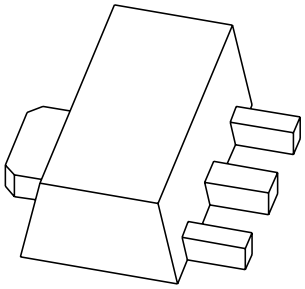
# DATA SHEET



# BZV49 series
## Voltage regulator diodes

Product data sheet
Supersedes data of 1999 May 11

2005 Feb 03

NXP founded by Philips

# Voltage regulator diodes BZV49 series

## FEATURES

- Total power dissipation: max. 1 W
- Tolerance series: approx. ±5%
- Working voltage range: nom. 2.4 to 75 V (E24 range)
- Non-repetitive peak reverse power dissipation: max. 40 W.

## APPLICATIONS

- General regulation functions.

## DESCRIPTION

Medium-power voltage regulator diodes in a SOT89 plastic SMD package.

The diodes are available in the normalized E24 approx. ±5% tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V (BZV49-C2V4 to BZV49-C75).

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | anode |
| 2 | cathode |
| 3 | anode |

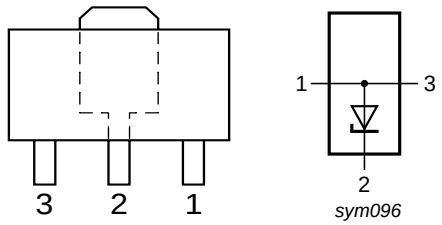



Fig.1 Simplified outline (SOT89) and symbol.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| BZV49-C2V4 to BZV49-C75 note 1 | SC-62 | plastic surface mounted package; collector pad for good heat transfer; 3 leads | SOT89 |

**Note**

1. The series consists of 37 types with nominal working voltages from 2.4 to 75 V (E24 range).

## MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|---|---|---|---|---|---|---|---|
| BZV49-C2V4 | 2Y4 | BZV49-C6V2 | 6Y2 | BZV49-C16 | 16Y | BZV49-C43 | 43Y |
| BZV49-C2V7 | 2Y7 | BZV49-C6V8 | 6Y8 | BZV49-C18 | 18Y | BZV49-C47 | 47Y |
| BZV49-C3V0 | 3Y0 | BZV49-C7V5 | 7Y5 | BZV49-C20 | 20Y | BZV49-C51 | 51Y |
| BZV49-C3Y3 | 3Y3 | BZV49-C8V2 | 8Y2 | BZV49-C22 | 22Y | BZV49-C56 | 56Y |
| BZV49-C3V6 | 3Y6 | BZV49-C9V1 | 9Y1 | BZV49-C24 | 24Y | BZV49-C62 | 62Y |
| BZV49-C3V9 | 3Y9 | BZV49-C10 | 10Y | BZV49-C27 | 27Y | BZV49-C68 | 68Y |
| BZV49-C4V3 | 4Y3 | BZV49-C11 | 11Y | BZV49-C30 | 30Y | BZV49-C75 | 75Y |
| BZV49-C4V7 | 4Y7 | BZV49-C12 | 12Y | BZV49-C33 | 33Y | – | – |
| BZV49-C5V1 | 5Y1 | BZV49-C13 | 13Y | BZV49-C36 | 36Y | – | – |
| BZV49-C5V6 | 5Y6 | BZV49-C15 | 15Y | BZV49-C39 | 39Y | – | – |

## 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 Table “Per type” | | |
| $P_{tot}$ | total power dissipation | $T_{amb}$ = 25 °C; note 1 | – | 1 | W |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p$ = 100 μs; square wave; $T_j$ = 25 °C prior to surge; see Fig.2 | – | 40 | W |
| $T_{stg}$ | storage temperature | | −65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |

**Note**

1. Device mounted on a ceramic substrate; area = 2.5 $cm^2$; thickness = 0.7 mm.

## ELECTRICAL CHARACTERISTICS

### Total series

$T_{amb}$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 50 mA; see Fig.3 | 1 | V |

**Per type**

$T_j$ = 25 °C unless otherwise specified.

| BZV49-CXXX | WORKING VOLTAGE $V_Z$ (V) at $I_{Ztest}$ | | DIFFERENTIAL RESISTANCE $r_{dif}$ (Ω) at $I_{Ztest}$ | | TEMP. COEFF. $S_Z$ (mV/K) at $I_{Ztest}$ see Figs 4 and 5 | | | TEST CURRENT $I_{Ztest}$ (mA) | DIODE CAP. $C_d$ (pF) at f = 1 MHz; at $V_R$ = 0 V | REVERSE CURRENT at REVERSE VOLTAGE | | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | $I_R$ (μA) | $V_R$ (V) | |
| | MIN. | MAX. | TYP. | MAX. | MIN. | TYP. | MAX. | | MAX. | MAX. | | MAX. |
| 2V4 | 2.2 | 2.6 | 70 | 100 | –3.5 | –1.6 | 0 | 5 | 450 | 50 | 1.0 | 6.0 |
| 2V7 | 2.5 | 2.9 | 75 | 100 | –3.5 | –2.0 | 0 | 5 | 450 | 20 | 1.0 | 6.0 |
| 3V0 | 2.8 | 3.2 | 80 | 95 | –3.5 | –2.1 | 0 | 5 | 450 | 10 | 1.0 | 6.0 |
| 3V3 | 3.1 | 3.5 | 85 | 95 | –3.5 | –2.4 | 0 | 5 | 450 | 5 | 1.0 | 6.0 |
| 3V6 | 3.4 | 3.8 | 85 | 90 | –3.5 | –2.4 | 0 | 5 | 450 | 5 | 1.0 | 6.0 |
| 3V9 | 3.7 | 4.1 | 85 | 90 | –3.5 | –2.5 | 0 | 5 | 450 | 3 | 1.0 | 6.0 |
| 4V3 | 4.0 | 4.6 | 80 | 90 | –3.5 | –2.5 | 0 | 5 | 450 | 3 | 1.0 | 6.0 |
| 4V7 | 4.4 | 5.0 | 50 | 80 | –3.5 | –1.4 | +0.2 | 5 | 300 | 3 | 2.0 | 6.0 |
| 5V1 | 4.8 | 5.4 | 40 | 60 | –2.7 | –0.8 | +1.2 | 5 | 300 | 2 | 2.0 | 6.0 |
| 5V6 | 5.2 | 6.0 | 15 | 40 | –2.0 | +1.2 | +2.5 | 5 | 300 | 1 | 2.0 | 6.0 |
| 6V2 | 5.8 | 6.6 | 6 | 10 | 0.4 | 2.3 | 3.7 | 5 | 200 | 3 | 4.0 | 6.0 |
| 6V8 | 6.4 | 7.2 | 6 | 15 | 1.2 | 3.0 | 4.5 | 5 | 200 | 2 | 4.0 | 6.0 |
| 7V5 | 7.0 | 7.9 | 6 | 15 | 2.5 | 4.0 | 5.3 | 5 | 150 | 1 | 5.0 | 4.0 |
| 8V2 | 7.7 | 8.7 | 6 | 15 | 3.2 | 4.6 | 6.2 | 5 | 150 | 0.7 | 5.0 | 4.0 |
| 9V1 | 8.5 | 9.6 | 6 | 15 | 3.8 | 5.5 | 7.0 | 5 | 150 | 0.5 | 6.0 | 3.0 |
| 10 | 9.4 | 10.6 | 8 | 20 | 4.5 | 6.4 | 8.0 | 5 | 90 | 0.2 | 7.0 | 3.0 |
| 11 | 10.4 | 11.6 | 10 | 20 | 5.4 | 7.4 | 9.0 | 5 | 85 | 0.1 | 8.0 | 2.5 |
| 12 | 11.4 | 12.7 | 10 | 25 | 6.0 | 8.4 | 10.0 | 5 | 85 | 0.1 | 8.0 | 2.5 |
| 13 | 12.4 | 14.1 | 10 | 30 | 7.0 | 9.4 | 11.0 | 5 | 80 | 0.1 | 8.0 | 2.5 |
| 15 | 13.8 | 15.6 | 10 | 30 | 9.2 | 11.4 | 13.0 | 5 | 75 | 0.05 | 10.5 | 2.0 |
| 16 | 15.3 | 17.1 | 10 | 40 | 10.4 | 12.4 | 14.0 | 5 | 75 | 0.05 | 11.2 | 1.5 |
| 18 | 16.8 | 19.1 | 10 | 45 | 12.4 | 14.4 | 16.0 | 5 | 70 | 0.05 | 12.6 | 1.5 |
| 20 | 18.8 | 21.2 | 15 | 55 | 14.4 | 16.4 | 18.0 | 5 | 60 | 0.05 | 14.0 | 1.5 |
| 22 | 20.8 | 23.3 | 20 | 55 | 16.4 | 18.4 | 20.0 | 5 | 60 | 0.05 | 15.4 | 1.25 |
| 24 | 22.8 | 25.6 | 25 | 70 | 18.4 | 20.4 | 22.0 | 5 | 55 | 0.05 | 16.8 | 1.25 |

| BZV49-CXXX | WORKING VOLTAGE $V_Z$ (V) at $I_{Ztest}$ | | DIFFERENTIAL RESISTANCE $r_{dif}$ (Ω) at $I_{Ztest}$ | | TEMP. COEFF. $S_Z$ (mV/K) at $I_{Ztest}$ see Figs 4 and 5 | | | TEST CURRENT $I_{Ztest}$ (mA) | DIODE CAP. $C_d$ (pF) at f = 1 MHz; at $V_R$ = 0 V | REVERSE CURRENT at REVERSE VOLTAGE | | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | $I_R$ (μA) | $V_R$ (V) | |
| | MIN. | MAX. | TYP. | MAX. | MIN. | TYP. | MAX. | | MAX. | MAX. | | MAX. |
| 27 | 25.1 | 28.9 | 25 | 80 | 21.4 | 23.4 | 25.3 | 2 | 50 | 0.05 | 18.9 | 1.0 |
| 30 | 28.0 | 32.0 | 30 | 80 | 24.4 | 26.6 | 29.4 | 2 | 50 | 0.05 | 21.0 | 1.0 |
| 33 | 31.0 | 35.0 | 35 | 80 | 27.4 | 29.7 | 33.4 | 2 | 45 | 0.05 | 23.1 | 0.9 |
| 36 | 34.0 | 38.0 | 35 | 90 | 30.4 | 33.0 | 37.4 | 2 | 45 | 0.05 | 25.2 | 0.8 |
| 39 | 37.0 | 41.0 | 40 | 130 | 33.4 | 36.4 | 41.2 | 2 | 45 | 0.05 | 27.3 | 0.7 |
| 43 | 40.0 | 46.0 | 45 | 150 | 37.6 | 41.2 | 46.6 | 2 | 40 | 0.05 | 30.1 | 0.6 |
| 47 | 44.0 | 50.0 | 50 | 170 | 42.0 | 46.1 | 51.8 | 2 | 40 | 0.05 | 32.9 | 0.5 |
| 51 | 48.0 | 54.0 | 60 | 180 | 46.6 | 51.0 | 57.2 | 2 | 40 | 0.05 | 35.7 | 0.4 |
| 56 | 52.0 | 60.0 | 70 | 200 | 52.2 | 57.0 | 63.8 | 2 | 40 | 0.05 | 39.2 | 0.3 |
| 62 | 58.0 | 66.0 | 80 | 215 | 58.8 | 64.4 | 71.6 | 2 | 35 | 0.05 | 43.4 | 0.3 |
| 68 | 64.0 | 72.0 | 90 | 240 | 65.6 | 71.7 | 79.8 | 2 | 35 | 0.05 | 47.6 | 0.25 |
| 75 | 70.0 | 79.0 | 95 | 255 | 73.4 | 80.2 | 88.6 | 2 | 35 | 0.05 | 52.5 | 0.2 |

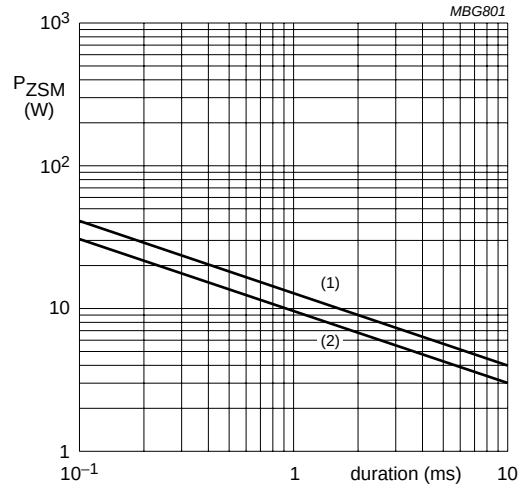
## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th(j-tp)}$ | thermal resistance from junction to tie-point | | 15 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1 | 125 | K/W |

**Note**

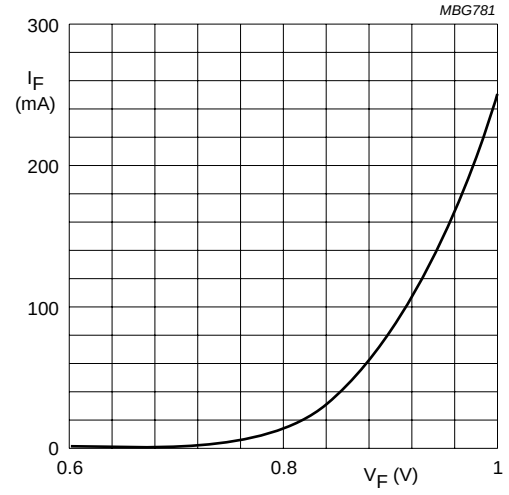
1. Device mounted on a ceramic substrate; area = 2.5 $cm^2$; thickness = 0.7 mm.

## GRAPHICAL DATA



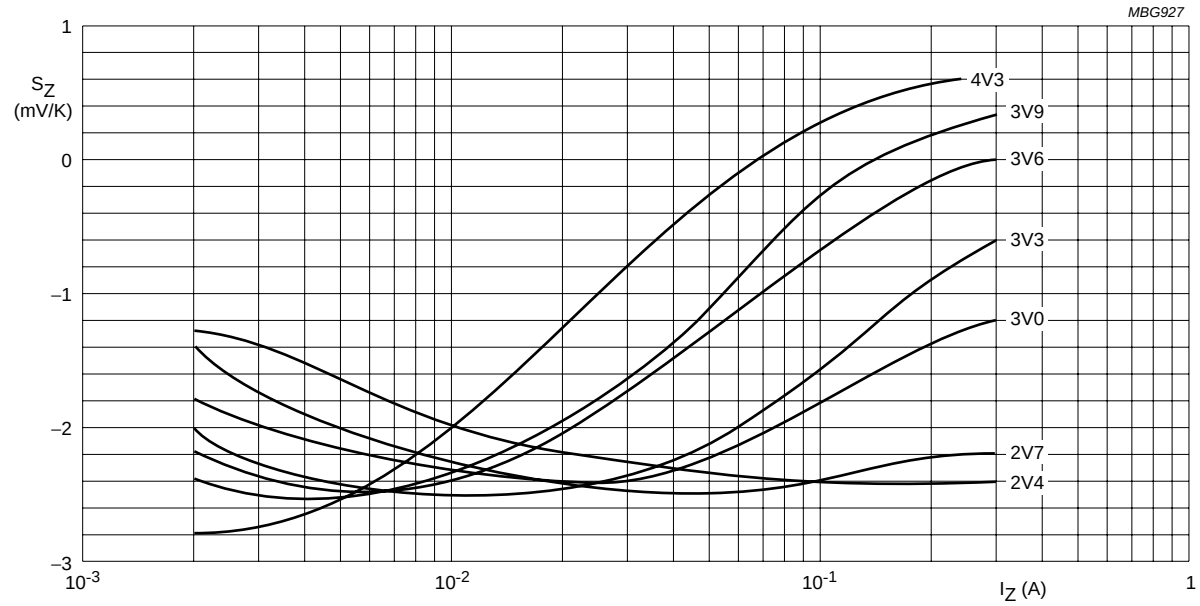

(1) $T_j$ = 25 °C (prior to surge).
(2) $T_j$ = 150 °C (prior to surge).

Fig.2 Maximum permissible non-repetitive peak reverse power dissipation versus duration.



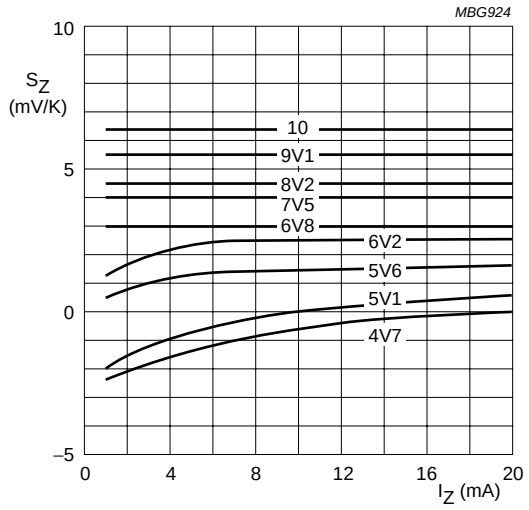

$T_j$ = 25 °C.

Fig.3 Forward current as a function of forward voltage; typical values.




**BZV49-C2V4 to C4V3.**
$T_j$ = 25 to 150 °C.

Fig.4 Temperature coefficient as a function of working current; typical values.

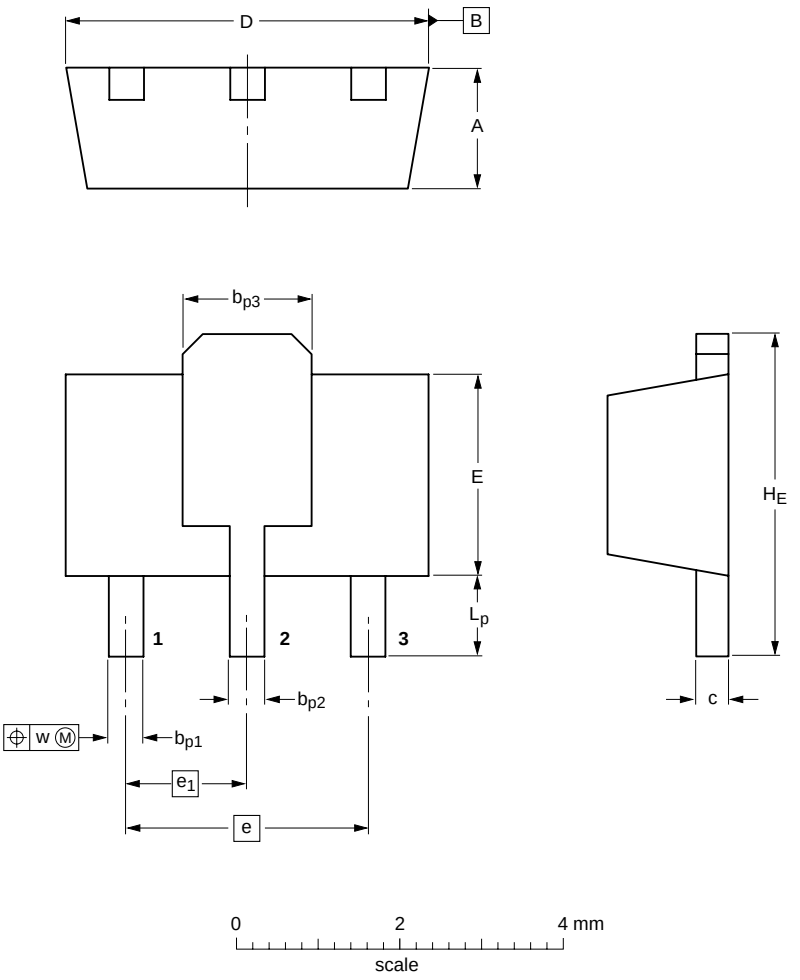



**BZV49-C4V7 to C10.**
$T_j$ = 25 to 150 °C.

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

## PACKAGE OUTLINE

**Plastic surface-mounted package; collector pad for good heat transfer; 3 leads** **SOT89**




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

| UNIT | A | $b_{p1}$ | $b_{p2}$ | $b_{p3}$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.6<br>1.4 | 0.48<br>0.35 | 0.53<br>0.40 | 1.8<br>1.4 | 0.44<br>0.23 | 4.6<br>4.4 | 2.6<br>2.4 | 3.0 | 1.5 | 4.25<br>3.75 | 1.2<br>0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT89 | | TO-243 | SC-62 | | | ~~04-08-03~~<br>06-03-16 |

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| DOCUMENT STATUS[1] | PRODUCT STATUS[2] | DEFINITION |
|---|---|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
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