



BZX38450-Q series

Low-current voltage regulator diodes

Rev. 2 — 25 August 2021

Product data sheet

1. General description

Low-current voltage regulator diodes in a small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Total power dissipation: ≤ 300 mW
- Tolerance series: approximately $\pm 5\%$
- Working voltage range: nominal 1.8 V to 75 V
- Specified at a low test current (50 μ A), ideal for low bias and portable battery-powered applications
- Qualified according to AEC-Q101 and recommended for use in automotive applications

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	$T_{amb} \leq 25$ °C [2]	-	-	300	mW

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

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode [1]		 006aaa152
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX38450-Q series	SC-76	plastic surface-mounted package; 2 leads	SOD323

7. Marking

Table 4. Marking Codes

Type number	Marking Code	Type number	Marking Code	Type number	Marking Code	Type number	Marking Code
BZX38450-C1V8-Q	6R	BZX38450-C4V7-Q	7B	BZX38450-C12-Q	7N	BZX38450-C33-Q	7Y
BZX38450-C2V0-Q	6S	BZX38450-C5V1-Q	7C	BZX38450-C13-Q	7P	BZX38450-C36-Q	7Z
BZX38450-C2V2-Q	6T	BZX38450-C5V6-Q	7D	BZX38450-C15-Q	7Q	BZX38450-C39-Q	8A
BZX38450-C2V4-Q	6U	BZX38450-C6V2-Q	7E	BZX38450-C16-Q	7R	BZX38450-C43-Q	8B
BZX38450-C2V7-Q	6V	BZX38450-C6V8-Q	7F	BZX38450-C18-Q	7S	BZX38450-C47-Q	8C
BZX38450-C3V0-Q	6W	BZX38450-C7V5-Q	7G	BZX38450-C20-Q	7T	BZX38450-C51-Q	8D
BZX38450-C3V3-Q	6X	BZX38450-C8V2-Q	7H	BZX38450-C22-Q	7U	BZX38450-C56-Q	8E
BZX38450-C3V6-Q	6Y	BZX38450-C9V1-Q	7J	BZX38450-C24-Q	7V	BZX38450-C62-Q	8F
BZX38450-C3V9-Q	6Z	BZX38450-C10-Q	7K	BZX38450-C27-Q	7W	BZX38450-C68-Q	8G
BZX38450-C4V3-Q	7A	BZX38450-C11-Q	7M	BZX38450-C30-Q	7X	BZX38450-C75-Q	8H

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			-	250	mA
P_{ZSM}	non-repetitive peak reverse power dissipation	$t_p = 100 \mu s$; square wave; $T_j = 25^\circ C$; prior to surge		-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ C$	[1]	-	300	mW
T_j	junction temperature			-	150	$^\circ C$
T_{amb}	ambient temperature			-55	+150	$^\circ C$
T_{stg}	storage temperature			-65	+150	$^\circ C$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single sided copper, tin-plated and standard footprint.

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]	-	-	415	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[2]	-	-	110	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single sided copper, tin-plated and standard footprint.

[2] Soldering point of cathode tab

10. Characteristics

Table 7. Electrical characteristics
 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

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

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$
Table 8. Electrical characteristics per type: BZX38450-C1V8-Q to BZX38450-C24-Q
 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

BZX38450-C	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]
	I _Z = 50 μA		I _Z = 1 mA	I _Z = 5 mA			I _Z = 5 mA		
	Min	Max	Max	Max	Max	V _R (V)	Min	Max	Max
1V8-Q	1.71	1.89	600	100	7.5	1.0	-3.5	0	220
2V0-Q	1.88	2.12	600	100	7	1.0	-3.5	0	220
2V2-Q	2.09	2.31	600	100	4	1.0	-3.5	0	210
2V4-Q	2.28	2.52	600	100	2	1.0	-3.5	0	200
2V7-Q	2.565	2.835	600	100	1	1.0	-3.5	0	190
3V0-Q	2.85	3.15	600	100	0.8	1.0	-3.5	0.2	170
3V3-Q	3.13	3.47	600	100	7.5	1.5	-3.5	1.2	160
3V6-Q	3.42	3.78	600	95	7.5	2.0	-3.5	1.2	160
3V9-Q	3.70	4.10	600	95	5.0	2.0	-2.7	2.5	150
4V3-Q	4.09	4.52	600	95	4.0	2.0	-2.7	2.5	150
4V7-Q	4.47	4.94	600	80	5.0	3.0	-2.7	2.5	140
5V1-Q	4.85	5.36	500	60	5.0	3.0	-2.0	3.7	130
5V6-Q	5.32	5.88	400	40	2.0	4.0	-2.0	3.7	120
6V2-Q	5.89	6.51	160	10	1.0	5.0	0.4	4.5	110
6V8-Q	6.46	7.14	80	15	0.1	5.1	1.2	4.5	100
7V5-Q	7.13	7.88	80	15	0.1	5.7	2.5	5.3	150
8V2-Q	7.79	8.61	80	15	0.1	6.2	3.2	6.2	150
9V1-Q	8.65	9.56	100	15	0.1	6.9	3.8	7.0	150
10-Q	9.50	10.50	150	20	0.1	7.6	4.5	8.0	90
11-Q	10.45	11.55	150	20	0.05	8.4	5.4	9.0	85
12-Q	11.40	12.60	150	25	0.05	9.1	6.0	10.0	85
13-Q	12.35	13.65	170	30	0.05	9.8	7.0	11.0	80
15-Q	14.25	15.75	200	30	0.05	11.4	9.2	13.0	75
16-Q	15.20	16.80	200	40	0.05	12.1	10.4	14.0	75
18-Q	17.10	18.90	225	45	0.05	13.6	12.4	16.0	70
20-Q	19.00	21.00	225	55	0.05	15.2	14.4	18.0	60
22-Q	20.90	23.10	250	55	0.05	16.7	16.4	20.0	60
24-Q	22.80	25.20	250	70	0.05	18.2	18.4	22.0	55

[1] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$

Table 9. Electrical characteristics per type: BZX38450-C27-Q to BZX38450-C75-Q

BZX38450-C	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]
	I _Z = 50 μA		I _Z = 0.5 mA	I _Z = 2 mA			I _Z = 2 mA		
	Min	Max	Max	Max	Max	V _R (V)	Min	Max	
27-Q	25.65	28.35	300	80	0.05	20.4	21.4	25.3	50
30-Q	28.50	31.50	300	80	0.05	22.8	24.4	29.4	50
33-Q	31.35	34.65	325	80	0.05	25.0	27.4	33.4	45
36-Q	34.20	37.80	350	90	0.05	27.3	30.4	37.4	45
39-Q	37.05	40.95	350	130	0.05	29.6	33.4	41.2	45
43-Q	40.85	45.15	375	150	0.05	32.6	37.6	46.6	40
47-Q	44.00	50.00	375	170	0.05	32.9	42.0	51.8	40
51-Q	48.00	54.00	400	180	0.05	35.7	46.6	57.2	40
56-Q	52.00	60.00	425	200	0.05	39.2	52.2	63.8	40
62-Q	58.00	66.00	450	215	0.05	43.4	58.8	71.6	35
68-Q	64.00	72.00	475	240	0.05	47.6	65.6	79.8	35
75-Q	70.00	79.00	500	255	0.05	52.5	73.4	88.6	35

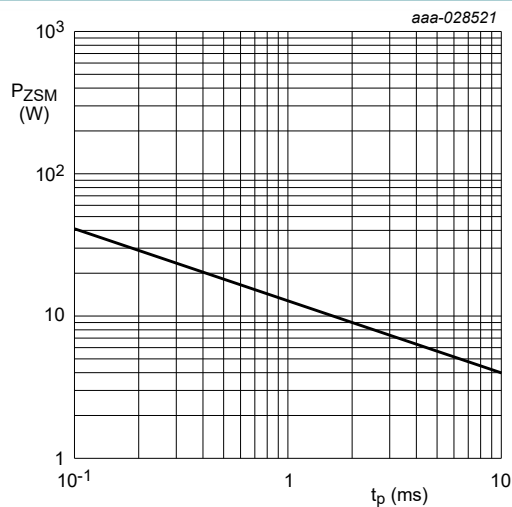
[1] $f = 1 MHz$; $V_R = 0 V$ (1) $T_j = 25^\circ C$ (before surge)

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

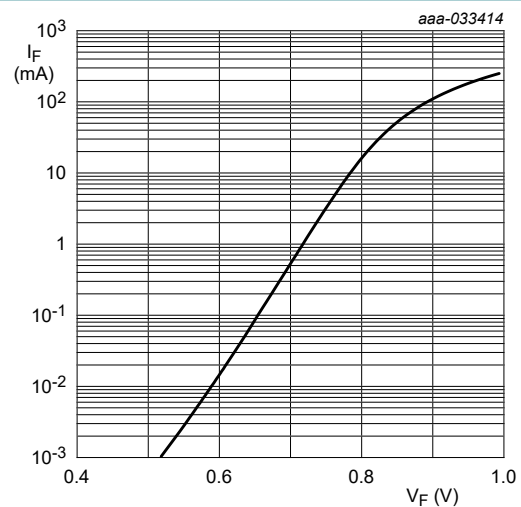
 $T_j = 25^\circ C$

Fig. 2. Forward current as a function of forward voltage; typical values (BZX38450-C1V8-Q)

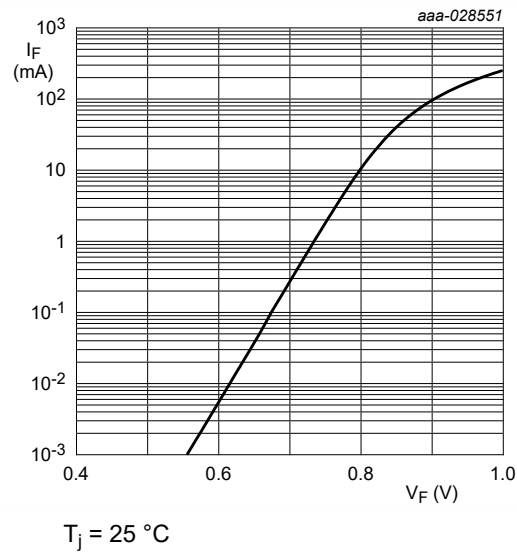


Fig. 3. Forward current as a function of forward voltage; typical values (BZX38450-C6V8-Q)

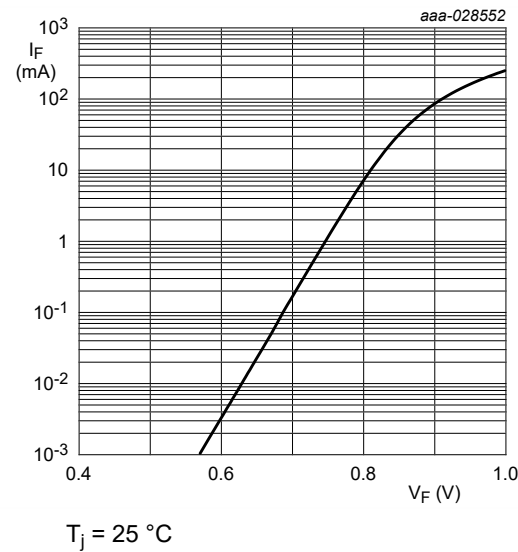


Fig. 4. Forward current as a function of forward voltage; typical values (BZX38450-C7V5-Q)

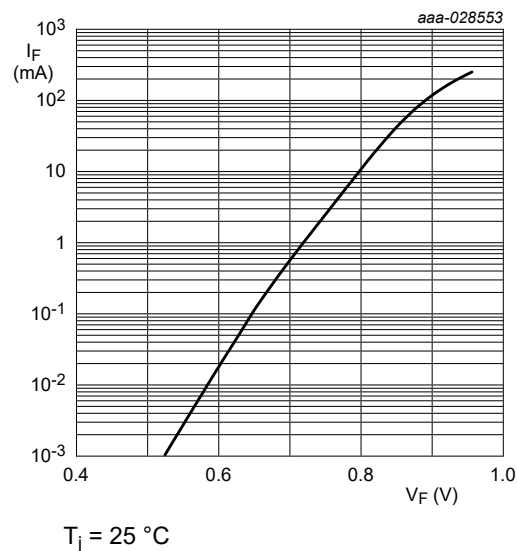


Fig. 5. Forward current as a function of forward voltage; typical values (BZX38450-C75-Q)

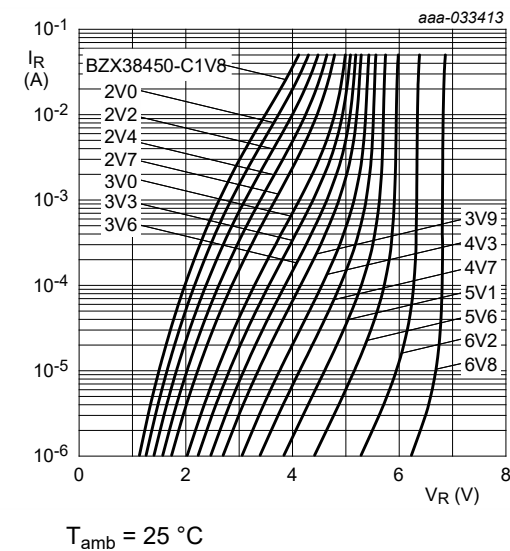


Fig. 6. Reverse current as a function of reverse voltage; typical values (BZX38450-C1V8-Q to BZX38450-C6V8-Q)

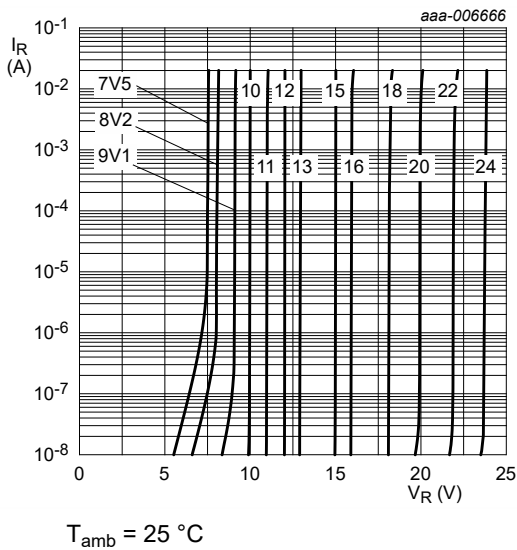


Fig. 7. Reverse current as a function of reverse voltage; typical values (BZX38450-C7V5-Q to BZX38450-C24-Q)

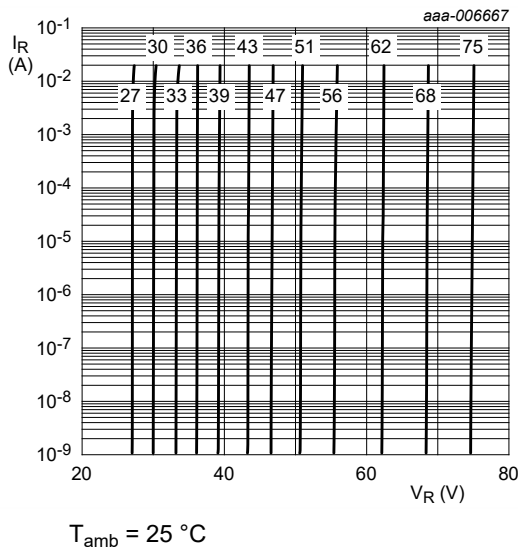


Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX38450-C27-Q to BZX38450-C75-Q)

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

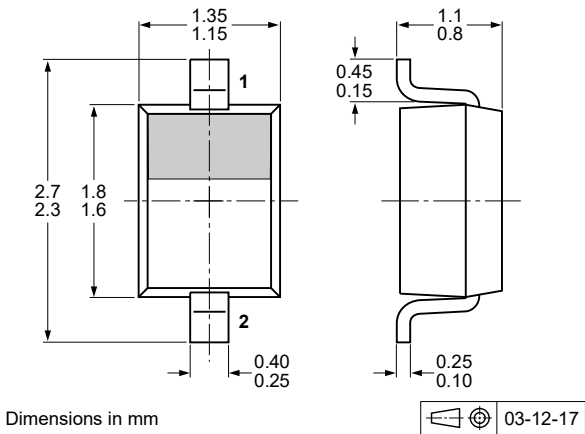


Fig. 9. Package outline SOD323 (SC-76)

13. Soldering

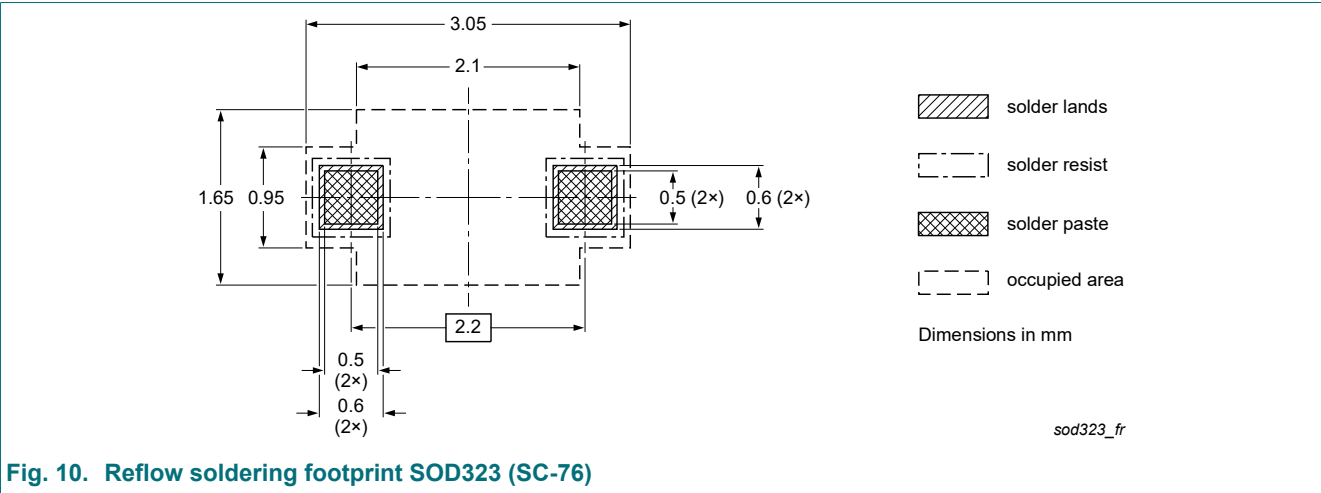


Fig. 10. Reflow soldering footprint SOD323 (SC-76)

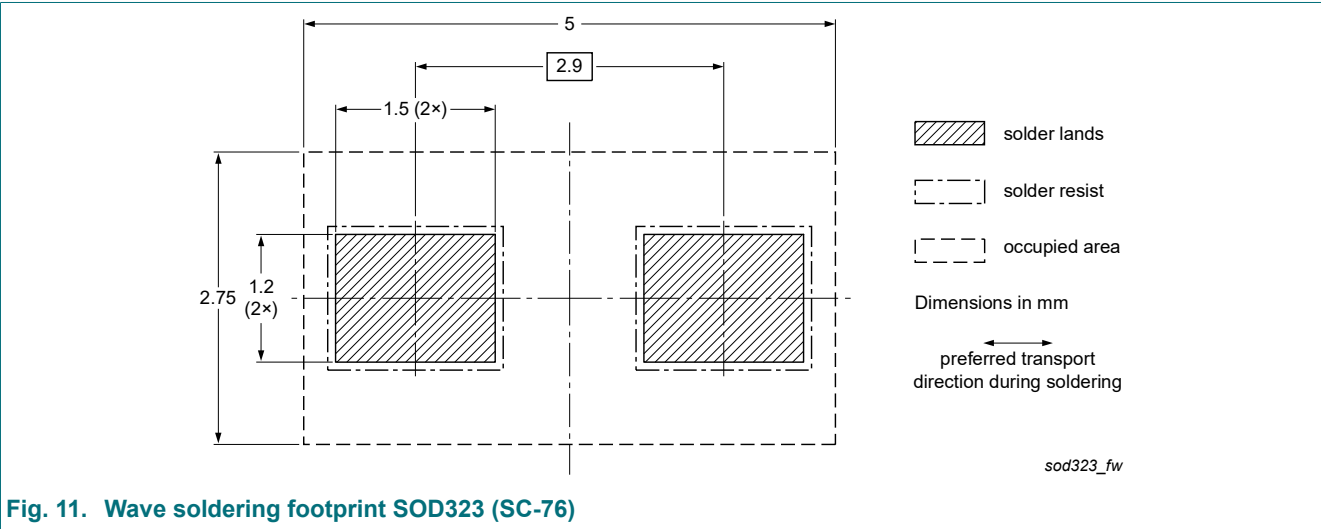


Fig. 11. Wave soldering footprint SOD323 (SC-76)

14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX38450-Q_SER v.2	20210825	Product data sheet	-	BZX38450-Q_SER v.1
Modifications:	Product status changed			
BZX38450-Q_SER v.1	20210427	Objective 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.

- [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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