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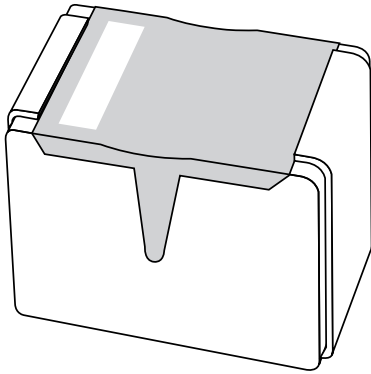
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Kind regards,

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

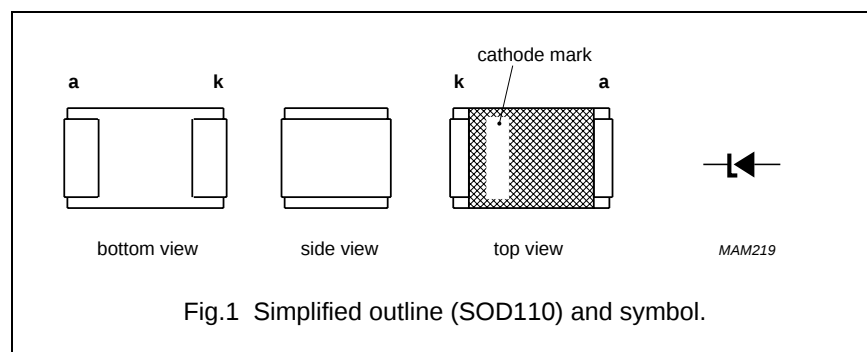
- Total power dissipation:  
max. 400 mW
- Two tolerance series:  
 $\pm 2\%$  and  $\pm 5\%$
- Working voltage range:  
nom. 2.4 to 75 V (E24 range).

## 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.



## 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 | $t_p = 100 \mu s$ ; square wave;<br>$T_{amb} = 25^\circ C$ prior to surge | see Tables 1 and 2 |      |            |
| $P_{tot}$ | total power dissipation             | $T_{amb} = 25^\circ C$ ; note 1                                           | –                  | 400  | mW         |
| $T_{stg}$ | storage temperature                 |                                                                           | –65                | +150 | $^\circ C$ |
| $T_j$     | junction temperature                |                                                                           | –                  | 150  | $^\circ C$ |

## Note

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

## ELECTRICAL CHARACTERISTICS

## Total BZX284-B and BZX284-C series

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

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

## Voltage regulator diodes

## BZX284 series

**Table 1** Per type BZX284-B/C2V4 to B/C24 $T_j = 25\text{ }^{\circ}\text{C}$  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>dif</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 | NON-REPETITIVE PEAK<br>REVERSE CURRENT<br>I <sub>ZSM</sub> (A) at t <sub>p</sub> = 100 μs;<br>T <sub>amb</sub> = 25 °C |
|-------------------------|-----------------------------------------------------------------------|-------|--------------|------|-------------------------------------------------|------|------------------------------|------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|                         | Tol. ±2% (B)                                                          |       | Tol. ±5% (C) |      | at I <sub>Ztest</sub> = 1 mA                    |      | at I <sub>Ztest</sub> = 5 mA |      |                                                                                             |                                                                            |                                                                                                                        |
|                         | MIN.                                                                  | MAX.  | MIN.         | MAX. | TYP.                                            | MAX. | TYP.                         | MAX. | TYP.                                                                                        | MAX.                                                                       | MAX.                                                                                                                   |
| 2V4                     | 2.35                                                                  | 2.45  | 2.2          | 2.6  | 275                                             | 400  | 70                           | 100  | −1.6                                                                                        | 450                                                                        | 12.0                                                                                                                   |
| 2V7                     | 2.65                                                                  | 2.75  | 2.5          | 2.9  | 300                                             | 450  | 75                           | 100  | −2.0                                                                                        | 440                                                                        | 12.0                                                                                                                   |
| 3V0                     | 2.94                                                                  | 3.06  | 2.8          | 3.2  | 325                                             | 500  | 80                           | 95   | −2.1                                                                                        | 425                                                                        | 12.0                                                                                                                   |
| 3V3                     | 3.23                                                                  | 3.37  | 3.1          | 3.5  | 350                                             | 500  | 85                           | 95   | −2.4                                                                                        | 410                                                                        | 12.0                                                                                                                   |
| 3V6                     | 3.53                                                                  | 3.67  | 3.4          | 3.8  | 375                                             | 500  | 85                           | 90   | −2.4                                                                                        | 390                                                                        | 12.0                                                                                                                   |
| 3V9                     | 3.82                                                                  | 3.98  | 3.7          | 4.1  | 400                                             | 500  | 85                           | 90   | −2.5                                                                                        | 370                                                                        | 12.0                                                                                                                   |
| 4V3                     | 4.21                                                                  | 4.39  | 4.0          | 4.6  | 410                                             | 600  | 80                           | 90   | −2.5                                                                                        | 350                                                                        | 12.0                                                                                                                   |
| 4V7                     | 4.61                                                                  | 4.79  | 4.4          | 5.0  | 425                                             | 500  | 50                           | 80   | −1.4                                                                                        | 325                                                                        | 12.0                                                                                                                   |
| 5V1                     | 5.00                                                                  | 5.20  | 4.8          | 5.4  | 400                                             | 480  | 40                           | 60   | −0.8                                                                                        | 300                                                                        | 12.0                                                                                                                   |
| 5V6                     | 5.49                                                                  | 5.71  | 5.2          | 6.0  | 80                                              | 400  | 15                           | 40   | 1.2                                                                                         | 275                                                                        | 12.0                                                                                                                   |
| 6V2                     | 6.08                                                                  | 6.32  | 5.8          | 6.6  | 40                                              | 150  | 6                            | 10   | 2.3                                                                                         | 250                                                                        | 12.0                                                                                                                   |
| 6V8                     | 6.66                                                                  | 6.94  | 6.4          | 7.2  | 30                                              | 80   | 6                            | 15   | 3.0                                                                                         | 215                                                                        | 12.0                                                                                                                   |
| 7V5                     | 7.35                                                                  | 7.65  | 7.0          | 7.9  | 15                                              | 80   | 2                            | 10   | 4.0                                                                                         | 170                                                                        | 4.0                                                                                                                    |
| 8V2                     | 8.04                                                                  | 8.36  | 7.7          | 8.7  | 20                                              | 80   | 2                            | 10   | 4.6                                                                                         | 150                                                                        | 4.0                                                                                                                    |
| 9V1                     | 8.92                                                                  | 9.28  | 8.5          | 9.6  | 20                                              | 100  | 2                            | 10   | 5.5                                                                                         | 120                                                                        | 3.0                                                                                                                    |
| 10                      | 9.80                                                                  | 10.20 | 9.4          | 10.6 | 20                                              | 150  | 2                            | 10   | 6.4                                                                                         | 110                                                                        | 3.0                                                                                                                    |
| 11                      | 10.80                                                                 | 11.20 | 10.4         | 11.6 | 25                                              | 150  | 2                            | 10   | 7.4                                                                                         | 108                                                                        | 2.5                                                                                                                    |
| 12                      | 11.80                                                                 | 12.20 | 11.4         | 12.7 | 25                                              | 150  | 2                            | 10   | 8.4                                                                                         | 105                                                                        | 2.5                                                                                                                    |
| 13                      | 12.70                                                                 | 13.30 | 12.4         | 14.1 | 25                                              | 170  | 2                            | 10   | 9.4                                                                                         | 103                                                                        | 2.5                                                                                                                    |
| 15                      | 14.70                                                                 | 15.30 | 13.8         | 15.6 | 25                                              | 200  | 3                            | 15   | 11.4                                                                                        | 99                                                                         | 2.0                                                                                                                    |
| 16                      | 15.70                                                                 | 16.30 | 15.3         | 17.1 | 25                                              | 200  | 4                            | 20   | 12.4                                                                                        | 97                                                                         | 1.5                                                                                                                    |
| 18                      | 17.60                                                                 | 18.40 | 16.8         | 19.1 | 25                                              | 225  | 4                            | 20   | 14.4                                                                                        | 93                                                                         | 1.5                                                                                                                    |
| 20                      | 19.60                                                                 | 20.40 | 18.8         | 21.2 | 30                                              | 225  | 4                            | 20   | 16.4                                                                                        | 88                                                                         | 1.5                                                                                                                    |
| 22                      | 21.60                                                                 | 22.40 | 20.8         | 23.3 | 30                                              | 250  | 5                            | 25   | 18.4                                                                                        | 84                                                                         | 1.25                                                                                                                   |
| 24                      | 23.50                                                                 | 24.50 | 22.8         | 25.6 | 30                                              | 250  | 6                            | 30   | 20.4                                                                                        | 80                                                                         | 1.25                                                                                                                   |

Voltage regulator diodes

BZX284 series

**Table 2** Per type BZX284-B/C27 to B/C75  
T<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 | NON-REPETITIVE PEAK<br>REVERSE CURRENT<br>I <sub>ZSM</sub> (A) at t <sub>p</sub> = 100 μs;<br>T <sub>amb</sub> = 25 °C |
|-------------------------|-----------------------------------------------------------------------|-------|--------------|------|-------------------------------------------------|------|------------------------------|------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|                         | 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. | TYP.                                                                  | MAX.                                                                       | MAX.                                                                                                                   |
| 27                      | 26.50                                                                 | 27.50 | 25.1         | 28.9 | 35                                              | 250  | 8                            | 40   | 23.4                                                                  | 73                                                                         | 1.0                                                                                                                    |
| 30                      | 29.40                                                                 | 30.60 | 28.0         | 32.0 | 35                                              | 250  | 10                           | 40   | 26.6                                                                  | 66                                                                         | 1.0                                                                                                                    |
| 33                      | 32.30                                                                 | 33.70 | 31.0         | 35.0 | 40                                              | 275  | 11                           | 40   | 29.7                                                                  | 60                                                                         | 0.9                                                                                                                    |
| 36                      | 35.30                                                                 | 36.70 | 34.0         | 38.0 | 40                                              | 300  | 15                           | 60   | 33.0                                                                  | 59                                                                         | 0.8                                                                                                                    |
| 39                      | 38.20                                                                 | 39.80 | 37.0         | 41.0 | 40                                              | 300  | 25                           | 75   | 36.4                                                                  | 58                                                                         | 0.7                                                                                                                    |
| 43                      | 42.10                                                                 | 43.90 | 40.0         | 46.0 | 45                                              | 325  | 30                           | 80   | 41.2                                                                  | 56                                                                         | 0.6                                                                                                                    |
| 47                      | 46.10                                                                 | 47.90 | 44.0         | 50.0 | 45                                              | 325  | 30                           | 90   | 46.1                                                                  | 55                                                                         | 0.5                                                                                                                    |
| 51                      | 50.00                                                                 | 52.00 | 48.0         | 54.0 | 45                                              | 350  | 35                           | 110  | 51.0                                                                  | 52                                                                         | 0.4                                                                                                                    |
| 56                      | 54.90                                                                 | 57.10 | 52.0         | 60.0 | 50                                              | 375  | 40                           | 120  | 57.0                                                                  | 49                                                                         | 0.3                                                                                                                    |
| 62                      | 60.80                                                                 | 63.20 | 58.0         | 66.0 | 60                                              | 400  | 50                           | 140  | 64.4                                                                  | 44                                                                         | 0.3                                                                                                                    |
| 68                      | 66.60                                                                 | 69.40 | 64.0         | 72.0 | 75                                              | 400  | 55                           | 160  | 71.7                                                                  | 40                                                                         | 0.25                                                                                                                   |
| 75                      | 73.50                                                                 | 76.50 | 70.0         | 79.0 | 85                                              | 400  | 70                           | 175  | 80.2                                                                  | 35                                                                         | 0.2                                                                                                                    |

Voltage regulator diodes

BZX284 series

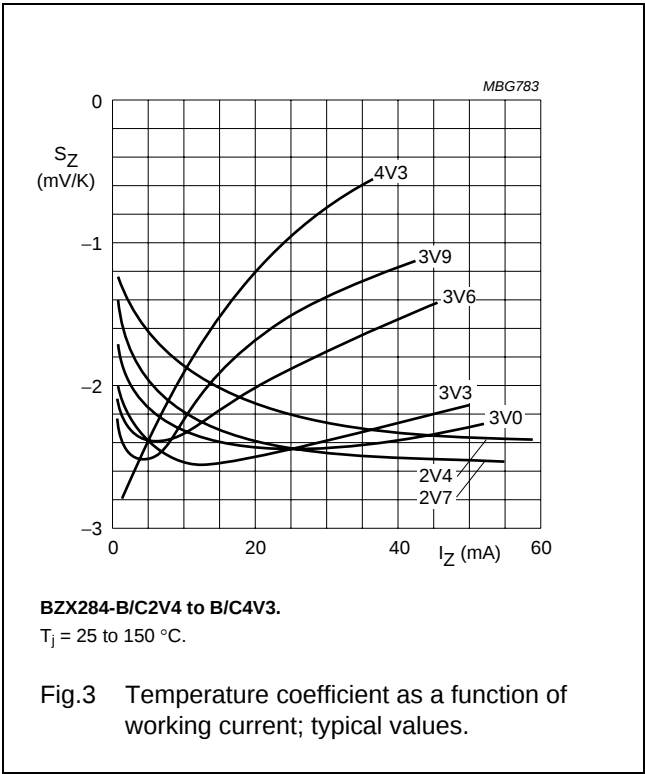
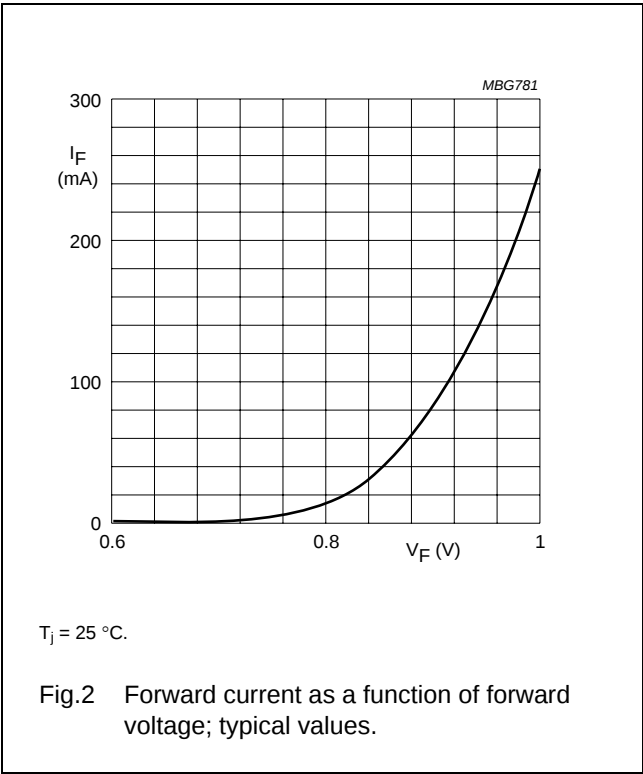
THERMAL CHARACTERISTICS

| SYMBOL              | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------------|---------------------------------------------|------------|-------|------|
| R <sub>th j-a</sub> | thermal resistance from junction to ambient | note 1     | 315   | K/W  |

Note

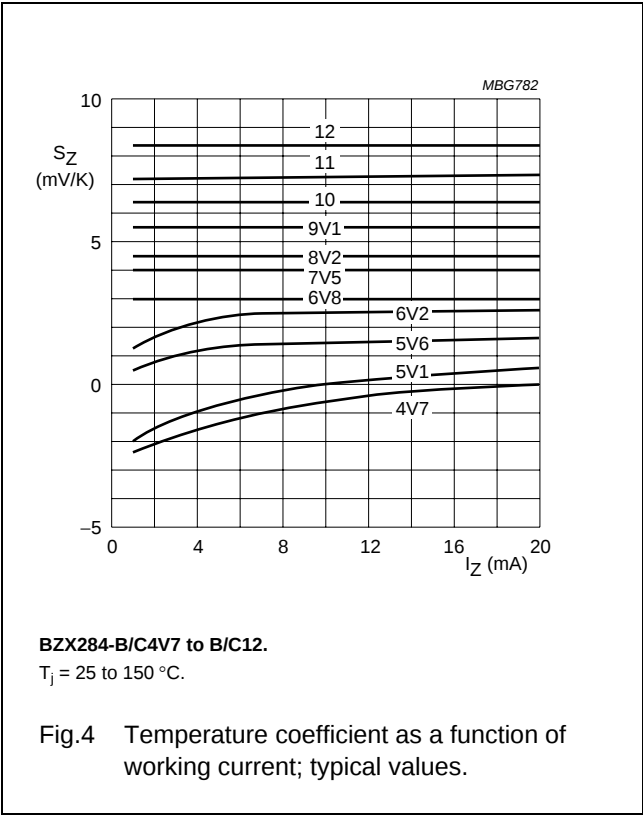
1. Device mounted on a printed-circuit board: 11 × 25 × 1.6 mm.

GRAPHICAL DATA



Voltage regulator diodes

BZX284 series



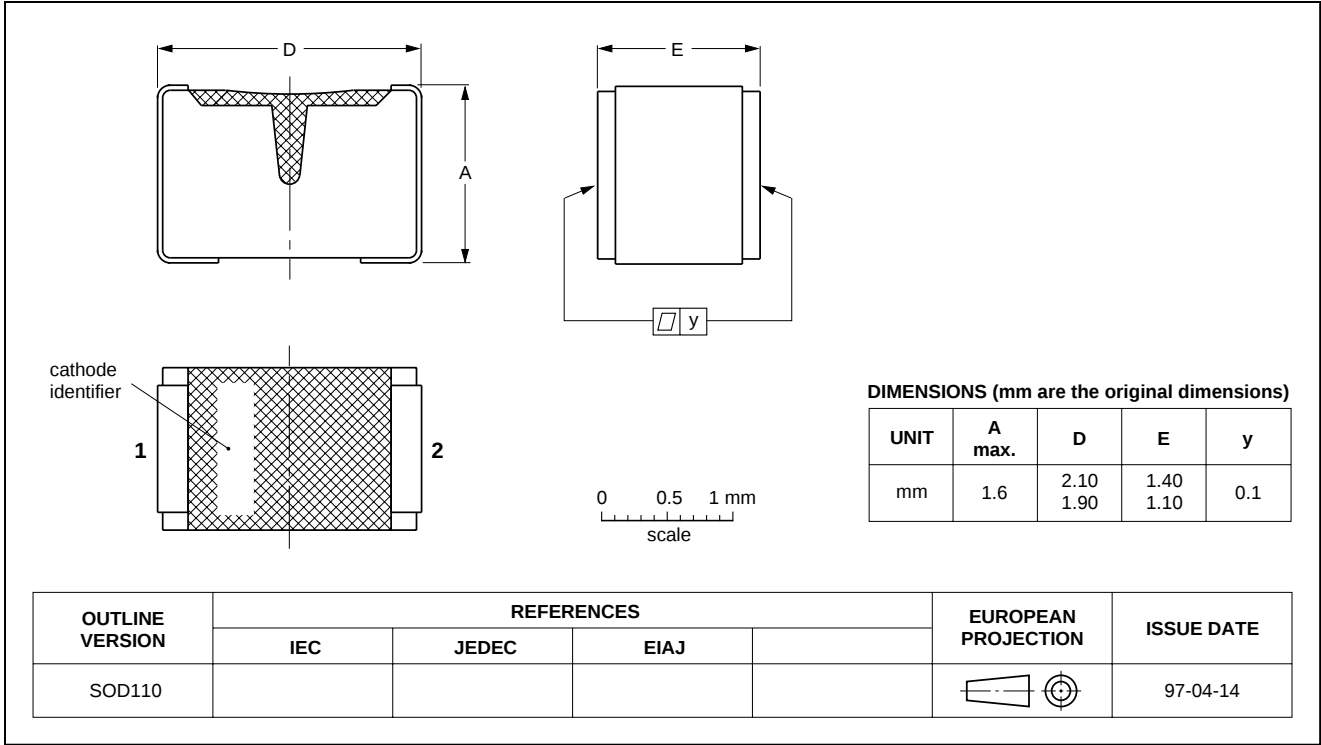
Voltage regulator diodes

BZX284 series

PACKAGE OUTLINE

Very small ceramic rectangular surface mounted package

SOD110



## 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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