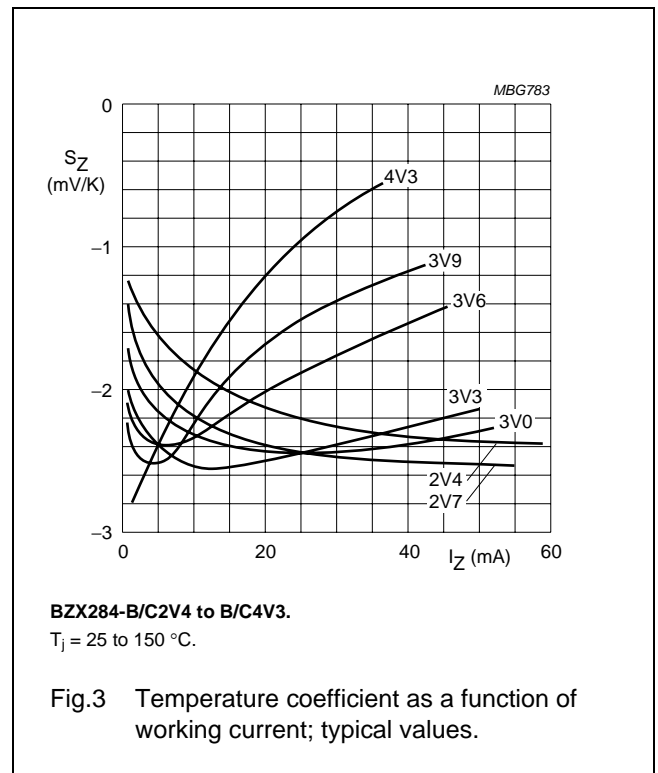
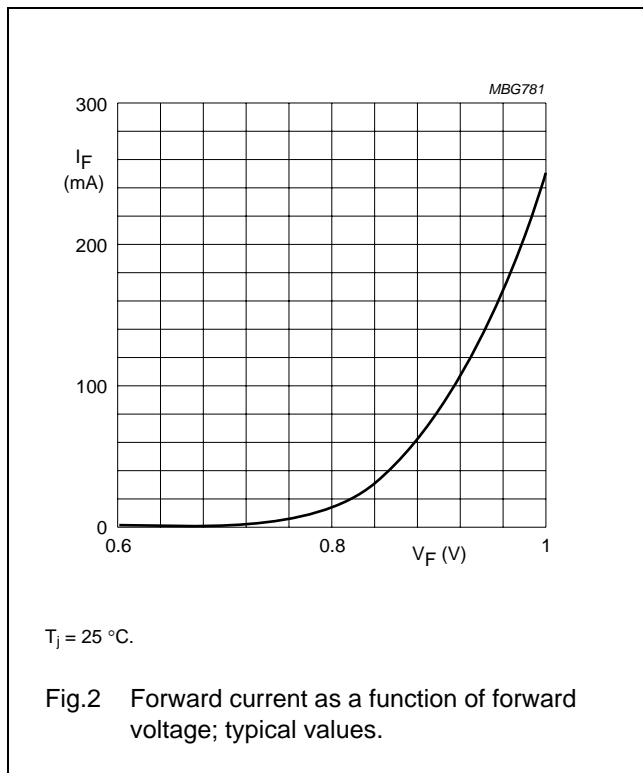
**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---------------------------------------------|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1     | 315   | K/W  |

**Note**

1. Device mounted on a printed-circuit board: 11 × 25 × 1.6 mm.

**GRAPHICAL DATA**



Voltage regulator diodes

BZX284 series



Voltage regulator diodes

BZX284 series

PACKAGE OUTLINE

Very small ceramic rectangular surface mounted package

SOD110

**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max. | D            | E            | y   |
|------|--------|--------------|--------------|-----|
| mm   | 1.6    | 2.10<br>1.90 | 1.40<br>1.10 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |            |
| SOD110          |            |       |      |  |                     | 97-04-14   |

Voltage regulator diodes

BZX284 series

**DATA SHEET STATUS**

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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