



# THE DATASHEET OF BZV55-B51





# BZV55 series

## Voltage regulator diodes

Rev. 5 — 26 January 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Low-power voltage regulator diodes in small hermetically sealed glass SOD80C Surface-Mounted Device (SMD) packages. The diodes are available in the normalized E24  $\pm 2\%$  (BZV55-B) and approximately  $\pm 5\%$  (BZV55-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 V to 75 V.

### 1.2 Features and benefits

- Non-repetitive peak reverse power dissipation:  $\leq 40$  W
- Total power dissipation:  $\leq 500$  mW
- Two tolerance series:  $\pm 2\%$  and  $\pm 5\%$
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Low differential resistance
- Small hermetically sealed glass SMD package

### 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	-	-	0.9	V
$P_{ZSM}$	non-repetitive peak reverse power dissipation		[1]	-	40	W

[1]  $t_p = 100$   $\mu$ s; square wave;  $T_j = 25$  °C prior to surge

## 2. Pinning information

Table 2. Pinning

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

[1] The marking band indicates the cathode.

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		Version
	Name	Description	
BZV55-B2V4 to BZV55-C75 <sup>[1]</sup>	-	hermetically sealed glass surface-mounted package; 2 connectors	SOD80C

[1] The series consists of 74 types with nominal working voltages from 2.4 V to 75 V.

### 4. Marking

**Table 4. Marking codes**

Type number	Marking code
BZV55-B2V4 to BZV55-C75	marking band

### 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		<sup>[1]</sup> -	see <a href="#">Table 8</a> and <a href="#">9</a>	
$P_{ZSM}$	non-repetitive peak reverse power dissipation		<sup>[1]</sup> -	40	W
$P_{tot}$	total power dissipation	$T_{amb} \leq 50\text{ °C}$	<sup>[2]</sup> -	400	mW
		$T_{tp} \leq 50\text{ °C}$	<sup>[2]</sup> -	500	mW
$T_{stg}$	storage temperature		-65	+200	°C
$T_j$	junction temperature		-65	+200	°C

[1]  $t_p = 100\ \mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge

[2] Device mounted on a ceramic substrate of  $10 \times 10 \times 0.6\text{ mm}$ .

### 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	<sup>[1]</sup> -	-	380	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	300	K/W

[1] Device mounted on a ceramic substrate of  $10 \times 10 \times 0.6\text{ mm}$ .



Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 7. Characteristics

**Table 7. Characteristics**  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 10 mA	-	-	0.9	V
I <sub>R</sub>	reverse current					
	BZV55-B/C2V4	V <sub>R</sub> = 1 V	-	-	50	μA
	BZV55-B/C2V7	V <sub>R</sub> = 1 V	-	-	20	μA
	BZV55-B/C3V0	V <sub>R</sub> = 1 V	-	-	10	μA
	BZV55-B/C3V3	V <sub>R</sub> = 1 V	-	-	5	μA
	BZV55-B/C3V6	V <sub>R</sub> = 1 V	-	-	5	μA
	BZV55-B/C3V9	V <sub>R</sub> = 1 V	-	-	3	μA
	BZV55-B/C4V3	V <sub>R</sub> = 1 V	-	-	3	μA
	BZV55-B/C4V7	V <sub>R</sub> = 2 V	-	-	3	μA
	BZV55-B/C5V1	V <sub>R</sub> = 2 V	-	-	2	μA
	BZV55-B/C5V6	V <sub>R</sub> = 2 V	-	-	1	μA
	BZV55-B/C6V2	V <sub>R</sub> = 4 V	-	-	3	μA
	BZV55-B/C6V8	V <sub>R</sub> = 4 V	-	-	2	μA
	BZV55-B/C7V5	V <sub>R</sub> = 5 V	-	-	1	μA
	BZV55-B/C8V2	V <sub>R</sub> = 5 V	-	-	700	nA
	BZV55-B/C9V1	V <sub>R</sub> = 6 V	-	-	500	nA
	BZV55-B/C10	V <sub>R</sub> = 7 V	-	-	200	nA
	BZV55-B/C11	V <sub>R</sub> = 8 V	-	-	100	nA
	BZV55-B/C12	V <sub>R</sub> = 8 V	-	-	100	nA
	BZV55-B/C13	V <sub>R</sub> = 8 V	-	-	100	nA
	BZV55-B/C15 to BZV55-B/C75	V <sub>R</sub> = 0.7V <sub>Z(nom)</sub>	-	-	50	nA

**Table 8. Characteristics per type; BZV55-B2V4 to BZV55-C24** $T_j = 25\text{ °C}$  unless otherwise specified.

BZV55-xxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )				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>
		$I_Z = 5\text{ mA}$		$I_Z = 1\text{ mA}$		$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$				
		Min	Max	Typ	Max	Typ	Max	Min	Typ	Max		
2V4	B	2.35	2.45	275	600	70	100	-3.5	-1.6	0	450	6.0
	C	2.2	2.6									
2V7	B	2.65	2.75	300	600	75	100	-3.5	-2.0	0	450	6.0
	C	2.5	2.9									
3V0	B	2.94	3.06	325	600	80	95	-3.5	-2.1	0	450	6.0
	C	2.8	3.2									
3V3	B	3.23	3.37	350	600	85	95	-3.5	-2.4	0	450	6.0
	C	3.1	3.5									
3V6	B	3.53	3.67	375	600	85	90	-3.5	-2.4	0	450	6.0
	C	3.4	3.8									
3V9	B	3.82	3.98	400	600	85	90	-3.5	-2.5	0	450	6.0
	C	3.7	4.1									
4V3	B	4.21	4.39	410	600	80	90	-3.5	-2.5	0	450	6.0
	C	4.0	4.6									
4V7	B	4.61	4.79	425	500	50	80	-3.5	-1.4	0.2	300	6.0
	C	4.4	5.0									
5V1	B	5.0	5.2	400	480	40	60	-2.7	-0.8	1.2	300	6.0
	C	4.8	5.4									
5V6	B	5.49	5.71	80	400	15	40	-2.0	1.2	2.5	300	6.0
	C	5.2	6.0									
6V2	B	6.08	6.32	40	150	6	10	0.4	2.3	3.7	200	6.0
	C	5.8	6.6									
6V8	B	6.66	6.94	30	80	6	15	1.2	3.0	4.5	200	6.0
	C	6.4	7.2									
7V5	B	7.35	7.65	30	80	6	15	2.5	4.0	5.3	150	4.0
	C	7.0	7.9									
8V2	B	8.04	8.36	40	80	6	15	3.2	4.6	6.2	150	4.0
	C	7.7	8.7									
9V1	B	8.92	9.28	40	100	6	15	3.8	5.5	7.0	150	3.0
	C	8.5	9.6									
10	B	9.8	10.2	50	150	8	20	4.5	6.4	8.0	90	3.0
	C	9.4	10.6									
11	B	10.8	11.2	50	150	10	20	5.4	7.4	9.0	85	2.5
	C	10.4	11.6									
12	B	11.8	12.2	50	150	10	25	6.0	8.4	10.0	85	2.5
	C	11.4	12.7									

**Table 8. Characteristics per type; BZV55-B2V4 to BZV55-C24 ...continued** $T_j = 25\text{ °C}$  unless otherwise specified.

BZV55-xxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )				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>
				$I_Z = 5\text{ mA}$		$I_Z = 1\text{ mA}$	$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$			
		Min	Max	Typ	Max	Typ	Max	Min	Typ	Max	Max	Max
13	B	12.7	13.3	50	170	10	30	7.0	9.4	11.0	80	2.5
	C	12.4	14.1									
15	B	14.7	15.3	50	200	10	30	9.2	11.4	13.0	75	2.0
	C	13.8	15.6									
16	B	15.7	16.3	50	200	10	40	10.4	12.4	14.0	75	1.5
	C	15.3	17.1									
18	B	17.6	18.4	50	225	10	45	12.4	14.4	16.0	70	1.5
	C	16.8	19.1									
20	B	19.6	20.4	60	225	15	55	12.3	15.6	18.0	60	1.5
	C	18.8	21.2									
22	B	21.6	22.4	60	250	20	55	14.1	17.6	20.0	60	1.25
	C	20.8	23.3									
24	B	23.5	24.5	60	250	25	70	15.9	19.6	22.0	55	1.25
	C	22.8	25.6									

[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge

**Table 9. Characteristics per type; BZV55-B27 to BZV55-C75** $T_j = 25\text{ °C}$  unless otherwise specified.

BZV55-xxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )				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>
		$I_Z = 2\text{ mA}$		$I_Z = 0.5\text{ mA}$		$I_Z = 2\text{ mA}$		$I_Z = 2\text{ mA}$				
		Min	Max	Typ	Max	Typ	Max	Min	Typ	Max		
27	B	26.5	27.5	65	300	25	80	18.0	22.7	25.3	50	1.0
	C	25.1	28.9									
30	B	29.4	30.6	70	300	30	80	20.6	25.7	29.4	50	1.0
	C	28.0	32.0									
33	B	32.3	33.7	75	325	35	80	23.3	28.7	33.4	45	0.9
	C	31.0	35.0									
36	B	35.3	36.7	80	350	35	90	26.0	31.8	37.4	45	0.8
	C	34.0	38.0									
39	B	38.2	39.8	80	350	40	130	28.7	34.8	41.2	45	0.7
	C	37.0	41.0									
43	B	42.1	43.9	85	375	45	150	31.4	38.8	46.6	40	0.6
	C	40.0	46.0									
47	B	46.1	47.9	85	375	50	170	35.0	42.9	51.8	40	0.5
	C	44.0	50.0									
51	B	50.0	52.0	90	400	60	180	38.6	46.9	57.2	40	0.4
	C	48.0	54.0									
56	B	54.9	57.1	100	425	70	200	42.2	52.0	63.8	40	0.3
	C	52.0	60.0									
62	B	60.8	63.2	120	450	80	215	58.8	64.4	71.6	35	0.3
	C	58.0	66.0									
68	B	66.6	69.4	150	475	90	240	65.6	71.7	79.8	35	0.25
	C	64.0	72.0									
75	B	73.5	76.5	170	500	95	255	73.4	80.2	88.6	35	0.2
	C	70.0	79.0									

[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge



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

**Fig 2. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values**



$T_j = 25^\circ\text{C}$

**Fig 3. Forward current as a function of forward voltage; typical values**



BZV55-B/C2V4 to BZV55-B/C4V3  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

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



BZV55-B/C4V7 to BZV55-B/C12  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

**Fig 5. Temperature coefficient as a function of working current; typical values**

## 8. Package outline



## 9. Packing information

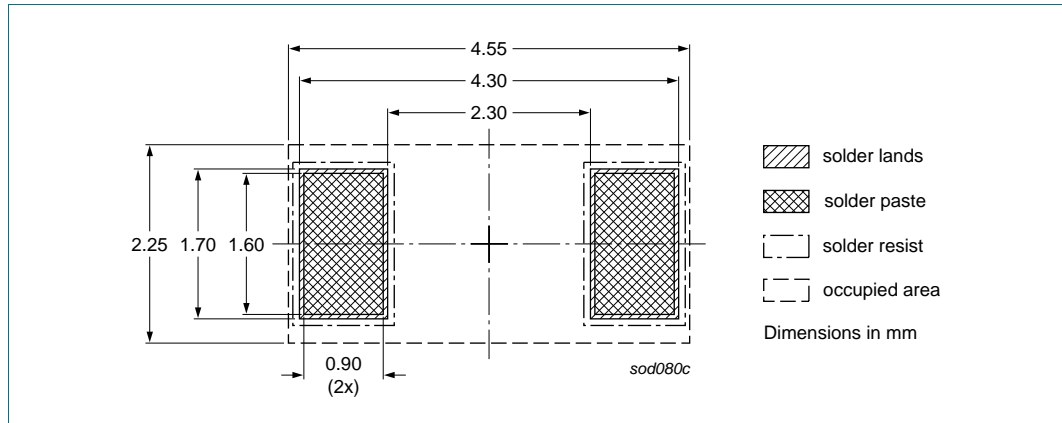
**Table 10. Packing methods**

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

Type number	Package	Description	Packing quantity	
			2500	10000
BZV55-B2V4 to BZV55-C75	SOD80C	4 mm pitch, 8 mm tape and reel	-115	-135

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

**10. Soldering**



**Fig 7. Reflow soldering footprint SOD80C**



**Fig 8. Wave soldering footprint SOD80C**

## 11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZV55_SER v.5	20110126	Product data sheet	-	BZV55_SER v.4
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Section 4 “Marking”</a>: updated</li> <li>• <a href="#">Table 6 “Thermal characteristics”</a>: changed <math>R_{th(j-t)}</math> for <math>R_{th(j-sp)}</math></li> <li>• <a href="#">Figure 6</a>: superseded by minimized outline drawing</li> <li>• <a href="#">Section 12 “Legal information”</a>: updated</li> </ul>			
BZV55_SER v.4	20070719	Product data sheet	CPCN200508022F	BZV55 v.3
BZV55 v.3	20020228	Product specification	-	BZV55 v.2
BZV55 v.2	19990521	Product specification	-	BZV55 v.1
BZV55 v.1	19960426	Product specification	-	-

## 12. Legal information

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

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