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: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- AEC-Q101 qualified
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: ±2 % and ±5 %
- Low differential resistance

1.3 Applications

- General regulation functions

1.4 Quick reference data

Table 1. Quick reference data

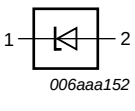
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA	[1]	-	-	1.1	V
P_{ZSM}	non-repetitive peak reverse power dissipation		[2]	-	-	40	W

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

[2] t_p = 100 μs; 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[1]	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	$T_{amb} \leq 25$ °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] $t_p = 100$ μs; square wave; $T_j = 25$ °C before surge

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

[2] 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	[1]				
		$I_F = 10$ mA	-	-	0.9	V
		$I_F = 100$ mA	-	-	1.1	V

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

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

T_j = 25 °C unless otherwise specified.

BZX585-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)				Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)			Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 1 mA		I_Z = 5 mA				I_Z = 5 mA				
		Min	Max	Typ	Max	Typ	Max	Max	V_R (V)	Min	Typ	Max	Max	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 °C unless otherwise specified.

BZX585-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)				Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)			Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 1 mA		I_Z = 5 mA				I_Z = 5 mA				
		Min	Max	Typ	Max	Typ	Max	Max	V_R (V)	Min	Typ	Max	Max	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 MHz; V_R = 0 V

[2] t_p = 100 μs; square wave; T_j = 25 °C before surge

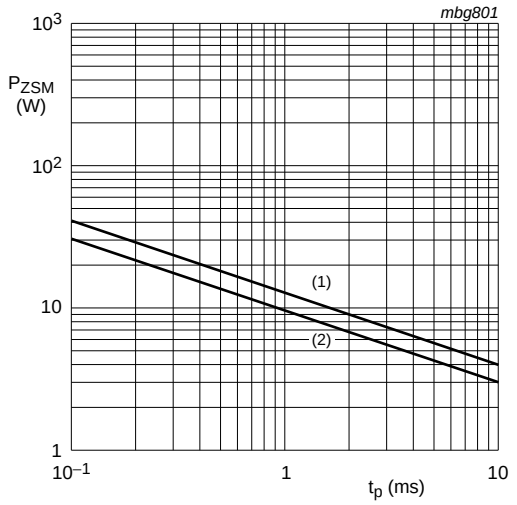
Table 9. Characteristics per type; BZX585-B27 to BZX585-C75

T_j = 25 °C unless otherwise specified.

BZX585 -xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)				Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)			Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 2 mA		I_Z = 0.5 mA		I_Z = 2 mA				I_Z = 2 mA				
		Min	Max	Typ	Max	Typ	Max	Max	V_R (V)	Min	Typ	Max	Max	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 MHz; V_R = 0 V

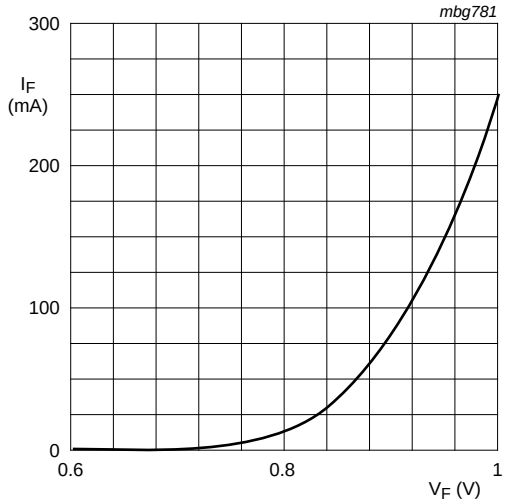
[2] t_p = 100 μs; square wave; T_j = 25 °C before surge



(1) T_j = 25 °C (before surge)

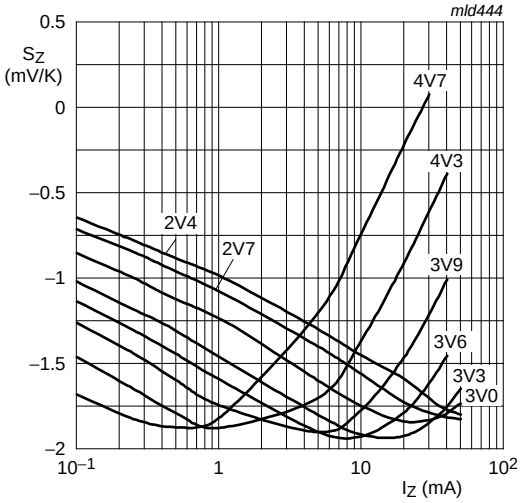
(2) T_j = 150 °C (before surge)

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



T_j = 25 °C

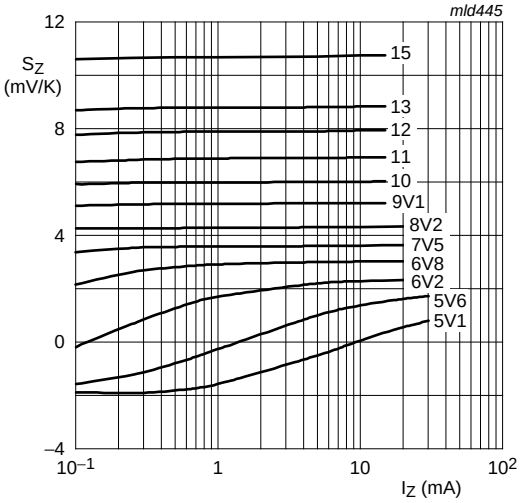
Fig 2. Forward current as a function of forward voltage; typical values



BZX585-B/C2V4 to BZX585-B/C4V7

T_j = 25 °C to 150 °C

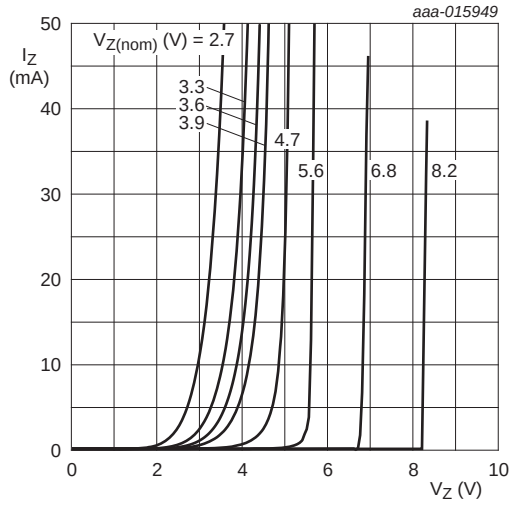
Fig 3. Temperature coefficient as a function of working current; typical values



BZX585-B/C5V1 to BZX585-B/C15

T_j = 25 °C to 150 °C

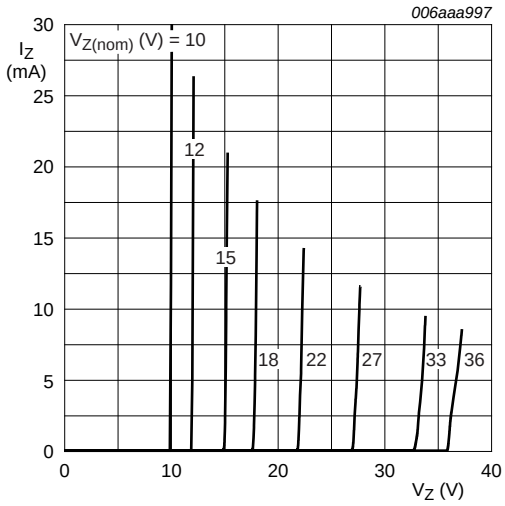
Fig 4. Temperature coefficient as a function of working current; typical values



T_j = 25 °C

BZX585-B/C2V7 to BZX585-B/C8V2

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



T_j = 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

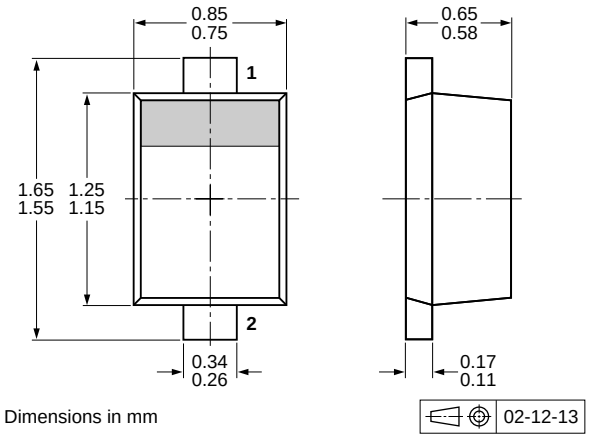


Fig 7. Package outline SOD523 (SC-79)

10. Soldering

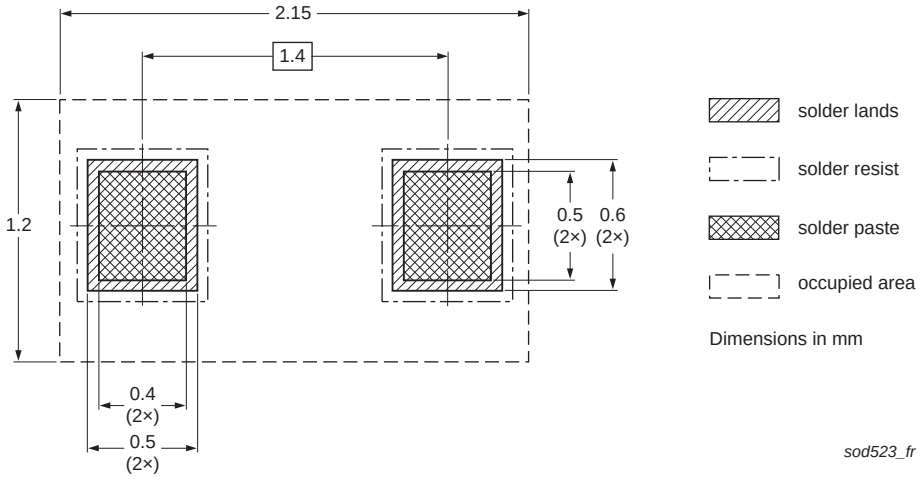


Fig 8. Reflow soldering footprint SOD523 (SC-79)

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:	• The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors • Legal texts have been adapted to the new company name where appropriate. • Section 1 “Product profile”: enhanced. • Table 5: T_{amb} added. • Table 8 and Table 9: updated • Figure 1, Figure 5 and Figure 6: added • Section 8 “Test information”: added. • Figure 7: replaced by minimized package outline • Section 10 “Soldering”: added • Section 12 “Legal information”: updated			
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[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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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13. Contact information

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For sales office addresses, please send an email to: **salesaddresses@nexperia.com**

14. Contents

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