BZT52-B series

Single Zener diodes in a SOD123 package

Rev. 1 — 20 December 2017 Product data sheet

1 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

- Total power dissipation: ≤ 590 mW
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Small plastic package suitable for surface-mounted design
- Low differential resistance
- B selection
- AEC-Q101 qualified

1.3 Applications

- General regulation functions

1.4 Quick reference data

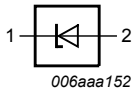
Table 1. Quick reference data

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} ≤ 25 °C	[2]	-	-	350	mW
			[3]	-	-	590	mW

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 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.

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
BZT52-B2V4 to BZT52-B75[1]	-	plastic surface-mounted package; 2 leads	SOD123

[1] The series consists of 37 types with nominal working voltages from 2.4 V to 75 V.

4 Marking

Table 4. Marking Codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZT52-B2V4	D7	BZT52-B6V2	DH	BZT52-B16	DT	BZT52-B43	E6
BZT52-B2V7	D8	BZT52-B6V8	DJ	BZT52-B18	DU	BZT52-B47	E7
BZT52-B3V0	D9	BZT52-B7V5	DK	BZT52-B20	DV	BZT52-B51	E8
BZT52-B3V3	DA	BZT52-B8V2	DL	BZT52-B22	DW	BZT52-B56	E9
BZT52-B3V6	DB	BZT52-B9V1	DM	BZT52-B24	DY	BZT52-B62	EA
BZT52-B3V9	DC	BZT52-B10	DN	BZT52-B27	E1	BZT52-B68	EB
BZT52-B4V3	DD	BZT52-B11	DP	BZT52-B30	E2	BZT52-B75	EC
BZT52-B4V7	DE	BZT52-B12	DQ	BZT52-B33	E3	-	-
BZT52-B5V1	DF	BZT52-B13	DR	BZT52-B36	E4	-	-
BZT52-B5V6	DG	BZT52-B15	DS	BZT52-B39	E5	-	-

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			-	250	mA
I_{ZSM}	non-repetitive peak reverse current			-	see Table 8 Table 9 Table 10	
P_{ZSM}	non-repetitive peak power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	350	mW
			[3]	-	590	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]	-	-	350	K/W
			[2]	-	-	210	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	55	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

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

Table 8. Characteristics per type; BZT52-B2V4 to BZT52-B24

T_j = 25 °C unless otherwise specified.

BZT52-xxx	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]
				I_Z = 1 mA	I_Z = 5 mA						
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
2V4	B	2.35	2.45	400	85	50	1	−3.5	0.0	450	6.00
2V7	B	2.65	2.75	500	83	20	1	−3.5	0.0	450	6.00
3V0	B	2.94	3.06	500	95	10	1	−3.5	0.0	450	6.00
3V3	B	3.23	3.37	500	95	5	1	−3.5	0.0	450	6.00
3V6	B	3.53	3.67	500	95	5	1	−3.5	0.0	450	6.00
3V9	B	3.82	3.98	500	95	3	1	−3.5	0.0	450	6.00
4V3	B	4.21	4.39	500	95	3	1	−3.5	0.0	450	6.00
4V7	B	4.61	4.79	500	78	3	2	−3.5	0.2	300	6.00
5V1	B	5.00	5.20	480	60	2	2	−2.7	1.2	300	6.00
5V6	B	5.49	5.71	400	40	1	2	−2.0	2.5	300	6.00
6V2	B	6.08	6.32	150	10	3	4	0.4	3.7	200	6.00
6V8	B	6.66	6.94	80	8	2	4	1.2	4.5	200	6.00
7V5	B	7.35	7.65	80	10	1	5	2.5	5.3	150	4.00
8V2	B	8.04	8.36	80	10	0.7	5	3.2	6.2	150	4.00
9V1	B	8.92	9.28	100	10	0.5	6	3.8	7.0	150	3.00
10	B	9.80	10.20	70	10	0.2	7	4.5	8.0	90	3.00
11	B	10.80	11.20	70	10	0.1	8	5.4	9.0	85	2.50
12	B	11.80	12.20	90	10	0.1	8	6.0	10.0	85	2.50
13	B	12.70	13.30	110	10	0.1	8	7.0	11.0	80	2.50
15	B	14.70	15.30	110	15	0.05	10.5	9.2	13.0	75	2.00
16	B	15.70	16.30	170	20	0.05	11.2	10.4	14.0	75	1.50
18	B	17.60	18.40	170	20	0.05	12.6	12.4	16.0	70	1.50
20	B	19.60	20.40	220	20	0.05	14	14.4	18.0	60	1.50
22	B	21.60	22.40	220	25	0.05	15.4	16.4	20.0	60	1.25
24	B	23.50	24.50	220	30	0.05	16.8	18.4	22.0	55	1.25

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

Table 9. Characteristics per type; BZT52-B27 to BZT52-B51

T_j = 25 °C unless otherwise specified.

BZT52-xxx	Sel	Working voltage V_Z (V); I_Z = 2 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]
				I_Z = 1 mA	I_Z = 5 mA						
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
27	B	26.5	27.5	250	40	0.05	18.9	21.4	25.3	50	1.0
30	B	29.4	30.6	250	40	0.05	21.0	24.4	29.4	50	1.0
33	B	32.3	33.7	250	40	0.05	23.1	27.4	33.4	45	0.9
36	B	35.3	36.7	250	60	0.05	25.2	30.4	37.4	45	0.8
39	B	38.2	39.8	300	75	0.05	27.3	33.4	41.2	45	0.7
43	B	42.1	43.9	325	80	0.05	30.1	37.6	46.6	40	0.6
47	B	46.1	47.9	325	90	0.05	32.9	42.0	51.8	40	0.5
51	B	50.0	52.0	350	100	0.05	35.7	46.6	57.2	40	0.4

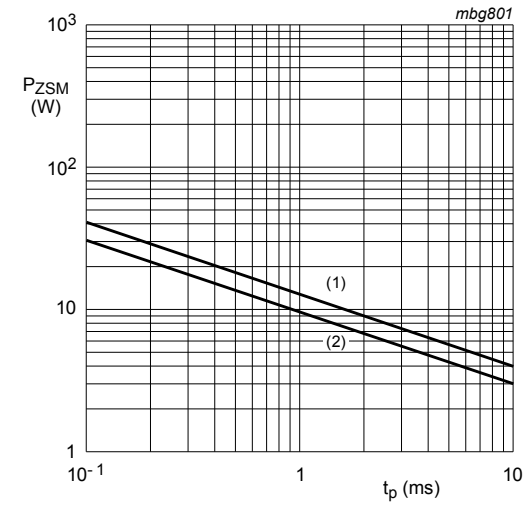
[1] f = 1 MHz; V_R = 0 V
[2] t_p = 100 μs; T_{amb} = 25 °C

Table 10. Characteristics per type; BZT52-B56 to BZT52-B75

T_j = 25 °C unless otherwise specified.

BZT52-xxx	Sel	Working voltage V_Z (V); I_Z = 2 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]
				I_Z = 0.5 mA	I_Z = 2 mA						
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
56	B	54.9	57.1	375	120	0.05	39.2	52.2	63.8	40	0.30
62	B	60.8	63.2	400	140	0.05	43.4	58.8	71.6	35	0.30
68	B	66.6	69.4	400	160	0.05	47.6	65.6	79.8	35	0.25
75	B	73.5	76.5	400	175	0.05	52.5	73.4	88.6	35	0.20

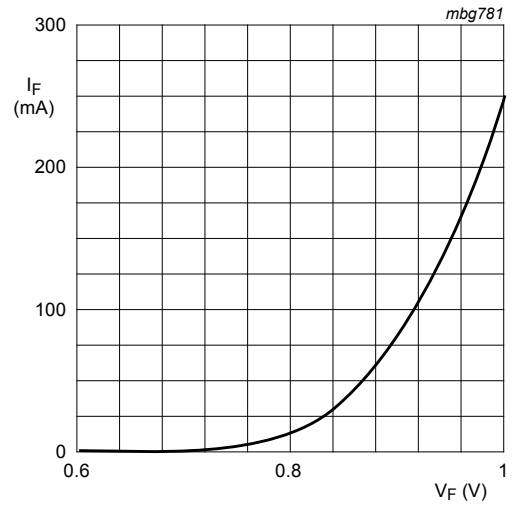
[1] f = 1 MHz; V_R = 0 V
[2] t_p = 100 μs; T_{amb} = 25 °C



(1) T_j = 25 °C (prior to surge)

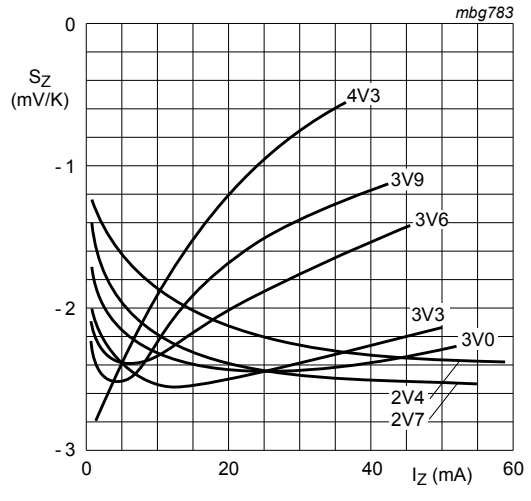
(2) T_j = 150 °C (prior to surge)

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



T_j = 25 °C

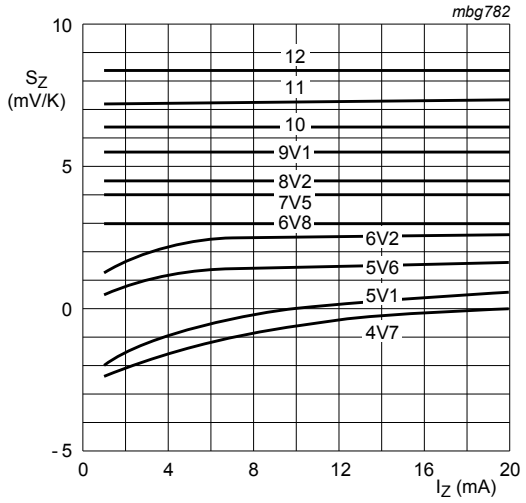
Figure 2. Forward current as a function of forward voltage; typical values



BZT52-B2V4 to BZT52-B4V3

T_j = 25 °C to 150 °C

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



BZT52-B4V7 to BZT52-B12

T_j = 25 °C to 150 °C

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

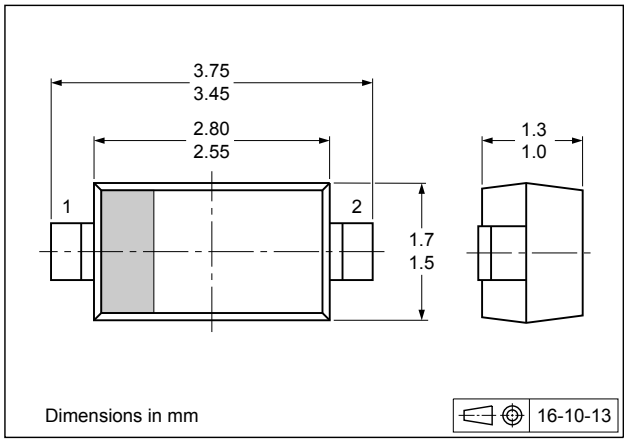
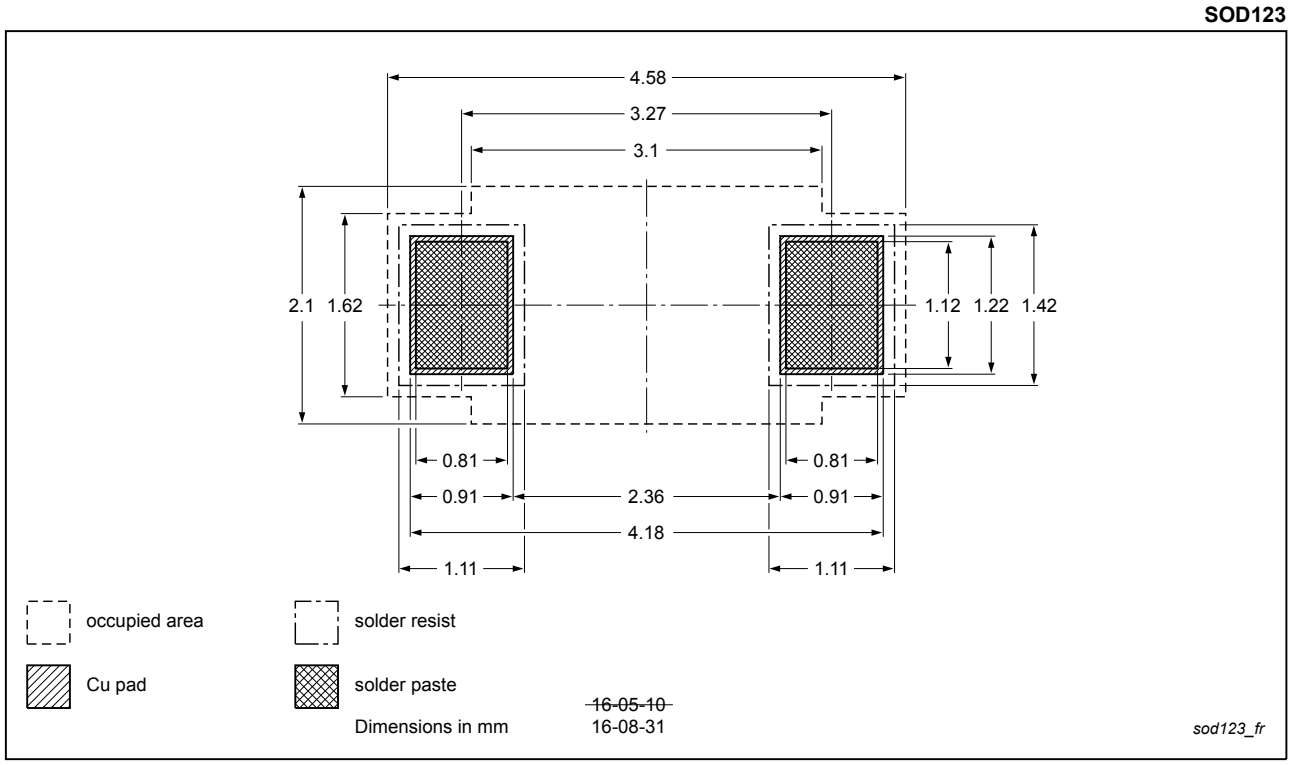


Figure 5. Package outline SOD123

10 Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm.

Figure 6. Reflow soldering footprint SOD123

11 Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZT52-B_SER v.1	20171220	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.

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