PDZ-GW series

Single Zener diodes in a SOD123 package

Rev. 1 — 4 September 2017 Product data sheet

1 Product profile

1.1 General description

General-purpose Zener diodes in a SOD123 small Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Non-repetitive peak reverse power dissipation: $P_{ZSM} \leq 40$ W
- Total power dissipation: $P_{tot} \leq 365$ mW
- Tolerance series:
  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 = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	-	365	mW
			[3]	-	-	625	mW

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.
[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^2.

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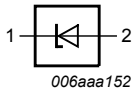
2 Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]		
2	A	anode		

[1] The marking bar indicates the cathode.

3 Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PDZ2.4BGW to PDZ36BGW[1]	-	plastic surface-mounted package; 2 leads	SOD123

[1] The series consists of 29 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	Type number	Marking Code
PDZ2.4BGW	B1	PDZ6.2BGW	BB	PDZ16BGW	BM
PDZ2.7BGW	B2	PDZ6.8BGW	BC	PDZ18BGW	BN
PDZ3.0BGW	B3	PDZ7.5BGW	BD	PDZ20BGW	BP
PDZ3.3BGW	B4	PDZ8.2BGW	BE	PDZ22BGW	BQ
PDZ3.6BGW	B5	PDZ9.1BGW	BF	PDZ24BGW	BR
PDZ3.9BGW	B6	PDZ10BGW	BG	PDZ27BGW	BS
PDZ4.3BGW	B7	PDZ11BGW	BH	PDZ30BGW	BT
PDZ4.7BGW	B8	PDZ12BGW	BJ	PDZ33BGW	BU
PDZ5.1BGW	B9	PDZ13BGW	BK	PDZ36BGW	BV
PDZ5.6BGW	BA	PDZ15BGW	BL		

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 characteristics table	
P_{ZSM}	non-repetitive peak power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	365	mW
			[3]	-	625	mW
T_j	junction temperature			-	150	
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] 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.

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]	-	-	340	K/W
			[2]	-	-	200	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	50	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (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 cm^2.
[3] 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	I_F = 10 mA	[1]	-	-	0.9	V
V_F	forward voltage	I_F = 100 mA	[1]	-	-	1.1	V

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

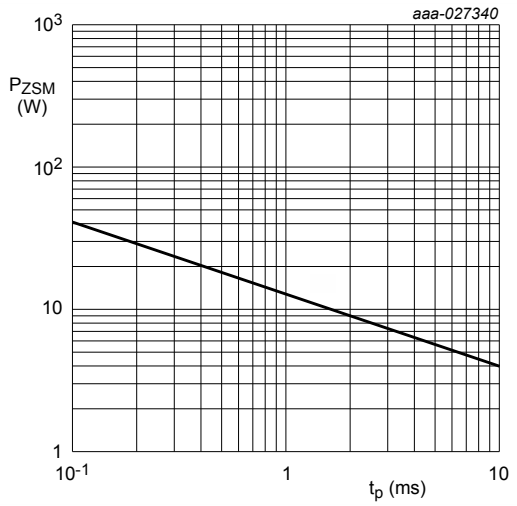
Table 8. Characteristics per type; PDZ2.4BGW to PDZ36BGW

T_j = 25 °C unless otherwise specified.

PDZx BGW	Sel	Working voltage V_Z (V); I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		Min	Max	I_Z = 0.5 mA	I_Z = 5 mA	Max	V_R (V)	Typ	Max	Max
2.4	B	2.43	2.63	1000	100	50	1.0	−1.6	450	8.0
2.7	B	2.69	2.91	1000	100	20	1.0	−2.0	440	8.0
3.0	B	2.85	3.07	1000	95	10	1.0	−2.1	425	8.0
3.3	B	3.32	3.53	1000	95	5	1.0	−2.4	410	8.0
3.6	B	3.60	3.85	500 @ 1 mA	90	5	1.0	−2.4	390	8.0
3.9	B	3.89	4.16	500 @ 1 mA	90	3	1.0	−2.5	370	8.0
4.3	B	4.17	4.48	600 @ 1 mA	90	3	1.0	−2.5	350	8.0
4.7	B	4.55	4.75	600 @ 1 mA	90	2	1.0	−1.4	325	8.0
5.1	B	4.96	5.20	250	60	2	1.5	0.3	300	5.5
5.6	B	5.48	5.73	100	50	1	2.5	1.9	275	5.5
6.2	B	6.06	6.33	80	50	0.5	3.0	2.7	250	5.5
6.8	B	6.65	6.93	60	40	0.5	3.5	3.4	215	5.5
7.5	B	7.28	7.60	60	10	0.5	4.0	4.0	170	3.5
8.2	B	8.02	8.36	60	10	0.5	5.0	4.6	150	3.5
9.1	B	8.85	9.23	60	10	0.5	6.0	5.5	120	3.5
10	B	9.77	10.21	60	10	0.1	7.0	6.4	110	3.5
11	B	10.78	11.22	60	10	0.1	8.0	7.4	108	3.0
12	B	11.74	12.24	80	10	0.1	9.0	8.4	105	3.0
13	B	12.91	13.49	80	10	0.1	10.0	9.4	103	2.5
15	B	14.34	14.98	80	15	0.05	11.0	11.4	99	2.0
16	B	15.85	16.51	80	20	0.05	12.0	12.4	97	1.5
18	B	17.56	18.35	80	20	0.05	13.0	14.4	93	1.5
20	B	19.52	20.39	100	20	0.05	15.0	16.4	88	1.5
22	B	21.54	22.47	100	25	0.05	17.0	18.4	84	1.3
24	B	23.72	24.78	120	30	0.05	19.0	20.4	80	1.3

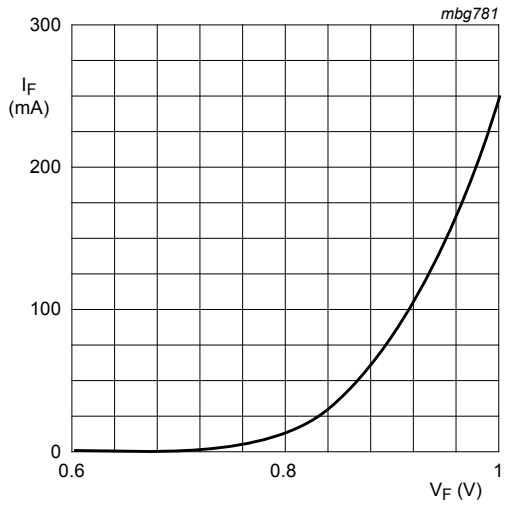
PDZx BGW	Sel	Working voltage V_Z (V); I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA	Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		Min	Max	I_Z = 0.5 mA	I_Z = 5 mA	Max	V_R (V)	Typ	Max	Max
27	B	26.19	27.53	150	40	0.05	21.0	23.4	73	1.0
30	B	29.19	30.69	200	40	0.05	23.0	26.6	66	1.0
33	B	32.15	33.79	250	40	0.05	25.0	29.7	60	0.9
36	B	35.07	36.87	300	60	0.05	27.0	33.0	59	0.8

[1] f = 1 MHz; V_R = 0 V.
[2] t_p = 100 μs; T_{amb} = 25 °C.



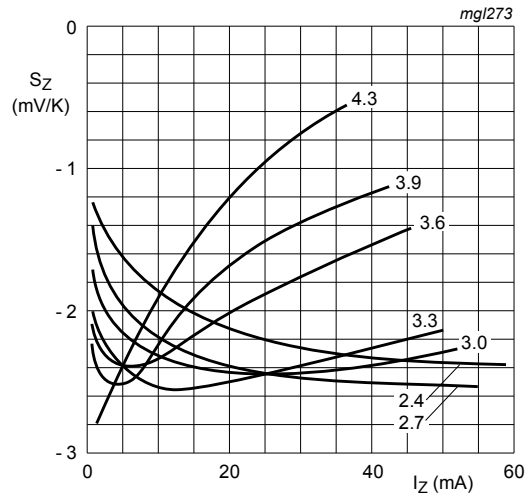
T_j = 25 °C (prior to surge)

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



T_j = 25 °C

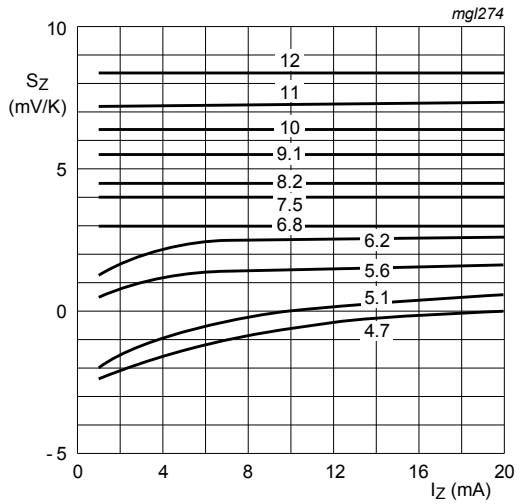
Figure 2. Forward current as a function of forward voltage; typical values



PDZ2.4BGW to PDZ4.3BGW

T_j = 25 °C to 150 °C

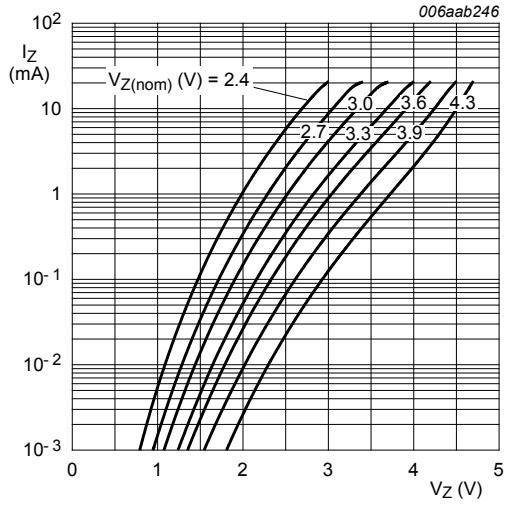
Figure 3. Temperature coefficient as a function of working current; typical values



PDZ4.7BGW to PDZ12BGW

T_j = 25 °C to 150 °C

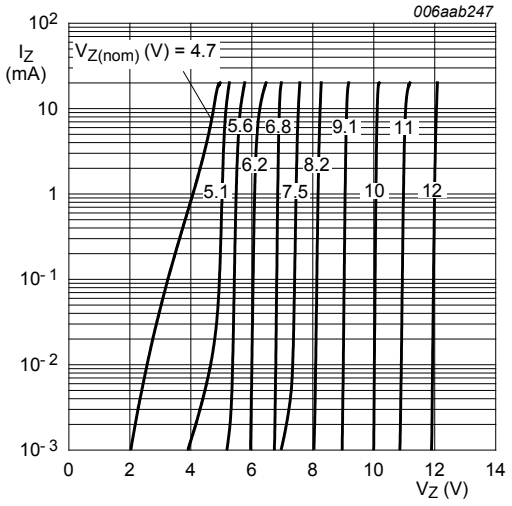
Figure 4. Temperature coefficient as a function of working current; typical values



PDZ2.4BGW to PDZ4.3BGW

T_j = 25 °C

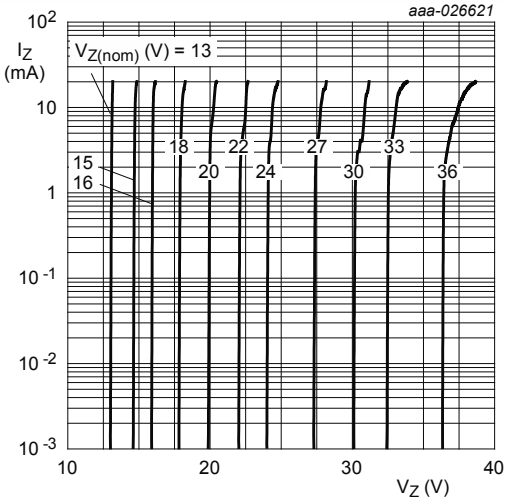
Figure 5. Working current as a function of working voltage; typical values



PDZ4.7BGW to PDZ12BGW

T_j = 25 °C

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



PDZ13BGW to PDZ36BGW

T_j = 25 °C

Figure 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

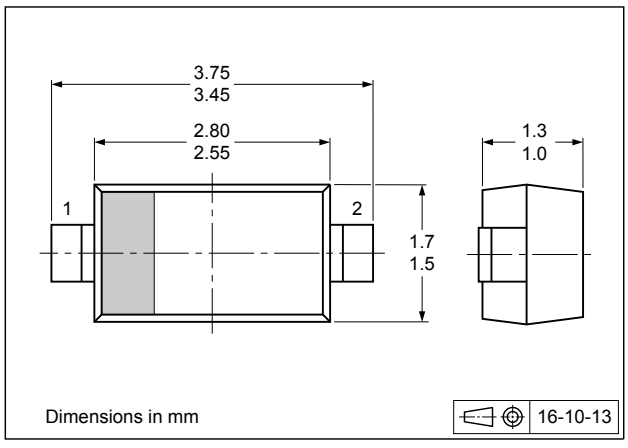
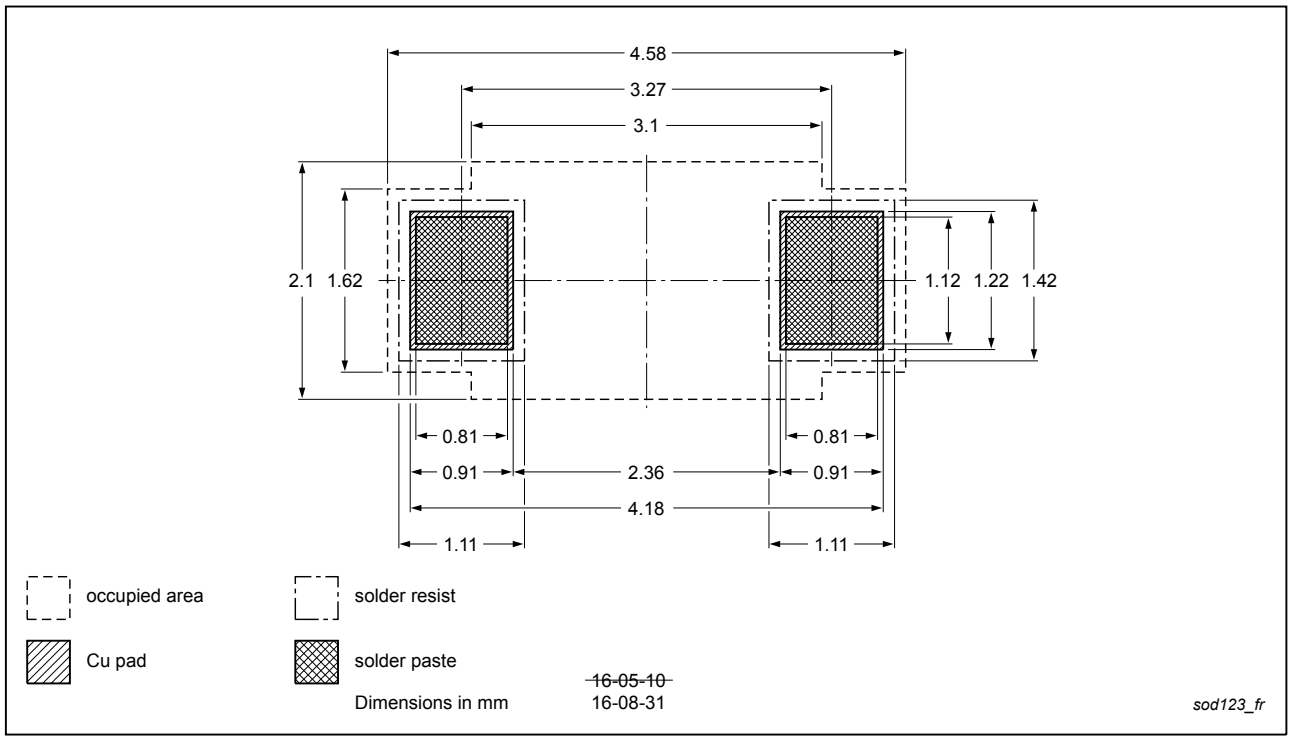


Figure 8. Package outline SOD123

10 Soldering



Reflow soldering is the only recommended soldering method.
Dimensions in mm.

Figure 9. Reflow soldering footprint SOD123

11 Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDZ-GW_SER v.1	20170904	Product data sheet	-	-

12 Legal information

12.1 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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