Product data sheet

1. General description

General-purpose Zener diodes in a SOD323 (SC-76) very small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Non-repetitive peak reverse power dissipation: P_{ZSM} ≤ 40 W
- Total power dissipation: P_{tot} ≤ 320 mW
- Tolerance series:
 - B: approximately ±5 %
 - B1, B2, B3: 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
- PZU5.1BA-Q 10BA-Q: Very low dynamic impedances at low currents, very low leakage current, hard breakdown knee
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

General regulation functions

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	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	$T_{amb} \le 25 ^{\circ}C$ [3]	-	-	320	mW

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

[2] $t_p = 100 \mu s$; square wave; $T_j = 25 \degree C$ prior to surge.

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

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5. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Symbol
1	cathode	[1]	1 2	и ПД ,
2	anode			006aaa152

[1] The marking bar indicates the cathode

6. Ordering information

Table 3. Ordering information

Type number	Package						
	Name	Description	Version				
PZU2.4BA-Q to PZU36BA-Q [1]	SC-76	plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body	SOD323				

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

7. Marking

Table 4. Marking codes

Type number	Marki	ng code	9		Type number	Mark	Marking code			
[1]	В	B1	B2	В3		В	B1	B2	В3	
PZU2.4*A-Q	X8	-	-	-	PZU10*A-Q	VA	VB	VC	VD	
PZU2.7*A-Q	X9	XA	XB	-	PZU11*A-Q	VE	VF	VG	VH	
PZU3.0*A-Q	XT	XU	XV	-	PZU12*A-Q	VK	VL	VM	VN	
PZU3.3*A-Q	XW	XX	XY	-	PZU13*A-Q	VP	VR	VS	VT	
PZU3.6*A-Q	XZ	МС	MD	-	PZU14*A-Q	-	-	VU	-	
PZU3.9*A-Q	ME	MF	MG	-	PZU15*A-Q	VV	VW	VX	VY	
PZU4.3*A-Q	MM	MN	MP	MR	PZU16*A-Q	VZ	X1	X2	Х3	
PZU4.7*A-Q	MS	MT	MU	MV	PZU18*A-Q	X4	X5	X6	X7	
PZU5.1*A-Q	MW	MX	MY	MZ	PZU20*A-Q	XC	XD	XE	XF	
PZU5.6*A-Q	LF	LG	LH	LK	PZU22*A-Q	XG	XH	XK	XL	
PZU6.2*A-Q	LL	LM	LN	LP	PZU24*A-Q	XM	XN	XP	XR	
PZU6.8*A-Q	LR	LS	LT	LU	PZU27*A-Q	XS	-	-	-	
PZU7.5*A-Q	LV	LW	LX	LY	PZU30*A-Q	МН	-	-	-	
PZU8.2*A-Q	LZ	CR	CS	СТ	PZU33*A-Q	MK	-	-	-	
PZU9.1*A-Q	CU	CV	CW	CX	PZU36*A-Q	ML	-	-	-	

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
l _F	forward current			-	200	mA
I _{ZSM}	non-repetitive peak reverse current		[1]	-	see: Table 8	
P _{ZSM}	non-repetitive peak reverse power dissipation		[1]	-	40	W
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[2]	-	320	mW
			[3]	-	490	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	+150	°C
T _{stg}	storage temperature			-65	+150	°C

- [1] $t_p = 100 \,\mu s$; square wave; $T_j = 25 \,^{\circ} C$ 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 cm².

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-a)}	thermal resistance from	in free air	[1] -	-	390	K/W
	junction to ambient		[2] -	-	255	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.
- Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1cm².
- Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V _F	forward voltage	$I_F = 10 \text{ mA}$ $T_{amb} = 25 \text{ °C}$	[1]	-	-	0.9	V
		I _F = 100 mA T _{amb} = 25 °C	[1]	-	-	1.1	V

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

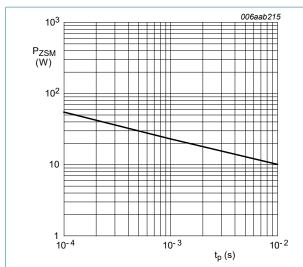
Table 8. Characteristics per type

 T_j = 25 °C unless otherwise specified

PZU xBA -Q	Sel	Worki voltaç V _Z (V)	je	Maximum differential resistance $r_{dif}(\Omega)$		Revers curren I _R (µA)	ıt	Temperature coefficient S _Z (mV/K)	Diode capacitance C _d (pF)	Non-repetitive peak reverse current I _{ZSM} (A)	
		I _Z = 5 mA		I _Z = 0.5 mA	I _Z = 5 mA			I _Z = 5 mA	f = 1 MHz; V _R = 0 V	t_p = 100 μ s; square wave; T_j = 25 °C; prior to surge	
		Min	Max	Max	Max	Max	V _R (V)	Тур	Max	Max	
2.4	В	2.3	2.6	1000	100	50	1	-1.6	450	8	
2.7	В	2.5	2.9	1000	100	20	1	-2.0	440	8	
	B1	2.5	2.75								
	B2	2.65	2.9								
3.0	В	2.80	3.20	1000	95	10	1	-2.1	425	8	
	B1	2.80	3.05								
	B2	2.95	3.20								
3.3	В	3.10	3.50	1000	95	5	1	-2.4	410	8	
	B1	3.10	3.35								
	B2	3.25	3.50								
3.6	В	3.40	3.80	1000	90	5	1	-2.4	390	8	
	B1	3.40	3.65	_							
	B2	3.55	3.80								
3.9	В	3.70	4.10	1000	90	90 3	1	-2.5	370	8	
	B1	3.70	3.97								
	B2	3.87	4.10	_							
4.3	В	4.01	4.48	1000	90	3	1	-2.5	350	8	
	B1	4.01	4.21	_							
	B2	4.15	4.34								
	В3	4.28	4.48	1							
4.7	В	4.42	4.90	800	80	2	1	-1.4	325	8	
	B1	4.42	4.61	1							
	B2	4.55	4.75	-							
	B3	4.69	4.90	-							
5.1	В	4.84	5.37	250	60	2	1.5	0.3	300	5.5	
	B1	4.84	5.04						300	0.0	
	B2	4.98	5.20	-							
	B3	5.14	5.37	-							

PZU xBA -Q	Sel	Worki voltag V _Z (V)	e	$\begin{array}{l} \text{Maximum differential} \\ \text{resistance} \\ \text{r}_{\text{dif}} \left(\Omega \right) \end{array}$		Rever currer I _R (µA	nt	Temperature coefficient S _Z (mV/K)	Diode capacitance C _d (pF)	Non-repetitive peak reverse current I _{ZSM} (A)	
		I _Z = 5 ı		I _Z = 0.5 mA	I _Z = 5 mA			I _Z = 5 mA	f = 1 MHz; V _R = 0 V	t _p = 100 μs; square wave; T _j = 25 °C; prior to surge	
		Min	Max	Max	Max	Max	V _R (V)	Тур	Max	Max	
5.6	В	5.31	5.92	100	40	1000	2.5	1.9	275	5.5	
	B1	5.31	5.55								
	B2	5.49	5.73								
	B3	5.67	5.92								
6.2	В	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	В	6.47	7.14	60	20	500	3.5	3.4	215	5.5	
	B1	6.47	6.73								
	B2	6.65	6.93								
	В3	6.86	7.14								
7.5	В	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	В	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	В	8.56	9.55	60	10	500	6	5.5	120	3.5	
	B1	8.56	8.93								
	B2	8.85	9.23								
	В3	9.15	9.55								
10	В	9.45	10.55	60	10	100	7	6.4	110	3.5	
	B1	9.45	9.87								
	B2	9.77	10.21								
	В3	10.11	10.55								
11	В	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									
12	В	11.42	12.60	80	10	100	9	8.4	105	3	
	B1	11.42	11.90								
	B2	11.74	12.24								
	В3	12.08	12.60								

PZU xBA -Q	Sel	Workii voltag V _Z (V)		Maximum d resistance r _{dif} (Ω)	ifferential	Rever currer I _R (µA	nt	Temperature coefficient S _Z (mV/K)	Diode capacitance C _d (pF)	Non-repetitive peak reverse current I _{ZSM} (A)
		I _Z = 5 mA		I _Z = 0.5 mA	I _Z = 5 mA			I _Z = 5 mA	f = 1 MHz; V _R = 0 V	t _p = 100 μs; square wave; T _j = 25 °C; prior to surge
		Min	Max	Max	Max	Max	V _R (V)	Тур	Max	Max
13	В	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
15	В	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	В	15.37	17.09	80	20	50	12	12.4	97	1.5
	B1	15.37	16.01							
	B2	15.85	16.51							
	В3	16.35	17.09							
18	В	16.94	19.03	80	20	50	13	14.4	93	1.5
	B1	16.94	17.70							
	B2	17.56	18.35							
	В3	18.21	19.03	-						
20	В	18.86	21.08	100	20	50	15	16.4	88	1.5
	B1	18.86	19.70	-						
	B2	19.52	20.39	-						
	В3	20.21	21.08							
22	В	20.88	23.17	100	25	50	17	18.4	84	1.3
	B1	20.88	21.77							
	B2	21.54	22.47							
	В3	22.23	23.17	-						
24	В	22.93	25.57	120	30	50	19	20.4	80	1.3
	B1	22.93	23.96							
	B2	23.72	24.78							
	В3	24.54	25.57							
27	В	25.1	28.9	150	40	50	21	23.4	73	1
30	В	28	32	200	40	50	23	26.6	66	1
33	В	31	35	250	40	50	25	29.7	60	0.9
36	В	34	38	300	60	50	27	33.0	59	0.8



T_i = 25 °C (prior to surge)

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

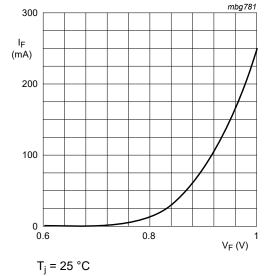
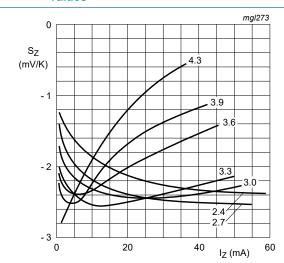
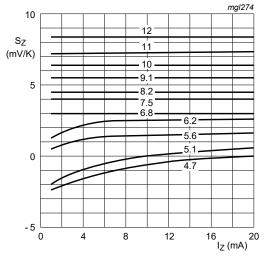


Fig. 2. Forward current as a function of forward voltage; typical values



 T_j = 25 °C to 150 °C V_Z = 2.4 V to 4.3 V

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



 $T_j = 25 \,^{\circ}\text{C} \text{ to } 150 \,^{\circ}\text{C}$ $V_Z = 4.7 \,^{\circ}\text{V} \text{ to } 12 \,^{\circ}\text{V}$

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

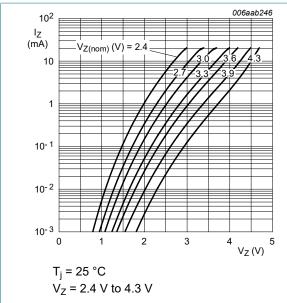


Fig. 5. Working current as a function of working voltage; typical values

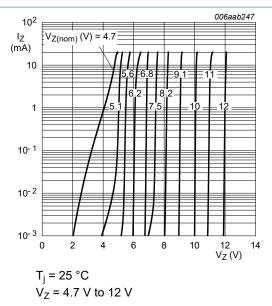
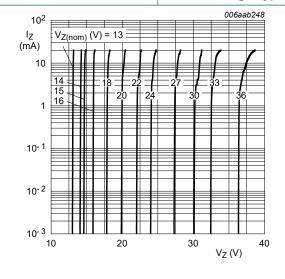


Fig. 6. Working current as a function of working voltage; typical values



 V_Z = 13 V to 36 V Fig. 7. Working current as a function of working voltage; typical values

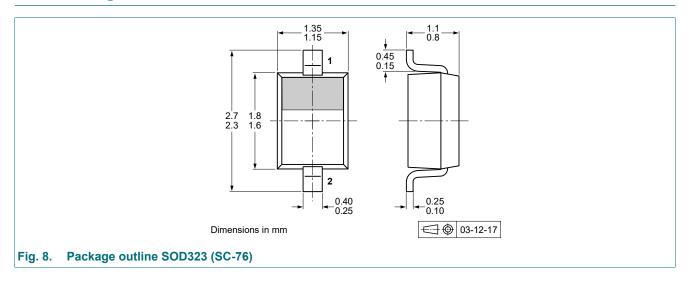
11. Test information

 $T_i = 25 \,^{\circ}C$

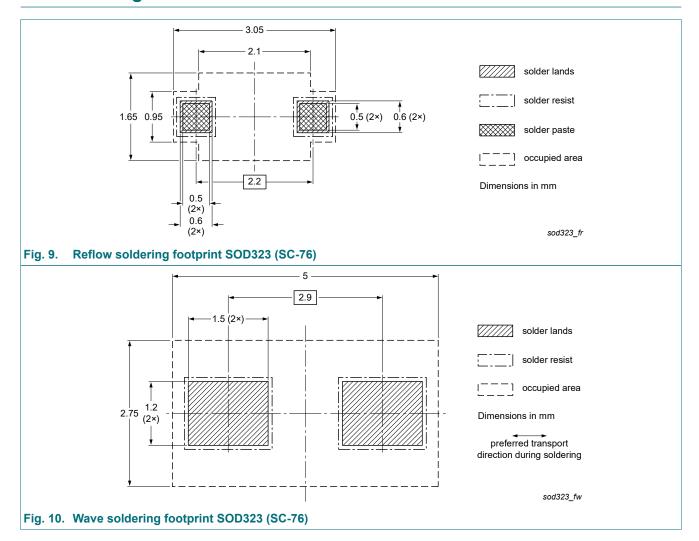
Quality information

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.

12. Package outline



13. Soldering



14. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Supersedes
PZUXBA-Q_SER v. 1	20220810	Product data sheet	-

15. Legal information

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.

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