



# PZUxB series

Single Zener diodes in a SOD323F package

Rev. 01 — 7 March 2006

Product data sheet

## 1. Product profile

### 1.1 General description

General-purpose Zener diodes in a SOD323F (SC-90) very small and flat lead Surface Mounted Device (SMD) plastic package.

### 1.2 Features

- Total power dissipation:  $\leq 310$  mW
- Tolerance series: B: approximately  $\pm 5$  %; B1, B2, B3: sequential, approximately  $\pm 2$  %
- Small plastic package suitable for surface mounted design
- Wide working voltage range: nominal 2.4 V to 36 V

### 1.3 Applications

- General regulation functions

### 1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 100$ mA	[1] -	-	1.1	V
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[2] -	-	310	mW
			[3] -	-	550	mW

[1] Pulse test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

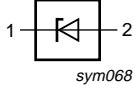

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

**PHILIPS**

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode	[1]	 sym068
2	anode		

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PZU2.4B to PZU36B[1]	SC-90	plastic surface mounted package; 2 leads	SOD323F

[1] The series consists of 97 types with nominal working voltages from 2.4 V to 36 V.

## 4. Marking

Table 4. Marking codes

Type number	Marking code				Type number	Marking code			
	B	B1	B2	B3		B	B1	B2	B3
PZU2.4	G3	-	-	-	PZU10	GJ	FH	HF	KB
PZU2.7	G4	F3	H1	-	PZU11	GK	FJ	HG	KC
PZU3.0	G5	F4	H2	-	PZU12	GL	FK	HH	KD
PZU3.3	G6	F5	H3	-	PZU13	GM	FL	HJ	KE
PZU3.6	G7	F6	H4	-	PZU14	-	-	HK	-
PZU3.9	G8	F7	H5	-	PZU15	GN	FM	HL	KF
PZU4.3	G9	F8	H6	HS	PZU16	GP	FN	HM	KG
PZU4.7	GA	F9	H7	HT	PZU18	GQ	FP	HN	KH
PZU5.1	GB	FA	H8	HU	PZU20	GR	FQ	HP	KJ
PZU5.6	GC	FB	H9	HV	PZU22	GS	FR	HQ	KK
PZU6.2	GD	FC	HA	HW	PZU24	GT	FS	HR	KL
PZU6.8	GE	FD	HB	HX	PZU27	GU	-	-	-
PZU7.5	GF	FE	HC	HY	PZU30	GV	-	-	-
PZU8.2	GG	FF	HD	HZ	PZU33	GW	-	-	-
PZU9.1	GH	FG	HE	KA	PZU36	GX	-	-	-

## 5. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$I_F$	forward current		-	200	mA
$I_{ZSM}$	non-repetitive peak reverse current		-	see <a href="#">Table 8</a> and <a href="#">9</a>	
$P_{ZSM}$	non-repetitive peak reverse power dissipation		[1] -	40	W
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2] -	310	mW
			[3] -	550	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1]  $t_p = 100\ \mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	400	K/W
			[2] -	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3] -	-	55	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

[3] Soldering point of cathode tab.

## 7. Characteristics

**Table 7. Characteristics**

$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 10\text{ mA}$	[1] -	-	0.9	V
		$I_F = 100\text{ mA}$	[1] -	-	1.1	V

[1] Pulse test:  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$ .

Table 8. Characteristics per type; PZU2.4B to PZU5.6B3

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

PZU xxx	Sel	Working voltage $V_Z$ (V); $I_Z = 5\text{ mA}$		Maximum differential resistance $r_{\text{dif}}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu\text{A}$ )		Temperature coefficient $S_Z$ (mV/K); $I_Z = 5\text{ mA}$	Diode capacitance $C_d$ (pF) <sup>[1]</sup>	Non-repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup>
		Min	Max	$I_Z = 0.5\text{ mA}$	$I_Z = 5\text{ mA}$	Max	$V_R$ (V)	Typ	Max	Max
2.4	B	2.3	2.6	1000	100	50	1	-1.6	450	8
2.7	B	2.5	2.9	1000	100	20	1	-2.0	440	8
	B1	2.5	2.75							
	B2	2.65	2.9							
3.0	B	2.80	3.20	1000	95	10	1	-2.1	425	8
	B1	2.80	3.05							
	B2	2.95	3.20							
3.3	B	3.10	3.50	1000	95	5	1	-2.4	410	8
	B1	3.10	3.35							
	B2	3.25	3.50							
3.6	B	3.40	3.80	1000	90	5	1	-2.4	390	8
	B1	3.40	3.65							
	B2	3.55	3.80							
3.9	B	3.70	4.10	1000	90	3	1	-2.5	370	8
	B1	3.70	3.97							
	B2	3.87	4.10							
4.3	B	4.01	4.48	1000	90	3	1	-2.5	350	8
	B1	4.01	4.21							
	B2	4.15	4.34							
	B3	4.28	4.48							
4.7	B	4.42	4.90	800	80	2	1	-1.4	325	8
	B1	4.42	4.61							
	B2	4.55	4.75							
	B3	4.69	4.90							
5.1	B	4.84	5.37	250	60	2	1.5	0.3	300	5.5
	B1	4.84	5.04							
	B2	4.98	5.20							
	B3	5.14	5.37							
5.6	B	5.31	5.92	100	40	1	2.5	1.9	275	5.5
	B1	5.31	5.55							
	B2	5.49	5.73							
	B3	5.67	5.92							

[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ }^\circ\text{C}$  prior to surge

**Table 9. Characteristics per type; PZU6.2B to PZU36B***T<sub>J</sub> = 25 °C unless otherwise specified.*

PZU xxx	Sel	Working voltage V <sub>Z</sub> (V); I <sub>Z</sub> = 5 mA		Maximum differential resistance r <sub>dif</sub> (Ω)		Reverse current I <sub>R</sub> (nA)		Temperature coefficient S <sub>Z</sub> (mV/K); I <sub>Z</sub> = 5 mA	Diode capacitance C <sub>d</sub> (pF) <sup>[1]</sup>	Non-repetitive peak reverse current I <sub>ZSM</sub> (A) <sup>[2]</sup>
		Min	Max	I <sub>Z</sub> = 0.5 mA	I <sub>Z</sub> = 5 mA	Max	V <sub>R</sub> (V)	Typ	Max	Max
6.2	B	5.86	6.53	80	30	500	3	2.7	250	5.5
	B1	5.86	6.12							
	B2	6.06	6.33							
	B3	6.26	6.53							
6.8	B	6.47	7.14	60	20	500	3.5	3.4	215	5.5
	B1	6.47	6.73							
	B2	6.65	6.93							
	B3	6.86	7.14							
7.5	B	7.06	7.84	60	10	500	4	4.0	170	3.5
	B1	7.06	7.36							
	B2	7.28	7.60							
	B3	7.52	7.84							
8.2	B	7.76	8.64	60	10	500	5	4.6	150	3.5
	B1	7.76	8.10							
	B2	8.02	8.36							
	B3	8.28	8.64							
9.1	B	8.56	9.55	60	10	500	6	5.5	120	3.5
	B1	8.56	8.93							
	B2	8.85	9.23							
	B3	9.15	9.55							
10	B	9.45	10.55	60	10	100	7	6.4	110	3.5
	B1	9.45	9.87							
	B2	9.77	10.21							
	B3	10.11	10.55							
11	B	10.44	11.56	60	10	100	8	7.4	108	3
	B1	10.44	10.88							
	B2	10.76	11.22							
	B3	11.10	11.56							
12	B	11.42	12.60	80	10	100	9	8.4	105	3
	B1	11.42	11.90							
	B2	11.74	12.24							
	B3	12.08	12.60							
13	B	12.47	13.96	80	10	100	10	9.4	103	2.5
	B1	12.47	13.03							
	B2	12.91	13.49							
	B3	13.37	13.96							
14	B2	13.70	14.30	80	10	100	11	10.4	101	2

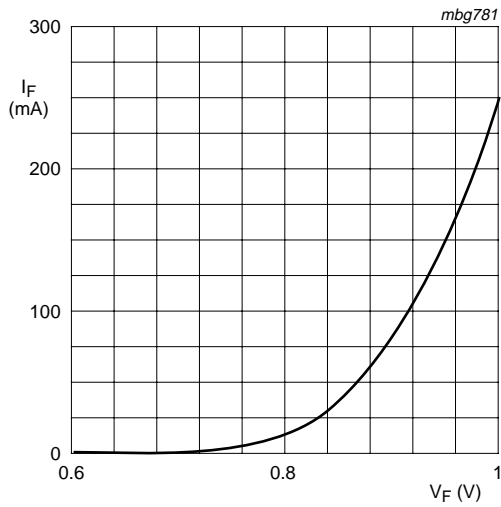
**Table 9. Characteristics per type; PZU6.2B to PZU36B ...continued**

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

PZU xxx	Sel	Working voltage $V_Z$ (V); $I_Z = 5\text{ mA}$		Maximum differential resistance $r_{\text{dif}}$ ( $\Omega$ )		Reverse current $I_R$ (nA)		Temperature coefficient $S_Z$ (mV/K); $I_Z = 5\text{ mA}$	Diode capacitance $C_d$ (pF) <sup>[1]</sup>	Non-repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup>
		Min	Max	$I_Z = 0.5\text{ mA}$	$I_Z = 5\text{ mA}$	Max	$V_R$ (V)	Typ	Max	Max
15	B	13.84	15.52	80	15	50	11	11.4	99	2
	B1	13.84	14.46							
	B2	14.34	14.98							
	B3	14.85	15.52							
16	B	15.37	17.09	80	20	50	12	12.4	97	1.5
	B1	15.37	16.01							
	B2	15.85	16.51							
	B3	16.35	17.09							
18	B	16.94	19.03	80	20	50	13	14.4	93	1.5
	B1	16.94	17.70							
	B2	17.56	18.35							
	B3	18.21	19.03							
20	B	18.86	21.08	100	20	50	15	16.4	88	1.5
	B1	18.86	19.70							
	B2	19.52	20.39							
	B3	20.21	21.08							
22	B	20.88	23.17	100	25	50	17	18.4	84	1.3
	B1	20.88	21.77							
	B2	21.54	22.47							
	B3	22.23	23.17							
24	B	22.93	25.57	120	30	50	19	20.4	80	1.3
	B1	22.93	23.96							
	B2	23.72	24.78							
	B3	24.54	25.57							
27	B	25.1	28.9	150	40	50	21	23.4	73	1
30	B	28	32	200	40	50	23	26.6	66	1
33	B	31	35	250	40	50	25	29.7	60	0.9
36	B	34	38	300	60	50	27	33.0	59	0.8

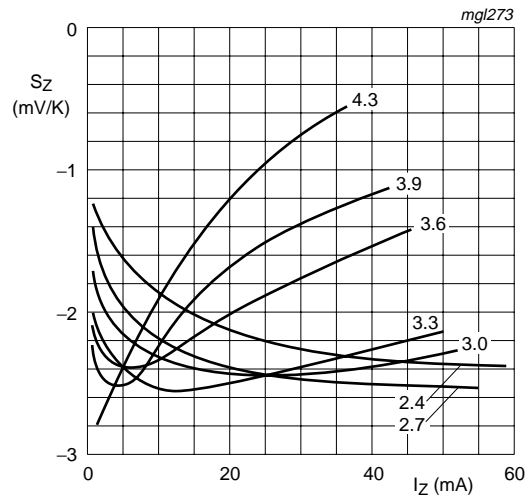
[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$

[2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ }^\circ\text{C}$  prior to surge



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

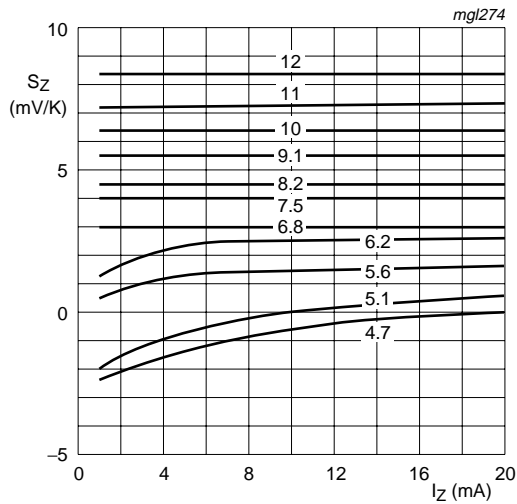
**Fig 1. Forward current as a function of forward voltage; typical values**



PZU2.4B to PZU4.3B

$T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

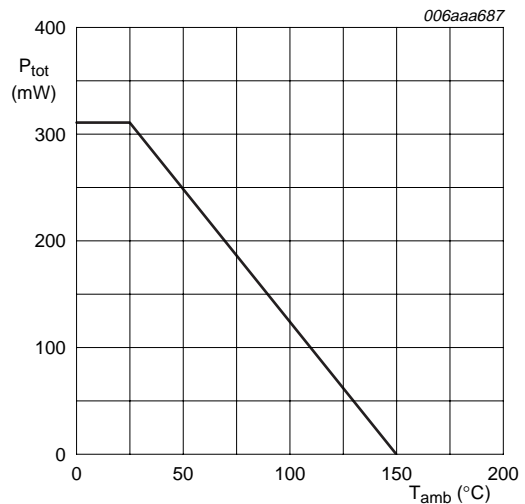
**Fig 2. Temperature coefficient as a function of working current; typical values**



PZU4.7B to PZU12B

$T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

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



FR4 PCB, standard footprint

**Fig 4. Power derating curve**

### 8. Package outline

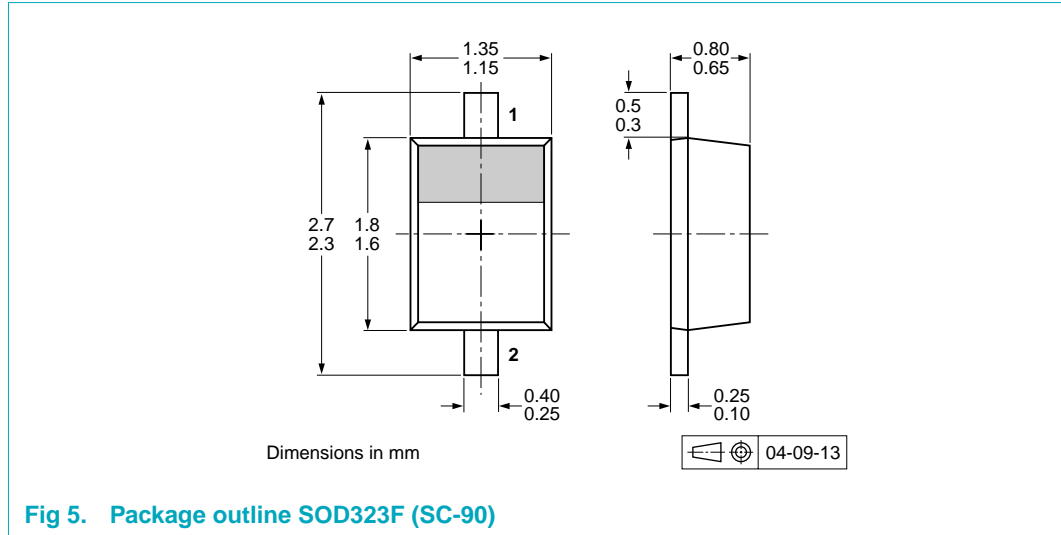


Fig 5. Package outline SOD323F (SC-90)

### 9. Packing information

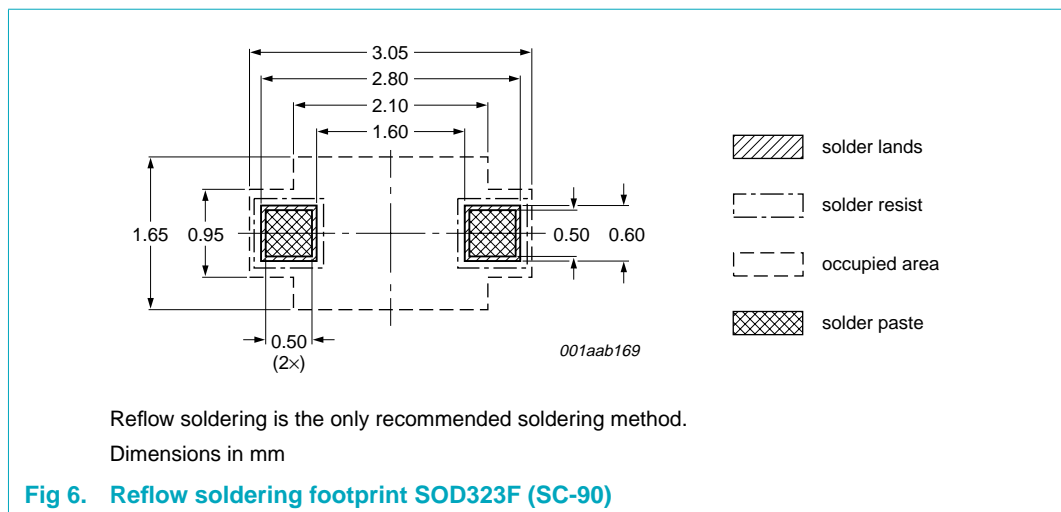
Table 10. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity	
			3000	10000
PZU2.4B to PZU36B	SOD323F	4 mm pitch, 8 mm tape and reel	-115	-135

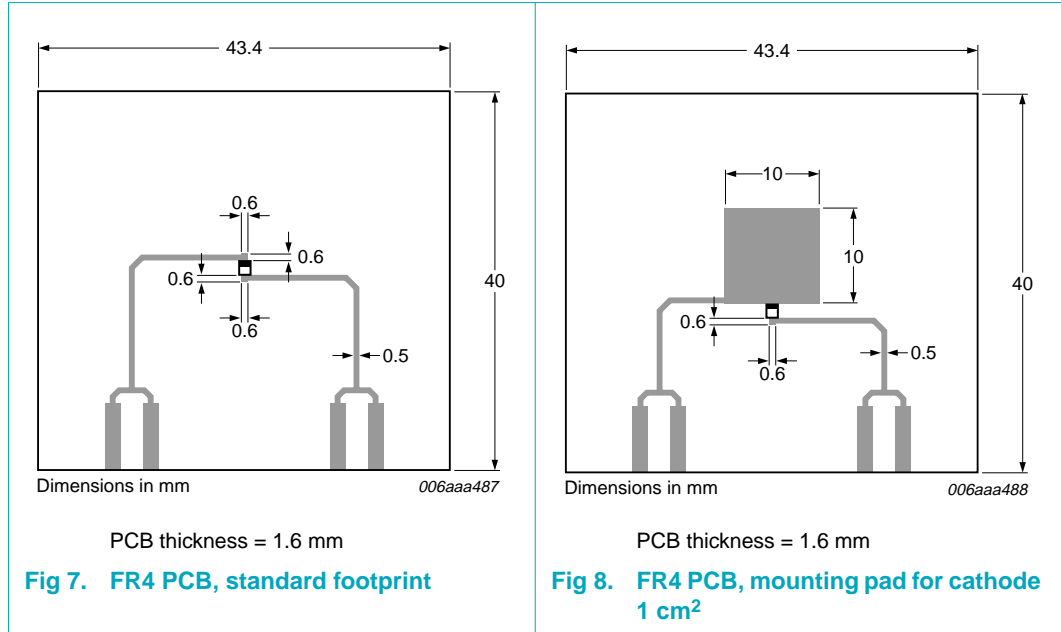
[1] For further information and the availability of packing methods, see [Section 14](#).

### 10. Soldering





**11. Mounting**



## 12. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PZUXB_SER_1	20060307	Product data sheet	-	-

## 13. Legal information

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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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