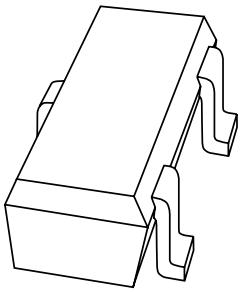
DATA SHEET



PZM-NA series
Voltage regulator double diodes

Product specification
Supersedes data of 1999 Jun 02

1999 Jun 11

Philips
Semiconductors

PHILIPS

Voltage regulator double diodes PZM-NA series

FEATURES

- Total power dissipation: max. 220 mW per diode
- Small plastic package suitable for surface mounted design
- Working voltage: nom. 2.4 V and 15 V (E24 range).

APPLICATIONS

- General regulation functions.

DESCRIPTION

Low power general purpose voltage regulator double diodes in a SOT346 (SC59) plastic package, suitable for surface mounted design.

PINNING

PIN	DESCRIPTION
1	cathode
2	cathode
3	anode

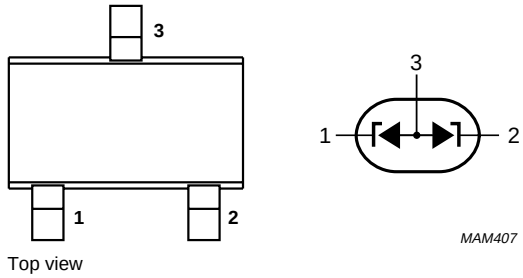


Fig.1 Simplified outline (SOT346; SC59) and symbol.

MARKING

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
PZM2.4NBA	2A4	PZM6.2NB2A	6A2
PZM2.7NB2A	2A7	PZM6.8NB2A	6A8
PZM3.0NB2A	3A0	PZM7.5NB2A	7A5
PZM3.3NB2A	3A3	PZM8.2NB2A	8A2
PZM3.6NB2A	3A6	PZM9.1NB2A	9A1
PZM3.9NB2A	3A9	PZM10NB2A	10A
PZM4.3NB2A	4A3	PZM11NB2A	11A
PZM4.7NB2A	4A7	PZM12NB2A	12A
PZM5.1NB2A	5A1	PZM13NB2A	13A
PZM5.6NB2A	5A6	PZM15NB2A	15A

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_F	continuous forward current		–	200	mA
I_{ZSM}	non-repetitive peak current	t_p = 100 µs; square wave	see Table 1		
P	power dissipation; see note 1	T_{amb} = 25 °C	–	220	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

Note

1. Device mounted on an FR4 printed circuit board with Cu clad 5 × 5 mm.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one diode loaded; note 1	350	K/W
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	one diode loaded; note 2	560	K/W

Notes

1. Solderpoint of cathode tab.
2. Device mounted on an FR4 printed circuit board with Cu clad 5 × 5 mm.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

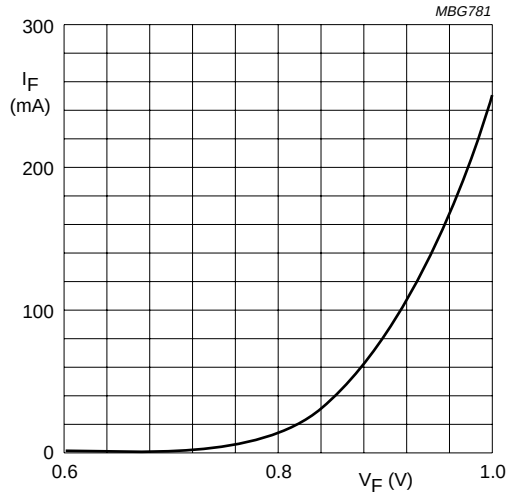
SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA; see Fig.2	0.9	V
		I_F = 100 mA; see Fig.2	1.1	V
I_R	reverse current			
	PZM2.4NBA	V_R = 1 V	50	µA
	PZM2.7NB2A	V_R = 1 V	20	µA
	PZM3.0NB2A	V_R = 1 V	10	µA
	PZM3.3NB2A	V_R = 1 V	5	µA
	PZM3.6NB2A	V_R = 1 V	5	µA
	PZM3.9NB2A	V_R = 1 V	3	µA
	PZM4.3NB2A	V_R = 1 V	3	µA
	PZM4.7NB2A	V_R = 1 V	3	µA
	PZM5.1NB2A	V_R = 1.5 V	3	µA
	PZM5.6NB2A	V_R = 2.5 V	2	µA
	PZM6.2NB2A	V_R = 3.0 V	2	µA
	PZM6.8NB2A	V_R = 3.5 V	2	µA
	PZM7.5NB2A	V_R = 4.0 V	1	µA
	PZM8.2NB2A	V_R = 5.0 V	700	nA
	PZM9.1NB2A	V_R = 6.0 V	500	nA
	PZM10NB2A	V_R = 7.0 V	200	nA
	PZM11NB2A	V_R = 8.0 V	100	nA
	PZM12NB2A	V_R = 9.0 V	100	nA
	PZM13NB2A	V_R = 10.0 V	100	nA
	PZM15NB2A	V_R = 11.0 V	70	nA

Table 1 Per type; PZM2.4N to PZM24N

T_j = 25 °C unless otherwise specified.

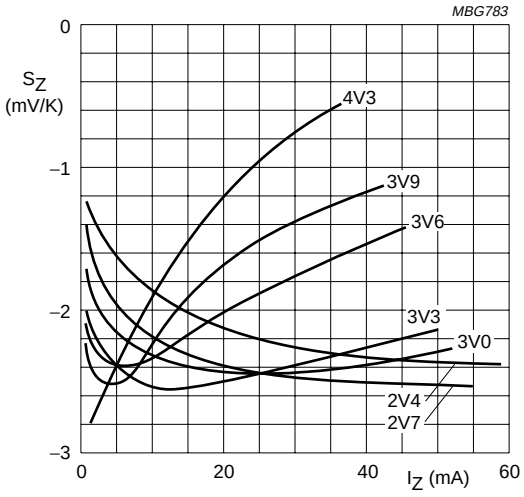
PZM -XXX	WORKING VOLTAGE V_Z (V) at I_Z = 5 mA; t_m = 40 ms; T_{amb} = 25 °C		DIFFERENTIAL RESISTANCE r_{dif} (Ω)				TEMP. COEFF. S_Z (mV/K) at I_Z = 5 mA	DIODE CAP. C_d (pF) at f = 1 MHz; V_R = 0	NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at t_p = 100 μs
			I_Z = 1 mA		I_Z = 5 mA				
	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MAX.
2.4NBA	2.30	2.60	275	400	70	100	–1.6	450	8.00
2.7NB2A	2.65	2.90	300	450	75	100	–2.0	440	8.00
3.0NB2A	2.95	3.20	325	500	80	95	–2.1	425	8.00
3.3NB2A	3.25	3.50	350	500	85	95	–2.4	410	8.00
3.6NB2A	3.55	3.80	375	500	85	90	–2.4	390	8.00
3.9NB2A	3.87	4.10	400	500	85	90	–2.5	370	8.00
4.3NB2A	4.15	4.34	410	600	80	90	–2.5	350	8.00
4.7NB2A	4.55	4.75	425	500	50	80	–1.4	325	8.00
5.1NB2A	4.98	5.20	400	480	40	60	–0.8	300	8.00
5.6NB2A	5.49	5.73	80	400	15	40	1.2	275	8.00
6.2NB2A	6.06	6.33	40	150	6	10	2.3	250	8.00
6.8NB2A	6.65	6.93	30	80	6	15	3.0	215	8.00
7.5NB2A	7.28	7.60	15	80	2	10	4.0	170	3.50
8.2NB2A	8.02	8.36	20	80	2	10	4.6	150	3.50
9.1NB2A	8.85	9.23	20	100	2	10	5.5	120	3.50
10NB2A	9.77	10.21	20	150	2	10	6.4	110	3.50
11NB2A	10.76	11.22	25	150	2	10	7.4	110	3.00
12NB2A	11.74	12.24	25	150	2	10	8.4	105	3.00
13NB2A	12.91	13.49	25	170	2	10	9.4	105	2.50
15NB2A	14.34	14.98	25	200	3	15	11.4	100	2.00

GRAPHICAL DATA



T_j = 25 °C.

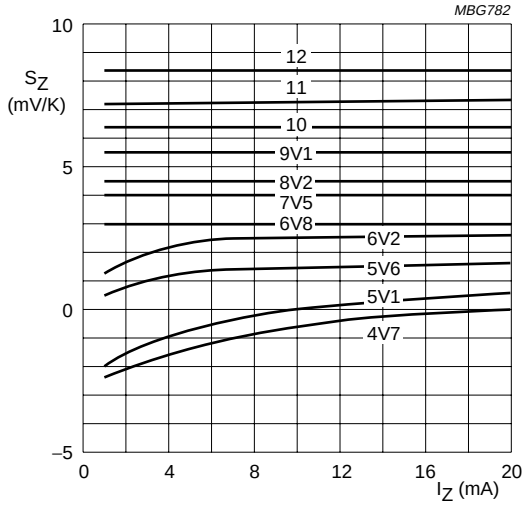
Fig.2 Forward current as a function of forward voltage; typical values.



PZM2.4NBA to PZM4.3NB2A.

T_j = 25 °C to 150 °C.

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



PZM4.7NB2A to PZM12NB2A.

T_j = 25 °C to 150 °C.

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

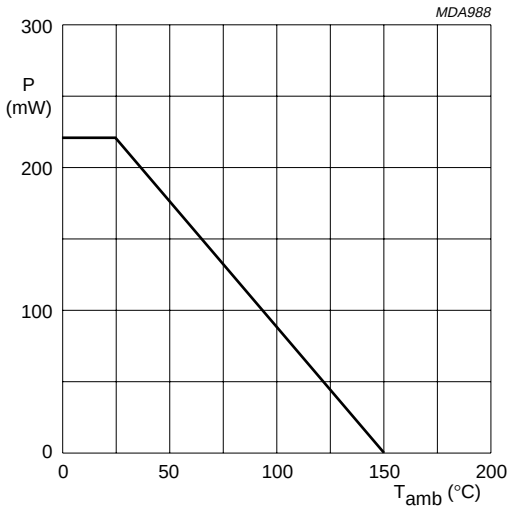
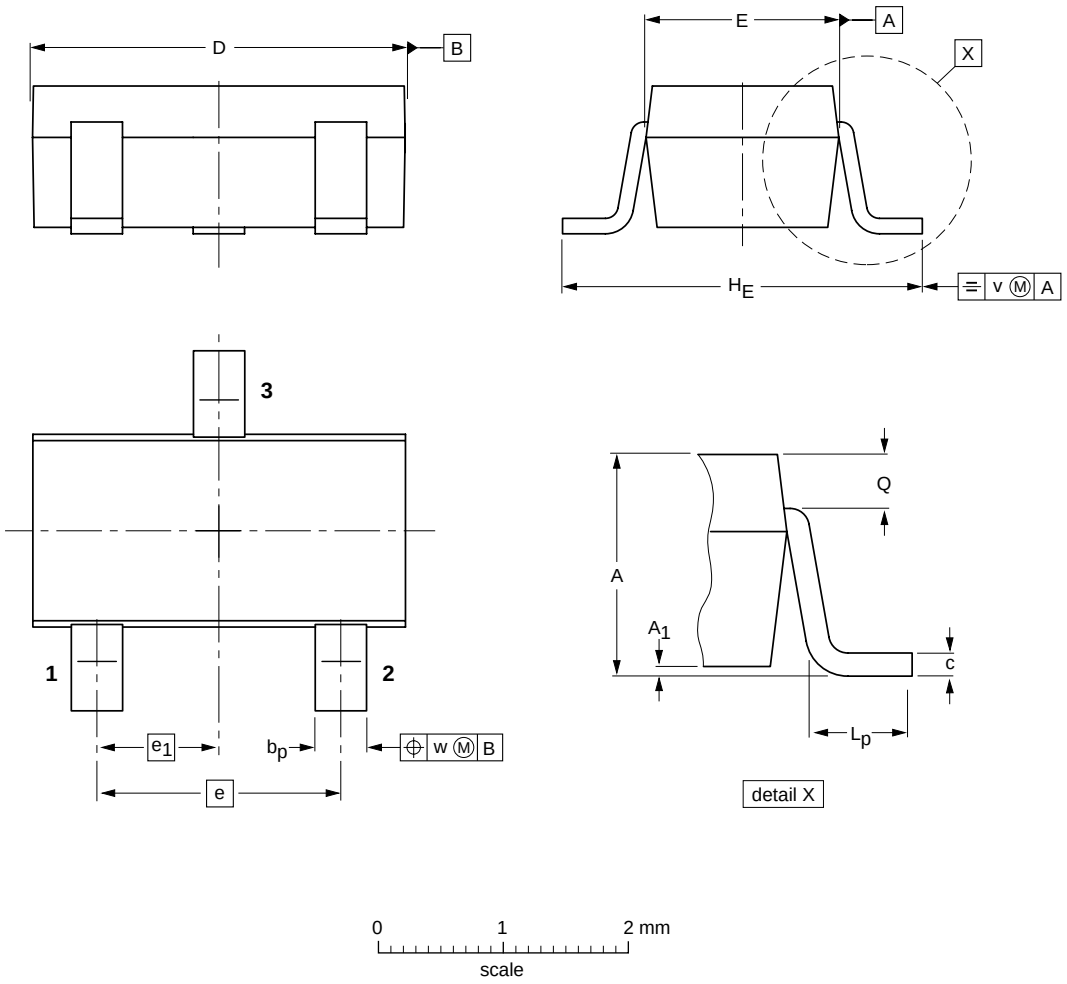


Fig.5 Power derating curve per diode.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT346**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.3 1.0	0.1 0.013	0.50 0.35	0.26 0.10	3.1 2.7	1.7 1.3	1.9	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT346		TO-236	SC-59			98-07-17

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.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

NOTES

NOTES

NOTES

Philips Semiconductors – a worldwide company

Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

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, Piazza IV Novembre 3,
20124 MILANO, Tel. +39 02 67 52 2531, Fax. +39 02 67 52 2557

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: Ul. Lukiska 10, PL 04-123 WARSZAWA,
Tel. +48 22 612 2831, Fax. +48 22 612 2327

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. +44 181 730 5000, Fax. +44 181 754 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

Vietnam: see Singapore

Yugoslavia: PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,
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

Internet: http://www.semiconductors.philips.com

© Philips Electronics N.V. 1999 SCA 65

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands 115002/04/pp12 Date of release: 1999 Jun 11 Document order number: 9397 750 06096

Let's make things better.

Philips Semiconductors

PHILIPS