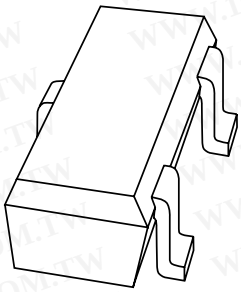
DATA SHEET



PZM-N series
Voltage regulator diodes

Product specification
Supersedes data of 1997 Dec 15

1999 Jan 28

Philips
Semiconductors

PHILIPS

Voltage regulator diodes PZM-N series

FEATURES

- Total power dissipation: max. 300 mW
- Small plastic package suitable for surface mounted design
- Wide working voltage range: nom. 2.4 to 75 V (E24 range).

APPLICATIONS

- General regulation functions.

DESCRIPTION

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

PINNING

PIN	DESCRIPTION
1	anode
2	not connected
3	cathode

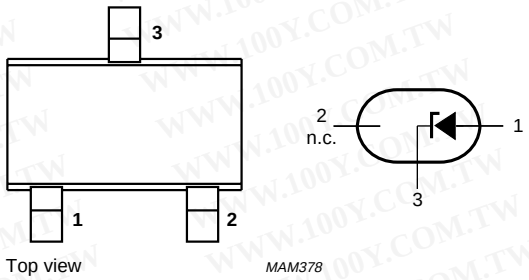


Fig.1 Simplified outline (SOT346; SC59) and symbol.

MARKING

TYPE NUMBER	MARKING CODE				TYPE NUMBER	MARKING CODE			
	B	B1	B2	B3		B	B1	B2	B3
PZM2.4N	2V4	–	–	–	PZM15N	15V	151	152	153
PZM2.7N	2V7	271	272	–	PZM16N	16V	161	162	163
PZM3.0N	3V0	301	302	–	PZM18N	18V	181	182	183
PZM3.3N	3V3	331	332	–	PZM20N	20V	201	202	203
PZM3.6N	3V6	361	362	–	PZM22N	22V	221	222	223
PZM3.9N	3V9	391	392	–	PZM24N	24V	241	242	243
PZM4.3N	4V3	431	432	433	PZM27N	27V	–	–	–
PZM4.7N	4V7	471	472	473	PZM30N	30V	–	–	–
PZM5.1N	5V1	511	512	513	PZM33N	33V	–	–	–
PZM5.6N	5V6	561	562	563	PZM36N	36V	–	–	–
PZM6.2N	6V2	621	622	623	PZM39N	39V	–	–	–
PZM6.8N	6V8	681	682	683	PZM43N	43V	–	–	–
PZM7.5N	7V5	751	752	753	PZM47N	47V	–	–	–
PZM8.2N	8V2	821	822	823	PZM51N	51V	–	–	–
PZM9.1N	9V1	911	912	913	PZM56N	56V	–	–	–
PZM10N	10V	101	102	103	PZM62N	62V	–	–	–
PZM11N	11V	111	112	113	PZM68N	68V	–	–	–
PZM12N	12V	121	122	123	PZM75N	75V	–	–	–
PZM13N	13V	131	132	133	–	–	–	–	–

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_F	continuous forward current		–	250	mA
I_{ZSM}	non-repetitive peak 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	–	300	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	T_s = 60 °C	300	K/W

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			
	PZM2.4N	V_R = 1 V	50	µA
	PZM2.7N	V_R = 1 V	20	µA
	PZM3.0N	V_R = 1 V	10	µA
	PZM3.3N	V_R = 1 V	5	µA
	PZM3.6N	V_R = 1 V	5	µA
	PZM3.9N	V_R = 1 V	3	µA
	PZM4.3N	V_R = 1 V	3	µA
	PZM4.7N	V_R = 1 V	3	µA
	PZM5.1N	V_R = 1.5 V	3	µA
	PZM5.6N	V_R = 2.5 V	2	µA
	PZM6.2N	V_R = 3.0 V	2	µA
	PZM6.8N	V_R = 3.5 V	2	µA
	PZM7.5N	V_R = 4.0 V	1	µA
	PZM8.2N	V_R = 5.0 V	700	nA
	PZM9.1N	V_R = 6.0 V	500	nA
	PZM10N	V_R = 7.0 V	200	nA
	PZM11N	V_R = 8.0 V	100	nA
	PZM12N	V_R = 9.0 V	100	nA
	PZM13N	V_R = 10.0 V	100	nA
	PZM15N	V_R = 11.0 V	70	nA
	PZM16N	V_R = 12.0 V	70	nA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
I_R	reverse current			
	PZM18N	V_R = 13.0 V	70	nA
	PZM20N	V_R = 15.0 V	70	nA
	PZM22N	V_R = 17.0 V	70	nA
	PZM24N	V_R = 19.0 V	70	nA
	PZM27N	V_R = 21.0 V	70	nA
	PZM30N	V_R = 23.0 V	70	nA
	PZM33N	V_R = 25.0 V	70	nA
	PZM36N	V_R = 27.0 V	70	nA
	PZM39N	V_R = 0.7 V_{Znom}	50	nA
	PZM43N	V_R = 0.7 V_{Znom}	50	nA
	PZM47N	V_R = 0.7 V_{Znom}	50	nA
	PZM51N	V_R = 0.7 V_{Znom}	50	nA
	PZM56N	V_R = 0.7 V_{Znom}	50	nA
	PZM62N	V_R = 0.7 V_{Znom}	50	nA
	PZM68N	V_R = 0.7 V_{Znom}	50	nA
	PZM75N	V_R = 0.7 V_{Znom}	50	nA

Table 1 Per type; PZM2.4N to PZM24N

T_j = 25 °C unless otherwise specified.

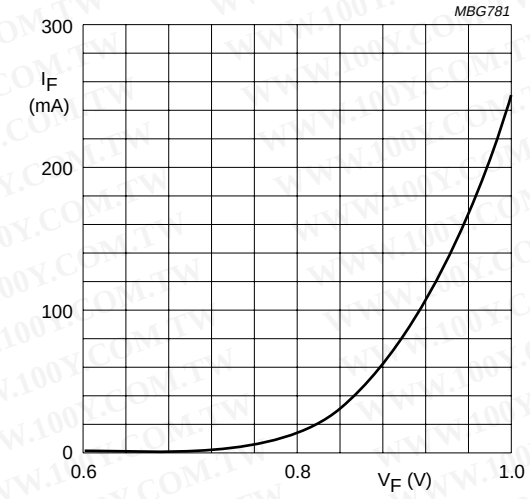
PZM -XXX	WORKING VOLTAGE V_Z (V) at I_Z = 5 mA; t_m = 40 ms								DIFFERENTIAL RESISTANCE r_{dif} (Ω)				TEMP. COEFF. S_Z (mV/K) at I_Z = 5 mA	DIODE CAP. C_d (pF) at f = 1 MHz; V_R = 0	NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at t_p = 100 μs; T_{amb} = 25 °C
	B		B1		B2		B3		I_Z = 1 mA		I_Z = 5 mA				
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MAX.
2.4N	2.30	2.60	–	–	–	–	–	–	275	400	70	100	–1.6	450	8.00
2.7N	2.50	2.90	2.50	2.75	2.65	2.90	–	–	300	450	75	100	–2.0	440	8.00
3.0N	2.80	3.20	2.80	3.05	2.95	3.20	–	–	325	500	80	95	–2.1	425	8.00
3.3N	3.10	3.50	3.10	3.35	3.25	3.50	–	–	350	500	85	95	–2.4	410	8.00
3.6N	3.40	3.80	3.40	3.65	3.55	3.80	–	–	375	500	85	90	–2.4	390	8.00
3.9N	3.70	4.10	3.70	3.97	3.87	4.10	–	–	400	500	85	90	–2.5	370	8.00
4.3N	4.01	4.48	4.01	4.21	4.15	4.34	4.28	4.48	410	600	80	90	–2.5	350	8.00
4.7N	4.42	4.90	4.42	4.61	4.55	4.75	4.69	4.90	425	500	50	80	–1.4	325	8.00
5.1N	4.84	5.37	4.84	5.04	4.98	5.20	5.14	5.37	400	480	40	60	–0.8	300	8.00
5.6N	5.31	5.92	5.31	5.55	5.49	5.73	5.67	5.92	80	400	15	40	1.2	275	8.00
6.2N	5.86	6.53	5.86	6.12	6.06	6.33	6.26	6.53	40	150	6	10	2.3	250	8.00
6.8N	6.47	7.14	6.47	6.73	6.65	6.93	6.86	7.14	30	80	6	15	3.0	215	8.00
7.5N	7.06	7.84	7.06	7.36	7.28	7.60	7.52	7.84	15	80	2	10	4.0	170	3.50
8.2N	7.76	8.64	7.76	8.10	8.02	8.36	8.28	8.64	20	80	2	10	4.6	150	3.50
9.1N	8.56	9.55	8.56	8.93	8.85	9.23	9.15	9.55	20	100	2	10	5.5	120	3.50
10N	9.45	10.55	9.45	9.87	9.77	10.21	10.11	10.55	20	150	2	10	6.4	110	3.50
11N	10.44	11.56	10.44	10.88	10.76	11.22	11.10	11.56	25	150	2	10	7.4	108	3.00
12N	11.42	12.60	11.42	11.90	11.74	12.24	12.08	12.60	25	150	2	10	8.4	105	3.00
13N	12.47	13.96	12.47	13.03	12.91	13.49	13.37	13.96	25	170	2	10	9.4	103	2.50
15N	13.84	15.52	13.84	14.46	14.34	14.98	14.85	15.52	25	200	3	15	11.4	99	2.00
16N	15.37	17.09	15.37	16.01	15.85	16.51	16.35	17.09	25	200	4	20	12.4	97	1.50
18N	16.94	19.03	16.94	17.70	17.56	18.35	18.21	19.03	25	225	4	20	14.4	93	1.50
20N	18.86	21.08	18.86	19.70	19.52	20.39	20.21	21.08	30	225	4	20	16.4	88	1.50
22N	20.88	23.17	20.88	21.77	21.54	22.47	22.23	23.17	30	250	5	25	18.4	84	1.25
24N	22.93	25.57	22.93	23.96	23.72	24.78	24.54	25.57	30	250	6	30	20.4	80	1.25

Table 2 Per type; PZM27N to PZM75N

T_j = 25 °C unless otherwise specified.

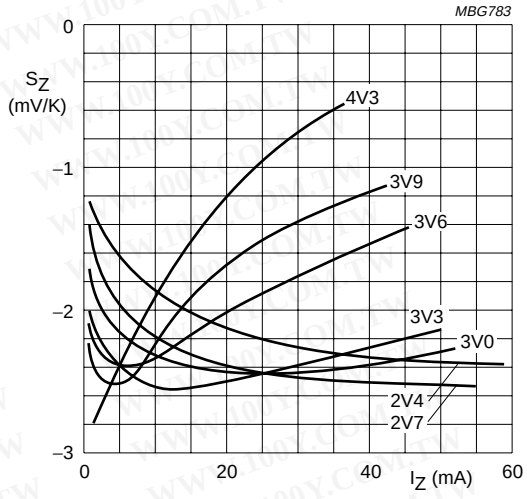
PZM -XXX	WORKING VOLTAGE V_Z (V) at I_Z = 2 mA; t_m = 40 ms								DIFFERENTIAL RESISTANCE r_{dif} (Ω)				TEMP. COEFF. S_Z (mV/K) at I_Z = 2 mA	DIODE CAP. C_d (pF) at f = 1 MHz; V_R = 0	NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at t_p = 100 μs; T_{amb} = 25 °C
	B		B1		B2		B3		I_Z = 0.5 mA		I_Z = 2 mA				
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MAX.
27N	25.10	28.90	–	–	–	–	–	–	35	250	8	40	23.4	73	1.00
30N	28.00	32.00	–	–	–	–	–	–	35	250	10	40	26.6	66	1.00
33N	31.00	35.00	–	–	–	–	–	–	40	275	11	40	29.7	60	0.90
36N	34.00	38.00	–	–	–	–	–	–	40	300	15	60	33.0	59	0.80
39N	37.00	41.00	–	–	–	–	–	–	40	300	25	75	36.4	58	0.70
43N	40.00	46.00	–	–	–	–	–	–	45	325	30	80	41.2	56	0.60
47N	44.00	50.00	–	–	–	–	–	–	45	325	30	90	46.1	55	0.50
51N	48.00	54.00	–	–	–	–	–	–	45	350	35	110	51.0	52	0.40
56N	52.00	60.00	–	–	–	–	–	–	50	375	40	120	57.0	49	0.30
62N	58.00	66.00	–	–	–	–	–	–	60	400	50	140	64.4	44	0.30
68N	64.00	72.00	–	–	–	–	–	–	75	400	55	160	71.7	40	0.25
75N	70.00	79.00	–	–	–	–	–	–	85	400	70	175	80.2	35	0.20

GRAPHICAL DATA



T_j = 25 °C.

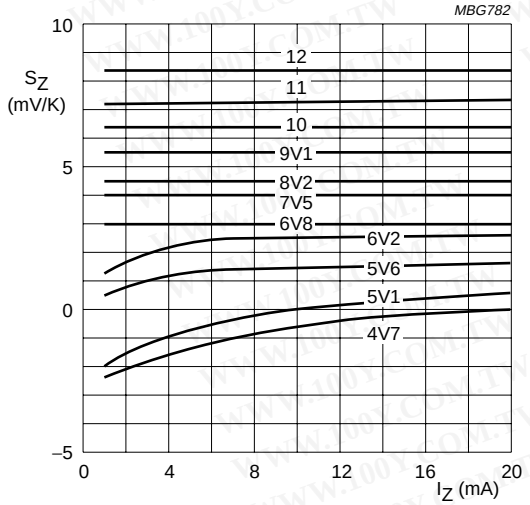
Fig.2 Forward current as a function of forward voltage; typical values.



PZM2.4N to PZM4.3N.

T_j = 25 °C to 150 °C.

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



PZM4.7N to PZM12N.

T_j = 25 °C to 150 °C.

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

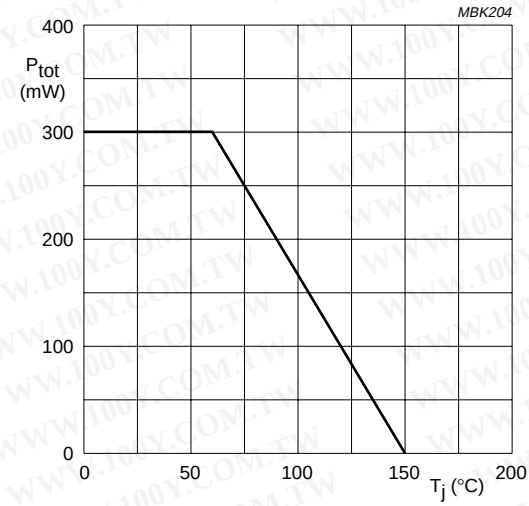
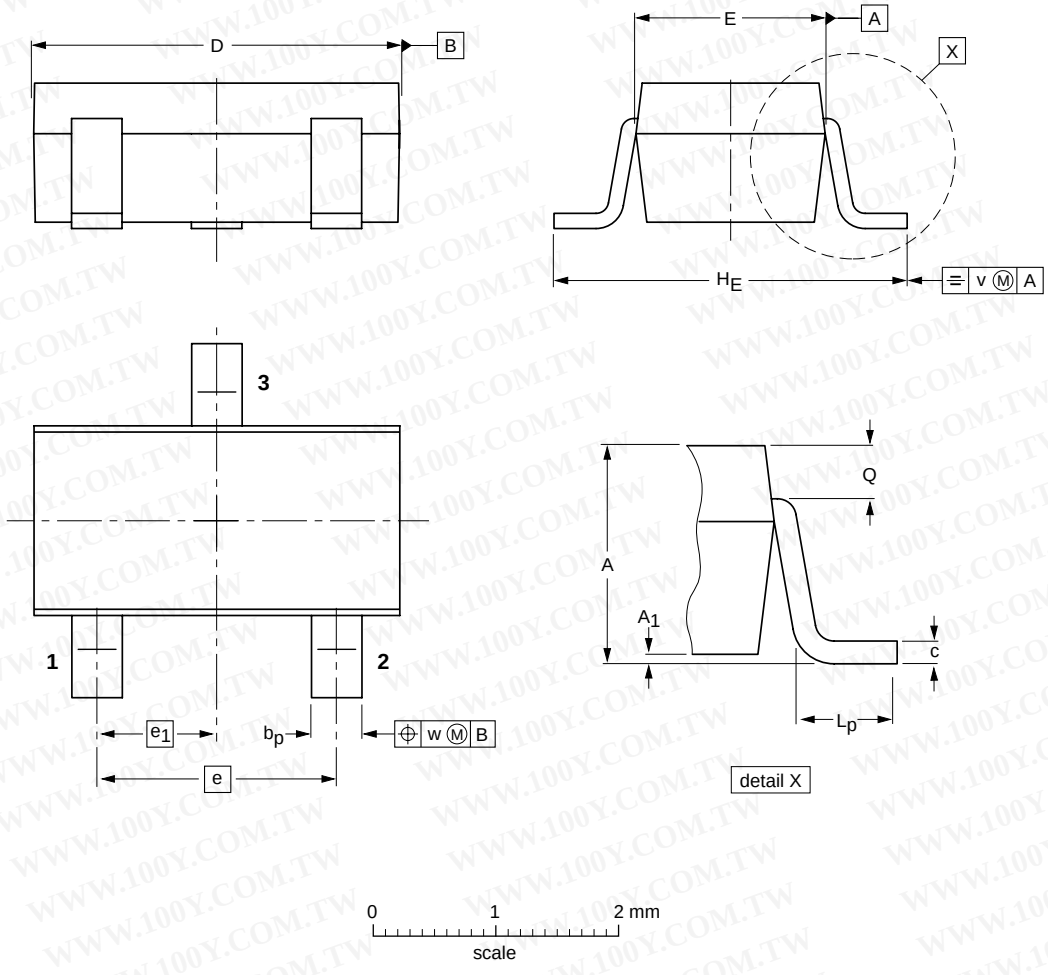


Fig.5 Power derating curve.

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			97-02-28

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.