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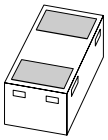
Team Nexperia



PZUxBL series

Single Zener diodes

Rev. 01 — 6 May 2008 Product data sheet

1. Product profile

1.1 General description

General-purpose Zener diodes in SOD882 leadless ultra small Surface-Mounted Device (SMD) plastic package.

1.2 Features

- Non-repetitive peak reverse power dissipation: $P_{ZSM} \leq 40$ W
- Total power dissipation: $P_{tot} \leq 250$ mW
- Tolerance series:
  B: approximately ±5 %;
  B2: approximately ±2 %
- Wide working voltage range:
  nominal 2.4 V to 36 V (E24 range)
- Low reverse current I_R range
- Small plastic package suitable for surface-mounted design
- AEC-Q101 qualified

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_{ZSM}	non-repetitive peak reverse power dissipation		[2]	-	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[3][4]	-	-	250	mW

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

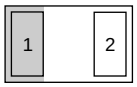
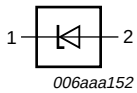
[2] t_p = 100 µs; square wave; T_j = 25 °C prior to surge

[3] Reflow soldering is the only recommended soldering method.

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

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
1	cathode	[1]	 Transparent top view	 006aaa152
2	anode			

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PZU2.4BL to PZU36BL[1]	-	leadless ultra small plastic package; 2 terminals; body 1.0 × 0.6 × 0.5 mm	SOD882
PZU2.7B2L to PZU24B2L[2]			

[1] The series consists of 29 types with nominal working voltages from 2.4 V to 36 V.

[2] The series consists of 25 types with nominal working voltages from 2.7 V to 24 V.

4. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code
PZU2.4BL	H2	PZU2.7B2L	HZ
PZU2.7BL	H3	PZU3.0B2L	K1
PZU3.0BL	H4	PZU3.3B2L	K2
PZU3.3BL	H5	PZU3.6B2L	K3
PZU3.6BL	H6	PZU3.9B2L	K4
PZU3.9BL	H7	PZU4.3B2L	K5
PZU4.3BL	H8	PZU4.7B2L	K6
PZU4.7BL	H9	PZU5.1B2L	K7
PZU5.1BL	HA	PZU5.6B2L	K8
PZU5.6BL	HB	PZU6.2B2L	H1
PZU6.2BL	HC	PZU6.8B2L	K9
PZU6.8BL	HD	PZU7.5B2L	KA
PZU7.5BL	HE	PZU8.2B2L	KB
PZU8.2BL	HF	PZU9.1B2L	KC
PZU9.1BL	HG	PZU10B2L	KD
PZU10BL	HH	PZU11B2L	KE
PZU11BL	HK	PZU12B2L	KF

Table 4. Marking codes *...continued*

Type number	Marking code	Type number	Marking code
PZU12BL	HL	PZU13B2L	KG
PZU13BL	HM	PZU14B2L	KH
PZU15BL	HN	PZU15B2L	KK
PZU16BL	HP	PZU16B2L	KL
PZU18BL	HR	PZU18B2L	KM
PZU20BL	HS	PZU20B2L	KN
PZU22BL	HT	PZU22B2L	KP
PZU24BL	HU	PZU24B2L	KR
PZU27BL	HV	-	-
PZU30BL	HW	-	-
PZU33BL	HX	-	-
PZU36BL	HY	-	-

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		[1]	-	see Table 8 and 9	
P_{ZSM}	non-repetitive peak reverse power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2][3]	-	250	mW
			[2][4]	-	500	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–55	+150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] t_p = 100 µs; square wave; T_j = 25 °C prior to surge

[2] Reflow soldering is the only recommended soldering method.

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

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 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][2]	-	-	500	K/W
			[1][3]	-	-	250	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	55	K/W

[1] Reflow soldering is the only recommended soldering method.

[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 cm^2.

[4] Soldering point of cathode tab.

7. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

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

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

Table 8. Characteristics per type; PZU2.4BL to PZU5.6B2L

T_j = 25 °C unless otherwise specified.

PZUxxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
		Min	Max	Max	Max	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
	B2	2.65	2.9							
3.0	B	2.80	3.20	1000	95	10	1	–2.1	425	8
	B2	2.95	3.20							
3.3	B	3.10	3.50	1000	95	5	1	–2.4	410	8
	B2	3.25	3.50							
3.6	B	3.40	3.80	1000	90	5	1	–2.4	390	8
	B2	3.55	3.80							
3.9	B	3.70	4.10	1000	90	3	1	–2.5	370	8
	B2	3.87	4.10							
4.3	B	4.01	4.48	1000	90	3	1	–2.5	350	8
	B2	4.15	4.34							

Table 8. Characteristics per type; PZU2.4BL to PZU5.6B2L *…continued*

T_j = 25 °C unless otherwise specified.

PZUxxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
		Min	Max	Max	Max	Max	V_R (V)	Typ	Max	Max
4.7	B	4.42	4.90	800	80	2	1	−1.4	325	8
	B2	4.55	4.75							
5.1	B	4.84	5.37	250	60	2	1.5	0.3	300	5.5
	B2	4.98	5.20							
5.6	B	5.31	5.92	100	40	1	2.5	1.9	275	5.5
	B2	5.49	5.73							

[1] f = 1 MHz; V_R = 0 V

[2] t_p = 100 μs; square wave; T_j = 25 °C prior to surge

Table 9. Characteristics per type; PZU6.2BL to PZU36BL

T_j = 25 °C unless otherwise specified.

PZUxxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (nA)		Temperature coefficient S_Z (mV/K)	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
		Min	Max	Max	Max	Max	V_R (V)	Typ	Max	Max
6.2	B	5.86	6.53	80	30	500	3	2.7	250	5.5
	B2	6.06	6.33							
6.8	B	6.47	7.14	60	20	500	3.5	3.4	215	5.5
	B2	6.65	6.93							
7.5	B	7.06	7.84	60	10	500	4	4.0	170	3.5
	B2	7.28	7.60							
8.2	B	7.76	8.64	60	10	500	5	4.6	150	3.5
	B2	8.02	8.36							
9.1	B	8.56	9.55	60	10	500	6	5.5	120	3.5
	B2	8.85	9.23							
10	B	9.45	10.55	60	10	100	7	6.4	110	3.5
	B2	9.77	10.21							
11	B	10.44	11.56	60	10	100	8	7.4	108	3
	B2	10.76	11.22							
12	B	11.42	12.60	80	10	100	9	8.4	105	3
	B2	11.74	12.24							
13	B	12.47	13.96	80	10	100	10	9.4	103	2.5
	B2	12.91	13.49							
14	B2	13.70	14.30	80	10	100	11	10.4	101	2

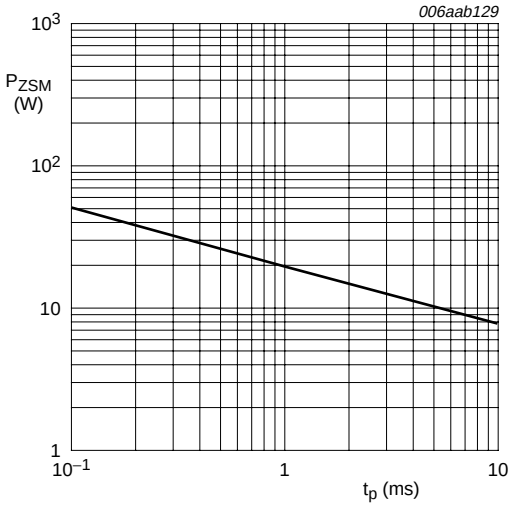
Table 9. Characteristics per type; PZU6.2BL to PZU36BL *...continued*

T_j = 25 °C unless otherwise specified.

PZUxxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (nA)		Temperature coefficient S_Z (mV/K)	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
		Min	Max	Max	Max	Max	V_R (V)	Typ	Max	Max
15	B	13.84	15.52	80	15	50	11	11.4	99	2
	B2	14.34	14.98							
16	B	15.37	17.09	80	20	50	12	12.4	97	1.5
	B2	15.85	16.51							
18	B	16.94	19.03	80	20	50	13	14.4	93	1.5
	B2	17.56	18.35							
20	B	18.86	21.08	100	20	50	15	16.4	88	1.5
	B2	19.52	20.39							
22	B	20.88	23.17	100	25	50	17	18.4	84	1.3
	B2	21.54	22.47							
24	B	22.93	25.57	120	30	50	19	20.4	80	1.3
	B2	23.72	24.78							
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

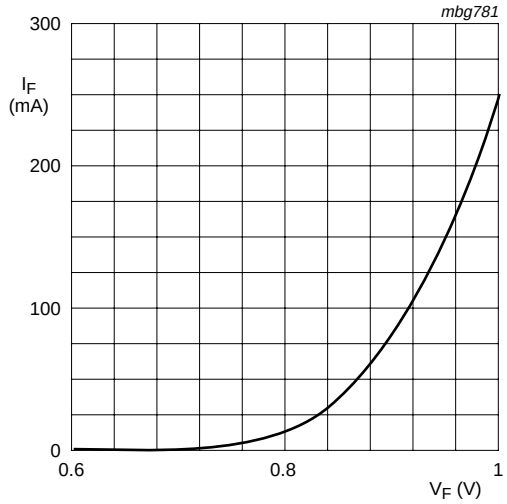
[1] f = 1 MHz; V_R = 0 V

[2] t_p = 100 µs; square wave; T_j = 25 °C prior to surge



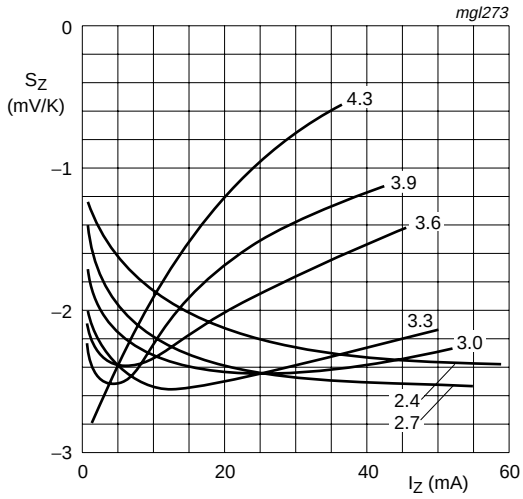
T_j = 25 °C (prior to surge)

Fig 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values



T_j = 25 °C

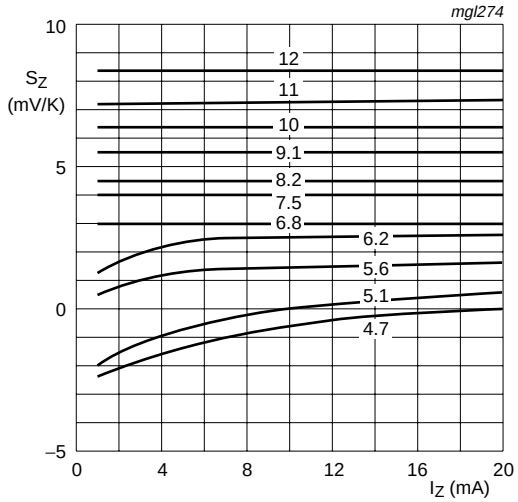
Fig 2. Forward current as a function of forward voltage; typical values



T_j = 25 °C to 150 °C

PZU2.4BL to PZU4.3B2L

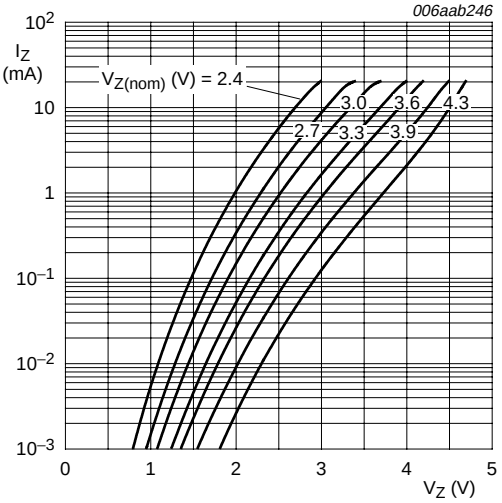
Fig 3. Temperature coefficient as a function of working current; typical values



T_j = 25 °C to 150 °C

PZU4.7BL to PZU12B2L

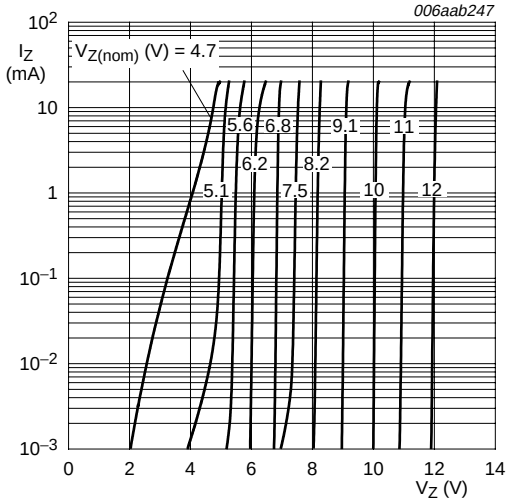
Fig 4. Temperature coefficient as a function of working current; typical values



T_j = 25 °C

PZU2.4BL to PZU4.3B2L

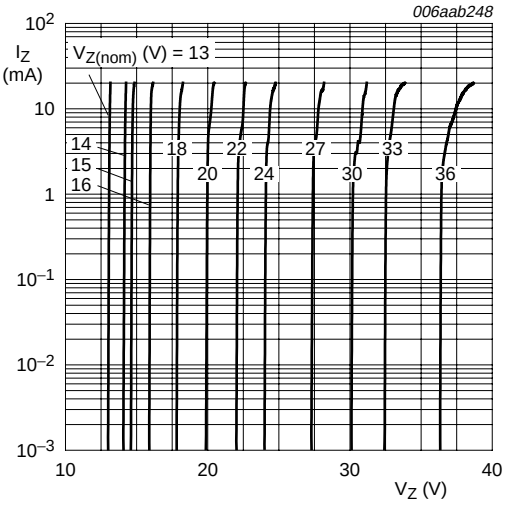
Fig 5. Working current as a function of working voltage; typical values



T_j = 25 °C

PZU4.7BL to PZU12B2L

Fig 6. Working current as a function of working voltage; typical values



T_j = 25 °C

PZU13BL to PZU36BL

Fig 7. Working current as a function of working voltage; typical values

8. Test information

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

9. Package outline

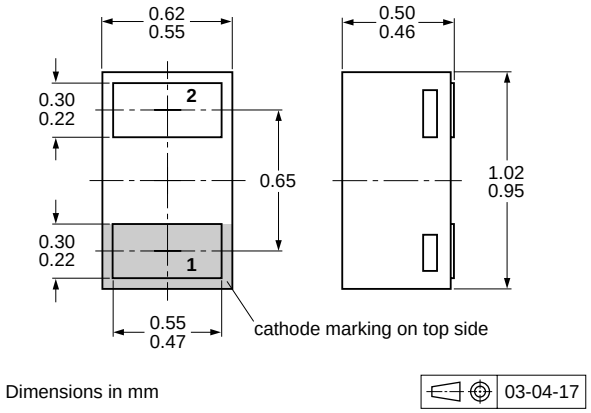


Fig 8. Package outline SOD882

10. Packing information

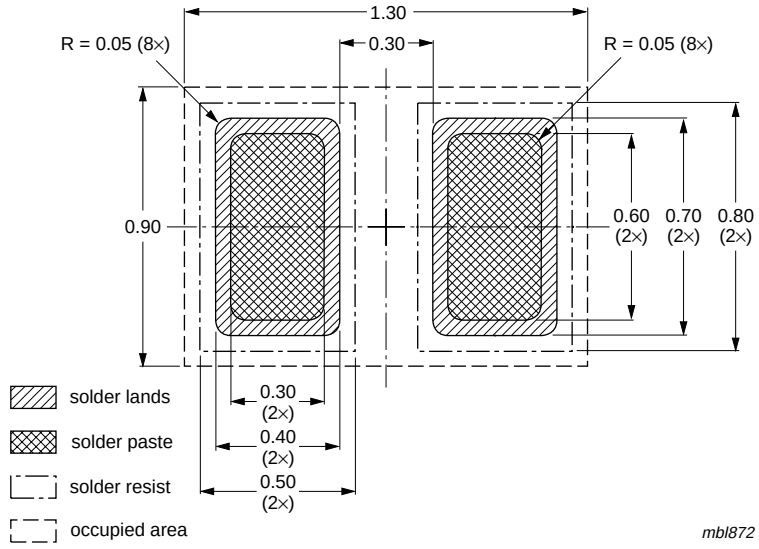
Table 10. Packing methods

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

Type number	Package	Description	Packing quantity
			10000
PZU2.4BL to PZU36BL	SOD882	2 mm pitch, 8 mm tape and reel	-315
PZU2.7B2L to PZU24B2L			

[1] For further information and the availability of packing methods, see Section 13.

11. Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 9. Reflow soldering footprint SOD882

12. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PZUXBL_SER_1	20080506	Product data sheet	-	-

13. Legal information

13.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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15. Contents

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Date of release: 6 May 2008

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PZU10B2L,315 PZU10BL,315 PZU11B2L,315 PZU11BL,315 PZU12B2L,315 PZU12BL,315 PZU13B2L,315 PZU13BL,315 PZU14B2L,315 PZU15B2L,315 PZU15BL,315 PZU16B2L,315 PZU16BL,315 PZU18B2L,315 PZU18BL,315 PZU2.4BL,315 PZU2.7B2L,315 PZU2.7BL,315 PZU20B2L,315 PZU20BL,315 PZU22B2L,315 PZU22BL,315 PZU24B2L,315 PZU24BL,315 PZU27BL,315 PZU3.0B2L,315 PZU3.0BL,315 PZU3.3B2L,315 PZU3.3BL,315 PZU3.6B2L,315 PZU3.6BL,315 PZU3.9B2L,315 PZU3.9BL,315 PZU30BL,315 PZU33BL,315 PZU36BL,315 PZU4.3B2L,315 PZU4.3BL,315 PZU4.7B2L,315 PZU4.7BL,315 PZU5.1B2L,315 PZU5.1BL,315 PZU5.6B2L,315 PZU5.6BL,315 PZU6.2B2L,315 PZU6.2BL,315 PZU6.8B2L,315 PZU6.8BL,315 PZU7.5B2L,315 PZU7.5BL,315 PZU8.2B2L,315 PZU8.2BL,315 PZU9.1B2L,315 PZU9.1BL,315 PZU12B2AZ