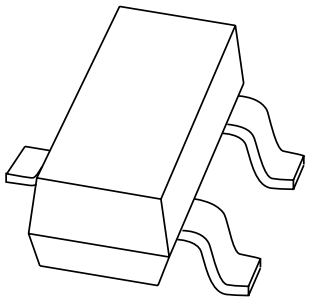
DATA SHEET



BZX99 series
Voltage regulator diodes

Product specification
Supersedes data of 1999 May 31

1999 Oct 20

Philips
Semiconductors

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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

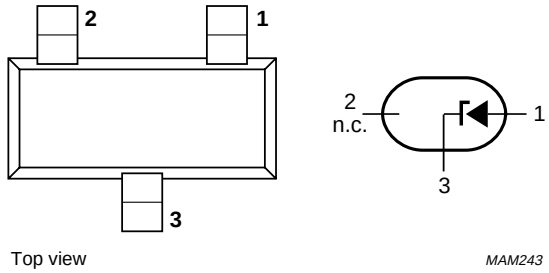


Fig.1 Simplified outline (SOT23) and symbol.

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

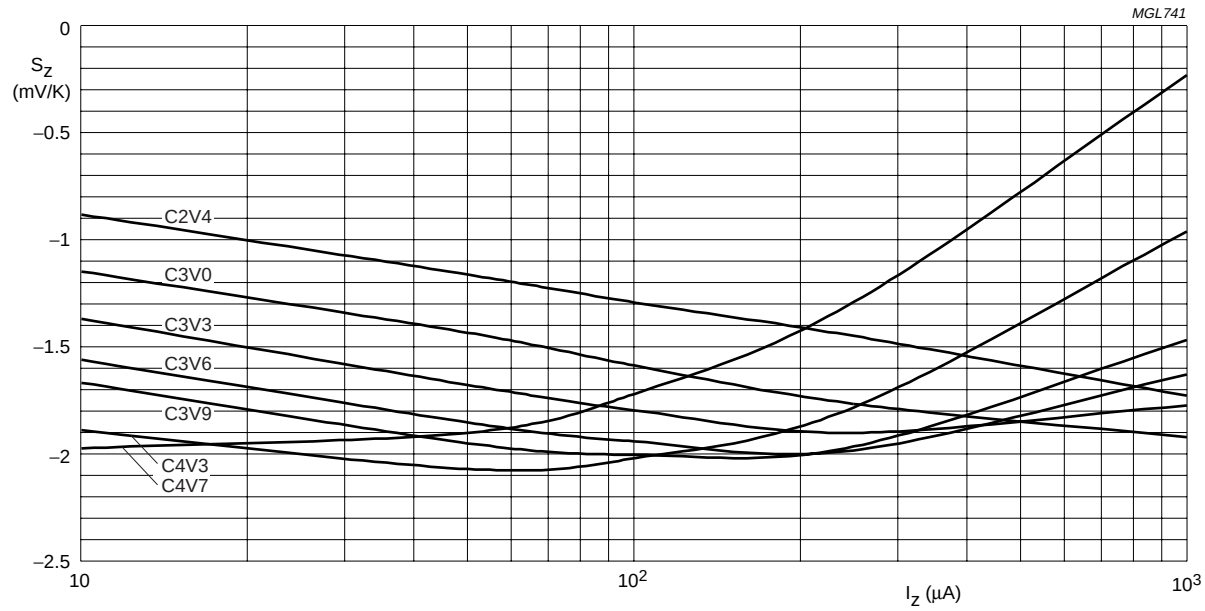
THERMAL CHARACTERISTICS

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

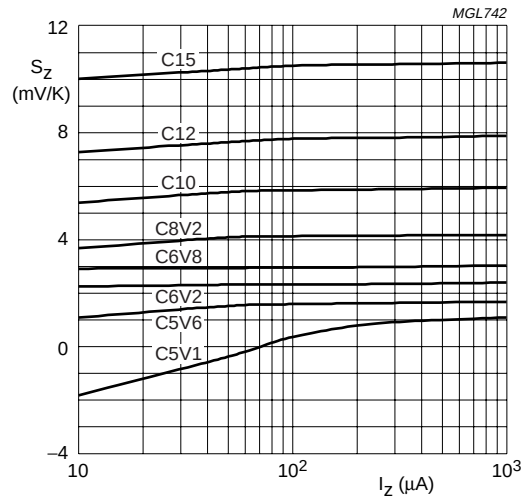
1. Device mounted on an FR4 printed-circuit board.
2. Solderpoint of cathode tab.

GRAPHICAL DATA



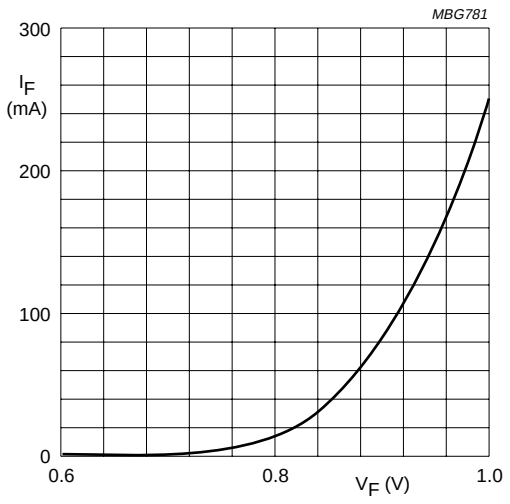
T_j = 25 to 150 °C.

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.

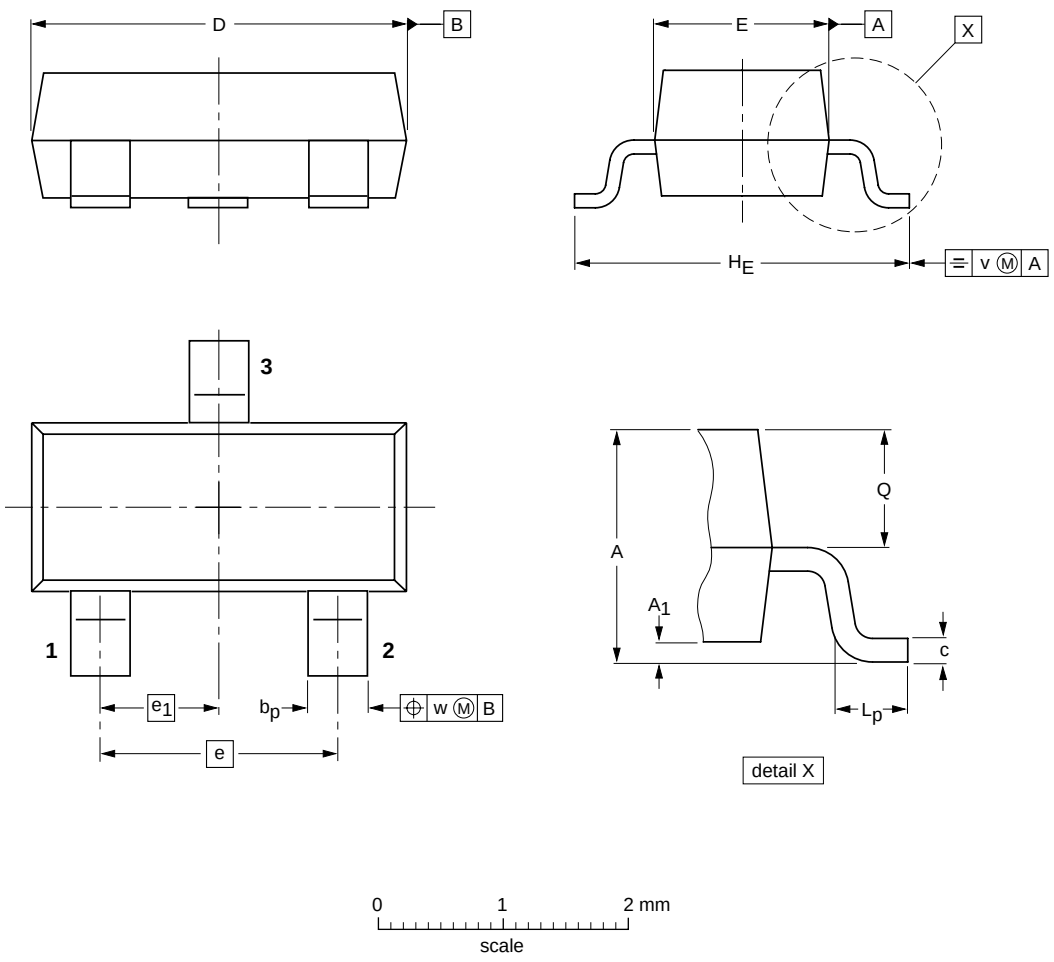


T_j = 25 °C.

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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Philips Semiconductors – a worldwide company

Argentina: see South America

Australia: 3 Figtree Drive, HOMEBUSH, NSW 2140,
Tel. +61 2 9704 8141, Fax. +61 2 9704 8139

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213,
Tel. +43 1 60 101 1248, Fax. +43 1 60 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 20 0733, Fax. +375 172 20 0773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 68 9211, Fax. +359 2 68 9102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Sydhavnsgade 23, 1780 COPENHAGEN V,
Tel. +45 33 29 3333, Fax. +45 33 29 3905

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615 800, Fax. +358 9 6158 0920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 4099 6161, Fax. +33 1 4099 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 2353 60, Fax. +49 40 2353 6300

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: PT Philips Development Corporation, Semiconductors Division,
Gedung Philips, Jl. Buncit Raya Kav.99-100, JAKARTA 12510,
Tel. +62 21 794 0040 ext. 2501, Fax. +62 21 794 0080

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Via Casati, 23 - 20052 MONZA (MI),
Tel. +39 039 203 6838, Fax +39 039 203 6800

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku,
TOKYO 108-8507, Tel. +81 3 3740 5130, Fax. +81 3 3740 5057

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381, Fax +9-5 800 943 0087

Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Pakistan: see Singapore

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Al.Jerozolimskie 195 B, 02-222 WARSAW,
Tel. +48 22 5710 000, Fax. +48 22 5710 001

Portugal: see Spain

Romania: see Italy

Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
Tel. +7 095 755 6918, Fax. +7 095 755 6919

Singapore: Lorong 1, Toa Payoh, SINGAPORE 319762,
Tel. +65 350 2538, Fax. +65 251 6500

Slovakia: see Austria

Slovenia: see Italy

South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
2092 JOHANNESBURG, P.O. Box 58088 Newville 2114,
Tel. +27 11 471 5401, Fax. +27 11 471 5398

South America: Al. Vicente Pinzon, 173, 6th floor,
04547-130 SÃO PAULO, SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 821 2382

Spain: Balmes 22, 08007 BARCELONA,
Tel. +34 93 301 6312, Fax. +34 93 301 4107

Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
Tel. +46 8 5985 2000, Fax. +46 8 5985 2745

Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
Tel. +41 1 488 2741 Fax. +41 1 488 3263

Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
TAIPEI, Taiwan Tel. +886 2 2134 2886, Fax. +886 2 2134 2874

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
209/2 Sanpavuth-Bangna Road Prakanong, BANGKOK 10260,
Tel. +66 2 745 4090, Fax. +66 2 398 0793

Turkey: Yukari Dudullu, Org. San. Blg., 2.Cad. Nr. 28 81260 Umraniye,
ISTANBUL, Tel. +90 216 522 1500, Fax. +90 216 522 1813

Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 208 730 5000, Fax. +44 208 754 8421

United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

Uruguay: see South America

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Tel. +381 11 62 5344, Fax.+381 11 63 5777

For all other countries apply to: Philips Semiconductors,
International Marketing & Sales Communications, Building BE-p, P.O. Box 218,
5600 MD EINDHOVEN, The Netherlands, Fax. +31 40 27 24825

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