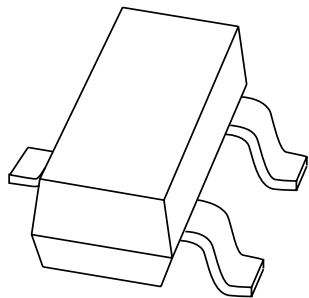


# DATA SHEET



## **BZX99 series** Voltage regulator diodes

Product specification  
Supersedes data of 1999 May 31

1999 Oct 20

# Voltage regulator diodes

# BZX99 series

### FEATURES

- Total power dissipation: max. 300 mW
- Tolerance:  $\pm 5\%$
- Working voltage range: nom. 2.4 to 15 V (E24 range)
- Improved  $I_z/V_z$  characteristics at low currents ( $I_z = 50 \mu A$ ). This results in a noise free and sharp breakdown knee.

### APPLICATIONS

- General regulation functions, where low noise at low currents is required
- Low-power consumption applications (e.g. hand-held applications).

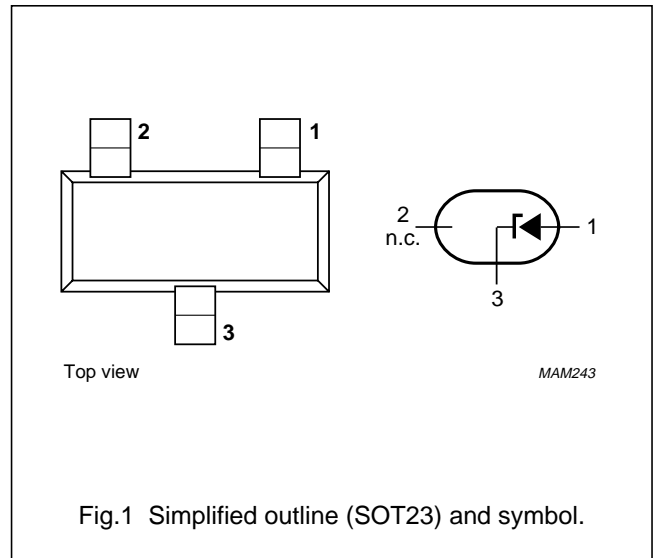
### DESCRIPTION

Low-power low noise voltage regulator diodes in small SOT23 plastic SMD packages.

The diodes are available in the normalized E24  $\pm 5\%$  tolerance range. The series consists of 20 types with nominal working voltages from 2.4 to 15 V.

### PINNING

PIN	DESCRIPTION
1	anode
2	not connected
3	cathode



### MARKING

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BZX99-C2V4	XL	BZX99-C3V9	XS	BZX99-C6V2	XD	BZX99-C10	XX
BZX99-C2V7	XM	BZX99-C4V3	XT	BZX99-C6V8	XE	BZX99-C11	XY
BZX99-C3V0	XN	BZX99-C4V7	XA	BZX99-C7V5	XU	BZX99-C12	XZ
BZX99-C3V3	XP	BZX99-C5V1	XB	BZX99-C8V2	XV	BZX99-C13	X2
BZX99-C3V6	XR	BZX99-C5V6	XC	BZX99-C9V1	XW	BZX99-C15	X3

## Voltage regulator diodes

## BZX99 series

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_F$	continuous forward current		–	300	mA
$I_{ZSM}$	non-repetitive peak reverse current	$t_p = 100 \mu\text{s}$ ; square wave; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ prior to surge	see Table 1		
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ ; note 1	–	300	mW
$T_{\text{stg}}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	150	$^\circ\text{C}$

**Note**

1. Device mounted on an FR4 printed-circuit board.

**ELECTRICAL CHARACTERISTICS****Total BZX99-C series**

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

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$V_F$	forward voltage	$I_F = 10 \text{ mA}$ ; see Fig.4	0.9	V
		$I_F = 100 \text{ mA}$ ; see Fig.4	1	V
$I_R$	reverse current			
	BZX99-C2V4	$V_R = 1 \text{ V}$	0.2	$\mu\text{A}$
	BZX99-C2V7	$V_R = 1 \text{ V}$	0.05	$\mu\text{A}$
	BZX99-C3V0	$V_R = 1 \text{ V}$	0.02	$\mu\text{A}$
	BZX99-C3V3	$V_R = 2 \text{ V}$	2	$\mu\text{A}$
	BZX99-C3V6	$V_R = 2 \text{ V}$	1	$\mu\text{A}$
	BZX99-C3V9	$V_R = 2 \text{ V}$	0.5	$\mu\text{A}$
	BZX99-C4V3	$V_R = 2 \text{ V}$	0.1	$\mu\text{A}$
	BZX99-C4V7	$V_R = 3 \text{ V}$	2	$\mu\text{A}$
	BZX99-C5V1	$V_R = 3 \text{ V}$	1	$\mu\text{A}$
	BZX99-C5V6	$V_R = 4 \text{ V}$	1	$\mu\text{A}$
	BZX99-C6V2	$V_R = 5 \text{ V}$	0.1	$\mu\text{A}$
	BZX99-C6V8	$V_R = 5 \text{ V}$	0.01	$\mu\text{A}$
	BZX99-C7V5	$V_R = 5 \text{ V}$	0.1	$\mu\text{A}$
	BZX99-C8V2	$V_R = 6 \text{ V}$	0.2	$\mu\text{A}$
	BZX99-C9V1	$V_R = 7 \text{ V}$	0.1	$\mu\text{A}$
BZX99-C10	$V_R = 7 \text{ V}$	0.1	$\mu\text{A}$	
BZX99-C11	$V_R = 8 \text{ V}$	0.05	$\mu\text{A}$	
BZX99-C12	$V_R = 9 \text{ V}$	0.05	$\mu\text{A}$	
BZX99-C13	$V_R = 10 \text{ V}$	0.05	$\mu\text{A}$	
BZX99-C15	$V_R = 10.5 \text{ V}$	0.01	$\mu\text{A}$	

## Voltage regulator diodes

## BZX99 series

**Table 1** Per type BZX99-C2V4 to C15 $T_j = 25\text{ °C}$  unless otherwise specified.

BZX99-C XXX	WORKING VOLTAGE $V_Z$ (V) at $I_Z = 50\ \mu\text{A}$		VOLTAGE CHANGE $\Delta V_Z(\text{V})^{(1)}$	TEMP. COEFF. $S_Z$ (mV/K) $I_{Z\text{test}} = 50\ \mu\text{A}$ (see Figs 2 and 3)	DIODE CAP. $C_d$ (pF) at $f = 1\ \text{MHz}$ ; $V_R = 0\ \text{V}$	NON-REPETITIVE PEAK REVERSE CURRENT $I_{ZSM}$ (A) at $t_p = 100\ \mu\text{s}$ ; $T_{\text{amb}} = 25\ \text{°C}$
	Tol. $\pm 5\%$					
	MIN.	MAX.	MAX.	TYP.	MAX.	MAX.
2V4	2.28	2.52	0.80	-1.15	370	6.0
2V7	2.57	2.84	0.85	-1.35	350	6.0
3V0	2.85	3.15	0.90	-1.50	325	6.0
3V3	3.14	3.47	0.93	-1.65	310	6.0
3V6	3.42	3.78	0.95	-1.80	300	6.0
3V9	3.71	4.10	0.97	-1.95	290	6.0
4V3	4.09	4.52	0.99	-2.05	280	6.0
4V7	4.47	4.94	0.97	-1.90	275	6.0
5V1	4.85	5.36	0.60	-0.15	300	5.0
5V6	5.32	5.88	0.20	1.75	275	4.0
6V2	5.89	6.51	0.10	2.35	250	3.0
6V8	6.46	7.14	0.10	3.00	215	3.0
7V5	7.13	7.88	0.15	3.60	170	3.0
8V2	7.79	8.61	0.15	4.25	150	3.0
9V1	8.65	9.56	0.10	5.00	120	3.0
10	9.50	10.50	0.10	5.80	110	3.0
11	10.45	11.55	0.11	6.70	110	2.5
12	11.40	12.60	0.12	7.65	105	2.5
13	12.35	13.65	0.13	8.60	105	2.5
15	14.25	15.75	0.15	10.50	100	2.0

**Note**1.  $\Delta V_Z = V_Z$  at  $100\ \mu\text{A}$  minus  $V_Z$  at  $10\ \mu\text{A}$ **THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{\text{th } j-a}$	thermal resistance from junction to ambient	note 1	415	K/W
$R_{\text{th } j-s}$	thermal resistance from junction to solderpoint	note 2	195	K/W

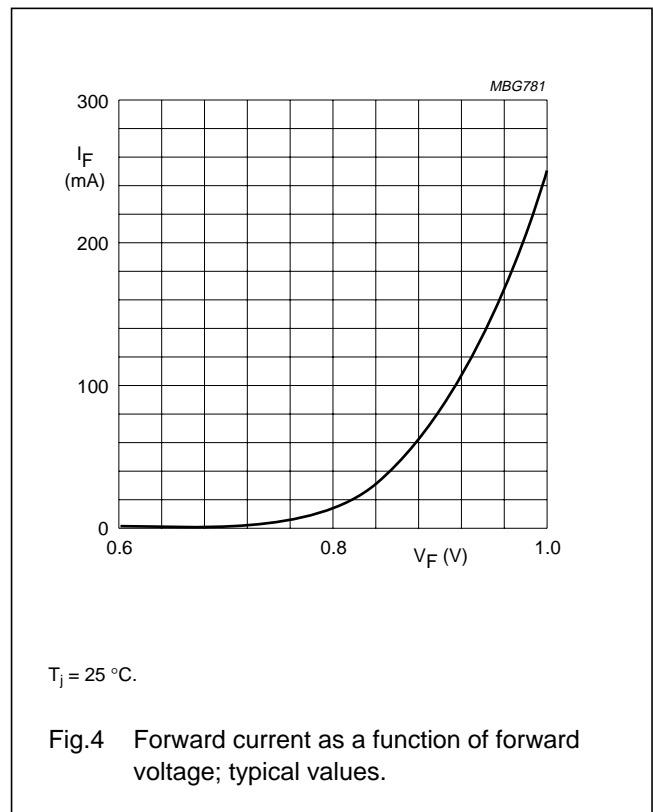
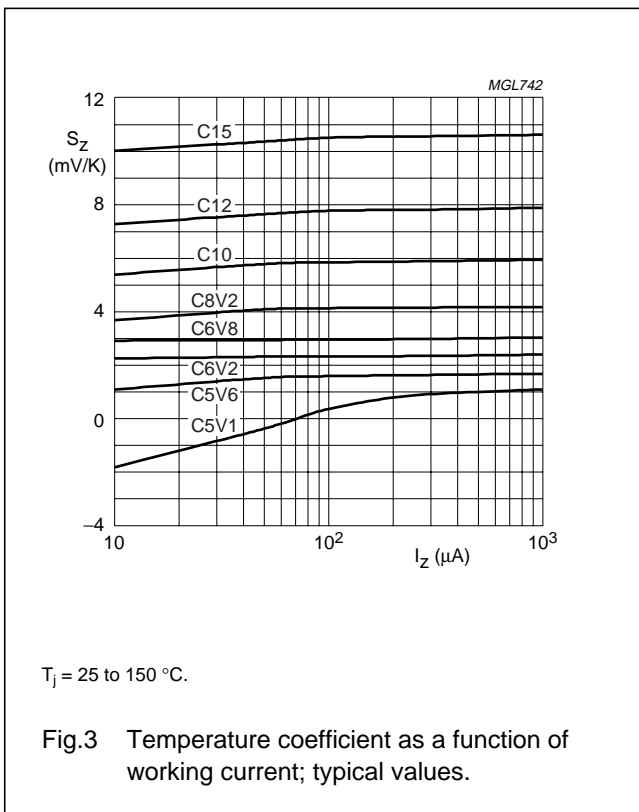
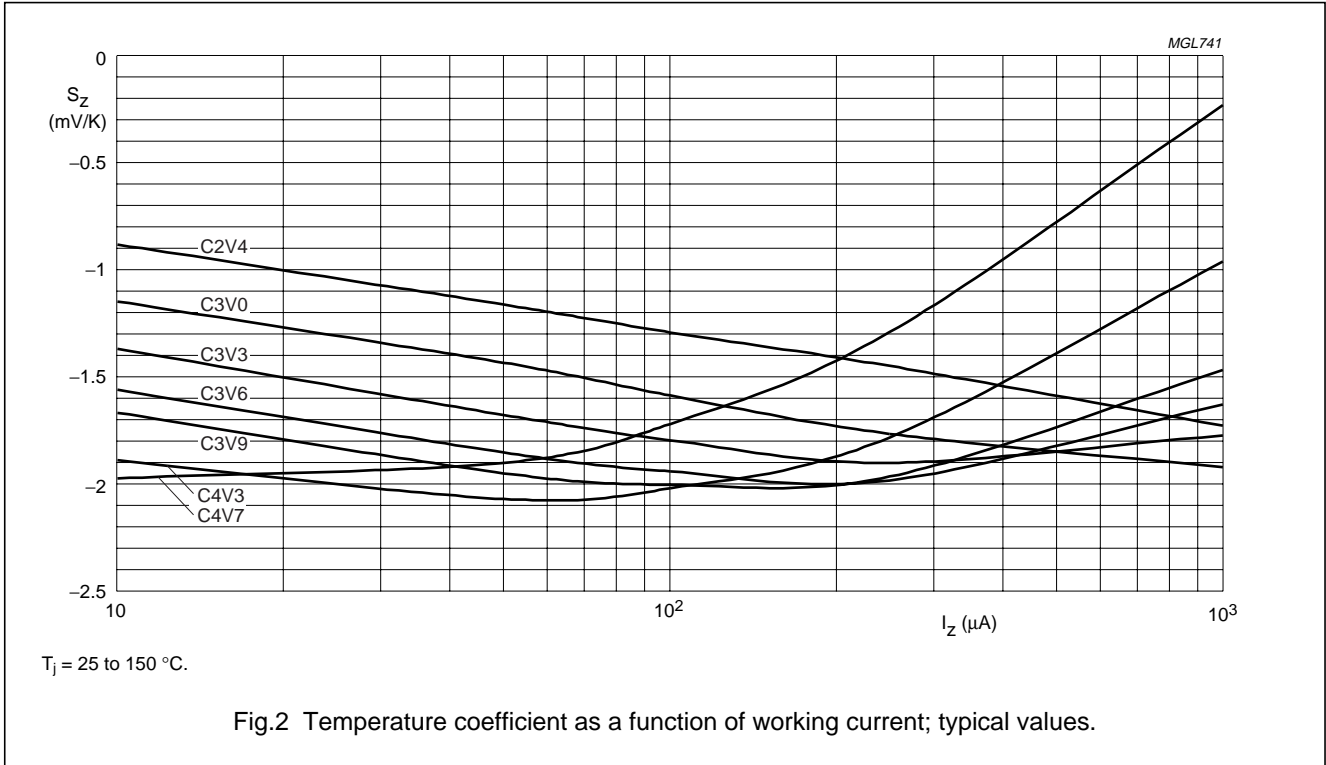
**Notes**

1. Device mounted on an FR4 printed-circuit board.
2. Solderpoint of cathode tab.

Voltage regulator diodes

BZX99 series

GRAPHICAL DATA



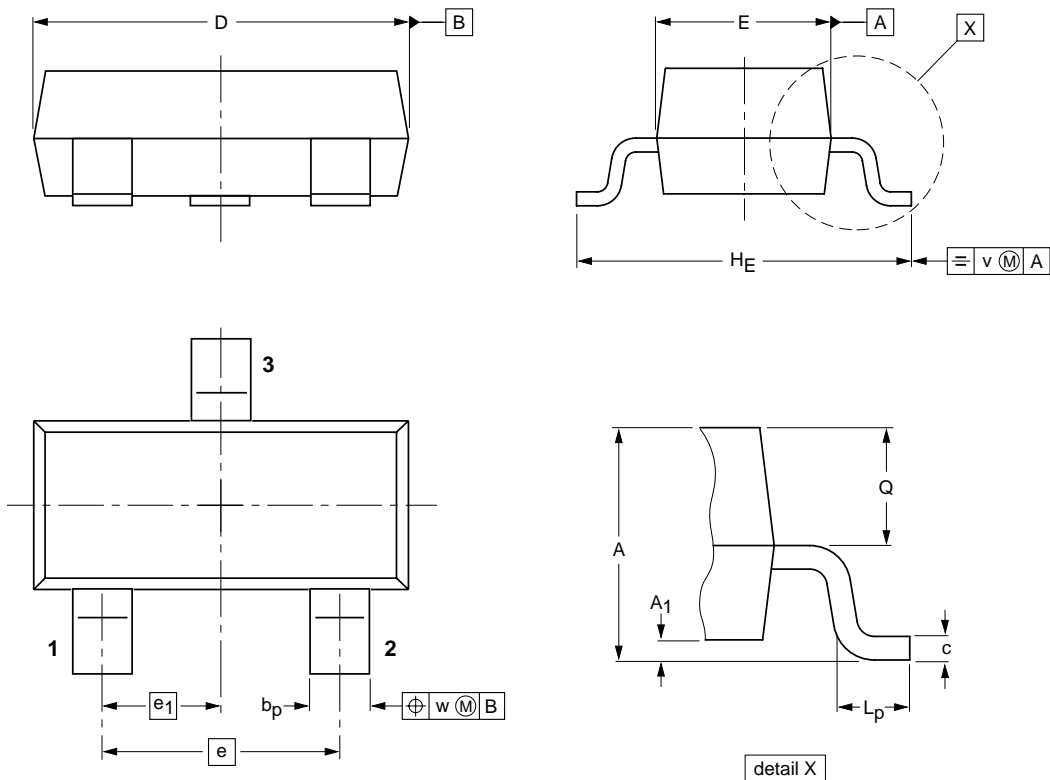
Voltage regulator diodes

BZX99 series

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				97-02-28 99-09-13

## Voltage regulator diodes

## BZX99 series

**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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