



BZX8450-Q series

Low-current voltage regulator diodes

Rev. 3 — 17 July 2024

Product data sheet

1. General description

Low-current voltage regulator diodes in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Total power dissipation: ≤ 250 mW
- Two tolerance series: $\pm 2\%$ and approximately $\pm 5\%$
- Working voltage range: nominal 1.8 V to 51 V
- Specified at a low test current (50 μ A), ideal for low bias and portable battery-powered applications
- BZX8450-B11-Q to -C51-Q: Intentional minor rise of leakage current for optimized fast switching and noise reduction [\[AN90031\]](#)
- 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]	-	-	250	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	A	anode		
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX8450-Q series	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking Codes

Type number	Marking code[1]	Type number	Marking code[1]	Type number	Marking code[1]	Type number	Marking code[1]
BZX8450-B1V8-Q	%P2	BZX8450-B10-Q	%PL	BZX8450-C1V8-Q	2Q%	BZX8450-C10-Q	F7%
BZX8450-B2V0-Q	%P3	BZX8450-B11-Q	%PM	BZX8450-C2V0-Q	2R%	BZX8450-C11-Q	F9%
BZX8450-B2V2-Q	%P4	BZX8450-B12-Q	%PN	BZX8450-C2V2-Q	6Q%	BZX8450-C12-Q	G2%
BZX8450-B2V4-Q	%P5	BZX8450-B13-Q	%PP	BZX8450-C2V4-Q	6V%	BZX8450-C13-Q	G3%
BZX8450-B2V7-Q	%P6	BZX8450-B15-Q	%PQ	BZX8450-C2V7-Q	8D%	BZX8450-C15-Q	G4%
BZX8450-B3V0-Q	%P7	BZX8450-B16-Q	%PR	BZX8450-C3V0-Q	BU%	BZX8450-C16-Q	H8%
BZX8450-B3V3-Q	%P8	BZX8450-B18-Q	%PS	BZX8450-C3V3-Q	D5%	BZX8450-C18-Q	H9%
BZX8450-B3V6-Q	%P9	BZX8450-B20-Q	%PT	BZX8450-C3V6-Q	D6%	BZX8450-C20-Q	HX%
BZX8450-B3V9-Q	%PA	BZX8450-B22-Q	%PU	BZX8450-C3V9-Q	D9%	BZX8450-C22-Q	J4%
BZX8450-B4V3-Q	%PB	BZX8450-B24-Q	%PV	BZX8450-C4V3-Q	E3%	BZX8450-C24-Q	J9%
BZX8450-B4V7-Q	%PC	BZX8450-B27-Q	%PX	BZX8450-C4V7-Q	E5%	BZX8450-C27-Q	JJ%
BZX8450-B5V1-Q	%PD	BZX8450-B30-Q	%PY	BZX8450-C5V1-Q	E6%	BZX8450-C30-Q	JQ%
BZX8450-B5V6-Q	%PE	BZX8450-B33-Q	%PZ	BZX8450-C5V6-Q	E7%	BZX8450-C33-Q	JT%
BZX8450-B6V2-Q	%PF	BZX8450-B36-Q	%H8	BZX8450-C6V2-Q	E8%	BZX8450-C36-Q	K5%
BZX8450-B6V8-Q	%PG	BZX8450-B39-Q	%H9	BZX8450-C6V8-Q	E9%	BZX8450-C39-Q	KQ%
BZX8450-B7V5-Q	%PH	BZX8450-B43-Q	%HL	BZX8450-C7V5-Q	F3%	BZX8450-C43-Q	L2%
BZX8450-B8V2-Q	%PJ	BZX8450-B47-Q	%HM	BZX8450-C8V2-Q	F5%	BZX8450-C47-Q	L3%
BZX8450-B9V1-Q	%PK	BZX8450-B51-Q	%HN	BZX8450-C9V1-Q	F6%	BZX8450-C51-Q	LV%

[1] % = placeholder for manufacturing site code

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]	-	250	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 70 μm 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]	-	-	500	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point	[2]	-	-	330	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single sided 70 μm copper, tin-plated and standard footprint.
[2] 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: BZX8450-B1V8-Q to BZX8450-C36-Q

T_j = 25 °C unless otherwise specified.

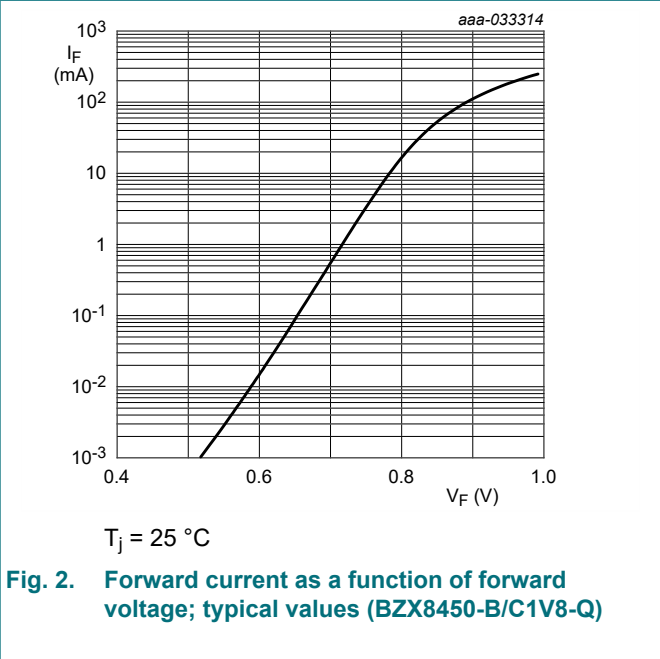
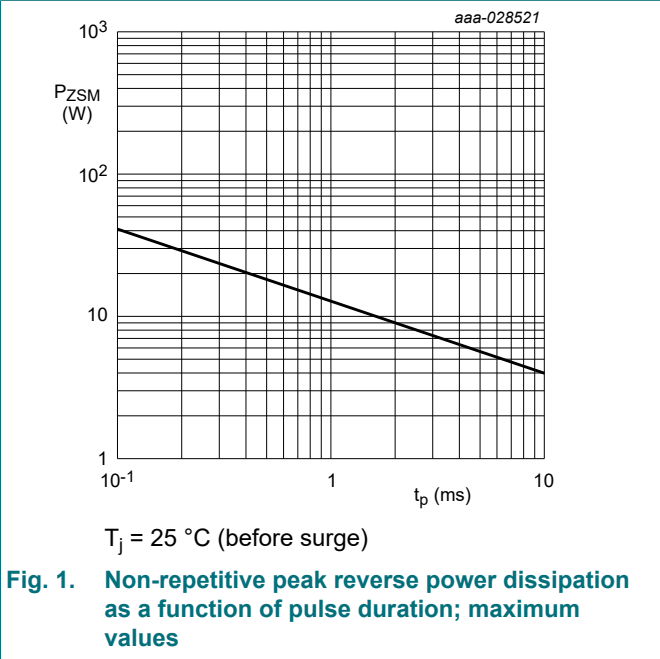
BZX8450- xxx-Q	Sel.	Working voltage V _Z (V)		Differential resistance r _{diff} (Ω)		Reverse current I _R (μA)		Temperature coefficient S _Z (mV/K)		Diode capacitance C _d (pF)
		I _Z = 50 μA		I _Z = 1 mA	I _Z = 5 mA			I _Z = 5 mA		f = 1 MHz V _R = 0 V
		Min	Max	Max	Max	Max	V _R (V)	Min	Max	Max
1V8	B	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							

BZX8450-xxx-Q	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: BZX8450-B39 to BZX8450-C51

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

BZX8450-xxx-Q	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)
		$I_Z = 50\text{ }\mu\text{A}$		$I_Z = 0.5\text{ mA}$	$I_Z = 2\text{ mA}$			$I_Z = 2\text{ mA}$		$f = 1\text{ MHz}$ $V_R = 0\text{ V}$
		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							



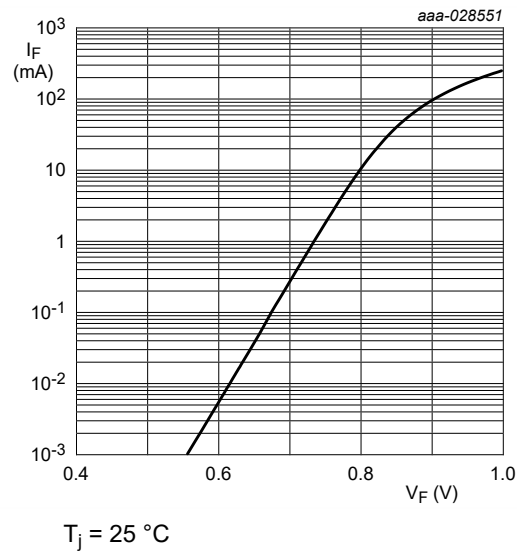


Fig. 3. Forward current as a function of forward voltage; typical values (BZX8450-B/C6V8-Q)

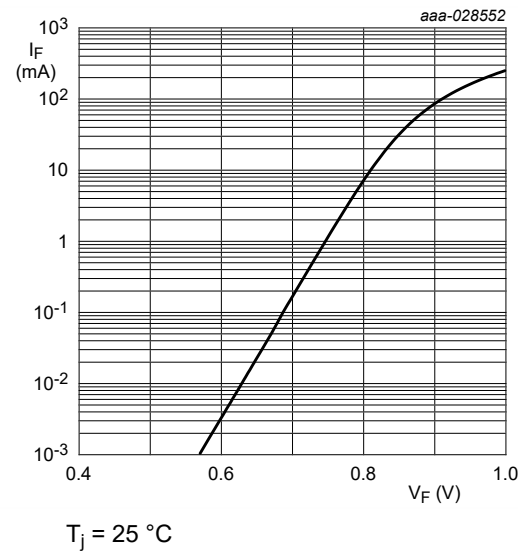


Fig. 4. Forward current as a function of forward voltage; typical values (BZX8450-B/C7V5-Q)

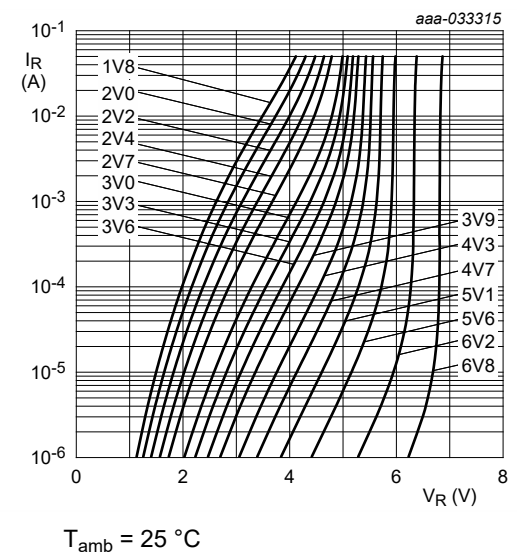


Fig. 5. Reverse current as a function of reverse voltage; typical values (BZX8450-B/C1V8-Q to BZX8450-B/C6V8-Q)

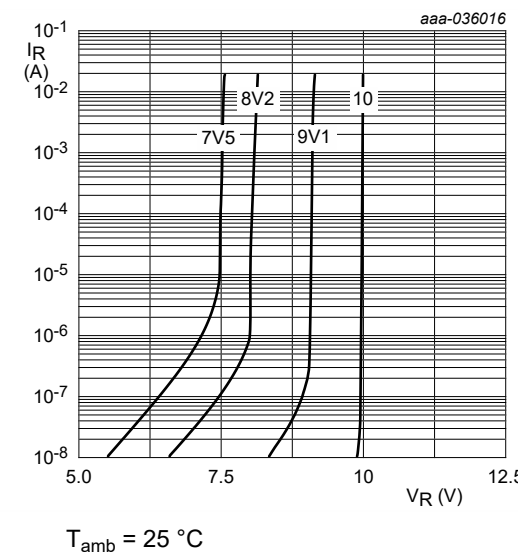


Fig. 6. Reverse current as a function of reverse voltage; typical values (BZX8450-B/C7V5-Q to BZX8450-B/C10-Q)

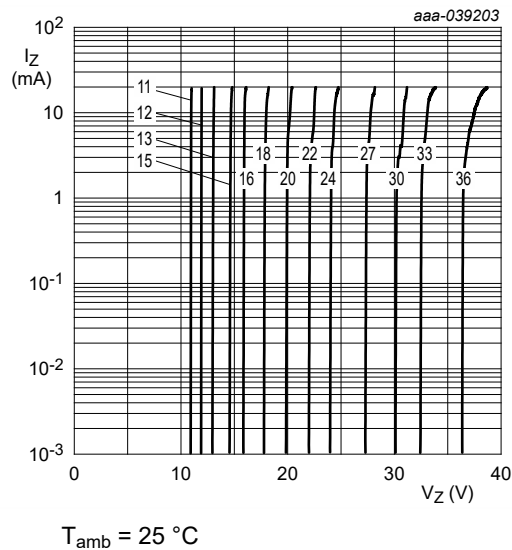


Fig. 7. Reverse current as a function of reverse voltage; typical values (BZX8450-B/C11-Q to BZX8450-B/C36-Q)

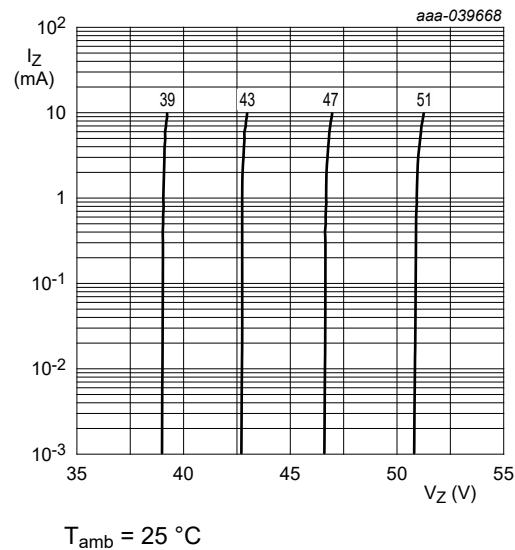


Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX8450-B/C39-Q to BZX8450-B/C51-Q)

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

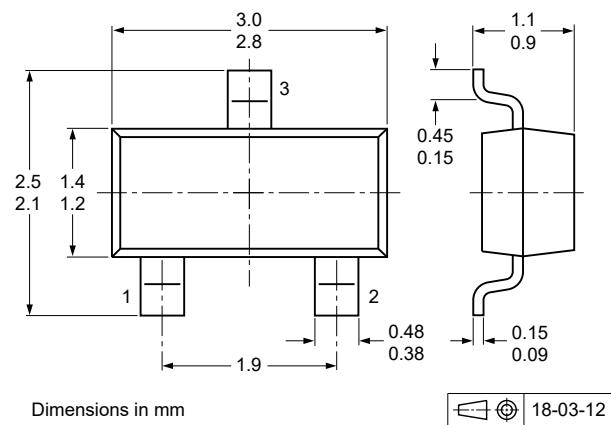
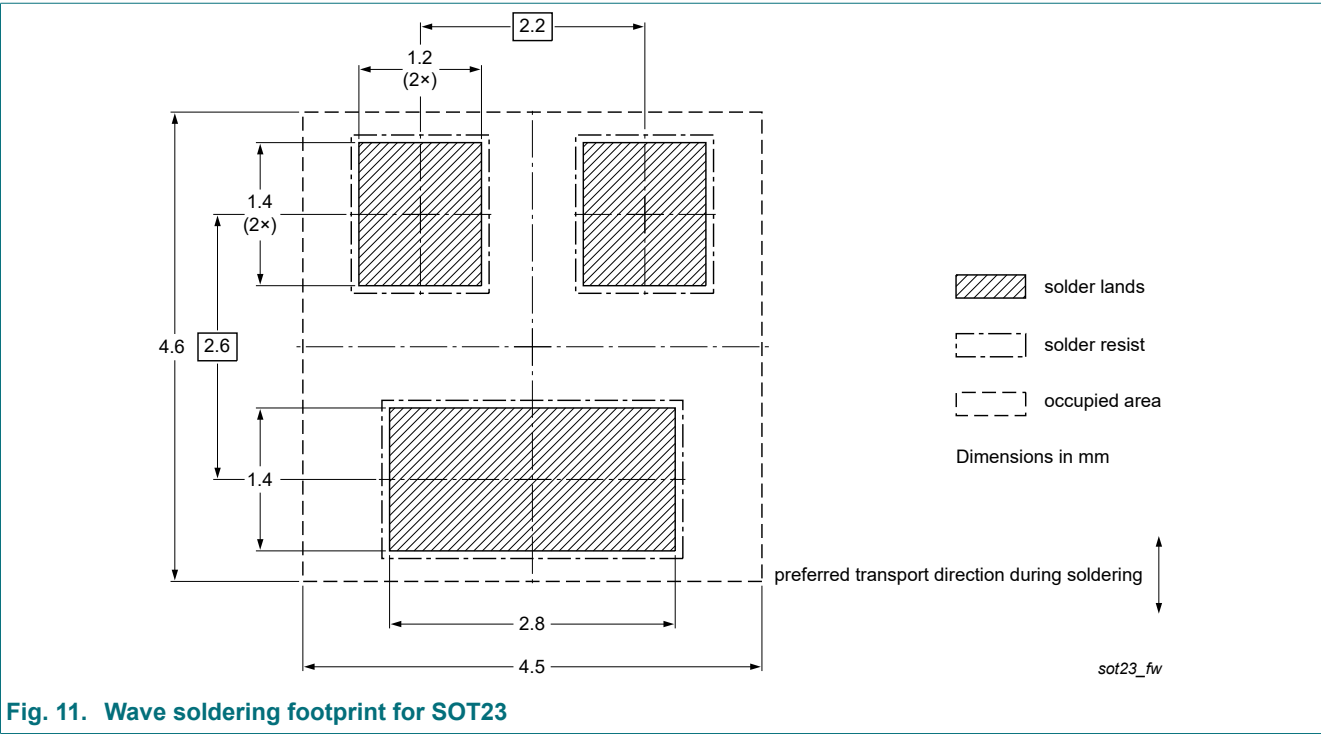
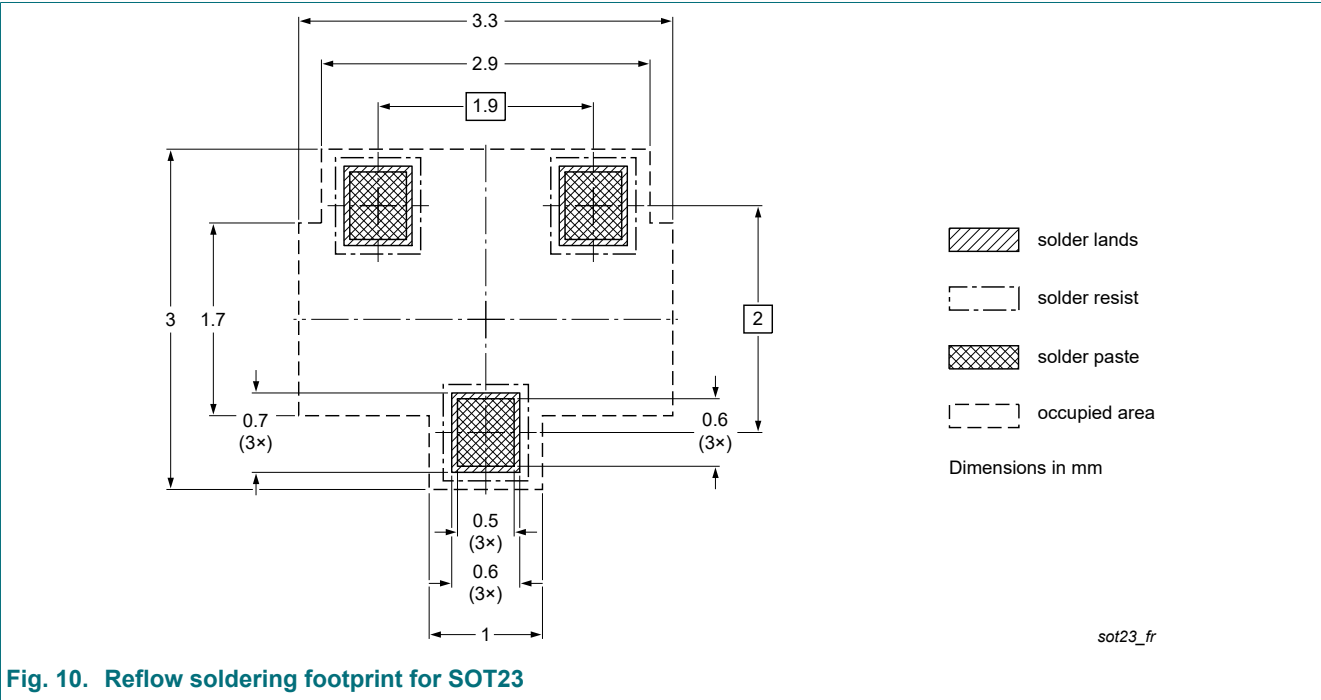


Fig. 9. Package outline SOT23

13. Soldering



14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX8450-Q_SER v.3	20240717	Product data sheet	-	BZX8450-Q_SER v.2
Modifications:	• Products added: B selections 1V8 to 51V and C selections 11V to 51 V			
BZX8450-Q_SER v.2	20230118	Product data sheet	-	BZX8450-Q_SER v.1
BZX8450-Q_SER v.1	20210824	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.

- [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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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information..... 1

6. Ordering information..... 2

7. Marking..... 2

8. Limiting values..... 3

9. Thermal characteristics..... 3

10. Characteristics..... 3

11. Test information..... 8

12. Package outline..... 8

13. Soldering..... 9

14. Revision history..... 10

15. Legal information..... 11

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