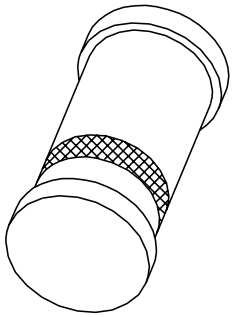
# DATA SHEET



# BZV55 series
## Voltage regulator diodes

Product specification
Supersedes data of 1999 May 21

2002 Feb 28

Philips
Semiconductors

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# Voltage regulator diodes BZV55 series

## FEATURES

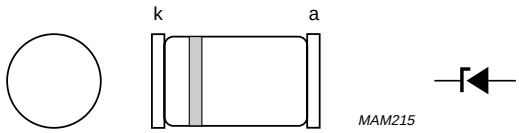
- Total power dissipation: max. 500 mW
- Two tolerance series: ±2%, and approx. ±5%
- Working voltage range: nom. 2.4 to 75 V (E24 range)
- Non-repetitive peak reverse power dissipation: max. 40 W.

## APPLICATIONS

- Low voltage stabilizers or voltage references.

## DESCRIPTION

Low-power voltage regulator diodes in small hermetically sealed glass SOD80C SMD packages. The diodes are available in the normalized E24 ±2% (BZV55-B) and approx. ±5% (BZV55-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V.




The cathode is indicated by a yellow band.

Fig.1 Simplified outline (SOD80C) and symbol.

## 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 µs; square wave; $T_j$ = 25 °C prior to surge | see Tables 1 and 2 | | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 50$ °C; note 1 | – | 400 | mW |
| | | tie-point ≤ 50 °C; note 1 | – | 500 | mW |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p$ = 100 µs; square wave; $T_j$ = 25 °C prior to surge; see Fig.3 | – | 40 | W |
| $T_{stg}$ | storage temperature | | –65 | +200 | °C |
| $T_j$ | junction temperature | | –65 | +200 | °C |

**Note**

1. Device mounted on a ceramic substrate of $10 \times 10 \times 0.6$ mm.

## ELECTRICAL CHARACTERISTICS

### Total BZV55-B and BZV55-C series

$T_j$ = 25 °C; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 10 mA; see Fig.4 | 0.9 | V |
| $I_R$ | reverse current | | | |
| | BZV55-B/C2V4 | $V_R$ = 1 V | 50 | µA |
| | BZV55-B/C2V7 | $V_R$ = 1 V | 20 | µA |
| | BZV55-B/C3V0 | $V_R$ = 1 V | 10 | µA |
| | BZV55-B/C3V3 | $V_R$ = 1 V | 5 | µA |
| | BZV55-B/C3V6 | $V_R$ = 1 V | 5 | µA |
| | BZV55-B/C3V9 | $V_R$ = 1 V | 3 | µA |
| | BZV55-B/C4V3 | $V_R$ = 1 V | 3 | µA |
| | BZV55-B/C4V7 | $V_R$ = 2 V | 3 | µA |
| | BZV55-B/C5V1 | $V_R$ = 2 V | 2 | µA |
| | BZV55-B/C5V6 | $V_R$ = 2 V | 1 | µA |
| | BZV55-B/C6V2 | $V_R$ = 4 V | 3 | µA |
| | BZV55-B/C6V8 | $V_R$ = 4 V | 2 | µA |
| | BZV55-B/C7V5 | $V_R$ = 5 V | 1 | µA |
| | BZV55-B/C8V2 | $V_R$ = 5 V | 700 | nA |
| | BZV55-B/C9V1 | $V_R$ = 6 V | 500 | nA |
| | BZV55-B/C10 | $V_R$ = 7 V | 200 | nA |
| | BZV55-B/C11 | $V_R$ = 8 V | 100 | nA |
| | BZV55-B/C12 | $V_R$ = 8 V | 100 | nA |
| | BZV55-B/C13 | $V_R$ = 8 V | 100 | nA |
| | BZV55-B/C15 to BZV55-B/C75 | $V_R = 0.7V_{Znom}$ | 50 | nA |

**Table 1** Per type, BZV55-**B/C2V4** to BZV55-**B/C24**

$T_j$ = 25 °C unless otherwise specified.

| BZV55-Bxxx Cxxx | WORKING VOLTAGE $V_Z$ (V) at $I_{Ztest}$ = 5 mA | | | | DIFFERENTIAL RESISTANCE $r_{dif}$ (Ω) | | | | TEMP. COEFF. $S_Z$ (mV/K) at $I_{Ztest}$ = 5 mA (see Figs 5 and 6) | | | DIODE CAP. $C_d$ (pF) at f = 1 MHz; $V_R$ = 0 V | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tol. ±2% (B) | | Tol. approx. ±5% (C) | | at $I_{Ztest}$ = 1 mA | | at $I_{Ztest}$ = 5 mA | | | | | | |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | MIN. | TYP. | MAX. | MAX. | 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 | 1.25 |
| 24 | 23.50 | 24.50 | 22.8 | 25.6 | 60 | 250 | 25 | 70 | 15.9 | 19.6 | 22.0 | 55 | 1.25 |

**Table 2** Per type, BZV55-**B/C27** to BZV55-**B/C75**

$T_j$ = 25 °C unless otherwise specified.

| BZV55-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 (see Figs 5 and 6) | | | DIODE CAP. $C_d$ (pF) at f = 1 MHz; $V_R$ = 0 V | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tol. ±2% (B) | | Tol. approx. ±5% (C) | | at $I_{Ztest}$ = 0.5 mA | | at $I_{Ztest}$ = 2 mA | | | | | | |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | MIN. | TYP. | MAX. | MAX. | 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 | 0.25 |
| 75 | 73.50 | 76.50 | 70.0 | 79.0 | 170 | 500 | 95 | 255 | 73.4 | 80.2 | 88.6 | 35 | 0.2 |

## THERMAL CHARACTERISTICS

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

**Note**

1. Device mounted on a ceramic substrate of $10 \times 10 \times 0.6$ mm.

## GRAPHICAL DATA

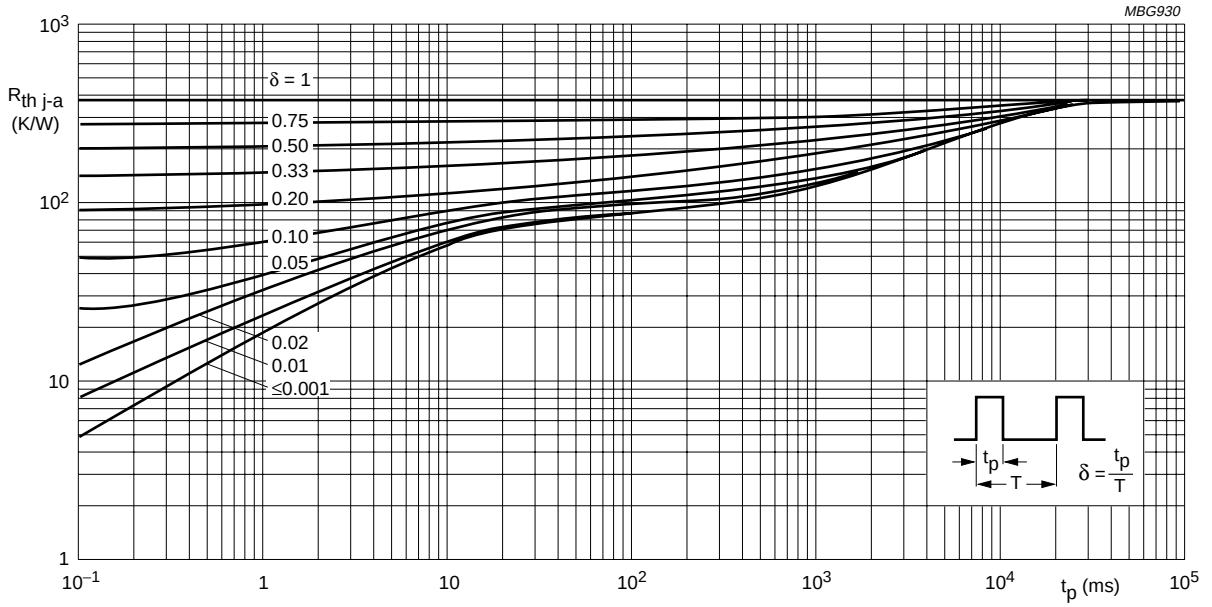
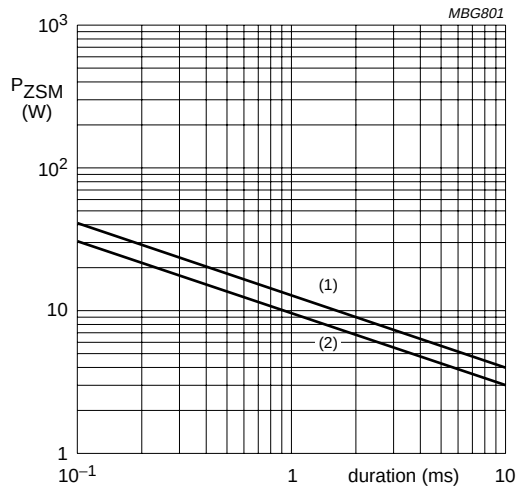
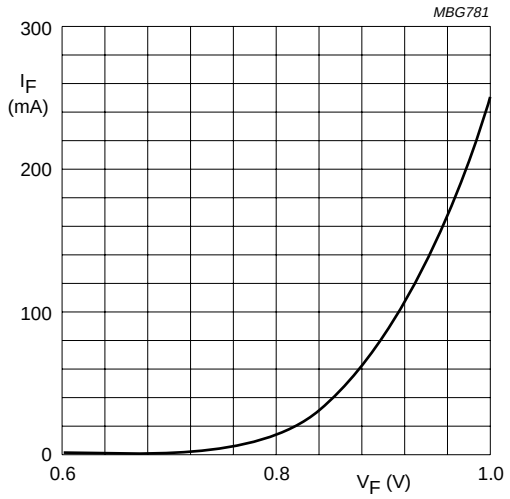



Fig.2 Thermal resistance from junction to ambient as a function of pulse duration.



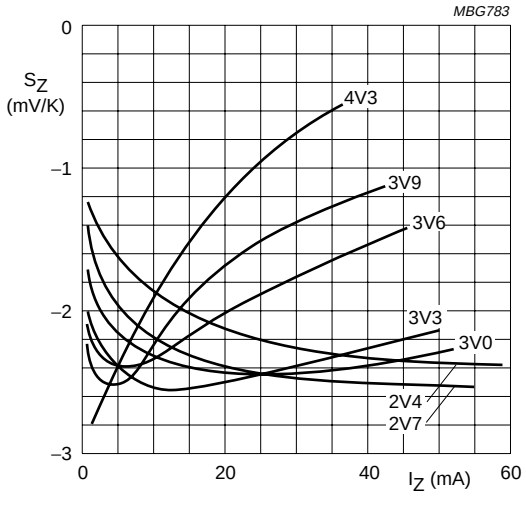

(1) $T_j$ = 25 °C (prior to surge).
(2) $T_j$ = 150 °C (prior to surge).

Fig.3 Maximum permissible non-repetitive peak reverse power dissipation versus duration.



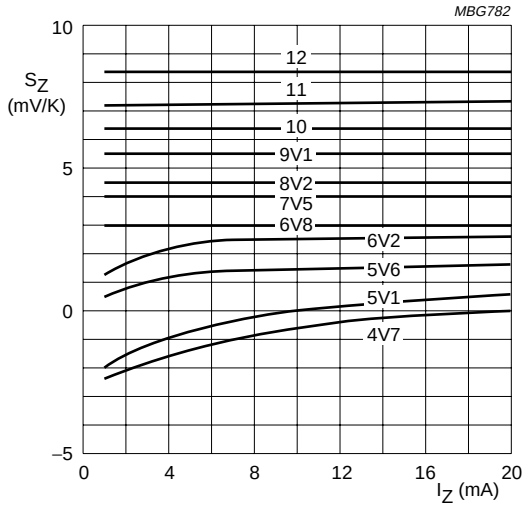

$T_j$ = 25 °C.

Fig.4 Typical forward current as a function of forward voltage.




**BZV55-B/C2V4 to BZV55-B/C4V3.**
$T_j$ = 25 to 150 °C.

Fig.5 Temperature coefficient as a function of working current; typical values.

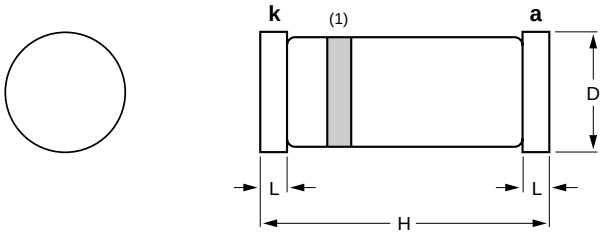



**BZV55-B/C4V7 to BZV55-B/C12.**
$T_j$ = 25 to 150 °C.

Fig.6 Temperature coefficient as a function of working current; typical values.

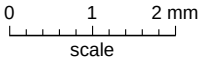
## PACKAGE OUTLINE

**Hermetically sealed glass surface mounted package; 2 connectors** **SOD80C**




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

| UNIT | D | H | L |
|---|---|---|---|
| mm | 1.60<br>1.45 | 3.7<br>3.3 | 0.3 |




**Note**

1. The marking band indicates the cathode.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOD80C | 100H01 | | | | | 97-06-20 |

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