



BZX585-Q series

Voltage regulator diodes

Rev. 1 — 11 October 2023

Product data sheet

1. General description

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

2. Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: $\pm 2\%$ and $\pm 5\%$
- Low differential resistance
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General regulation functions

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: $t_p \leq 300$ μ s; $\delta \leq 0.02$

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

5. 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.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX585-B2V4-Q to BZX585-C75-Q[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.

7. Marking

Table 4. Marking Codes

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

8. 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	$t_p = 100 \mu\text{s}$; square wave; $T_{amb} = 25 \text{ }^\circ\text{C}$; prior to surge	-	see Tables 8 and 9	
P_{ZSM}	non-repetitive peak reverse power dissipation	$t_p = 100 \mu\text{s}$; square wave; $T_{amb} = 25 \text{ }^\circ\text{C}$; prior to surge	-	40	W
P_{tot}	total power dissipation	$T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	300	mW
T_j	junction temperature		-65	150	$^\circ\text{C}$
T_{amb}	ambient temperature		-65	+150	$^\circ\text{C}$
T_{stg}	storage temperature		-65	+150	$^\circ\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 mm² Cu area at cathode tab

9. 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 mm² Cu area at cathode tab

[2] Soldering point of cathode tab

10. Characteristics

Table 7. Electrical characteristics

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

Symbol	Parameter	Conditions		Max	Unit
V_F	forward voltage	$I_F = 10\text{ mA}$	[1]	0.9	V
		$I_F = 100\text{ mA}$	[1]	1.1	V

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

Table 8. Electrical characteristics per type: BZX585-B2V4-Q to BZX585-C24-Q

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

BZX585-	Sel	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)				Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)			Diode capacit. C_d (pF)[1]	Non-repeti. peak reverse current I_{ZSM} (A) [2]
		$I_Z = 5\text{ mA}$		$I_Z = 1\text{ mA}$		$I_Z = 5\text{ mA}$		Max	V_R (V)	$I_Z = 5\text{ mA}$			Max	Max
		Min	Max	Typ	Max	Typ	Max			Min	Typ	Max		
2V4-Q	B	2.35	2.45	275	400	70	100	50.0	1.0	-3.5	-1.3	0	450	6.0
	C	2.28	2.52											
2V7-Q	B	2.65	2.75	300	450	75	100	20.0	1.0	-3.5	-1.4	0	440	6.0
	C	2.57	2.84											
3V0-Q	B	2.94	3.06	325	500	80	95	10.0	1.0	-3.5	-1.6	0	425	6.0
	C	2.85	3.15											
3V3-Q	B	3.23	3.37	350	500	85	95	5.0	1.0	-3.5	-1.8	0	410	6.0
	C	3.14	3.47											
3V6-Q	B	3.53	3.67	375	500	85	90	5.0	1.0	-3.5	-1.9	0	390	6.0
	C	3.42	3.78											
3V9-Q	B	3.82	3.98	400	500	85	90	3.0	1.0	-3.5	-1.9	0	370	6.0
	C	3.71	4.10											
4V3-Q	B	4.21	4.39	410	600	80	90	3.0	1.0	-3.5	-1.7	0	350	6.0
	C	4.09	4.52											
4V7-Q	B	4.61	4.79	425	500	50	80	3.0	2.0	-3.5	-1.2	0.2	325	6.0
	C	4.47	4.94											
5V1-Q	B	5.00	5.20	400	480	40	60	2.0	2.0	-2.7	-0.5	1.2	300	6.0
	C	4.85	5.36											
5V6-Q	B	5.49	5.71	80	400	15	40	1.0	2.0	-2.0	1.0	2.5	275	6.0
	C	5.32	5.88											
6V2-Q	B	6.08	6.32	40	150	6	10	3.0	4.0	0.4	2.2	3.7	250	6.0
	C	5.89	6.51											
6V8-Q	B	6.66	6.94	30	80	6	15	2.0	4.0	1.2	3.0	4.5	215	6.0
	C	6.46	7.14											
7V5-Q	B	7.35	7.65	15	80	2	10	1.0	5.0	2.5	3.6	5.3	170	4.0
	C	7.13	7.88											
8V2-Q	B	8.04	8.36	20	80	2	10	0.7	5.0	3.2	4.3	6.2	150	4.0
	C	7.79	8.61											

BZX585-	Sel	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)				Reverse current I_R (μ A)		Temperature coefficient S_Z (mV/K)			Diode capacit. C_d (pF)[1]	Non-repeti. peak reverse current I_{ZSM} (A) [2]
		$I_Z = 5$ mA		$I_Z = 1$ mA		$I_Z = 5$ mA		Max	V_R (V)	$I_Z = 5$ mA				
		Min	Max	Typ	Max	Typ	Max			Min	Typ	Max	Max	Max
9V1-Q	B	8.92	9.28	20	100	2	10	0.5	6.0	3.8	5.2	7.0	120	3.0
	C	8.65	9.56											
10-Q	B	9.80	10.20	20	150	2	10	0.2	7.0	4.5	6.0	8.0	110	3.0
	C	9.50	10.50											
11-Q	B	10.78	11.22	25	150	2	10	0.1	8.0	5.4	6.9	9.0	110	2.5
	C	10.45	11.55											
12-Q	B	11.76	12.24	25	150	2	10	0.1	8.0	6.0	7.9	10.0	105	2.5
	C	11.40	12.60											
13-Q	B	12.74	13.26	25	170	2	10	0.1	8.0	7.0	8.8	11.0	105	2.5
	C	12.35	13.65											
15-Q	B	14.70	15.30	25	200	3	15	0.05	10.5	9.2	10.7	13.0	100	2.0
	C	14.25	15.75											
16-Q	B	15.68	16.32	50	200	10	40	0.05	11.2	10.4	12.4	14.0	90	1.5
	C	15.20	16.80											
18-Q	B	17.64	18.36	50	225	10	45	0.05	12.6	12.4	14.4	16.0	80	1.5
	C	17.10	18.90											
20-Q	B	19.60	20.40	60	225	15	55	0.05	14.0	14.4	16.4	18.0	70	1.5
	C	19.00	21.00											
22-Q	B	21.56	22.44	60	250	20	55	0.05	15.4	16.4	18.4	20.0	60	1.25
	C	20.90	23.10											
24-Q	B	23.52	24.48	60	250	25	70	0.05	16.8	18.4	20.4	22.0	55	1.25
	C	22.80	25.20											

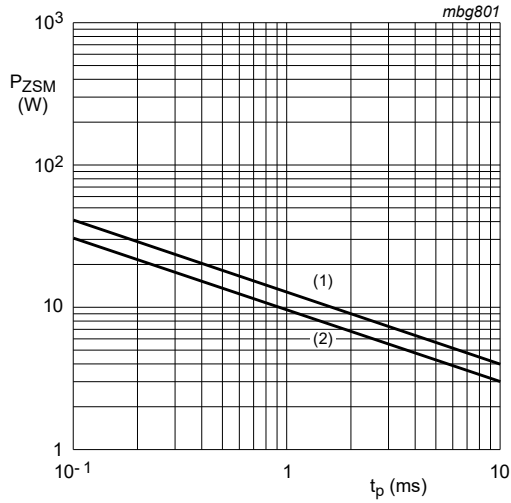
[1] $f = 1$ MHz; $V_R = 0$ V

[2] $t_p = 100$ μ s; square wave; $t_j = 25$ °C before surge

Table 9. Electrical characteristics per type: BZX585-B27-Q to BZX585-C75-Q

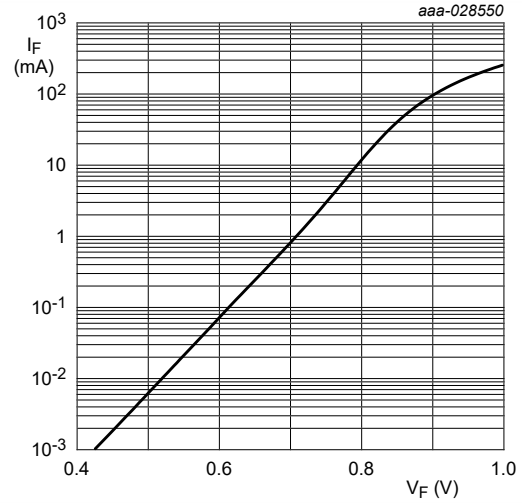
BZX585-	Sel	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)				Reverse current I_R (μ A)		Temperature coefficient S_Z (mV/K)			Diode capacit. C_d (pF) ^[1]	Non-repeti. peak reverse current I_{ZSM} (A) ^[2]
		$I_Z = 2$ mA		$I_Z = 0.5$ mA		$I_Z = 2$ mA		Max	V_R (V)	$I_Z = 2$ mA				
		Min	Max	Typ	Max	Typ	Max			Min	Typ	Max	Max	Max
27-Q	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-Q	B	29.40	30.60	70	300	30	80	0.05	21.0	24.4	26.6	29.4	50	1.0
	C	28.50	31.50											
33-Q	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-Q	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-Q	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-Q	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-Q	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-Q	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-Q	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-Q	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-Q	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-Q	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] $t_p = 100$ μ s; square wave; $t_j = 25$ °C before surge



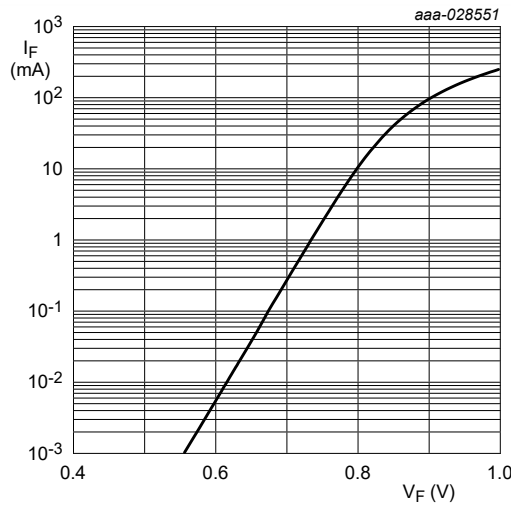
(1) $T_j = 25^\circ\text{C}$ (before surge)
 (2) $T_j = 150^\circ\text{C}$ (before surge)

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



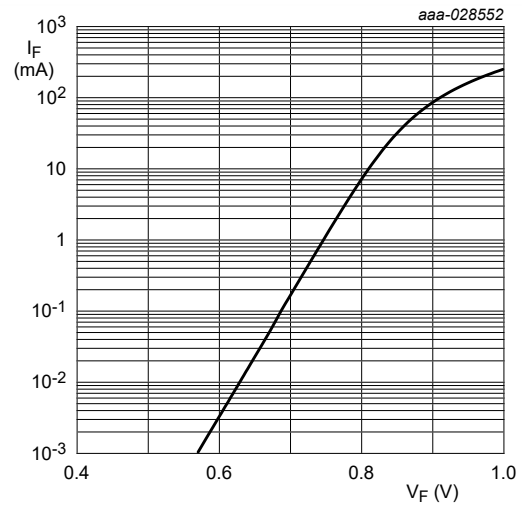
$T_j = 25^\circ\text{C}$

Fig. 2. Forward current as a function of forward voltage; typical values (BZX585-B/C2V4-Q)



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

Fig. 3. Forward current as a function of forward voltage; typical values (BZX585-B/C6V8-Q)



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

Fig. 4. Forward current as a function of forward voltage; typical values (BZX585-B/C7V5-Q)

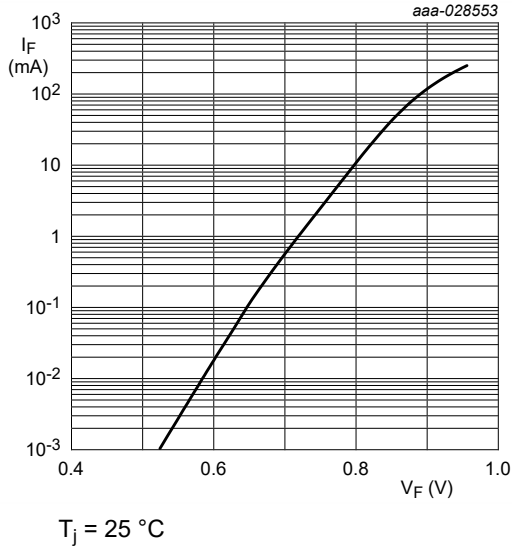


Fig. 5. Forward current as a function of forward voltage; typical values (BZX585-B/C75-Q)

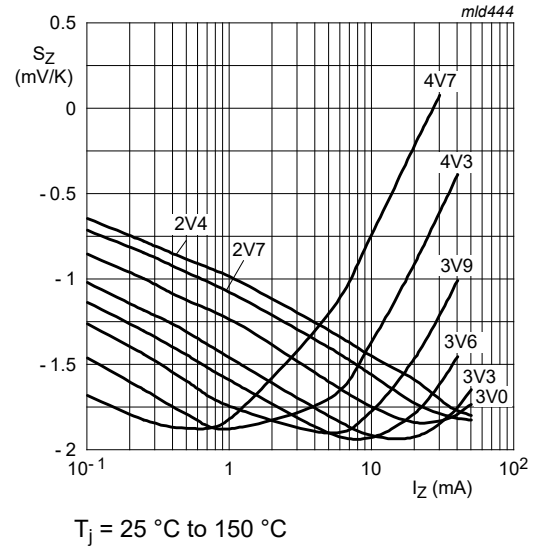


Fig. 6. Temperature coefficient as a function of working current; typical values (BZX585-B/C2V4-Q to B/C4V7-Q)

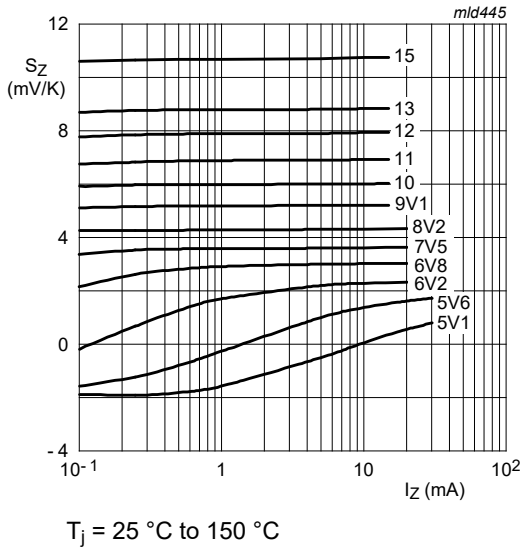


Fig. 7. Temperature coefficient as a function of working current; typical values (BZX585-B/C5V1-Q to B/C15-Q)

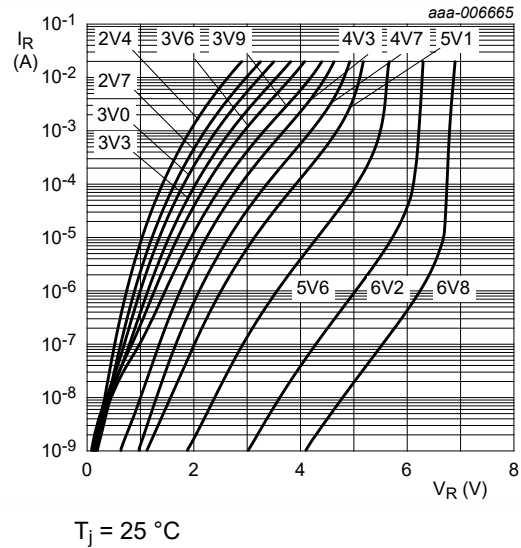
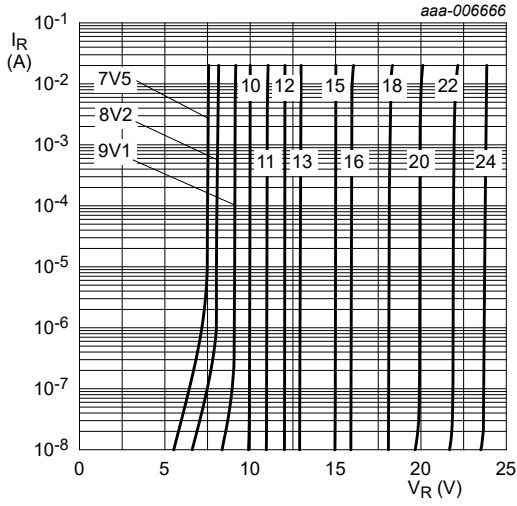
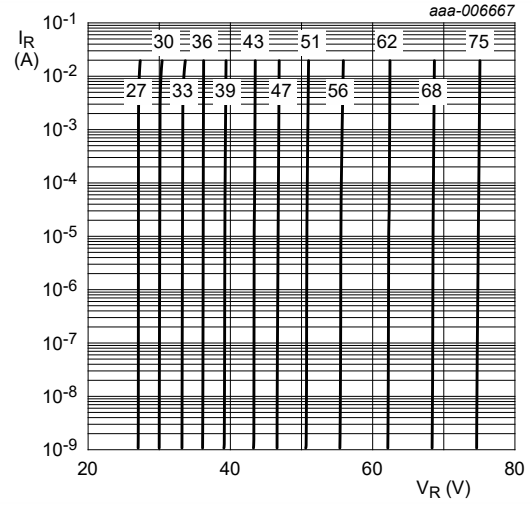


Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX585-B/C2V4-Q to BZX585-B/C6V8-Q)



T_j = 25 °C

Fig. 9. Reverse current as a function of reverse voltage; typical values (BZX585-B/C7V5-Q to BZX585-B/C24-Q)



T_j = 25 °C

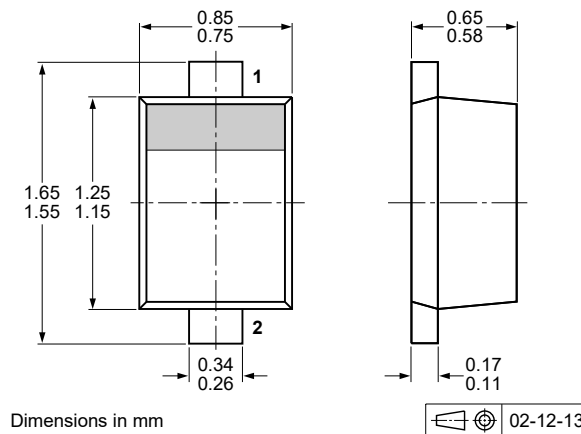
Fig. 10. Reverse current as a function of reverse voltage; typical values (BZX585-B/C27-Q to BZX585-B/C75-Q)

11. Test information

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.

12. Package outline



Dimensions in mm

Fig. 11. Package outline SOD523 (SC-79)

13. Soldering

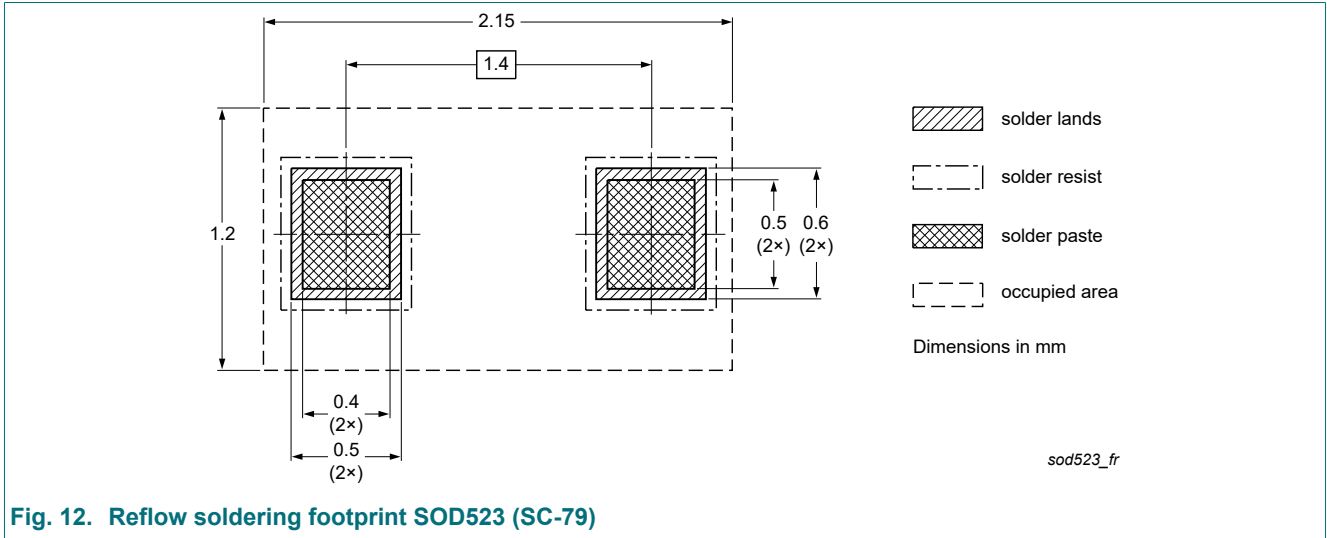


Fig. 12. Reflow soldering footprint SOD523 (SC-79)

14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX585-Q_SER v.1	20231011	Product data sheet	-	-

15. Legal information

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