



**THE DATASHEET OF  
BZX585-C3V9,115**





# BZX585 series

## Voltage regulator diodes

Rev. 5 — 11 October 2016

Product data sheet

## 1. Product profile

### 1.1 General description

General-purpose Zener diodes in an SOD523 (SC-79) ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

### 1.2 Features and benefits

- Non-repetitive peak reverse power dissipation:  $\leq 40$  W
- Total power dissipation:  $\leq 300$  mW
- AEC-Q101 qualified
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series:  $\pm 2\%$  and  $\pm 5\%$
- Low differential resistance

### 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	$I_F = 100$ mA	[1]	-	1.1	V
$P_{ZSM}$	non-repetitive peak reverse power dissipation		[2]	-	40	W

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

[2]  $t_p = 100$   $\mu$ s; square wave;  $T_j = 25$  °C before surge

## 2. Pinning information

Table 2. Pinning

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

[1] The marking bar indicates the cathode.

### 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX585-B2V4 to BZX585-C75 <sup>[1]</sup>	SC-79	plastic surface-mounted package; 2 leads	SOD523

[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	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZX585-B2V4	C1	BZX585-B15	E0	BZX585-C2V4	F1	BZX585-C15	H0
BZX585-B2V7	C2	BZX585-B16	EA	BZX585-C2V7	F2	BZX585-C16	HA
BZX585-B3V0	C3	BZX585-B18	EB	BZX585-C3V0	F3	BZX585-C18	HB
BZX585-B3V3	C4	BZX585-B20	EC	BZX585-C3V3	F4	BZX585-C20	HC
BZX585-B3V6	C5	BZX585-B22	ED	BZX585-C3V6	F5	BZX585-C22	HD
BZX585-B3V9	C6	BZX585-B24	EE	BZX585-C3V9	F6	BZX585-C24	HE
BZX585-B4V3	C7	BZX585-B27	EF	BZX585-C4V3	F7	BZX585-C27	HF
BZX585-B4V7	C8	BZX585-B30	EG	BZX585-C4V7	F8	BZX585-C30	HG
BZX585-B5V1	C9	BZX585-B33	EH	BZX585-C5V1	F9	BZX585-C33	HH
BZX585-B5V6	C0	BZX585-B36	EK	BZX585-C5V6	F0	BZX585-C36	HK
BZX585-B6V2	E1	BZX585-B39	EL	BZX585-C6V2	H1	BZX585-C39	HL
BZX585-B6V8	E2	BZX585-B43	EM	BZX585-C6V8	H2	BZX585-C43	HM
BZX585-B7V5	E3	BZX585-B47	EN	BZX585-C7V5	H3	BZX585-C47	HN
BZX585-B8V2	E4	BZX585-B51	EP	BZX585-C8V2	H4	BZX585-C51	HP
BZX585-B9V1	E5	BZX585-B56	ER	BZX585-C9V1	H5	BZX585-C56	HR
BZX585-B10	E6	BZX585-B62	ES	BZX585-C10	H6	BZX585-C62	HS
BZX585-B11	E7	BZX585-B68	ET	BZX585-C11	H7	BZX585-C68	HT
BZX585-B12	E8	BZX585-B75	EU	BZX585-C12	H8	BZX585-C75	HU
BZX585-B13	E9	-	-	BZX585-C13	H9	-	-

## 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	[1]	-	see Table 8 and 9	
$P_{ZSM}$	non-repetitive peak reverse power dissipation	[1]	-	40	W
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2]	300	mW
$T_{amb}$	ambient temperature		-65	+150	°C
$T_j$	junction temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

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

[2] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 mm<sup>2</sup> Cu area at cathode tab.

## 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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	65	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 mm<sup>2</sup> Cu area at cathode tab.

[2] 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	[1]				
		$I_F = 10\text{ mA}$	-	-	0.9	V
		$I_F = 100\text{ mA}$	-	-	1.1	V

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

Table 8. Characteristics per type; BZX585-B2V4 to BZX585-C24

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

BZX585-xxx	Sel	Working voltage $V_Z$ (V)		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>
				$I_Z = 1\text{ mA}$		$I_Z = 5\text{ mA}$				$I_Z = 5\text{ mA}$				
		Min	Max	Typ	Max	Typ	Max	Max	$V_R$ (V)	Min	Typ	Max		
2V4	B	2.35	2.45	275	400	70	100	50	1	-3.5	-1.3	0	450	6
	C	2.28	2.52											
2V7	B	2.65	2.75	300	450	75	100	20	1	-3.5	-1.4	0	440	6
	C	2.57	2.84											
3V0	B	2.94	3.06	325	500	80	95	10	1	-3.5	-1.6	0	425	6
	C	2.85	3.15											
3V3	B	3.23	3.37	350	500	85	95	5	1	-3.5	-1.8	0	410	6
	C	3.14	3.47											
3V6	B	3.53	3.67	375	500	85	90	5	1	-3.5	-1.9	0	390	6
	C	3.42	3.78											
3V9	B	3.82	3.98	400	500	85	90	3	1	-3.5	-1.9	0	370	6
	C	3.71	4.10											
4V3	B	4.21	4.39	410	600	80	90	3	1	-3.5	-1.7	0	350	6
	C	4.09	4.52											
4V7	B	4.61	4.79	425	500	50	80	3	2	-3.5	-1.2	0.2	325	6
	C	4.47	4.94											
5V1	B	5.00	5.20	400	480	40	60	2	2	-2.7	-0.5	1.2	300	6
	C	4.85	5.36											
5V6	B	5.49	5.71	80	400	15	40	1	2	-2	1.0	2.5	275	6
	C	5.32	5.88											
6V2	B	6.08	6.32	40	150	6	10	3	4	0.4	2.2	3.7	250	6
	C	5.89	6.51											
6V8	B	6.66	6.94	30	80	6	15	2	4	1.2	3.0	4.5	215	6
	C	6.46	7.14											
7V5	B	7.35	7.65	15	80	2	10	1	5	2.5	3.6	5.3	170	4
	C	7.13	7.88											
8V2	B	8.04	8.36	20	80	2	10	0.7	5	3.2	4.3	6.2	150	4
	C	7.79	8.61											
9V1	B	8.92	9.28	20	100	2	10	0.5	6	3.8	5.2	7	120	3
	C	8.65	9.56											
10	B	9.80	10.20	20	150	2	10	0.2	7	4.5	6.0	8	110	3
	C	9.50	10.50											
11	B	10.78	11.22	25	150	2	10	0.1	8	5.4	6.9	9	110	2.5
	C	10.45	11.55											
12	B	11.76	12.24	25	150	2	10	0.1	8	6	7.9	10	105	2.5
	C	11.40	12.60											

Table 8. Characteristics per type; BZX585-B2V4 to BZX585-C24 ...continued

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

BZX585-xxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )				Reverse current $I_R$ ( $\mu$ 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>
				$I_Z = 1\text{ mA}$		$I_Z = 5\text{ mA}$				$I_Z = 5\text{ mA}$				
		Min	Max	Typ	Max	Typ	Max	Max	$V_R$ (V)	Min	Typ	Max		
13	B	12.74	13.26	25	170	2	10	0.1	8	7	8.8	11	105	2.5
	C	12.35	13.65											
15	B	14.70	15.30	25	200	3	15	0.05	10.5	9.2	10.7	13	100	2
	C	14.25	15.75											
16	B	15.68	16.32	50	200	10	40	0.05	11.2	10.4	12.4	14	90	1.5
	C	15.20	16.80											
18	B	17.64	18.36	50	225	10	45	0.05	12.6	12.4	14.4	16	80	1.5
	C	17.10	18.90											
20	B	19.60	20.40	60	225	15	55	0.05	14	14.4	16.4	18	70	1.5
	C	19.00	21.00											
22	B	21.56	22.44	60	250	20	55	0.05	15.4	16.4	18.4	20	60	1.25
	C	20.90	23.10											
24	B	23.52	24.48	60	250	25	70	0.05	16.8	18.4	20.4	22	55	1.25
	C	22.80	25.20											

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

**Table 9. Characteristics per type; BZX585-B27 to BZX585-C75** $T_j = 25\text{ °C}$  unless otherwise specified.

BZX585 -xxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )				Reverse current $I_R$ ( $\mu$ 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>
				$I_Z = 0.5\text{ mA}$		$I_Z = 2\text{ mA}$				$I_Z = 2\text{ mA}$				
		Min	Max	Typ	Max	Typ	Max	Max	$V_R$ (V)	Min	Typ	Max		
27	B	26.46	27.54	65	300	25	80	0.05	18.9	21.4	23.4	25.3	50	1.0
	C	25.65	28.35											
30	B	29.40	30.60	70	300	30	80	0.05	21	24.4	26.6	29.4	50	1.0
	C	28.50	31.50											
33	B	32.34	33.66	75	325	35	80	0.05	23.1	27.4	29.7	33.4	45	0.9
	C	31.35	34.65											
36	B	35.28	36.72	80	350	35	90	0.05	25.2	30.4	33.0	37.4	45	0.8
	C	34.20	37.80											
39	B	38.22	39.78	80	350	40	130	0.05	27.3	33.4	36.4	41.2	45	0.7
	C	37.05	40.95											
43	B	42.14	43.86	85	375	45	150	0.05	30.1	37.6	41.2	46.6	40	0.6
	C	40.85	45.15											
47	B	46.06	47.94	85	375	50	170	0.05	32.9	42.0	46.1	51.8	40	0.5
	C	44.65	49.35											
51	B	49.98	52.02	90	400	60	180	0.05	35.7	46.6	51.0	57.2	40	0.4
	C	48.45	53.55											
56	B	54.88	57.12	100	425	70	200	0.05	39.2	52.2	57.0	63.8	40	0.3
	C	53.20	58.80											
62	B	60.76	63.24	120	450	80	215	0.05	43.4	58.8	64.4	71.6	35	0.3
	C	58.90	65.10											
68	B	66.64	69.36	150	475	90	240	0.05	47.6	65.6	71.7	79.8	35	0.25
	C	64.60	71.40											
75	B	73.50	76.50	170	500	95	255	0.05	52.5	73.4	80.2	88.6	35	0.2
	C	71.25	78.75											

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



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

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



$T_j = 25\text{ °C}$

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



BZX585-B/C2V4 to BZX585-B/C4V7  
 $T_j = 25\text{ °C}$  to  $150\text{ °C}$

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



BZX585-B/C5V1 to BZX585-B/C15  
 $T_j = 25\text{ °C}$  to  $150\text{ °C}$

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



T<sub>j</sub> = 25 °C  
 BZX585-B/C2V7 to BZX585-B/C8V2

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



T<sub>j</sub> = 25 °C  
 BZX585-B/C10 to BZX585-B/C36

**Fig 6. 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



## 10. Soldering



## 11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX585_SER v.5	20161011	Product data sheet	-	BZX585_SER v.4
Modifications:	<ul style="list-style-type: none"> <li>• The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Section 1 "Product profile"</a>: enhanced.</li> <li>• <a href="#">Table 5</a>: T<sub>amb</sub> added.</li> <li>• <a href="#">Table 8</a> and <a href="#">Table 9</a>: updated</li> <li>• <a href="#">Figure 1</a>, <a href="#">Figure 5</a> and <a href="#">Figure 6</a>: added</li> <li>• <a href="#">Section 8 "Test information"</a>: added.</li> <li>• <a href="#">Figure 7</a>: replaced by minimized package outline</li> <li>• <a href="#">Section 10 "Soldering"</a>: added</li> <li>• <a href="#">Section 12 "Legal information"</a>: updated</li> </ul>			
BZX585_SER v.4	20040622	Product data sheet	-	BZX585_SER v.3
BZX585_SER v.3	20040326	Product specification	-	BZX585_SER v.2
BZX585_SER v.2	20001020	Product specification	-	BZX585_SER v.1
BZX585_SER v.1	20000606	Product specification	-	-

## 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.
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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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## 13. Contact information

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For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)



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