

# 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       |

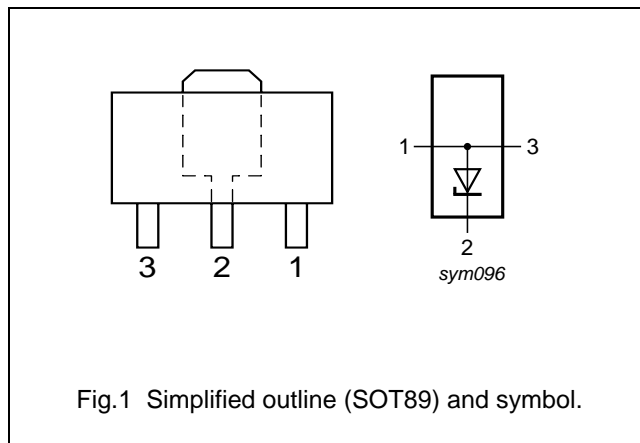


Fig.1 Simplified outline (SOT89) and symbol.

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

**Note**

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

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

$T_{amb} = 25 \text{ }^\circ\text{C}$  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

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## Per type

$T_j = 25\text{ °C}$  unless otherwise specified.

| BZV49-<br>CXXX | WORKING VOLTAGE<br>$V_Z$ (V)<br>at $I_{Ztest}$ |      | DIFFERENTIAL RESISTANCE<br>$r_{dif}$ ( $\Omega$ )<br>at $I_{Ztest}$ |      | TEMP. COEFF.<br>$S_Z$ (mV/K)<br>at $I_{Ztest}$<br>see Figs 4 and 5 |      |      | TEST CURRENT<br>$I_{Ztest}$ (mA) | DIODE CAP.<br>$C_d$ (pF)<br>at $f = 1\text{ MHz}$ ;<br>at $V_R = 0\text{ V}$ | REVERSE CURRENT at REVERSE VOLTAGE |                         | NON-REPETITIVE PEAK REVERSE CURRENT<br>$I_{ZSM}$ (A)<br>at $t_p = 100\ \mu\text{s}$ ;<br>$T_{amb} = 25\text{ °C}$ |           |
|----------------|--|------|---|------|--|------|------|----------------------------------|--|------------------------------------|-------------------------|---|-----------|
|                | MIN.   | MAX. | TYP.  | MAX. | MIN.   | TYP. | MAX. |                                  |  | MAX.                               | $I_R$ ( $\mu\text{A}$ ) |   | $V_R$ (V) |
|                |  |      |   |      |  |      |      |                                  |  |                                    | 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  |           |

## Voltage regulator diodes

## BZV49 series

| BZV49-<br>CXXX | WORKING<br>VOLTAGE<br>$V_Z$ (V)<br>at $I_{Ztest}$ |      | DIFFERENTIAL<br>RESISTANCE<br>$r_{dif}$ ( $\Omega$ )<br>at $I_{Ztest}$ |      | TEMP. COEFF.<br>$S_Z$ (mV/K)<br>at $I_{Ztest}$<br>see Figs 4 and 5 |      |      | TEST<br>CURRENT<br>$I_{Ztest}$ (mA) | DIODE CAP.<br>$C_d$ (pF)<br>at $f = 1$ MHz;<br>at $V_R = 0$ V | REVERSE<br>CURRENT at<br>REVERSE<br>VOLTAGE |       | NON-REPETITIVE PEAK<br>REVERSE CURRENT<br>$I_{ZSM}$ (A)<br>at $t_p = 100 \mu s$ ;<br>$T_{amb} = 25^\circ C$ |
|----------------|---|------|--|------|--|------|------|-------------------------------------|---|---|-------|---|
|                | MIN.  | MAX. | TYP.   | MAX. | MIN.   | TYP. | MAX. |                                     |   | $I_R$ ( $\mu A$ )                           | $V_R$ |   |
|                |   |      |  |      |  |      |      |                                     |   | MAX.  | (V)   |   |
| 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

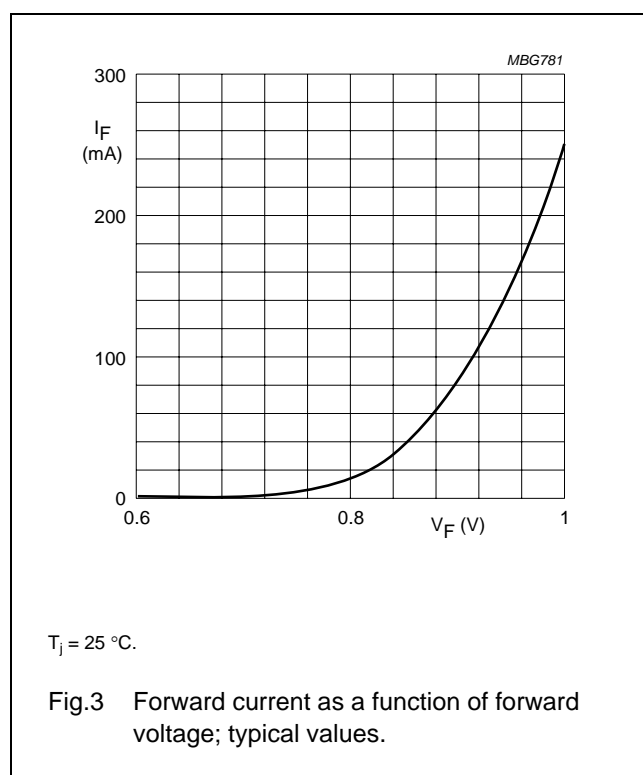
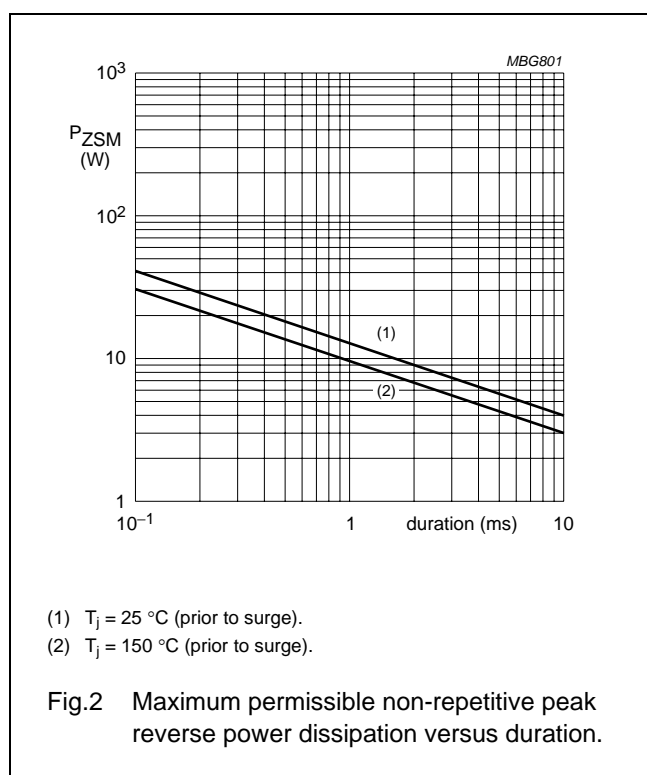
**THERMAL CHARACTERISTICS**

| 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**

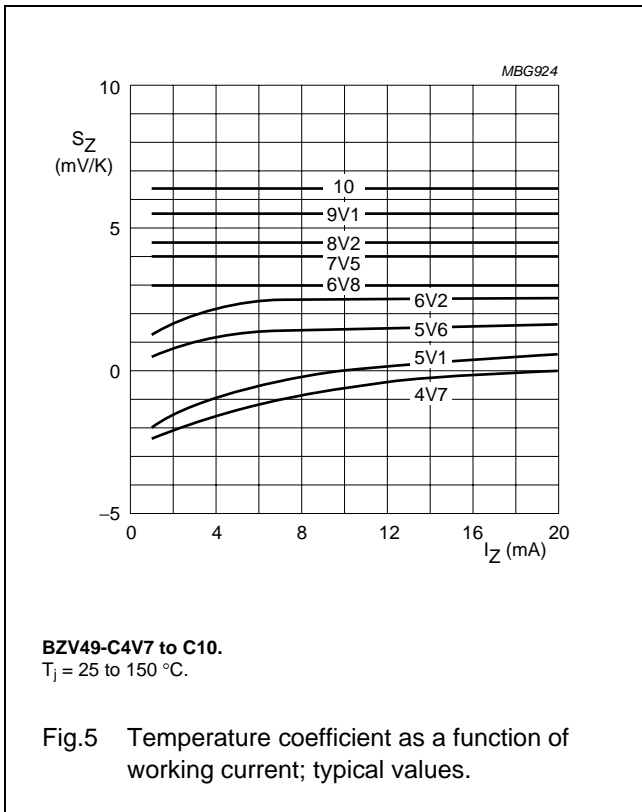
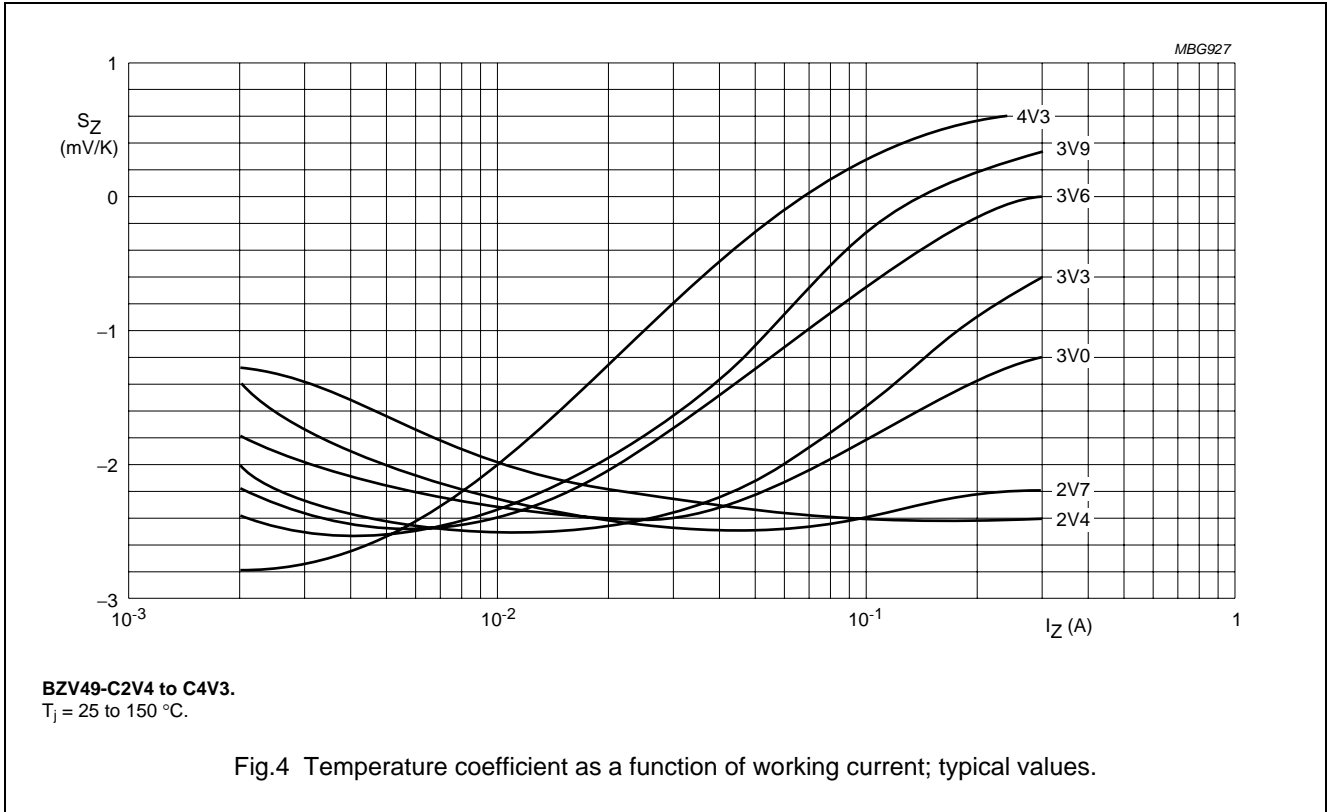
1. Device mounted on a ceramic substrate; area = 2.5 cm<sup>2</sup>; thickness = 0.7 mm.

**GRAPHICAL DATA**



Voltage regulator diodes

BZV49 series



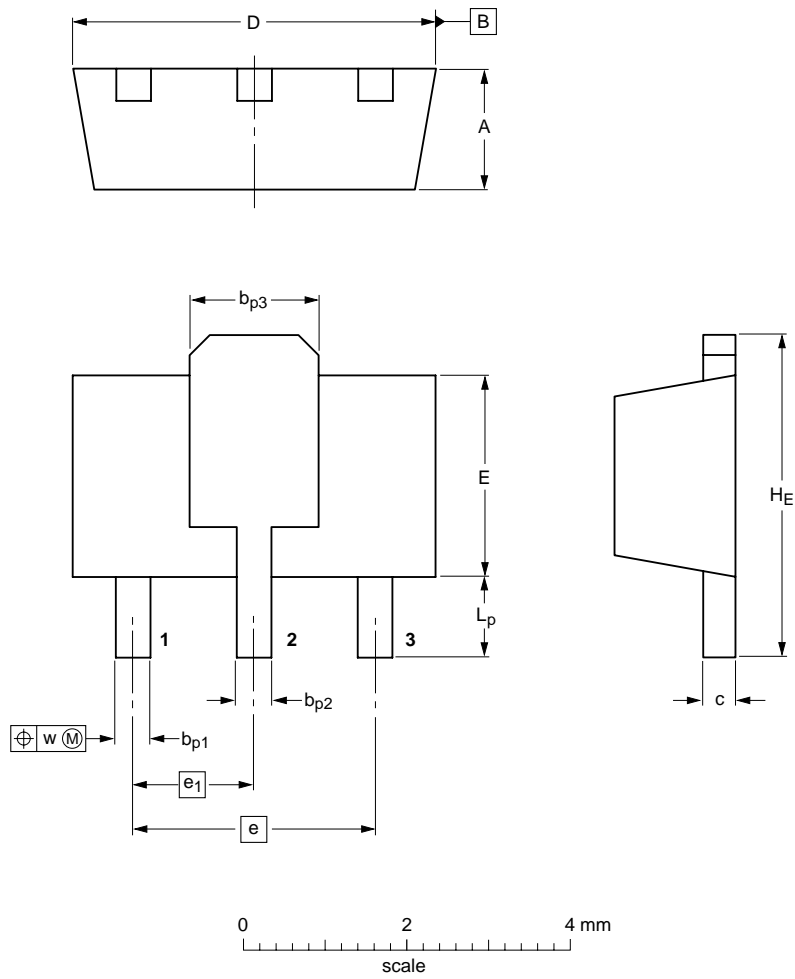
Voltage regulator diodes

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 VERSION | REFERENCES |        |       | EUROPEAN 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.                                     |

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