



**THE DATASHEET OF
BZX284-C3V9,115**



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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; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ prior to surge | see Tables 1 and 2 | | |
| P_{tot} | total power dissipation | $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$; note 1 | – | 400 | mW |
| T_{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 | μA |
| | BZX284-B/C2V7 | $V_R = 1 \text{ V}$ | 20 | μA |
| | BZX284-B/C3V0 | $V_R = 1 \text{ V}$ | 10 | μA |
| | BZX284-B/C3V3 | $V_R = 1 \text{ V}$ | 5 | μA |
| | BZX284-B/C3V6 | $V_R = 1 \text{ V}$ | 5 | μA |
| | BZX284-B/C3V9 | $V_R = 1 \text{ V}$ | 3 | μA |
| | BZX284-B/C4V3 | $V_R = 1 \text{ V}$ | 3 | μA |
| | BZX284-B/C4V7 | $V_R = 2 \text{ V}$ | 3 | μA |
| | BZX284-B/C5V1 | $V_R = 2 \text{ V}$ | 2 | μA |
| | BZX284-B/C5V6 | $V_R = 2 \text{ V}$ | 1 | μA |
| | BZX284-B/C6V2 | $V_R = 4 \text{ V}$ | 3 | μA |
| | BZX284-B/C6V8 | $V_R = 4 \text{ V}$ | 2 | μA |
| | BZX284-B/C7V5 | $V_R = 5 \text{ V}$ | 1 | μA |
| | 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_j = 25 °C unless otherwise specified.

| BZX284- Bxxx Cxxx | WORKING VOLTAGE V _Z (V) at I _{Ztest} = 5 mA | | | DIFFERENTIAL RESISTANCE r _{diff} (Ω) | | | | | | TEMP. COEFF. S _Z (mV/K) at I _{Ztest} = 5 mA (see Figs 3 and 4) | DIODE CAP. C _d (pF) at f = 1 MHz; V _R = 0 V |
|-------------------------|---|-------|--------------|--|------|------------------------------|------|------|------|---|--|
| | V _Z (V) at I _{Ztest} = 5 mA | | Tol. ±5% (C) | at I _{Ztest} = 1 mA | | at I _{Ztest} = 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_J = 25 °C unless otherwise specified.

| BZX284- Bxxx Cxxx | WORKING VOLTAGE V _Z (V) at I _{Ztest} = 2 mA | | | DIFFERENTIAL RESISTANCE r _{dif} (Ω) | | | | | | TEMP. COEFF. S _Z (mV/K) at I _{Ztest} = 2 mA | DIODE CAP. C _d (pF) at f = 1 MHz; V _R = 0 V |
|-------------------------|---|-------|--------------|---|--------------------------------|------|------------------------------|------|------|---|--|
| | Tol. ±2% (B) | | Tol. ±5% (C) | | at I _{Ztest} = 0.5 mA | | at I _{Ztest} = 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

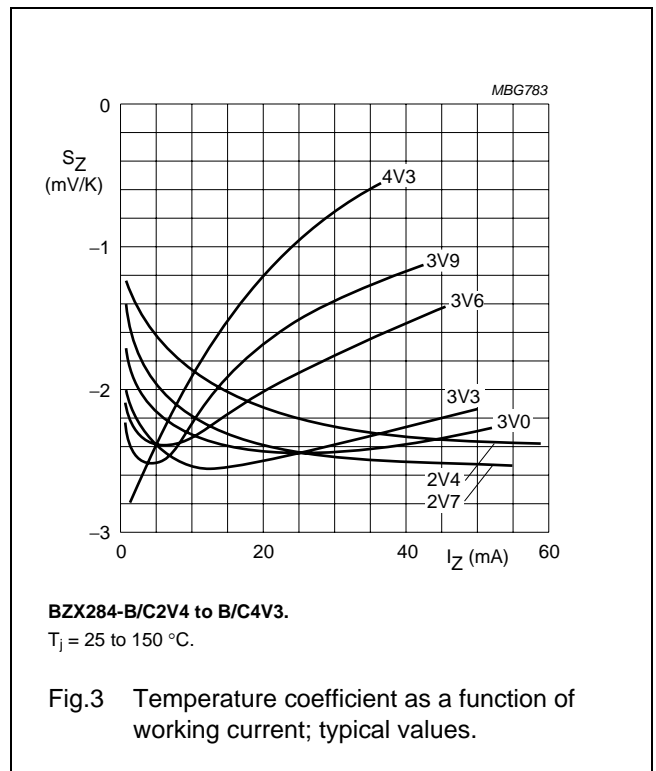
THERMAL CHARACTERISTICS

| 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 1.90 | 1.40 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

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|--------------------------------|-------------------------------|---|
| 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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