



# 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:  $\leq 590$  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	$T_{amb} \leq 25$ °C [2]	-	-	350	mW
		[3]	-	-	590	mW


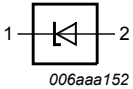
[1] Pulse test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

[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>.

## 2 Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode <sup>[1]</sup>		
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 <sup>[1]</sup>	-	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 <a href="#">Table 8</a> <a href="#">Table 9</a> <a href="#">Table 10</a>	
$P_{ZSM}$	non-repetitive peak power dissipation		[1] -	40	W
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[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]  $t_p = 100\text{ }\mu\text{s}$ ; 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] -	-	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  $1\text{ cm}^2$ .

[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

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

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

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

BZT52-xxx	Sel	Working voltage $V_Z$ (V); $I_Z = 5\text{ mA}$		Maximum differential resistance $r_{\text{dif}}$ ( $\Omega$ ) $I_Z = 1\text{ mA}$ $I_Z = 5\text{ mA}$		Reverse current $I_R$ ( $\mu\text{A}$ ) $V_R$ (V)		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	Max	Max	Max	Min	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]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ;  $T_{\text{amb}} = 25\text{ °C}$

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

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

BZT52 -xxx	Sel	Working voltage $V_Z$ (V);		Maximum differential resistance $r_{\text{dif}}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu\text{A}$ )	Temperature coefficient $S_Z$ (mV/K);		Diode capacitance $C_d$ (pF) <sup>[1]</sup>	Non- repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup>	
											$I_Z = 2\text{ mA}$
		Min	Max	Max	Max		Max	$V_R$ (V)			Min
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

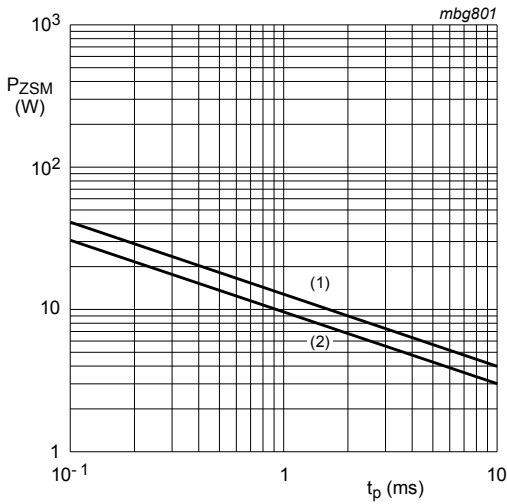
[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ;  $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ 

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

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

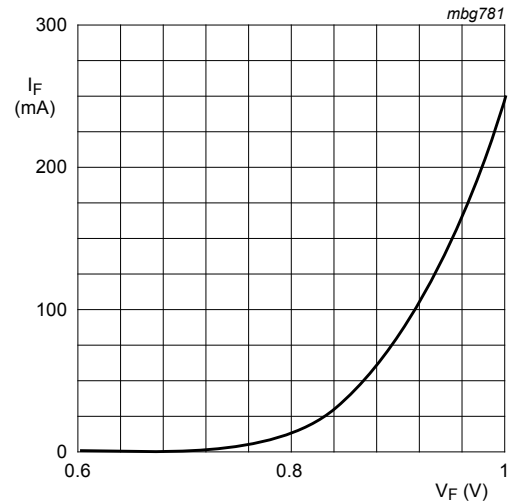
BZT52 -xxx	Sel	Working voltage $V_Z$ (V);		Maximum differential resistance $r_{\text{dif}}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu\text{A}$ )	Temperature coefficient $S_Z$ (mV/K);		Diode capacitance $C_d$ (pF) <sup>[1]</sup>	Non- repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup>	
											$I_Z = 2\text{ mA}$
		Min	Max	Max	Max		Max	$V_R$ (V)			Min
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]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ;  $T_{\text{amb}} = 25\text{ }^\circ\text{C}$



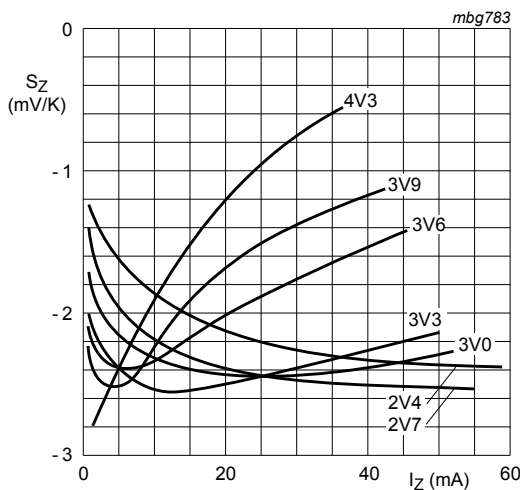
(1)  $T_j = 25\text{ °C}$  (prior to surge)  
 (2)  $T_j = 150\text{ °C}$  (prior to surge)

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



$T_j = 25\text{ °C}$

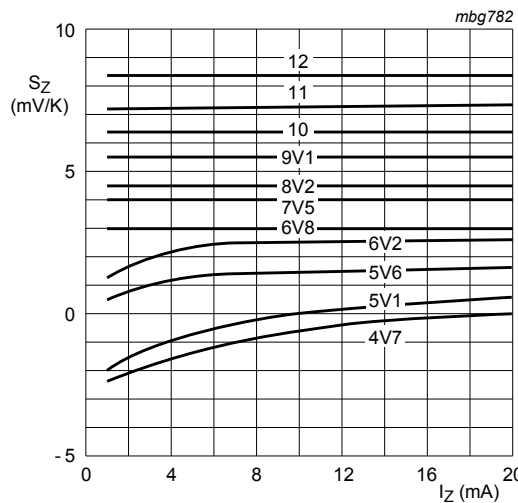
**Figure 2. Forward current as a function of forward voltage; typical values**



BZT52-B2V4 to BZT52-B4V3

$T_j = 25\text{ °C}$  to  $150\text{ °C}$

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



BZT52-B4V7 to BZT52-B12

$T_j = 25\text{ °C}$  to  $150\text{ °C}$

**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**

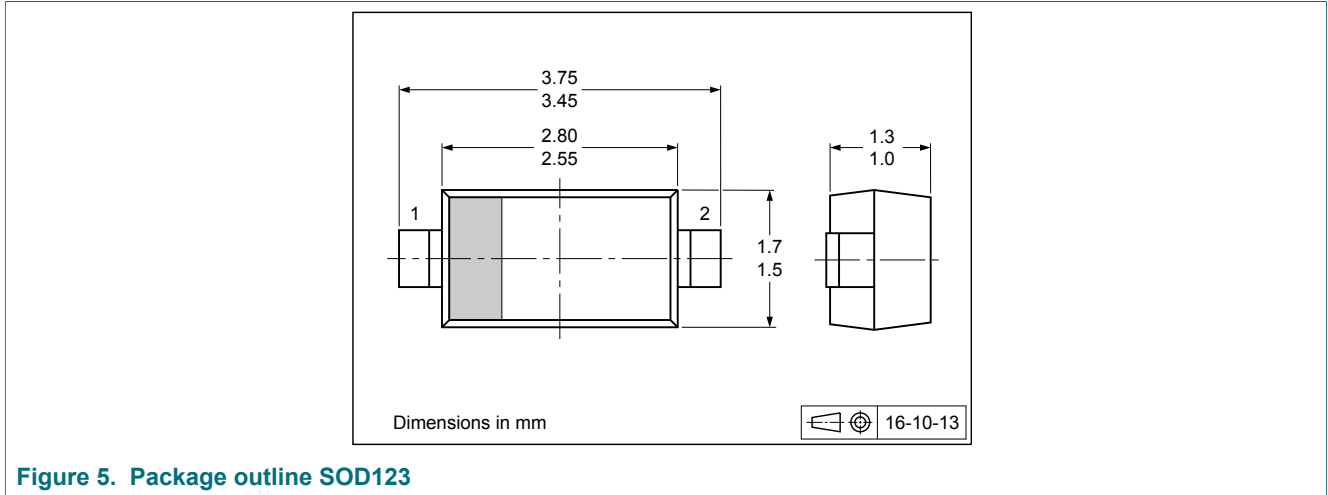
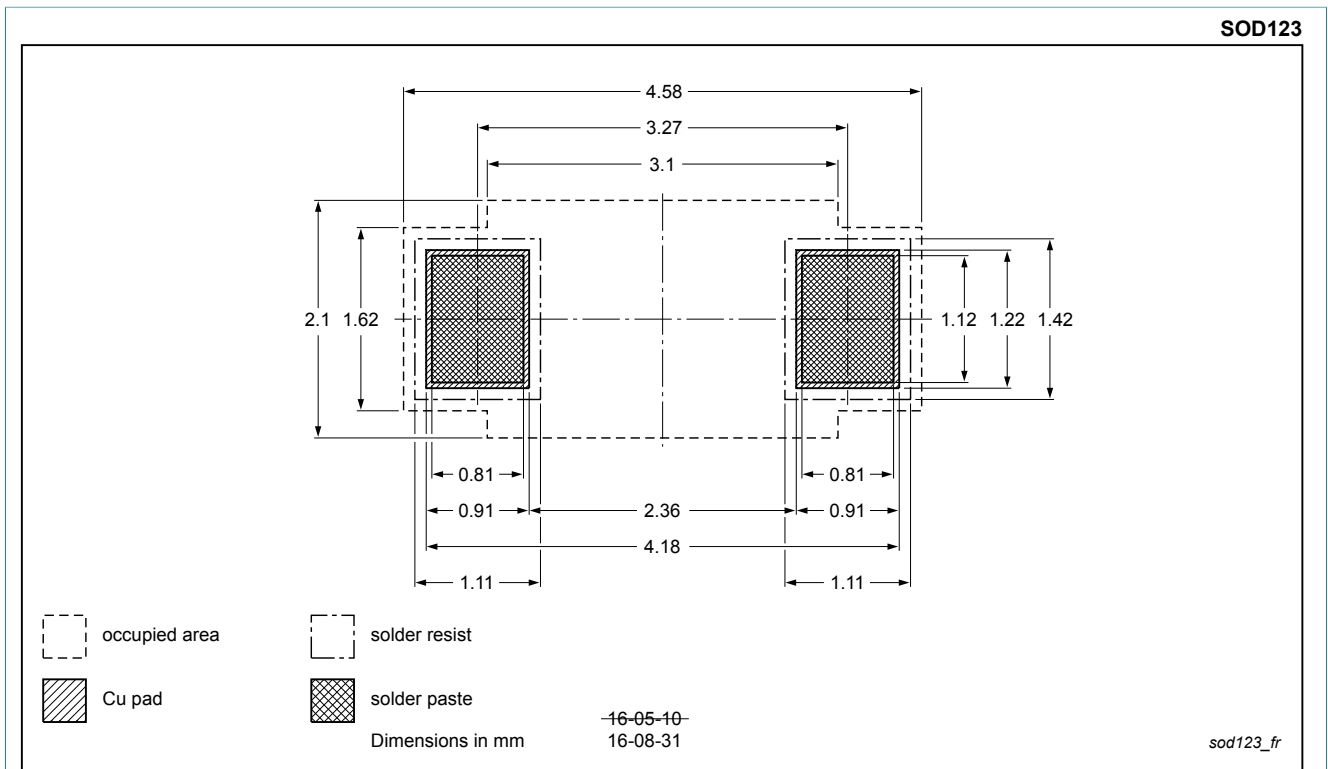


Figure 5. Package outline SOD123

**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 <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.
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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Date of release: 20 December 2017

Document identifier: BZT52-B\_SER