BZX58550 series

Low-current voltage regulator diodes

Rev. 3 — 26 July 2024 **Product data sheet**

1. General description

Low-current voltage regulator diodes in an SOD523 (SC-79) ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Total power dissipation: ≤ 300 mW
- Two tolerance series: ± 2 % and approximately ± 5 %
- Working voltage range: nominal 1.8 V to 51 V
- Specified at a low test current (50 µA), ideal for low bias and portable battery-powered applications
- BZX58550-B11 to -C51: Intentional minor rise of leakage current for optimized fast switching and noise reduction [AN90031]

3. Applications

- Low-current general regulation functions

4. Quick reference data

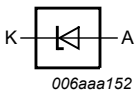
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[2]	-	-	300	mW

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 0.02
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), with approximately 35 mm^2 Cu area at cathode tab.

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.

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6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX58550 series	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	SOD523

7. Marking

Table 4. Marking Codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZX58550-B1V8	4H	BZX58550-B10	5T	BZX58550-C1V8	1C	BZX58550-C10	2L
BZX58550-B2V0	4K	BZX58550-B11	5U	BZX58550-C2V0	1E	BZX58550-C11	2N
BZX58550-B2V2	4L	BZX58550-B12	5X	BZX58550-C2V2	1F	BZX58550-C12	2S
BZX58550-B2V4	4N	BZX58550-B13	5Y	BZX58550-C2V4	1H	BZX58550-C13	2T
BZX58550-B2V7	4S	BZX58550-B15	5Z	BZX58550-C2V7	1K	BZX58550-C15	2U
BZX58550-B3V0	4T	BZX58550-B16	6C	BZX58550-C3V0	1L	BZX58550-C16	2X
BZX58550-B3V3	4U	BZX58550-B18	6E	BZX58550-C3V3	1N	BZX58550-C18	2Y
BZX58550-B3V6	4X	BZX58550-B20	6F	BZX58550-C3V6	1S	BZX58550-C20	3C
BZX58550-B3V9	4Y	BZX58550-B22	6H	BZX58550-C3V9	1T	BZX58550-C22	3E
BZX58550-B4V3	4Z	BZX58550-B24	6K	BZX58550-C4V3	1U	BZX58550-C24	3F
BZX58550-B4V7	5C	BZX58550-B27	6L	BZX58550-C4V7	1X	BZX58550-C27	3H
BZX58550-B5V1	5E	BZX58550-B30	6N	BZX58550-C5V1	1Y	BZX58550-C30	3K
BZX58550-B5V6	5F	BZX58550-B33	6S	BZX58550-C5V6	1Z	BZX58550-C33	3L
BZX58550-B6V2	5H	BZX58550-B36	6T	BZX58550-C6V2	2C	BZX58550-C36	3N
BZX58550-B6V8	5K	BZX58550-B39	6U	BZX58550-C6V8	2E	BZX58550-C39	3S
BZX58550-B7V5	5L	BZX58550-B43	6X	BZX58550-C7V5	2F	BZX58550-C43	3T
BZX58550-B8V2	5N	BZX58550-B47	6Y	BZX58550-C8V2	2H	BZX58550-C47	3U
BZX58550-B9V1	5S	BZX58550-B51	6Z	BZX58550-C9V1	2K	BZX58550-C51	3X

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
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square wave; T_j = 25 °C; prior to surge		-	40	W
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[1]	-	270	mW
			[2]	-	300	mW
			[3]	-	440	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[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, with approximately 35 mm^2 Cu area at cathode tab.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

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]	-	-	460	K/W
			[2]	-	-	350	K/W
			[3]	-	-	285	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	65	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, with approximately 35 mm^2 Cu area at cathode tab.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[4] Soldering point of cathode tab

10. Characteristics

Table 7. Electrical characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	0.9	V

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 0.02

Table 8. Electrical characteristics per type: BZX58550-B1V8 to BZX58550-C36

T_j = 25 °C unless otherwise specified.

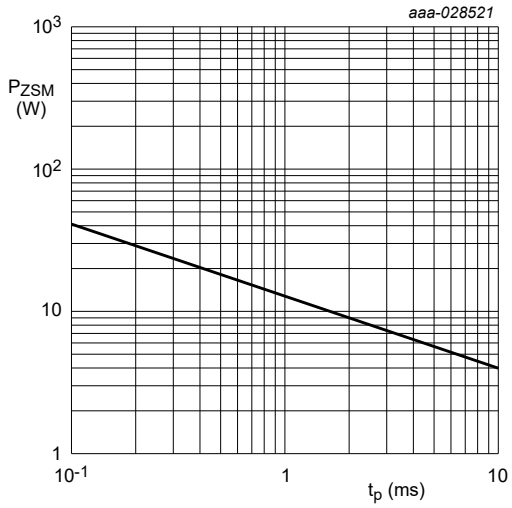
BZX58550-xxx	Sel.	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)		Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)
		I_Z = 50 µA		I_Z = 1 mA	I_Z = 5 mA			I_Z = 5 mA		f = 1 MHz V_R = 0 V
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max
1V8	B	1.76	1.84	600	100	7.5	1.0	-3.5	0	220
	C	1.71	1.89							
2V0	B	1.96	2.04	600	100	7	1.0	-3.5	0	220
	C	1.88	2.12							
2V2	B	2.15	2.25	600	100	4	1.0	-3.5	0	210
	C	2.09	2.31							
2V4	B	2.35	2.45	600	100	2	1.0	-3.5	0	200
	C	2.28	2.52							
2V7	B	2.65	2.75	600	100	1	1.0	-3.5	0	190
	C	2.565	2.835							
3V0	B	2.94	3.06	600	100	0.8	1.0	-3.5	0.2	170
	C	2.85	3.15							
3V3	B	3.23	3.37	600	100	7.5	1.5	-3.5	1.2	160
	C	3.13	3.47							
3V6	B	3.53	3.67	600	95	7.5	2.0	-3.5	1.2	160
	C	3.42	3.78							
3V9	B	3.82	3.98	600	95	5.0	2.0	-2.7	2.5	150
	C	3.70	4.10							
4V3	B	4.21	4.39	600	95	4.0	2.0	-2.7	2.5	150
	C	4.09	4.52							
4V7	B	4.61	4.79	600	80	5.0	3.0	-2.7	2.5	140
	C	4.47	4.94							
5V1	B	5.00	5.20	500	60	5.0	3.0	-2.0	3.7	130
	C	4.85	5.36							
5V6	B	5.49	5.71	400	40	2.0	4.0	-2.0	3.7	120
	C	5.32	5.88							
6V2	B	6.08	6.32	160	10	1.0	5.0	0.4	4.5	110
	C	5.89	6.51							
6V8	B	6.66	6.94	80	15	0.1	5.1	1.2	4.5	100
	C	6.46	7.14							
7V5	B	7.35	7.65	80	15	0.1	5.7	2.5	5.3	150
	C	7.13	7.88							
8V2	B	8.04	8.36	80	15	0.1	6.2	3.2	6.2	150
	C	7.79	8.61							
9V1	B	8.92	9.28	100	15	0.1	6.9	3.8	7.0	150
	C	8.65	9.56							
10	B	9.80	10.20	150	20	0.1	7.6	4.5	8.0	90
	C	9.50	10.50							

BZX58550-xxx	Sel.	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)
		I_Z = 50 μA		I_Z = 1 mA	I_Z = 5 mA			I_Z = 5 mA		f = 1 MHz V_R = 0 V
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max
11	B	10.80	11.20	150	20	0.05	8.4	5.4	9.0	85
	C	10.45	11.55							
12	B	11.80	12.20	150	25	0.05	9.1	6.0	10	85
	C	11.40	12.60							
13	B	12.70	13.30	170	30	0.05	9.8	7.0	11	80
	C	12.35	13.65							
15	B	14.70	15.30	200	30	0.05	11.4	9.2	13	75
	C	14.25	15.75							
16	B	15.70	16.30	200	40	0.05	12.1	10.4	14	75
	C	15.20	16.80							
18	B	17.60	18.40	225	45	0.05	13.6	12.4	16	70
	C	17.10	18.90							
20	B	19.60	20.40	225	55	0.05	15.2	14.4	18	60
	C	19.00	21.00							
22	B	21.60	22.40	250	55	0.05	16.7	16.4	20	60
	C	20.90	23.10							
24	B	23.50	24.50	250	70	0.05	18.2	18.4	22	55
	C	22.80	25.20							
27	B	26.50	27.50	300	80	0.05	20.4	21.4	25.3	50
	C	25.65	28.35							
30	B	29.40	30.60	300	80	0.05	22.8	24.4	29.4	50
	C	28.50	31.50							
33	B	32.30	33.70	325	80	0.05	25.0	27.4	33.4	45
	C	31.35	34.65							
36	B	35.30	36.70	350	90	0.05	27.3	30.4	37.4	45
	C	34.20	37.80							

Table 9. Electrical characteristics per type: BZX58550-B39 to BZX58550-C51

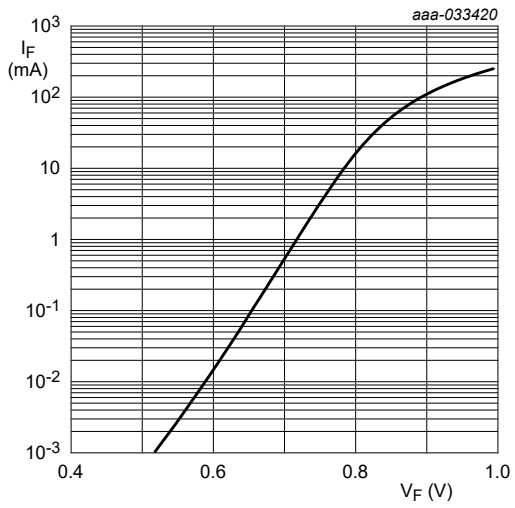
T_j = 25 °C unless otherwise specified.

BZX58550-xxx	Sel.	Working voltage V_Z (V)		Differential resistance r_{diff} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)
		I_Z = 50 μA		I_Z = 0.5 mA	I_Z = 2 mA			I_Z = 2 mA		f = 1 MHz V_R = 0 V
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max
39	B	38.20	39.80	350	130	0.05	29.6	33.4	41.2	45
	C	37.05	40.95							
43	B	42.10	43.90	375	150	0.05	32.6	37.6	46.6	40
	C	40.85	45.15							
47	B	46.10	47.90	375	170	0.05	32.9	42.0	51.8	40
	C	44.00	50.00							
51	B	50.00	52.00	400	180	0.05	35.7	46.6	57.2	40
	C	48.00	54.00							



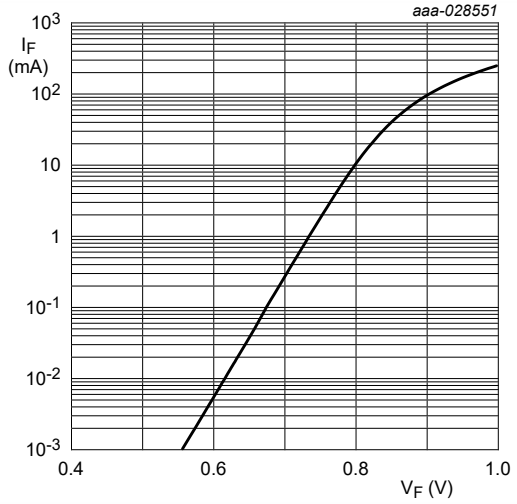
T_j = 25 °C (before surge)

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



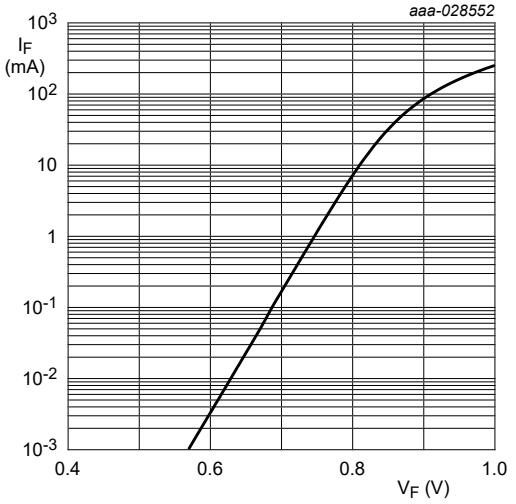
T_j = 25 °C

Fig. 2. Forward current as a function of forward voltage; typical values (BZX58550-B/C1V8)



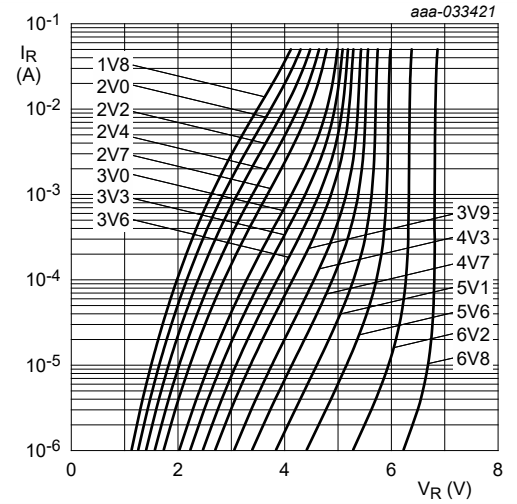
T_j = 25 °C

Fig. 3. Forward current as a function of forward voltage; typical values (BZX58550-B/C6V8)



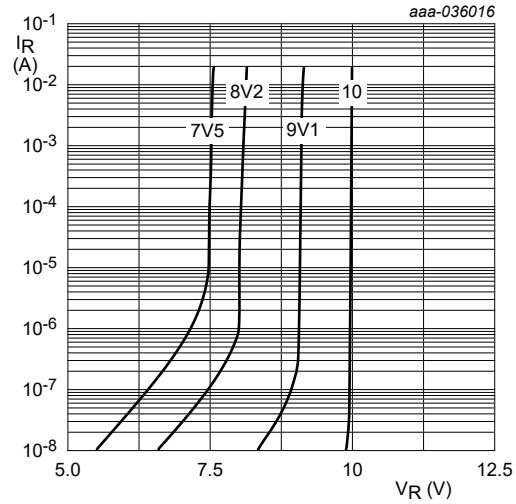
T_j = 25 °C

Fig. 4. Forward current as a function of forward voltage; typical values (BZX58550-B/C7V5)



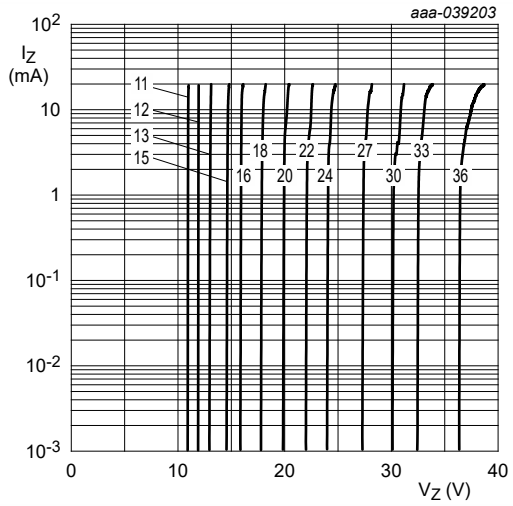
T_{amb} = 25 °C

Fig. 5. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C1V8 to BZX58550-B/C6V8)



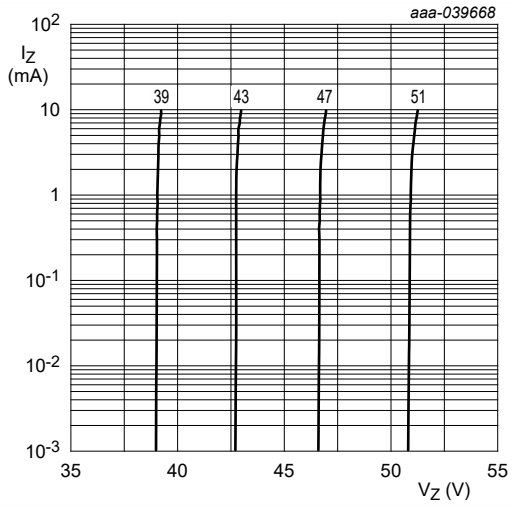
T_{amb} = 25 °C

Fig. 6. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C7V5 to BZX58550-B/C10)



T_{amb} = 25 °C

Fig. 7. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C11 to BZX58550-B/C36)



T_{amb} = 25 °C

Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C39 to BZX58550-B/C51)

11. Package outline

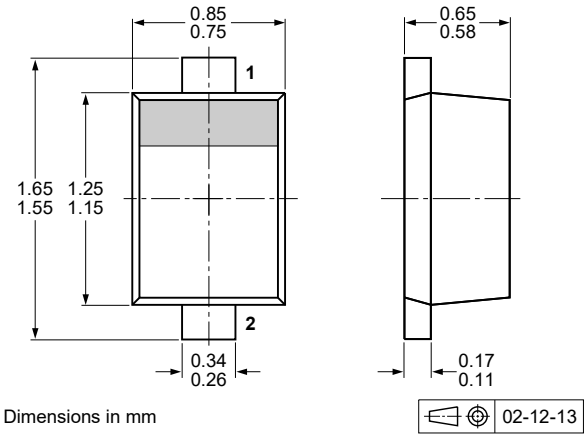


Fig. 9. Package outline SOD523 (SC-79)

12. Soldering

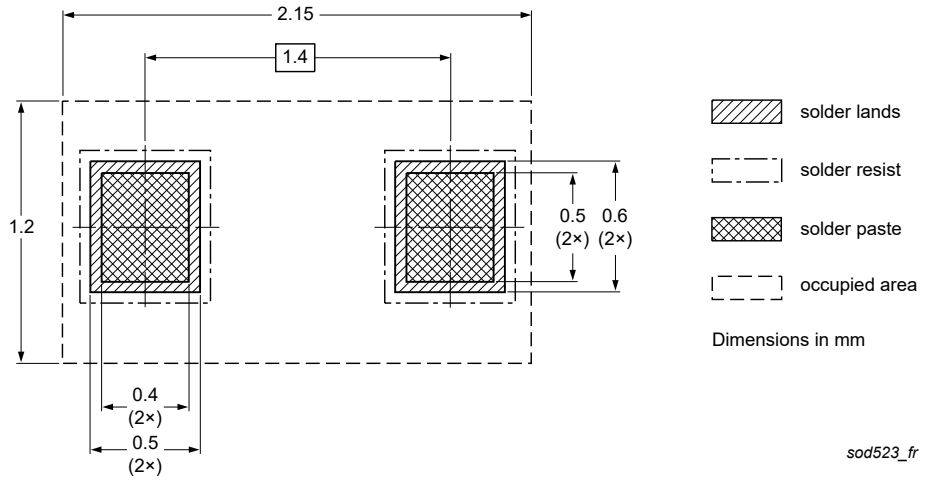


Fig. 10. Reflow soldering footprint for SOD523 (SC-79)

13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX58550_SER v.3	20240726	Product data sheet	-	BZX58550_SER v.2
Modifications:	• B and C selections 11 V up to 51 V added			
BZX58550_SER v.2	20230118	Product data sheet	-	BZX58550_SER v.1
BZX58550_SER v.1	20210824	Product data sheet	-	-

14. 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.

[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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Date of release: 26 July 2024