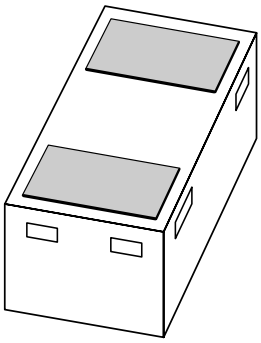
# DATA SHEET





# BZX884 series
## Voltage regulator diodes

Product specification
Supersedes data of 2003 May 15

2004 Mar 26

Philips
Semiconductors

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# Voltage regulator diodes BZX884 series

## FEATURES

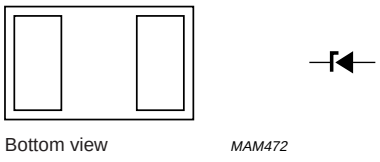
- Two tolerance series: ±2% and ±5%
- Working voltage range: nominal 2.4 V to 75 V (E24 range)
- Leadless ultra small plastic package (1 mm × 0.6 mm × 0.5 mm)
- Boardspace 1.17 $mm^2$ (approximately 10% of SOT23)
- Power dissipation comparable to SOT23.

## APPLICATIONS

- General regulation functions
- ESD ultra high-speed switching
- High frequency applications
- Mobile communication, digital (still) cameras, PDAs and PCMCIA cards.

## DESCRIPTION

Low-power voltage regulator diodes encapsulated in SOD882 leadless ultra small plastic packages.




The marking bar indicates the cathode.

Fig.1 Simplified outline (SOD882) and symbol.

## MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|---|---|---|---|---|---|---|---|
| **Marking codes for BZX884-B2V4 to BZX884-B75** | | | | | | | |
| BZX884-B2V4 | A1 | BZX884-B6V2 | AB | BZX884-B16 | C1 | BZX884-B43 | CB |
| BZX884-B2V7 | A2 | BZX884-B6V8 | AC | BZX884-B18 | C2 | BZX884-B47 | CC |
| BZX884-B3V0 | A3 | BZX884-B7V5 | AD | BZX884-B20 | C3 | BZX884-B51 | CD |
| BZX884-B3V3 | A4 | BZX884-B8V2 | AE | BZX884-B22 | C4 | BZX884-B56 | CE |
| BZX884-B3V6 | A5 | BZX884-B9V1 | AF | BZX884-B24 | C5 | BZX884-B62 | CF |
| BZX884-B3V9 | A6 | BZX884-B10 | AG | BZX884-B27 | C6 | BZX884-B68 | CG |
| BZX884-B4V3 | A7 | BZX884-B11 | AH | BZX884-B30 | C7 | BZX884-B75 | CH |
| BZX884-B4V7 | A8 | BZX884-B12 | AJ | BZX884-B33 | C8 | | |
| BZX884-B5V1 | A9 | BZX884-B13 | AK | BZX884-B36 | C9 | | |
| BZX884-B5V6 | AA | BZX884-B15 | AL | BZX884-B39 | CA | | |
| **Marking codes for BZX884-C2V4 to BZX884-C75** | | | | | | | |
| BZX884-C2V4 | B1 | BZX884-C6V2 | BB | BZX884-C16 | D1 | BZX884-C43 | DB |
| BZX884-C2V7 | B2 | BZX884-C6V8 | BC | BZX884-C18 | D2 | BZX884-C47 | DC |
| BZX884-C3V0 | B3 | BZX884-C7V5 | BD | BZX884-C20 | D3 | BZX884-C51 | DD |
| BZX884-C3V3 | B4 | BZX884-C8V2 | BE | BZX884-C22 | D4 | BZX884-C56 | DE |
| BZX884-C3V6 | B5 | BZX884-C9V1 | BF | BZX884-C24 | D5 | BZX884-C62 | DF |
| BZX884-C3V9 | B6 | BZX884-C10 | BG | BZX884-C27 | D6 | BZX884-C68 | DG |
| BZX884-C4V3 | B7 | BZX884-C11 | BH | BZX884-C30 | D7 | BZX884-C75 | DH |
| BZX884-C4V7 | B8 | BZX884-C12 | BJ | BZX884-C33 | D8 | | |
| BZX884-C5V1 | B9 | BZX884-C13 | BK | BZX884-C36 | D9 | | |
| BZX884-C5V6 | BA | BZX884-C15 | BL | BZX884-C39 | DA | | |

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| BZX884-B2V4 to BZX884-B75 | – | Leadless ultra small plastic package;2 terminals; body 1.0 x 0.6 x 0.5 mm | SOD882 |
| BZX884-C2V4 to BZX884-C75 | – | Leadless ultra small plastic package;2 terminals; body 1.0 x 0.6 x 0.5 mm | SOD882 |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $I_F$ | continuous forward current | | – | 200 | mA |
| $I_{ZSM}$ | non-repetitive peak reverse current | $t_p$ = 100 µs; square wave; $T_{amb}$ = 25 °C; prior to surge | see Tables 1 and 2 | | |
| $P_{tot}$ | total power dissipation | $T_{amb}$ = 25 °C; note 1 | – | 250 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |

**Note**

1. Refer to SOD882 standard mounting conditions (footprint), FR4 with 60 µm copper strip line.

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1 | 500 | K/W |

**Note**

1. Refer to SOD882 standard mounting conditions (footprint), FR4 with 60 µm copper strip line.

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 10 mA; see Fig.2 | 0.9 | V |
| $I_R$ | reverse current | | | |
| | BZX884-B/C2V4 | $V_R$ = 1 V | 50 | µA |
| | BZX884-B/C2V7 | $V_R$ = 1 V | 20 | µA |
| | BZX884-B/C3V0 | $V_R$ = 1 V | 10 | µA |
| | BZX884-B/C3V3 | $V_R$ = 1 V | 5 | µA |
| | BZX884-B/C3V6 | $V_R$ = 1 V | 5 | µA |
| | BZX884-B/C3V9 | $V_R$ = 1 V | 3 | µA |
| | BZX884-B/C4V3 | $V_R$ = 1 V | 3 | µA |
| | BZX884-B/C4V7 | $V_R$ = 2 V | 3 | µA |
| | BZX884-B/C5V1 | $V_R$ = 2 V | 2 | µA |
| | BZX884-B/C5V6 | $V_R$ = 2 V | 1 | µA |
| | BZX884-B/C6V2 | $V_R$ = 4 V | 3 | µA |
| | BZX884-B/C6V8 | $V_R$ = 4 V | 2 | µA |
| | BZX884-B/C7V5 | $V_R$ = 5 V | 1 | µA |
| | BZX884-B/C8V2 | $V_R$ = 5 V | 700 | nA |
| | BZX884-B/C9V1 | $V_R$ = 6 V | 500 | nA |
| | BZX884-B/C10 | $V_R$ = 7 V | 200 | nA |
| | BZX884-B/C11 | $V_R$ = 8 V | 100 | nA |
| | BZX884-B/C12 | $V_R$ = 8 V | 100 | nA |
| | BZX884-B/C13 | $V_R$ = 8 V | 100 | nA |
| | BZX884-B/C15 to 75 | $V_R$ = 0.7 $V_{Znom}$ | 50 | nA |

**Table 1** Per type BZX884-B/C2V4 to B/C24

$T_j$ = 25 °C unless otherwise specified.

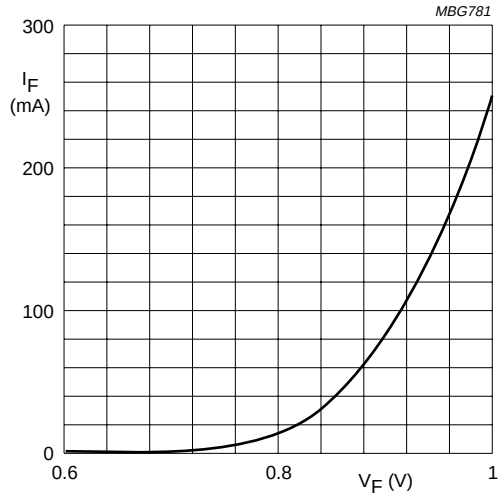
| BZX884-B or C XXX | WORKING VOLTAGE $V_Z$ (V) at $I_Z$ = 5 mA | | | | DIFFERENTIAL RESISTANCE $r_{dif}$ (Ω) | | | | TEMP. COEFF. $S_Z$ (mV/K) at $I_{Ztest}$ = 5 mA (see Figs 3 and 4) | DIODE CAP. $C_d$ (pF) at f = 1 MHz; $V_R$ = 0 V | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tol. ±2% (B) | | Tol. ±5% (C) | | at $I_{Ztest}$ = 1 mA | | at $I_{Ztest}$ = 5 mA | | | | |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | TYP. | MAX. | MAX. |
| 2V4 | 2.35 | 2.45 | 2.28 | 2.52 | 275 | 400 | 70 | 100 | –1.3 | 450 | 6.0 |
| 2V7 | 2.65 | 2.75 | 2.57 | 2.84 | 300 | 450 | 75 | 100 | –1.4 | 440 | 6.0 |
| 3V0 | 2.94 | 3.06 | 2.85 | 3.15 | 325 | 500 | 80 | 95 | –1.6 | 425 | 6.0 |
| 3V3 | 3.23 | 3.37 | 3.14 | 3.47 | 350 | 500 | 85 | 95 | –1.8 | 410 | 6.0 |
| 3V6 | 3.53 | 3.67 | 3.42 | 3.78 | 375 | 500 | 85 | 90 | –1.9 | 390 | 6.0 |
| 3V9 | 3.82 | 3.98 | 3.71 | 4.10 | 400 | 500 | 85 | 90 | –1.9 | 370 | 6.0 |
| 4V3 | 4.21 | 4.39 | 4.09 | 4.52 | 410 | 600 | 80 | 90 | –1.7 | 350 | 6.0 |
| 4V7 | 4.61 | 4.79 | 4.47 | 4.94 | 425 | 500 | 50 | 80 | –1.2 | 325 | 6.0 |
| 5V1 | 5.00 | 5.20 | 4.85 | 5.36 | 400 | 480 | 40 | 60 | –0.5 | 300 | 6.0 |
| 5V6 | 5.49 | 5.71 | 5.32 | 5.88 | 80 | 400 | 15 | 40 | 1.0 | 275 | 6.0 |
| 6V2 | 6.08 | 6.32 | 5.89 | 6.51 | 40 | 150 | 6 | 10 | 2.2 | 250 | 6.0 |
| 6V8 | 6.66 | 6.94 | 6.46 | 7.14 | 30 | 80 | 6 | 15 | 3.0 | 215 | 6.0 |
| 7V5 | 7.35 | 7.65 | 7.13 | 7.88 | 15 | 80 | 2 | 10 | 3.6 | 170 | 4.0 |
| 8V2 | 8.04 | 8.36 | 7.79 | 8.61 | 20 | 80 | 2 | 10 | 4.3 | 150 | 4.0 |
| 9V1 | 8.92 | 9.28 | 8.65 | 9.56 | 20 | 100 | 2 | 10 | 5.2 | 120 | 3.0 |
| 10 | 9.80 | 10.20 | 9.50 | 10.50 | 20 | 150 | 2 | 10 | 6.0 | 110 | 3.0 |
| 11 | 10.78 | 11.22 | 10.45 | 11.55 | 25 | 150 | 2 | 10 | 6.9 | 110 | 2.5 |
| 12 | 11.76 | 12.24 | 11.40 | 12.60 | 25 | 150 | 2 | 10 | 7.9 | 105 | 2.5 |
| 13 | 12.74 | 13.26 | 12.35 | 13.65 | 25 | 170 | 2 | 10 | 8.8 | 105 | 2.5 |
| 15 | 14.70 | 15.30 | 14.25 | 15.75 | 25 | 200 | 3 | 15 | 10.7 | 100 | 2.0 |
| 16 | 15.68 | 18.32 | 15.20 | 16.80 | 50 | 200 | 10 | 40 | 12.4 | 90 | 1.5 |
| 18 | 17.64 | 18.36 | 17.10 | 18.90 | 50 | 225 | 10 | 45 | 14.4 | 80 | 1.5 |
| 20 | 19.60 | 20.40 | 19.00 | 21.00 | 60 | 225 | 15 | 55 | 16.4 | 70 | 1.5 |
| 22 | 21.56 | 22.44 | 20.90 | 23.10 | 60 | 250 | 20 | 55 | 18.4 | 60 | 1.25 |
| 24 | 23.52 | 24.48 | 22.80 | 25.20 | 60 | 250 | 25 | 70 | 20.4 | 55 | 1.25 |

**Table 2** Per type BZX884-B/C27 to B/C75

$T_j$ = 25 °C unless otherwise specified.

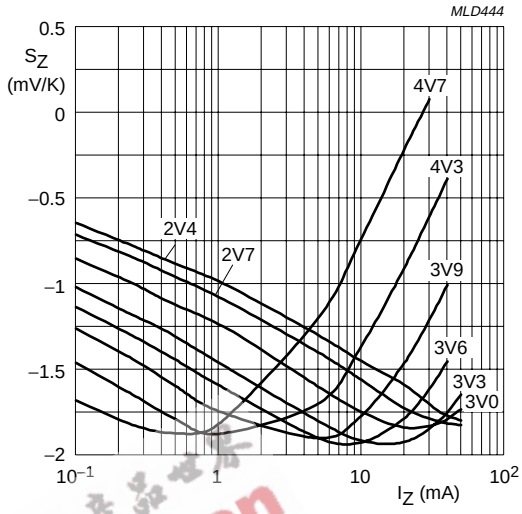
| BZX884-B or C XXX | WORKING VOLTAGE $V_Z$ (V) at $I_Z$ = 2 mA | | | | DIFFERENTIAL RESISTANCE $r_{dif}$ (Ω) | | | | TEMP. COEFF. $S_Z$ (mV/K) at $I_{Ztest}$ = 2 mA (see Figs 3 and 4) | DIODE CAP. $C_d$ (pF) at f = 1 MHz; $V_R$ = 0 V | NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p$ = 100 μs; $T_{amb}$ = 25 °C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tol. ±2% (B) | | Tol. ±5% (C) | | at $I_{Ztest}$ = 0.5 mA | | at $I_{Ztest}$ = 2 mA | | | | |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | TYP. | MAX. | MAX. |
| 27 | 26.46 | 27.54 | 25.65 | 28.35 | 65 | 300 | 25 | 80 | 23.4 | 50 | 1.0 |
| 30 | 29.40 | 30.60 | 28.50 | 31.50 | 70 | 300 | 30 | 80 | 26.6 | 50 | 1.0 |
| 33 | 32.34 | 33.66 | 31.35 | 34.65 | 75 | 325 | 35 | 80 | 29.7 | 45 | 0.9 |
| 36 | 35.28 | 36.72 | 34.20 | 37.80 | 80 | 350 | 35 | 90 | 33.0 | 45 | 0.8 |
| 39 | 38.22 | 39.78 | 37.05 | 40.95 | 80 | 350 | 40 | 130 | 36.4 | 45 | 0.7 |
| 43 | 42.14 | 43.86 | 40.85 | 45.15 | 85 | 375 | 45 | 150 | 41.2 | 40 | 0.6 |
| 47 | 46.06 | 47.94 | 44.65 | 49.35 | 85 | 375 | 50 | 170 | 46.1 | 40 | 0.5 |
| 51 | 49.98 | 52.02 | 48.45 | 53.55 | 90 | 400 | 60 | 180 | 51.0 | 40 | 0.4 |
| 56 | 54.88 | 57.12 | 53.20 | 58.80 | 100 | 425 | 70 | 200 | 57.0 | 40 | 0.3 |
| 62 | 60.76 | 63.24 | 58.90 | 65.10 | 120 | 450 | 80 | 215 | 64.4 | 35 | 0.3 |
| 68 | 66.64 | 69.36 | 64.60 | 71.40 | 150 | 475 | 90 | 240 | 71.7 | 35 | 0.25 |
| 75 | 73.50 | 76.50 | 71.25 | 78.75 | 170 | 500 | 95 | 255 | 80.2 | 35 | 0.2 |

## GRAPHICAL DATA




$T_j$ = 25 °C.

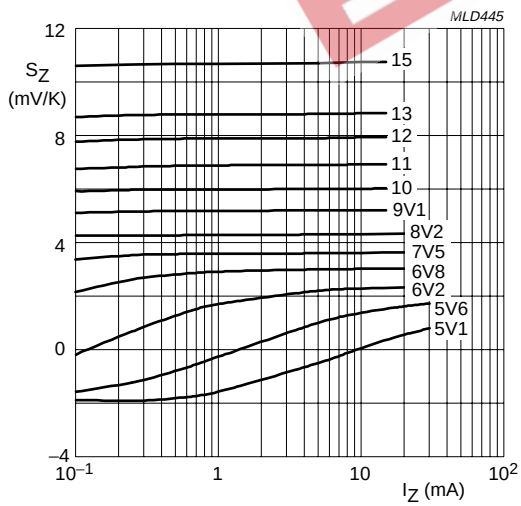
Fig.2 Forward current as a function of forward voltage; typical values.




**BZX884-B/C2V4 to B/C4V7.**

$T_j$ = 25 to 150 °C.

Fig.3 Temperature coefficient as a function of working current; typical values.



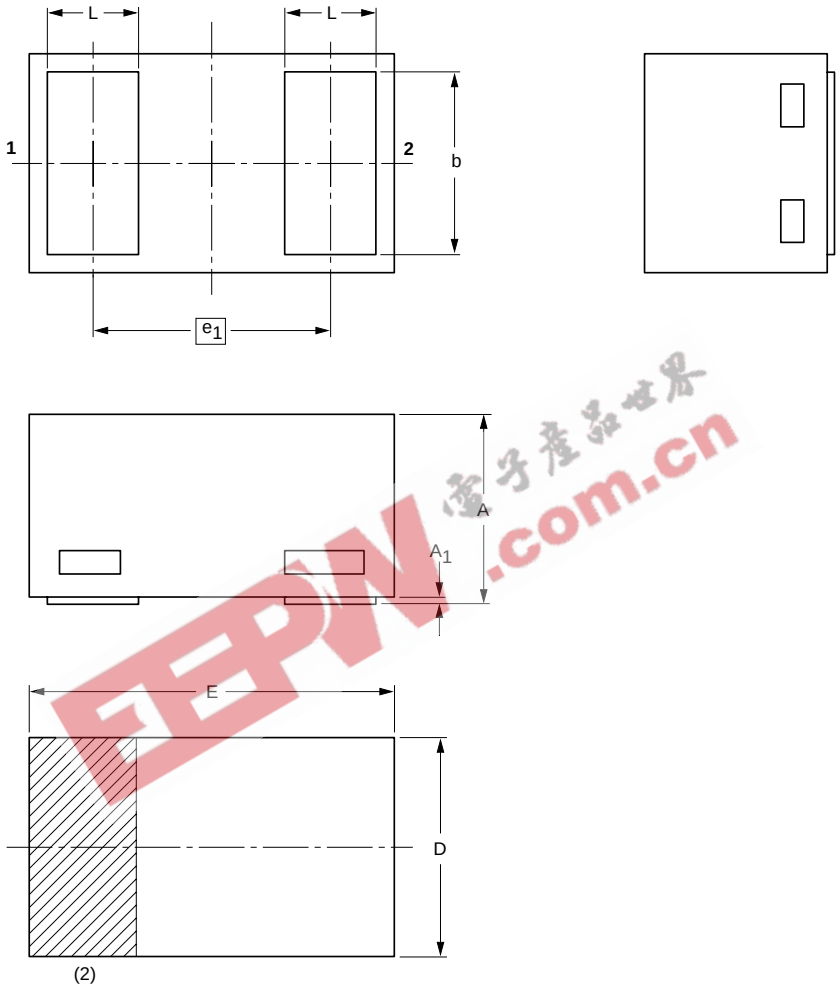

**BZX884-B/C5V1 to B/C15.**

$T_j$ = 25 to 150 °C.

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

## PACKAGE OUTLINE

**Leadless ultra small plastic package; 2 terminals; body 1.0 x 0.6 x 0.5 mm** **SOD882**




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

| UNIT | A(1) | A1 max. | b | D | E | e1 | L |
|---|---|---|---|---|---|---|---|
| mm | 0.50<br>0.46 | 0.03 | 0.55<br>0.47 | 0.62<br>0.55 | 1.02<br>0.95 | 0.65 | 0.30<br>0.22 |

**Notes**

1. Including plating thickness
2. The marking bar indicates the cathode

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD882 | | | | | | ~~03-04-16~~<br>03-04-17 |

## SOLDERING

Reflow soldering is the only recommended soldering method.

## DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | DEFINITION |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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