

Voltage regulator diodes

BZX79 series

FEATURES

- Total power dissipation:
max. 500 mW
- Three tolerance series: $\pm 1\%$, $\pm 2\%$,
and approx. $\pm 5\%$
- Working voltage range:
nom. 2.4 to 75 V (E24 range)
- Non-repetitive peak reverse power
dissipation: max. 40 W.

APPLICATIONS

- Low voltage stabilizers or voltage
references.

DESCRIPTION

Low-power voltage regulator diodes in hermetically sealed leaded glass SOD27 (DO-35) packages. The diodes are available in the normalized E24 $\pm 1\%$ (BZX79-A), $\pm 2\%$ (BZX79-B), and approx. $\pm 5\%$ (BZX79-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V.



The diodes are type branded.

Fig.1 Simplified outline (SOD27; DO-35) and symbol.

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 reverse current	$t_p = 100 \mu s$; square wave; $T_j = 25^\circ C$ prior to surge	see Tables 1, 2, 3 and 4		
P_{tot}	total power dissipation	$T_{amb} = 50^\circ C$; note 1	–	400	mW
		$T_{amb} = 50^\circ C$; note 2	–	500	mW
P_{ZSM}	non-repetitive peak reverse power dissipation	$t_p = 100 \mu s$; square wave; $T_j = 25^\circ C$ prior to surge; see Fig.3	–	40	W
T_{stg}	storage temperature		–65	+200	$^\circ C$
T_j	junction temperature		–65	+200	$^\circ C$

Notes

1. Device mounted on a printed circuit-board without metallization pad; lead length max.
2. Tie-point temperature $\leq 50^\circ C$; max. lead length 8 mm.

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ELECTRICAL CHARACTERISTICS**Total BZX79-A, B and 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_R	reverse current			
	BZX79-A/B/C2V4	$V_R = 1\text{ V}$	50	μA
	BZX79-A/B/C2V7	$V_R = 1\text{ V}$	20	μA
	BZX79-A/B/C3V0	$V_R = 1\text{ V}$	10	μA
	BZX79-A/B/C3V3	$V_R = 1\text{ V}$	5	μA
	BZX79-A/B/C3V6	$V_R = 1\text{ V}$	5	μA
	BZX79-A/B/C3V9	$V_R = 1\text{ V}$	3	μA
	BZX79-A/B/C4V3	$V_R = 1\text{ V}$	3	μA
	BZX79-A/B/C4V7	$V_R = 2\text{ V}$	3	μA
	BZX79-A/B/C5V1	$V_R = 2\text{ V}$	2	μA
	BZX79-A/B/C5V6	$V_R = 2\text{ V}$	1	μA
	BZX79-A/B/C6V2	$V_R = 4\text{ V}$	3	μA
	BZX79-A/B/C6V8	$V_R = 4\text{ V}$	2	μA
	BZX79-A/B/C7V5	$V_R = 5\text{ V}$	1	μA
	BZX79-A/B/C8V2	$V_R = 5\text{ V}$	700	nA
	BZX79-A/B/C9V1	$V_R = 6\text{ V}$	500	nA
	BZX79-A/B/C10	$V_R = 7\text{ V}$	200	nA
	BZX79-A/B/C11	$V_R = 8\text{ V}$	100	nA
	BZX79-A/B/C12	$V_R = 8\text{ V}$	100	nA
	BZX79-A/B/C13	$V_R = 8\text{ V}$	100	nA
	BZX79-A/B/C15 to 75	$V_R = 0.7V_{Znom}$	50	nA

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Table 1 Per type BZX79-A/B2V4 to A/B24 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

BZX79- A or B XXX	WORKING VOLTAGE V_Z (V) at $I_{Z\text{test}} = 5\text{ mA}$				DIFFERENTIAL RESISTANCE r_{dif} (Ω)				TEMP. COEFF. S_Z (mV/K) at $I_{Z\text{test}} = 5\text{ mA}$ (see Figs 5 and 6)			DIODE CAP. C_d (pF) at $f = 1\text{ MHz}$; $V_R = 0\text{ V}$	NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$
	Tol. $\pm 1\%$ (A)		Tol. $\pm 2\%$ (B)		at $I_{Z\text{test}} = 1\text{ mA}$		at $I_{Z\text{test}} = 5\text{ mA}$		MIN.	TYP.	MAX.	MAX.	MAX.
	MIN.	MAX.	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.					
2V4	2.37	2.43	2.35	2.45	275	600	70	100	-3.5	-1.6	0	450	6.0
2V7	2.67	2.73	2.65	2.75	300	600	75	100	-3.5	-2.0	0	450	6.0
3V0	2.97	3.03	2.94	3.06	325	600	80	95	-3.5	-2.1	0	450	6.0
3V3	3.26	3.34	3.23	3.37	350	600	85	95	-3.5	-2.4	0	450	6.0
3V6	3.56	3.64	3.53	3.67	375	600	85	90	-3.5	-2.4	0	450	6.0
3V9	3.86	3.94	3.82	3.98	400	600	85	90	-3.5	-2.5	0	450	6.0
4V3	4.25	4.35	4.21	4.39	410	600	80	90	-3.5	-2.5	0	450	6.0
4V7	4.65	4.75	4.61	4.79	425	500	50	80	-3.5	-1.4	0.2	300	6.0
5V1	5.04	5.16	5.00	5.20	400	480	40	60	-2.7	-0.8	1.2	300	6.0
5V6	5.54	5.66	5.49	5.71	80	400	15	40	-2.0	1.2	2.5	300	6.0
6V2	6.13	6.27	6.08	6.32	40	150	6	10	0.4	2.3	3.7	200	6.0
6V8	6.73	6.87	6.66	6.94	30	80	6	15	1.2	3.0	4.5	200	6.0
7V5	7.42	7.58	7.35	7.65	30	80	6	15	2.5	4.0	5.3	150	4.0
8V2	8.11	8.29	8.04	8.36	40	80	6	15	3.2	4.6	6.2	150	4.0
9V1	9.00	9.20	8.92	9.28	40	100	6	15	3.8	5.5	7.0	150	3.0
10	9.90	10.10	9.80	10.20	50	150	8	20	4.5	6.4	8.0	90	3.0
11	10.89	11.11	10.80	11.20	50	150	10	20	5.4	7.4	9.0	85	2.5
12	11.88	12.12	11.80	12.20	50	150	10	25	6.0	8.4	10.0	85	2.5
13	12.87	13.13	12.70	13.30	50	170	10	30	7.0	9.4	11.0	80	2.5
15	14.85	15.15	14.70	15.30	50	200	10	30	9.2	11.4	13.0	75	2.0
16	15.84	16.16	15.70	16.30	50	200	10	40	10.4	12.4	14.0	75	1.5
18	17.82	18.18	17.60	18.40	50	225	10	45	12.4	14.4	16.0	70	1.5
20	19.80	20.20	19.60	20.40	60	225	15	55	14.4	16.4	18.0	60	1.5
22	21.78	22.22	21.60	22.40	60	250	20	55	16.4	18.4	20.0	60	1.25
24	23.76	24.24	23.50	24.50	60	250	25	70	18.4	20.4	22.0	55	1.25

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Table 2 Per type BZX79-A/B27 to A/B75
T_j = 25 °C unless otherwise specified.

BZX79- A or B XXX	WORKING VOLTAGE V _Z (V) at I _{Ztest} = 2 mA				DIFFERENTIAL RESISTANCE r _{dif} (Ω)				TEMP. COEFF. S _Z (mV/K) at I _{Ztest} = 2 mA (see Figs 5 and 6)			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. ±1% (A)		Tol. ±2% (B)		at I _{Ztest} = 0.5 mA		at I _{Ztest} = 2 mA						
	MIN.	MAX.	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	MIN.	TYP.	MAX.	MAX.	MAX.
27	26.73	27.27	26.50	27.50	65	300	25	80	21.4	23.4	25.3	50	1.0
30	29.70	30.30	29.40	30.60	70	300	30	80	24.4	26.6	29.4	50	1.0
33	32.67	33.33	32.30	33.70	75	325	35	80	27.4	29.7	33.4	45	0.9
36	35.64	36.36	35.30	36.70	80	350	35	90	30.4	33.0	37.4	45	0.8
39	38.61	39.39	38.20	39.80	80	350	40	130	33.4	36.4	41.2	45	0.7
43	42.57	43.43	42.10	43.90	85	375	45	150	37.6	41.2	46.6	40	0.6
47	46.53	47.47	46.10	47.90	85	375	50	170	42.0	46.1	51.8	40	0.5
51	50.49	51.51	50.00	52.00	90	400	60	180	46.6	51.0	57.2	40	0.4
56	55.44	56.56	54.90	57.10	100	425	70	200	52.2	57.0	63.8	40	0.3
62	61.38	62.62	60.80	63.20	120	450	80	215	58.8	64.4	71.6	35	0.3
68	67.32	68.68	66.60	69.40	150	475	90	240	65.6	71.7	79.8	35	0.25
75	74.25	75.75	73.50	76.50	170	500	95	255	73.4	80.2	88.6	35	0.2

Voltage regulator diodes

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Table 3 Per type BZX79-C2V4 to C24 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

BZX79 - C XXX	WORKING VOLTAGE V _Z (V) at I _{Ztest} = 5 mA		DIFFERENTIAL RESISTANCE r _{dif} (Ω)				TEMP. COEFF. S _Z (mV/K) at I _{Ztest} = 5 mA (see Figs 5 and 6)			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. approx. ±5% (C)		at I _{Ztest} = 1 mA		at I _{Ztest} = 5 mA		MIN.	TYP.	MAX.		
	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.					
2V4	2.2	2.6	275	600	70	100	−3.5	−1.6	0	450	6.0
2V7	2.5	2.9	300	600	75	100	−3.5	−2.0	0	450	6.0
3V0	2.8	3.2	325	600	80	95	−3.5	−2.1	0	450	6.0
3V3	3.1	3.5	350	600	85	95	−3.5	−2.4	0	450	6.0
3V6	3.4	3.8	375	600	85	90	−3.5	−2.4	0	450	6.0
3V9	3.7	4.1	400	600	85	90	−3.5	−2.5	0	450	6.0
4V3	4.0	4.6	410	600	80	90	−3.5	−2.5	0	450	6.0
4V7	4.4	5.0	425	500	50	80	−3.5	−1.4	0.2	300	6.0
5V1	4.8	5.4	400	480	40	60	−2.7	−0.8	1.2	300	6.0
5V6	5.2	6.0	80	400	15	40	−2.0	1.2	2.5	300	6.0
6V2	5.8	6.6	40	150	6	10	0.4	2.3	3.7	200	6.0
6V8	6.4	7.2	30	80	6	15	1.2	3.0	4.5	200	6.0
7V5	7.0	7.9	30	80	6	15	2.5	4.0	5.3	150	4.0
8V2	7.7	8.7	40	80	6	15	3.2	4.6	6.2	150	4.0
9V1	8.5	9.6	40	100	6	15	3.8	5.5	7.0	150	3.0
10	9.4	10.6	50	150	8	20	4.5	6.4	8.0	90	3.0
11	10.4	11.6	50	150	10	20	5.4	7.4	9.0	85	2.5
12	11.4	12.7	50	150	10	25	6.0	8.4	10.0	85	2.5
13	12.4	14.1	50	170	10	30	7.0	9.4	11.0	80	2.5
15	13.8	15.6	50	200	10	30	9.2	11.4	13.0	75	2.0
16	15.3	17.1	50	200	10	40	10.4	12.4	14.0	75	1.5
18	16.8	19.1	50	225	10	45	12.4	14.4	16.0	70	1.5
20	18.8	21.2	60	225	15	55	14.4	16.4	18.0	60	1.5
22	20.8	23.3	60	250	20	55	16.4	18.4	20.0	60	1.25
24	22.8	25.6	60	250	25	70	18.4	20.4	22.0	55	1.25

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Table 4 Per type BZX79-C27 to C75
T_j = 25 °C unless otherwise specified.

BZX79 - C XXX	WORKING VOLTAGE V _Z (V) at I _{Ztest} = 2 mA		DIFFERENTIAL RESISTANCE r _{dif} (Ω)				TEMP. COEFF. S _Z (mV/K) at I _{Ztest} = 2 mA (see Figs 5 and 6)			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.approx. ±5% (C)		at I _{Ztest} = 0.5 mA		at I _{Ztest} = 2 mA						
	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	MIN.	TYP.	MAX.	MAX.	MAX.
27	25.1	28.9	65	300	25	80	21.4	23.4	25.3	50	1.0
30	28.0	32.0	70	300	30	80	24.4	26.6	29.4	50	1.0
33	31.0	35.0	75	325	35	80	27.4	29.7	33.4	45	0.9
36	34.0	38.0	80	350	35	90	30.4	33.0	37.4	45	0.8
39	37.0	41.0	80	350	40	130	33.4	36.4	41.2	45	0.7
43	40.0	46.0	85	375	45	150	37.6	41.2	46.6	40	0.6
47	44.0	50.0	85	375	50	170	42.0	46.1	51.8	40	0.5
51	48.0	54.0	90	400	60	180	46.6	51.0	57.2	40	0.4
56	52.0	60.0	100	425	70	200	52.2	57.0	63.8	40	0.3
62	58.0	66.0	120	450	80	215	58.8	64.4	71.6	35	0.3
68	64.0	72.0	150	475	90	240	65.6	71.7	79.8	35	0.25
75	70.0	79.0	170	500	95	255	73.4	80.2	88.6	35	0.2

Voltage regulator diodes

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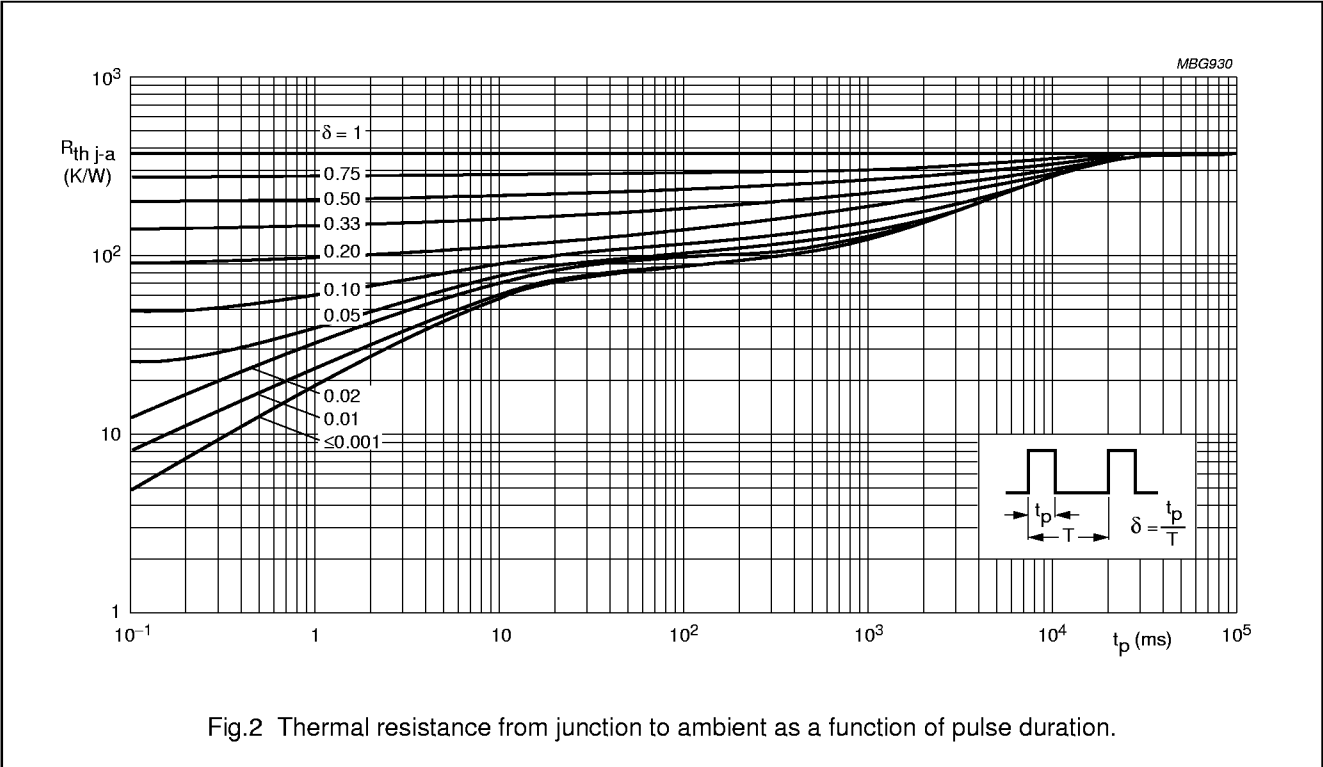
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point	lead length 8 mm.	300	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	lead length max.; see Fig.2 and note 1	380	K/W

Note

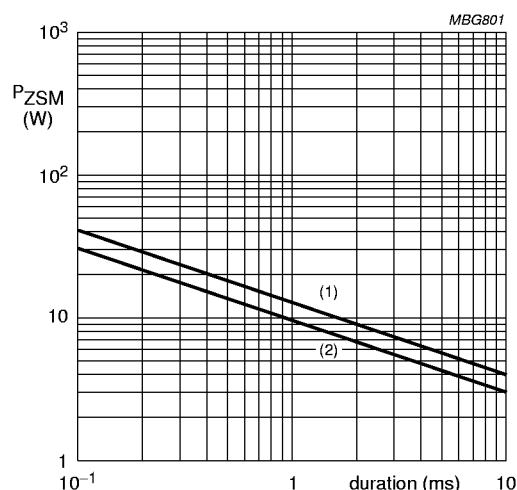
1. Device mounted on a printed circuit-board without metallization pad.

GRAPHICAL DATA



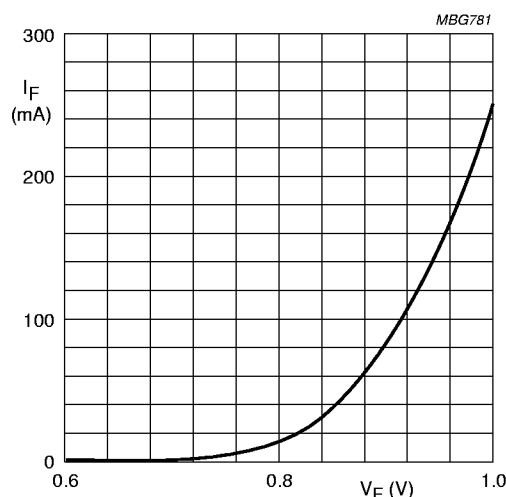
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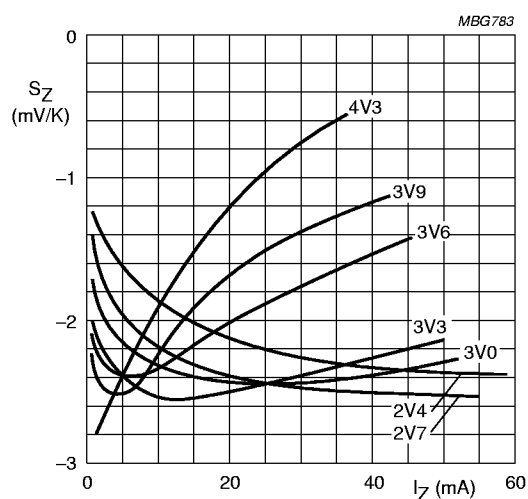
- (1) $T_j = 25\text{ }^{\circ}\text{C}$ (prior to surge).
 (2) $T_j = 150\text{ }^{\circ}\text{C}$ (prior to surge).

Fig.3 Maximum permissible non-repetitive peak reverse power dissipation versus duration.



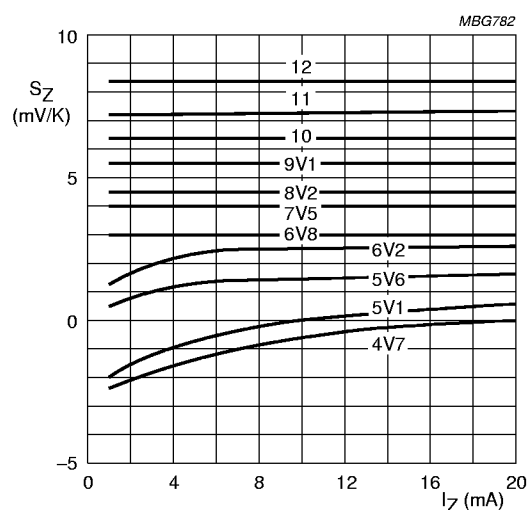
$T_j = 25\text{ }^{\circ}\text{C}$.

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



BZX79-A/B/C2V4 to A/B/C4V3.
 $T_j = 25\text{ to }150\text{ }^{\circ}\text{C}$.

Fig.5 Temperature coefficient as a function of working current; typical values.



BZX79-A/B/C4V7 to A/B/C12.
 $T_j = 25\text{ to }150\text{ }^{\circ}\text{C}$.

Fig.6 Temperature coefficient as a function of working current; typical values.

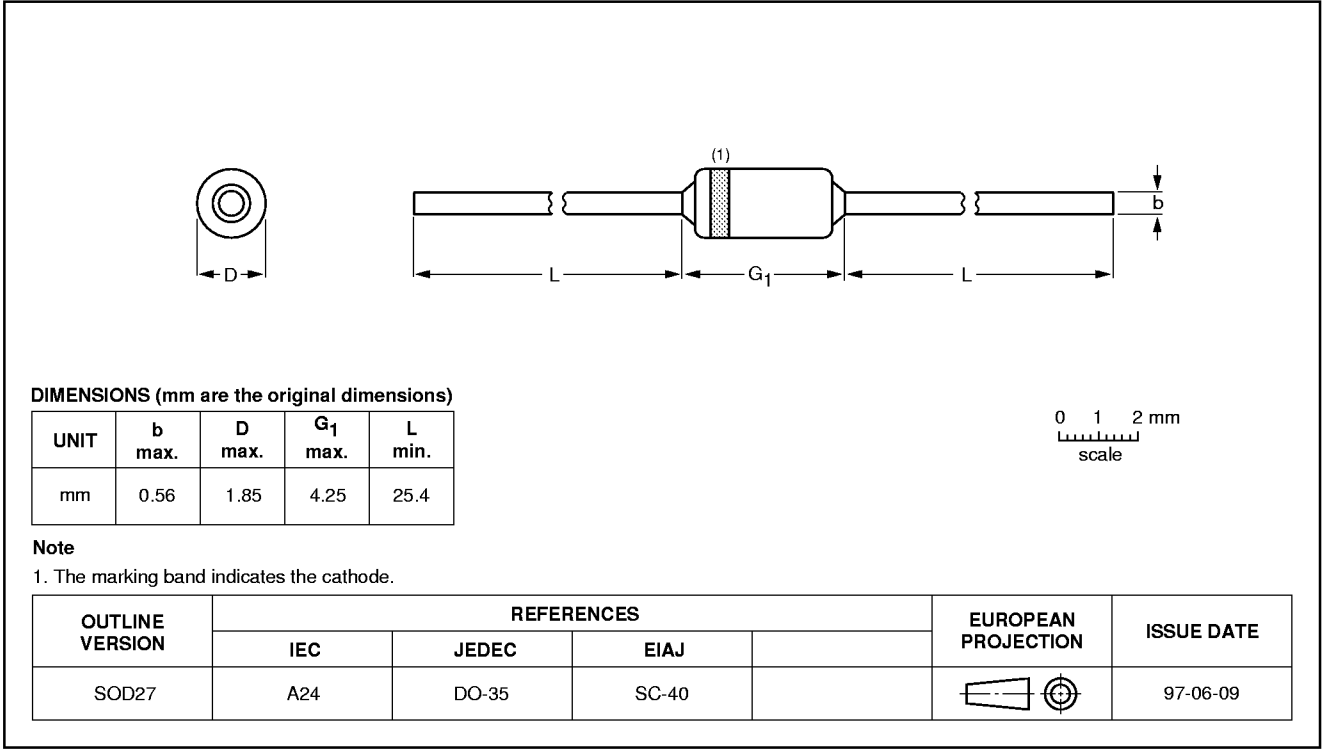
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PACKAGE OUTLINE

Hermetically sealed glass package; axial leaded; 2 leads

SOD27



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.