



**THE DATASHEET OF  
BZX79-C51,113**



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Team Nexperia

# DATA SHEET



## **BZX79 series** Voltage regulator diodes

Product data sheet  
Supersedes data of 1999 May 25

2002 Feb 27

# Voltage regulator diodes

# BZX79 series

### FEATURES

- Total power dissipation: max. 500 mW
- Two tolerance series:  $\pm 2\%$ , and approx.  $\pm 5\%$
- Working voltage range: nom. 2.4 to 75 V (E24 range)
- Non-repetitive peak reverse power dissipation: max. 40 W.

### APPLICATIONS

- Low voltage stabilizers or voltage references.

### DESCRIPTION

Low-power voltage regulator diodes in hermetically sealed leaded glass SOD27 (DO-35) packages. The diodes are available in the normalized E24  $\pm 2\%$  (BZX79-B) and approx.  $\pm 5\%$  (BZX79-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V.



### 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           | $t_p = 100 \mu s$ ; square wave;<br>$T_j = 25 \text{ }^\circ\text{C}$ prior to surge            | see Tables 1 and 2 |      | A                |
| $P_{tot}$ | total power dissipation                       | $T_{amb} = 50 \text{ }^\circ\text{C}$ ; note 1  | –                  | 400  | mW               |
|           |   | $T_{amb} = 50 \text{ }^\circ\text{C}$ ; note 2  | –                  | 500  | mW               |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p = 100 \mu s$ ; square wave;<br>$T_j = 25 \text{ }^\circ\text{C}$ prior to surge; see Fig.3 | –                  | 40   | W                |
| $T_{stg}$ | storage temperature                           |   | –65                | +200 | $^\circ\text{C}$ |
| $T_j$     | junction temperature                          |   | –65                | +200 | $^\circ\text{C}$ |

### Notes

1. Device mounted on a printed circuit-board without metallization pad; lead length max.
2. Tie-point temperature  $\leq 50 \text{ }^\circ\text{C}$ ; max. lead length 8 mm.

### ELECTRICAL CHARACTERISTICS

#### Total BZX79-B and BZX79-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.4 | 0.9  | V    |

## Voltage regulator diodes

## BZX79 series

| SYMBOL                     | PARAMETER           | CONDITIONS         | MAX. | UNIT          |
|----------------------------|---------------------|--------------------|------|---------------|
| $I_R$                      | reverse current     |                    |      |               |
|                            | BZX79-B/C2V4        | $V_R = 1\text{ V}$ | 50   | $\mu\text{A}$ |
|                            | BZX79-B/C2V7        | $V_R = 1\text{ V}$ | 20   | $\mu\text{A}$ |
|                            | BZX79-B/C3V0        | $V_R = 1\text{ V}$ | 10   | $\mu\text{A}$ |
|                            | BZX79-B/C3V3        | $V_R = 1\text{ V}$ | 5    | $\mu\text{A}$ |
|                            | BZX79-B/C3V6        | $V_R = 1\text{ V}$ | 5    | $\mu\text{A}$ |
|                            | BZX79-B/C3V9        | $V_R = 1\text{ V}$ | 3    | $\mu\text{A}$ |
|                            | BZX79-B/C4V3        | $V_R = 1\text{ V}$ | 3    | $\mu\text{A}$ |
|                            | BZX79-B/C4V7        | $V_R = 2\text{ V}$ | 3    | $\mu\text{A}$ |
|                            | BZX79-B/C5V1        | $V_R = 2\text{ V}$ | 2    | $\mu\text{A}$ |
|                            | BZX79-B/C5V6        | $V_R = 2\text{ V}$ | 1    | $\mu\text{A}$ |
|                            | BZX79-B/C6V2        | $V_R = 4\text{ V}$ | 3    | $\mu\text{A}$ |
|                            | BZX79-B/C6V8        | $V_R = 4\text{ V}$ | 2    | $\mu\text{A}$ |
|                            | BZX79-B/C7V5        | $V_R = 5\text{ V}$ | 1    | $\mu\text{A}$ |
|                            | BZX79-B/C8V2        | $V_R = 5\text{ V}$ | 700  | nA            |
|                            | BZX79-B/C9V1        | $V_R = 6\text{ V}$ | 500  | nA            |
|                            | BZX79-B/C10         | $V_R = 7\text{ V}$ | 200  | nA            |
|                            | BZX79-B/C11         | $V_R = 8\text{ V}$ | 100  | nA            |
|                            | BZX79-B/C12         | $V_R = 8\text{ V}$ | 100  | nA            |
|                            | BZX79-B/C13         | $V_R = 8\text{ V}$ | 100  | nA            |
| BZX79-B/C15 to BZX79-B/C75 | $V_R = 0.7V_{Znom}$ | 50                 | nA   |               |

**Table 1** Per type, BZX79-B/C2V4 to BZX79-B/C24T<sub>j</sub> = 25 °C unless otherwise specified.

| BZX79-<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 5 and 6) |      |      | DIODECAP.<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>V <sub>R</sub> = 0 V<br>at t |      |     |     |
|------------------------|---|-------|-------------------------|--|------|------------------------------|---|------|------|---|------|-----|-----|
|                        | Tol. ±2% (B)  |       | Tol. approx.<br>±5% (C) | at I <sub>ztest</sub> = 1 mA                     |      | at I <sub>ztest</sub> = 5 mA |   | MIN. | TYP. |   | MAX. |     |     |
|                        | MIN.  | MAX.  | MIN.                    | MAX.   | TYP. | MAX.                         | TYP.  | MAX. |      |   |      |     |     |
| 2V4                    | 2.35  | 2.45  | 2.2                     | 2.6  | 275  | 600                          | 70  | 100  | -3.5 | -1.6  | 0    | 450 | 6.0 |
| 2V7                    | 2.65  | 2.75  | 2.5                     | 2.9  | 300  | 600                          | 75  | 100  | -3.5 | -2.0  | 0    | 450 | 6.0 |
| 3V0                    | 2.94  | 3.06  | 2.8                     | 3.2  | 325  | 600                          | 80  | 95   | -3.5 | -2.1  | 0    | 450 | 6.0 |
| 3V3                    | 3.23  | 3.37  | 3.1                     | 3.5  | 350  | 600                          | 85  | 95   | -3.5 | -2.4  | 0    | 450 | 6.0 |
| 3V6                    | 3.53  | 3.67  | 3.4                     | 3.8  | 375  | 600                          | 85  | 90   | -3.5 | -2.4  | 0    | 450 | 6.0 |
| 3V9                    | 3.82  | 3.98  | 3.7                     | 4.1  | 400  | 600                          | 85  | 90   | -3.5 | -2.5  | 0    | 450 | 6.0 |
| 4V3                    | 4.21  | 4.39  | 4.0                     | 4.6  | 410  | 600                          | 80  | 90   | -3.5 | -2.5  | 0    | 450 | 6.0 |
| 4V7                    | 4.61  | 4.79  | 4.4                     | 5.0  | 425  | 500                          | 50  | 80   | -3.5 | -1.4  | 0.2  | 300 | 6.0 |
| 5V1                    | 5.00  | 5.20  | 4.8                     | 5.4  | 400  | 480                          | 40  | 60   | -2.7 | -0.8  | 1.2  | 300 | 6.0 |
| 5V6                    | 5.49  | 5.71  | 5.2                     | 6.0  | 80   | 400                          | 15  | 40   | -2.0 | 1.2   | 2.5  | 300 | 6.0 |
| 6V2                    | 6.08  | 6.32  | 5.8                     | 6.6  | 40   | 150                          | 6   | 10   | 0.4  | 2.3   | 3.7  | 200 | 6.0 |
| 6V8                    | 6.66  | 6.94  | 6.4                     | 7.2  | 30   | 80                           | 6   | 15   | 1.2  | 3.0   | 4.5  | 200 | 6.0 |
| 7V5                    | 7.35  | 7.65  | 7.0                     | 7.9  | 30   | 80                           | 6   | 15   | 2.5  | 4.0   | 5.3  | 150 | 4.0 |
| 8V2                    | 8.04  | 8.36  | 7.7                     | 8.7  | 40   | 80                           | 6   | 15   | 3.2  | 4.6   | 6.2  | 150 | 4.0 |
| 9V1                    | 8.92  | 9.28  | 8.5                     | 9.6  | 40   | 100                          | 6   | 15   | 3.8  | 5.5   | 7.0  | 150 | 3.0 |
| 10                     | 9.80  | 10.20 | 9.4                     | 10.6   | 50   | 150                          | 8   | 20   | 4.5  | 6.4   | 8.0  | 90  | 3.0 |
| 11                     | 10.80   | 11.20 | 10.4                    | 11.6   | 50   | 150                          | 10  | 20   | 5.4  | 7.4   | 9.0  | 85  | 2.5 |
| 12                     | 11.80   | 12.20 | 11.4                    | 12.7   | 50   | 150                          | 10  | 25   | 6.0  | 8.4   | 10.0 | 85  | 2.5 |
| 13                     | 12.70   | 13.30 | 12.4                    | 14.1   | 50   | 170                          | 10  | 30   | 7.0  | 9.4   | 11.0 | 80  | 2.5 |
| 15                     | 14.70   | 15.30 | 13.8                    | 15.6   | 50   | 200                          | 10  | 30   | 9.2  | 11.4  | 13.0 | 75  | 2.0 |
| 16                     | 15.70   | 16.30 | 15.3                    | 17.1   | 50   | 200                          | 10  | 40   | 10.4 | 12.4  | 14.0 | 75  | 1.5 |
| 18                     | 17.60   | 18.40 | 16.8                    | 19.1   | 50   | 225                          | 10  | 45   | 12.4 | 14.4  | 16.0 | 70  | 1.5 |
| 20                     | 19.60   | 20.40 | 18.8                    | 21.2   | 60   | 225                          | 15  | 55   | 12.3 | 15.6  | 18.0 | 60  | 1.5 |
| 22                     | 21.60   | 22.40 | 20.8                    | 23.3   | 60   | 250                          | 20  | 55   | 14.1 | 17.6  | 20.0 | 60  | 1.2 |
| 24                     | 23.50   | 24.50 | 22.8                    | 25.6   | 60   | 250                          | 25  | 70   | 15.9 | 19.6  | 22.0 | 55  | 1.2 |

**Table 2** Per type, BZX79-B/C27 to BZX79-B/C75 $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

| BZX79-<br>Bxxx<br>Cxxx | WORKING VOLTAGE<br>$V_z$ (V)<br>at $I_{ztest} = 2\text{ mA}$ |       |                               | DIFFERENTIAL RESISTANCE<br>$r_{diff}$ ( $\Omega$ )          |      |      | TEMP. COEFF.<br>$S_z$ (mV/K)<br>at $I_{ztest} = 2\text{ mA}$<br>(see Figs 5 and 6) |      |      | DIODECAP.<br>$C_d$ (pF)<br>at $f = 1\text{ MHz}$ ;<br>$V_R = 0\text{ V}$<br>at $t$ |      |    |     |
|------------------------|--|-------|-------------------------------|---|------|------|--|------|------|--|------|----|-----|
|                        | Tol. $\pm 2\%$ (B)   |       | Tol. approx.<br>$\pm 5\%$ (C) | at $I_{ztest} = 0.5\text{ mA}$ at $I_{ztest} = 2\text{ mA}$ |      |      | MIN.   | TYP. | MAX. |  |      |    |     |
|                        | MIN.   | MAX.  | MIN.                          | MAX.  | TYP. | MAX. | MIN.   | TYP. | MAX. |  |      |    |     |
| 27                     | 26.50  | 27.50 | 25.1                          | 28.9  | 65   | 300  | 25   | 80   | 18.0 | 22.7   | 25.3 | 50 | 1.0 |
| 30                     | 29.40  | 30.60 | 28.0                          | 32.0  | 70   | 300  | 30   | 80   | 20.6 | 25.7   | 29.4 | 50 | 1.0 |
| 33                     | 32.30  | 33.70 | 31.0                          | 35.0  | 75   | 325  | 35   | 80   | 23.3 | 28.7   | 33.4 | 45 | 0.9 |
| 36                     | 35.30  | 36.70 | 34.0                          | 38.0  | 80   | 350  | 35   | 90   | 26.0 | 31.8   | 37.4 | 45 | 0.8 |
| 39                     | 38.20  | 39.80 | 37.0                          | 41.0  | 80   | 350  | 40   | 130  | 28.7 | 34.8   | 41.2 | 45 | 0.7 |
| 43                     | 42.10  | 43.90 | 40.0                          | 46.0  | 85   | 375  | 45   | 150  | 31.4 | 38.8   | 46.6 | 40 | 0.6 |
| 47                     | 46.10  | 47.90 | 44.0                          | 50.0  | 85   | 375  | 50   | 170  | 35.0 | 42.9   | 51.8 | 40 | 0.5 |
| 51                     | 50.00  | 52.00 | 48.0                          | 54.0  | 90   | 400  | 60   | 180  | 38.6 | 46.9   | 57.2 | 40 | 0.4 |
| 56                     | 54.90  | 57.10 | 52.0                          | 60.0  | 100  | 425  | 70   | 200  | 42.2 | 52.0   | 63.8 | 40 | 0.3 |
| 62                     | 60.80  | 63.20 | 58.0                          | 66.0  | 120  | 450  | 80   | 215  | 58.8 | 64.4   | 71.6 | 35 | 0.3 |
| 68                     | 66.60  | 69.40 | 64.0                          | 72.0  | 150  | 475  | 90   | 240  | 65.6 | 71.7   | 79.8 | 35 | 0.2 |
| 75                     | 73.50  | 76.50 | 70.0                          | 79.0  | 170  | 500  | 95   | 255  | 73.4 | 80.2   | 88.6 | 35 | 0.2 |

Voltage regulator diodes

BZX79 series

**THERMAL CHARACTERISTICS**

| SYMBOL         | PARAMETER                                     | CONDITIONS                             | VALUE | UNIT |
|----------------|---|--|-------|------|
| $R_{th\ j-tp}$ | thermal resistance from junction to tie-point | lead length 8 mm.                      | 300   | K/W  |
| $R_{th\ j-a}$  | thermal resistance from junction to ambient   | lead length max.; see Fig.2 and note 1 | 380   | K/W  |

**Note**

1. Device mounted on a printed circuit-board without metallization pad.

**GRAPHICAL DATA**



Voltage regulator diodes

BZX79 series



Voltage regulator diodes

BZX79 series

**PACKAGE OUTLINE**

Hermetically sealed glass package; axial leaded; 2 leads

**SOD27**



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

| UNIT | b<br>max. | D<br>max. | G <sub>1</sub><br>max. | L<br>min. |
|------|-----------|-----------|------------------------|-----------|
| mm   | 0.56      | 1.85      | 4.25                   | 25.4      |



**Note**

1. The marking band indicates the cathode.

| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|--|------------------------|------------|
|                    | IEC        | JEDEC | EIAJ  |  |                        |            |
| SOD27              | A24        | DO-35 | SC-40 |  |                        | 97-06-09   |

## Voltage regulator diodes

## BZX79 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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Printed in The Netherlands

613514/03/pp10



Date of release: 2002 Feb 27

Document order number: 9397 750 09387



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