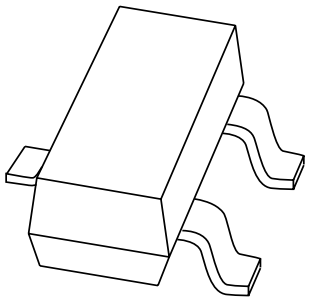
DATA SHEET



BZX99 series
Voltage regulator diodes

Product specification
Supersedes data of 1999 May 31

1999 Oct 20

Philips
Semiconductors

PHILIPS

Voltage regulator diodes BZX99 series

FEATURES

- Total power dissipation: max. 300 mW
- Tolerance: ±5%
- Working voltage range: nom. 2.4 to 15 V (E24 range)
- Improved I_Z/V_Z characteristics at low currents (I_Z = 50 μA). 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 ±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

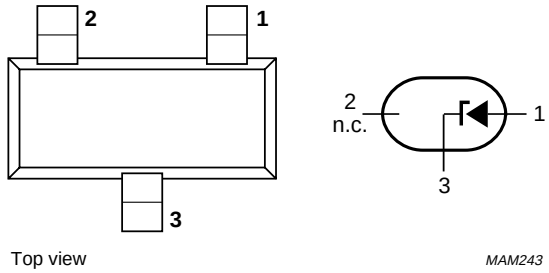


Fig.1 Simplified outline (SOT23) and symbol.

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

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 µs; square wave; T_{amb} = 25 °C prior to surge	see Table 1		
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 1	–	300	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Note

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

ELECTRICAL CHARACTERISTICS

Total BZX99-C series

T_j = 25 °C unless otherwise specified.

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

Table 1 Per type BZX99-C2V4 to C15
T_j = 25 °C unless otherwise specified.

BZX99-C XXX	WORKING VOLTAGE V_Z (V) at I_Z = 50 μA		VOLTAGE CHANGE ΔV_Z(V)(1)	TEMP. COEFF. S_Z (mV/K) I_{Ztest} = 50 μA (see Figs 2 and 3)	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. ±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. ΔV_Z = V_Z at 100 μA minus V_Z at 10 μA

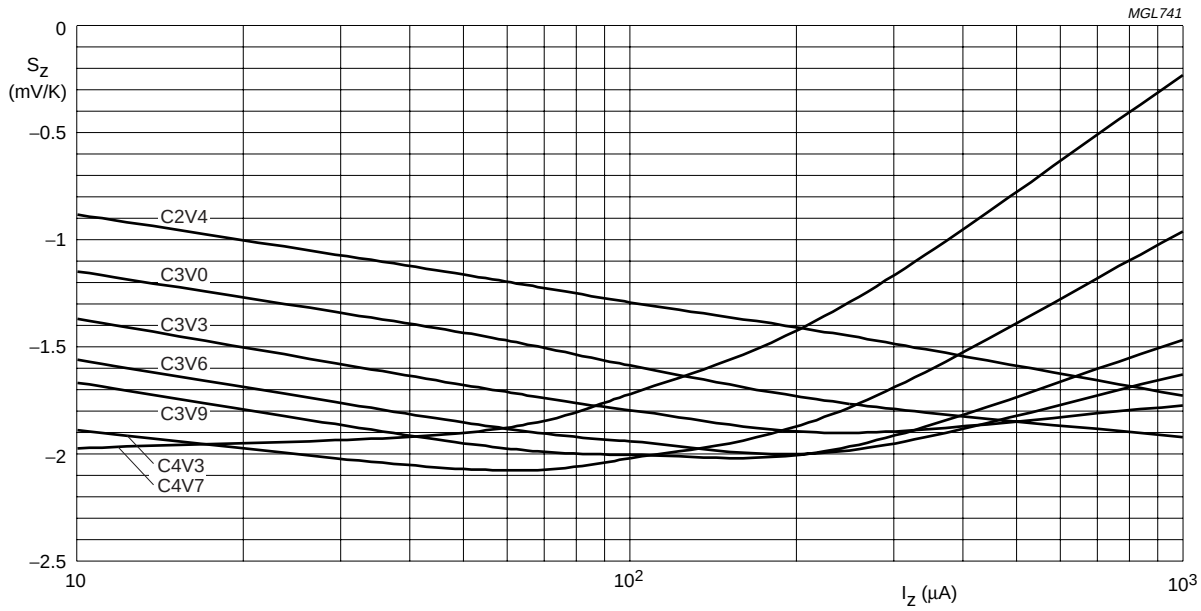
THERMAL CHARACTERISTICS

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

Notes

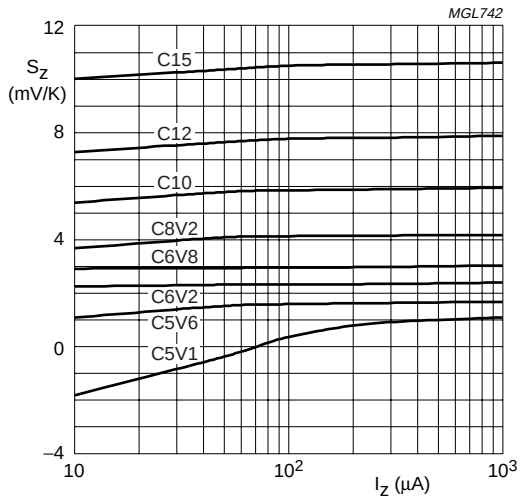
1. Device mounted on an FR4 printed-circuit board.
2. Solderpoint of cathode tab.

GRAPHICAL DATA



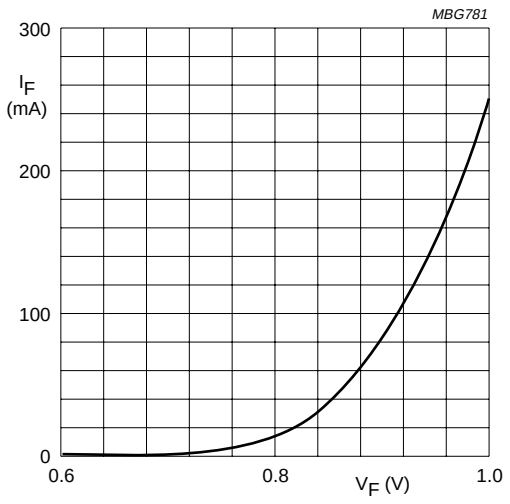
T_j = 25 to 150 °C.

Fig.2 Temperature coefficient as a function of working current; typical values.



T_j = 25 to 150 °C.

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

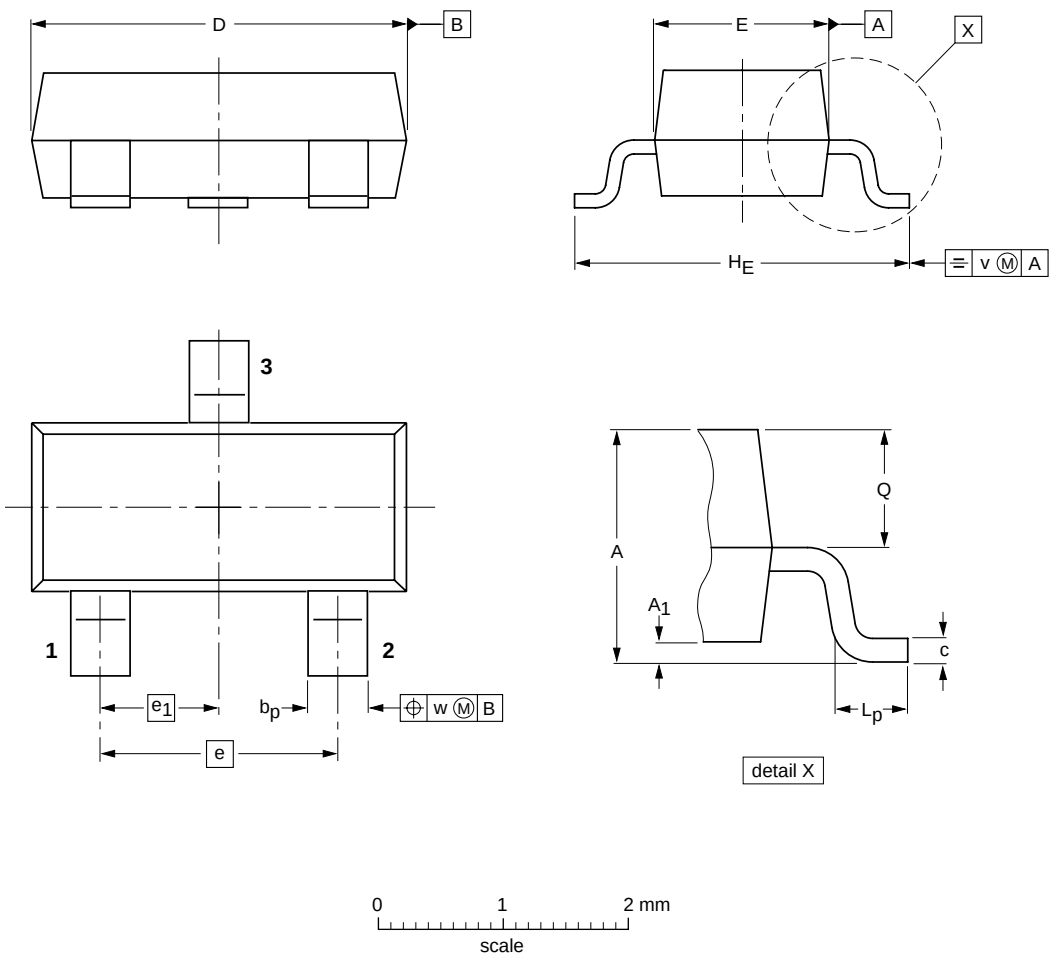


T_j = 25 °C.

Fig.4 Forward current as a function of forward voltage; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	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

DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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