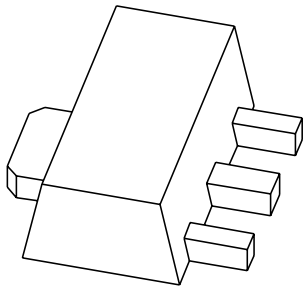


# DATA SHEET



## **BZV49 series** Voltage regulator diodes

Product data sheet  
Supersedes data of 1999 May 11

2005 Feb 03

## Voltage regulator diodes

## BZV49 series

## FEATURES

- Total power dissipation: max. 1 W
- Tolerance series: approx.  $\pm 5\%$
- 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.  $\pm 5\%$  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       |

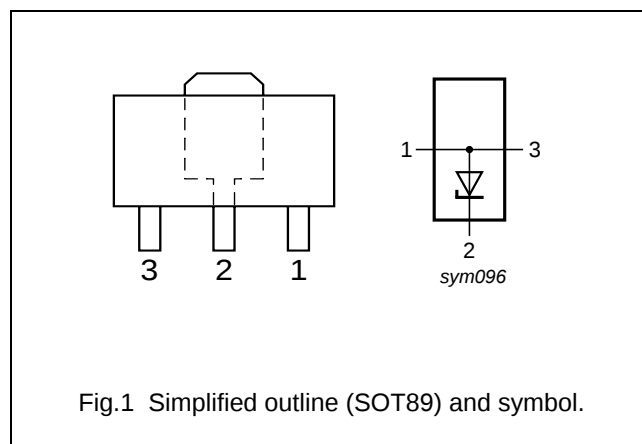


Fig.1 Simplified outline (SOT89) and symbol.

## ORDERING INFORMATION

| TYPE NUMBER                       | PACKAGE |                                                                                |         |
|-----------------------------------|---------|--------------------------------------------------------------------------------|---------|
|                                   | NAME    | DESCRIPTION                                                                    | VERSION |
| BZV49-C2V4 to BZV49-C75<br>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          | —           | —            |

## Voltage regulator diodes

## BZV49 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>$T_j = 25^\circ C$ prior to surge            | see Table<br>“Per type” |      |            |
| $P_{tot}$ | total power dissipation                       | $T_{amb} = 25^\circ C$ ; note 1                                                  | –                       | 1    | W          |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p = 100 \mu s$ ; square wave;<br>$T_j = 25^\circ C$ prior to surge; see Fig.2 | –                       | 40   | W          |
| $T_{stg}$ | storage temperature                           |                                                                                  | –65                     | +150 | $^\circ C$ |
| $T_j$     | junction temperature                          |                                                                                  | –                       | 150  | $^\circ C$ |

**Note**

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

**ELECTRICAL CHARACTERISTICS****Total series**

$T_{amb} = 25^\circ C$  unless otherwise specified.

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

## Voltage regulator diodes

## BZV49 series

## Per type

T<sub>j</sub> = 25 °C unless otherwise specified.

| BZV49-<br>CXXX | WORKING<br>VOLTAGE<br>V <sub>Z</sub> (V)<br>at I <sub>Ztest</sub> |      | DIFFERENTIAL<br>RESISTANCE<br>r <sub>dif</sub> (Ω)<br>at I <sub>Ztest</sub> |      | TEMP. COEFF.<br>S <sub>Z</sub> (mV/K)<br>at I <sub>Ztest</sub><br>see Figs 4 and 5 |      |      | TEST<br>CURRENT<br>I <sub>Ztest</sub> (mA) | DIODE CAP.<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>at V <sub>R</sub> = 0 V | REVERSE<br>CURRENT at<br>REVERSE<br>VOLTAGE |                       | NON-REPETITIVE PEAK<br>REVERSE CURRENT<br>I <sub>ZSM</sub> (A)<br>at t <sub>p</sub> = 100 μs;<br>T <sub>amb</sub> = 25 °C |
|----------------|-------------------------------------------------------------------|------|-----------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|------|------|--------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------|
|                | MIN.                                                              | MAX. | TYP.                                                                        | MAX. | MIN.                                                                               | TYP. | MAX. |                                            |                                                                               | I <sub>R</sub> (μA)                         | V <sub>R</sub><br>(V) |                                                                                                                           |
| 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                                                                                                                      |

Voltage regulator diodes

BZV49 series

| BZV49-<br>CXXX | WORKING<br>VOLTAGE<br>V <sub>Z</sub> (V)<br>at I <sub>Ztest</sub> |      | DIFFERENTIAL<br>RESISTANCE<br>r <sub>dif</sub> (Ω)<br>at I <sub>Ztest</sub> |      | TEMP. COEFF.<br>S <sub>Z</sub> (mV/K)<br>at I <sub>Ztest</sub><br>see Figs 4 and 5 |      |      | TEST<br>CURRENT<br>I <sub>Ztest</sub> (mA) | DIODE CAP.<br>C <sub>d</sub> (pF)<br>at f = 1 MHz;<br>at V <sub>R</sub> = 0 V | REVERSE<br>CURRENT at<br>REVERSE<br>VOLTAGE |                       | NON-REPETITIVE PEAK<br>REVERSE CURRENT<br>I <sub>ZSM</sub> (A)<br>at t <sub>p</sub> = 100 μs;<br>T <sub>amb</sub> = 25 °C |
|----------------|-------------------------------------------------------------------|------|-----------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|------|------|--------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------|
|                |                                                                   |      |                                                                             |      |                                                                                    |      |      |                                            |                                                                               | I <sub>R</sub> (μA)                         | V <sub>R</sub><br>(V) |                                                                                                                           |
|                | MIN.                                                              | MAX. | TYP.                                                                        | MAX. | MIN.                                                                               | TYP. | 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                                                                                                                       |

Voltage regulator diodes

BZV49 series

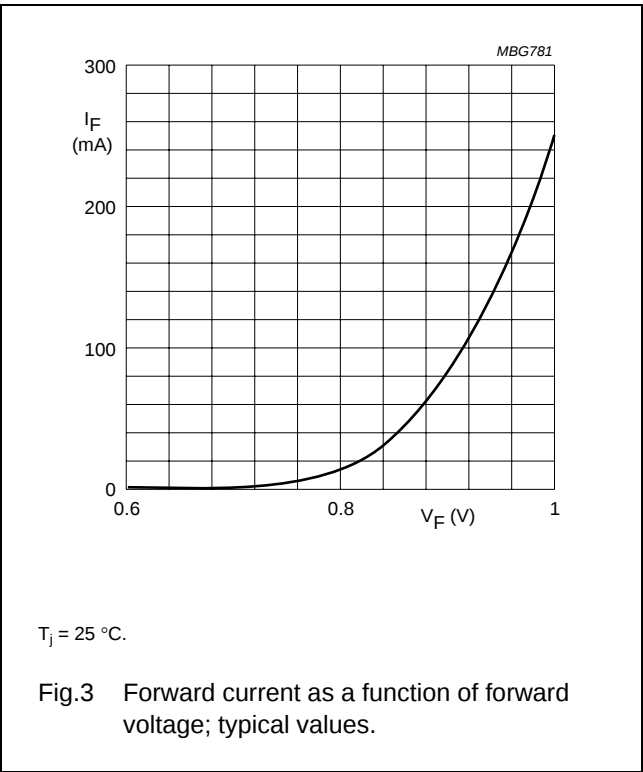
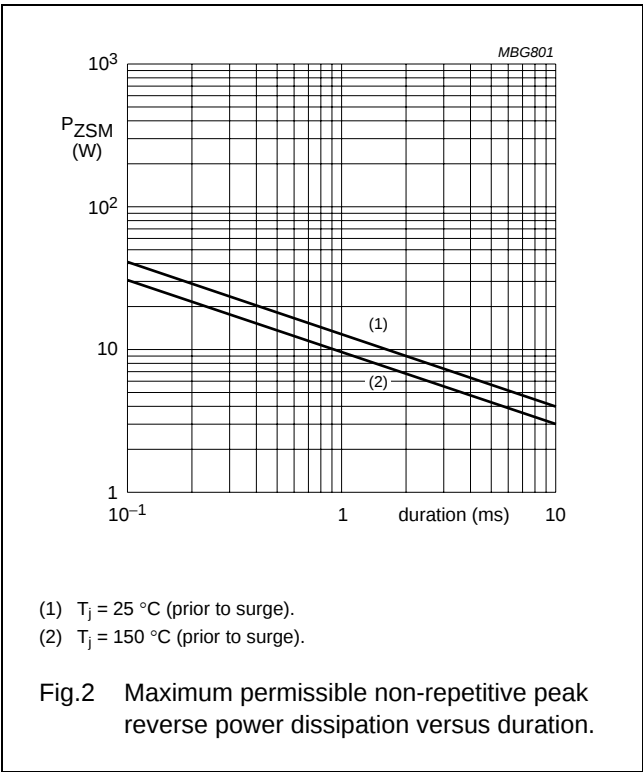
THERMAL CHARACTERISTICS

| 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

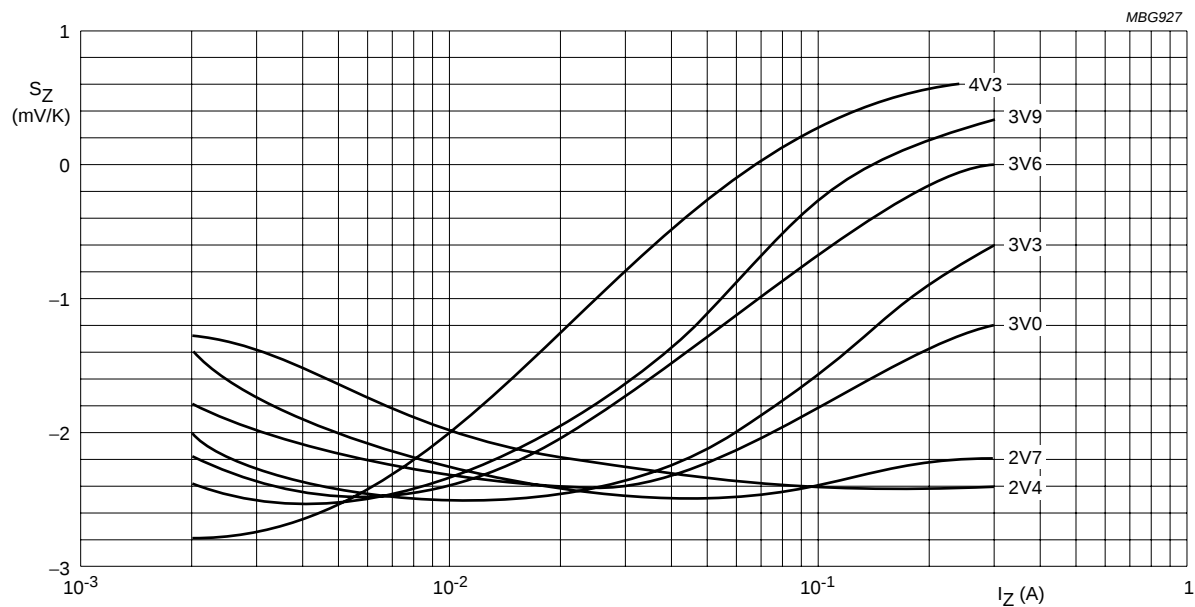
1. Device mounted on a ceramic substrate; area = 2.5 cm<sup>2</sup>; thickness = 0.7 mm.

GRAPHICAL DATA



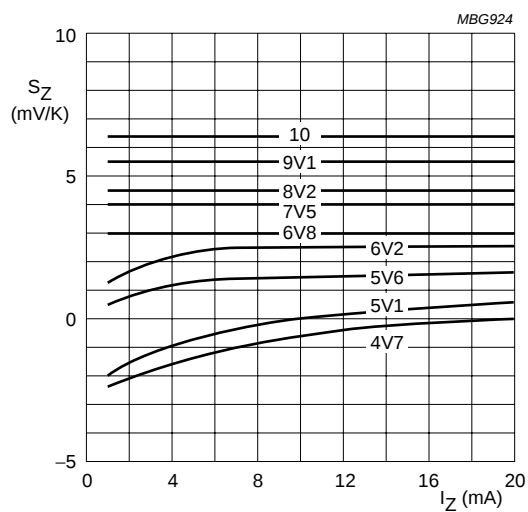
## Voltage regulator diodes

## BZV49 series



**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.

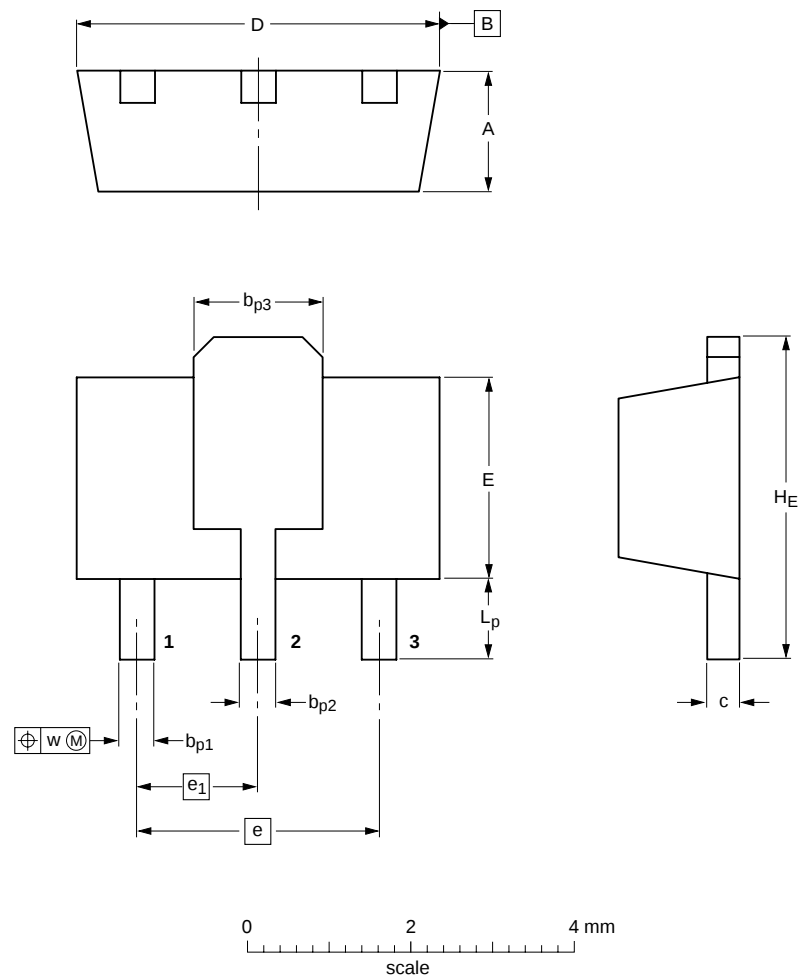
Voltage regulator diodes

BZV49 series

PACKAGE OUTLINE

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

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b <sub>p1</sub> | b <sub>p2</sub> | b <sub>p3</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | 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<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE           |
|--------------------|------------|--------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                    | IEC        | JEDEC  | JEITA |  |                                                                                       |                      |
| SOT89              |            | TO-243 | SC-62 |  |  | 04-08-03<br>06-03-16 |

## Voltage regulator diodes

## BZV49 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.                                     |

## Notes

1. Please consult the most recently issued document before initiating or completing a design.
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