



# BZX8450 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:  $\leq 250$  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  $\mu$ A), ideal for low bias and portable battery-powered applications
- BZX8450-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

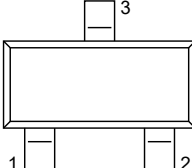
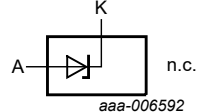
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 10$ mA [1]	-	-	0.9	V
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C [2]	-	-	250	mW

[1] Pulse test:  $t_p \leq 300$   $\mu$ 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 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	%P2	BZX8450-B10	%PL	BZX8450-C1V8	2Q%	BZX8450-C10	F7%
BZX8450-B2V0	%P3	BZX8450-B11	%PM	BZX8450-C2V0	2R%	BZX8450-C11	F9%
BZX8450-B2V2	%P4	BZX8450-B12	%PN	BZX8450-C2V2	6Q%	BZX8450-C12	G2%
BZX8450-B2V4	%P5	BZX8450-B13	%PP	BZX8450-C2V4	6V%	BZX8450-C13	G3%
BZX8450-B2V7	%P6	BZX8450-B15	%PQ	BZX8450-C2V7	8D%	BZX8450-C15	G4%
BZX8450-B3V0	%P7	BZX8450-B16	%PR	BZX8450-C3V0	BU%	BZX8450-C16	H8%
BZX8450-B3V3	%P8	BZX8450-B18	%PS	BZX8450-C3V3	D5%	BZX8450-C18	H9%
BZX8450-B3V6	%P9	BZX8450-B20	%PT	BZX8450-C3V6	D6%	BZX8450-C20	HX%
BZX8450-B3V9	%PA	BZX8450-B22	%PU	BZX8450-C3V9	D9%	BZX8450-C22	J4%
BZX8450-B4V3	%PB	BZX8450-B24	%PV	BZX8450-C4V3	E3%	BZX8450-C24	J9%
BZX8450-B4V7	%PC	BZX8450-B27	%PX	BZX8450-C4V7	E5%	BZX8450-C27	JJ%
BZX8450-B5V1	%PD	BZX8450-B30	%PY	BZX8450-C5V1	E6%	BZX8450-C30	JQ%
BZX8450-B5V6	%PE	BZX8450-B33	%PZ	BZX8450-C5V6	E7%	BZX8450-C33	JT%
BZX8450-B6V2	%PF	BZX8450-B36	%H8	BZX8450-C6V2	E8%	BZX8450-C36	K5%
BZX8450-B6V8	%PG	BZX8450-B39	%H9	BZX8450-C6V8	E9%	BZX8450-C39	KQ%
BZX8450-B7V5	%PH	BZX8450-B43	%HL	BZX8450-C7V5	F3%	BZX8450-C43	L2%
BZX8450-B8V2	%PJ	BZX8450-B47	%HM	BZX8450-C8V2	F5%	BZX8450-C47	L3%
BZX8450-B9V1	%PK	BZX8450-B51	%HN	BZX8450-C9V1	F6%	BZX8450-C51	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	$t_p = 100 \mu\text{s}$ ; square wave; $T_j = 25 \text{ }^\circ\text{C}$ ; prior to surge	-	40	W
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	250	mW
$T_j$	junction temperature		-	150	$^\circ\text{C}$
$T_{amb}$	ambient temperature		-55	+150	$^\circ\text{C}$
$T_{stg}$	storage temperature		-65	+150	$^\circ\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single sided 70  $\mu\text{m}$  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  $\mu\text{m}$  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:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$

Table 8. Electrical characteristics per type: BZX8450-B1V8 to BZX8450-C36

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

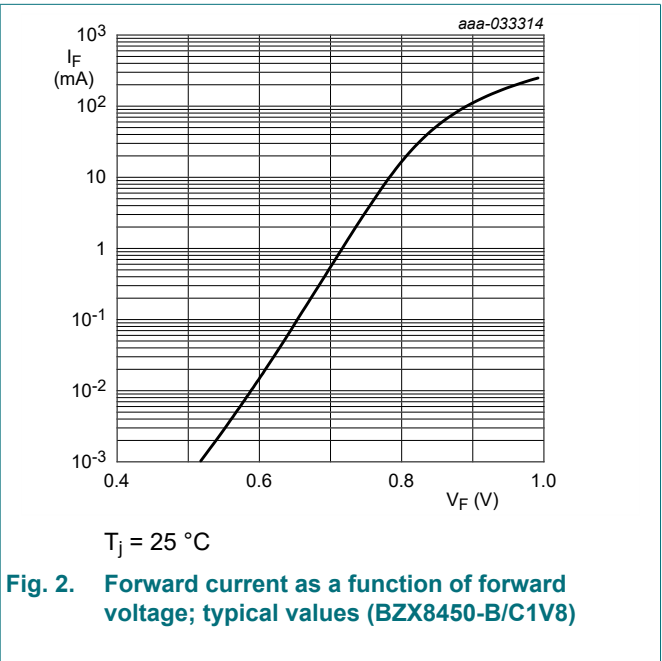
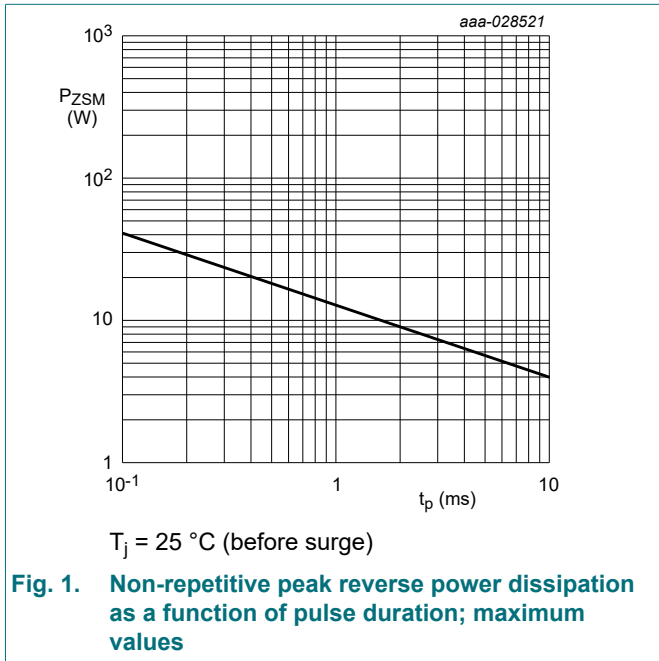
BZX8450-xxx	Sel.	Working voltage $V_Z$ (V)		Differential resistance $r_{diff}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu$ A)		Temperature coefficient $S_Z$ (mV/K)		Diode capacitance $C_d$ (pF)
		$I_Z = 50\ \mu$ A		$I_Z = 1$ mA	$I_Z = 5$ mA	Max	$V_R$ (V)	$I_Z = 5$ mA		$f = 1$ MHz $V_R = 0$ V
		Min	Max	Max	Max			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							

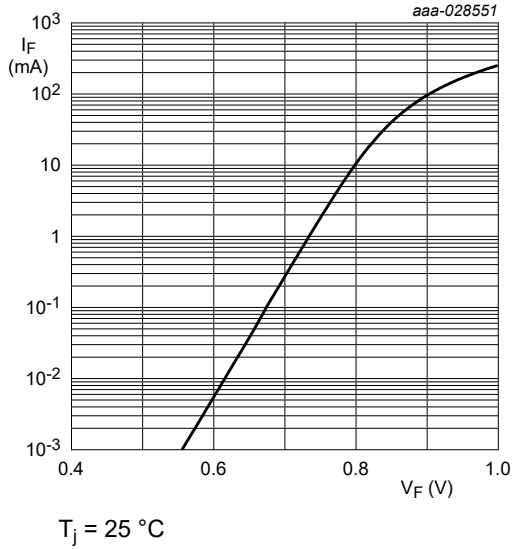
BZX8450-xxx	Sel.	Working voltage $V_Z$ (V)		Differential resistance $r_{diff}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu$ A)		Temperature coefficient $S_Z$ (mV/K)		Diode capacitance $C_d$ (pF)
		$I_Z = 50 \mu$ A		$I_Z = 1$ mA	$I_Z = 5$ mA	Max	$V_R$ (V)	$I_Z = 5$ mA		$f = 1$ MHz $V_R = 0$ V
		Min	Max	Max	Max			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

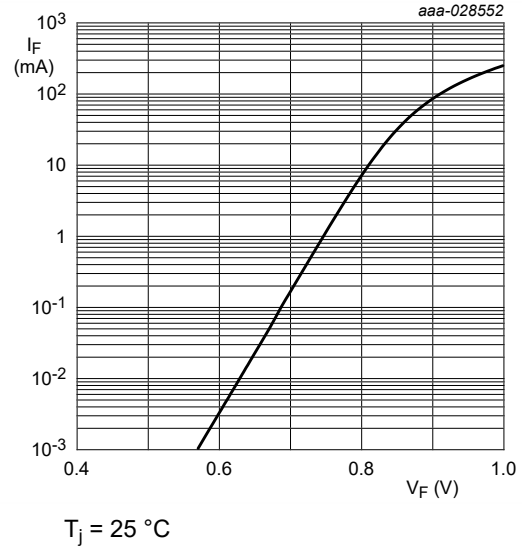
$T_j = 25\text{ °C}$  unless otherwise specified.

BZX8450-xxx	Sel.	Working voltage $V_Z$ (V)		Differential resistance $r_{diff}$ ( $\Omega$ )		Reverse current $I_R$ ( $\mu\text{A}$ )		Temperature coefficient $S_Z$ (mV/K)		Diode capacitance $C_d$ (pF)
		$I_Z = 50\ \mu\text{A}$		$I_Z = 0.5\ \text{mA}$	$I_Z = 2\ \text{mA}$	Max	$V_R$ (V)	$I_Z = 2\ \text{mA}$		$f = 1\ \text{MHz}$ $V_R = 0\ \text{V}$
		Min	Max	Max	Max			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							

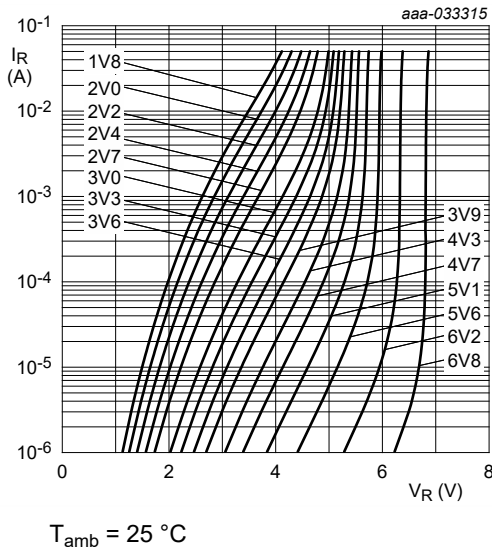




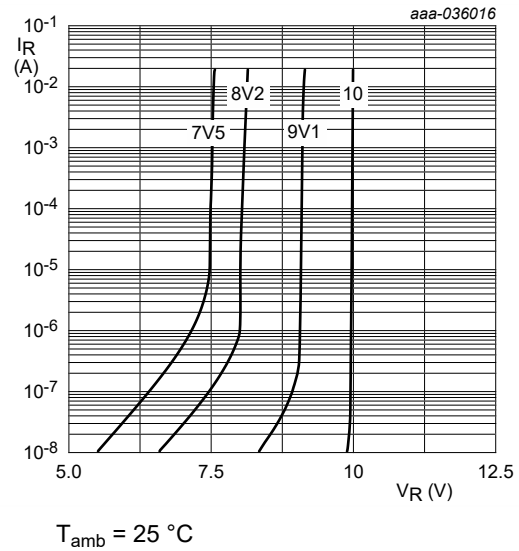
**Fig. 3.** Forward current as a function of forward voltage; typical values (BZX8450-B/C6V8)



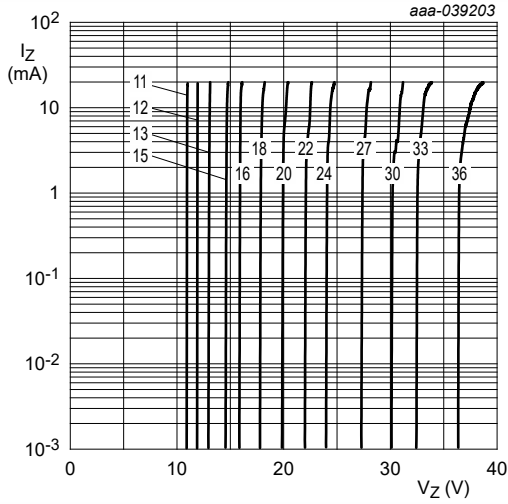
**Fig. 4.** Forward current as a function of forward voltage; typical values (BZX8450-B/C7V5)



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

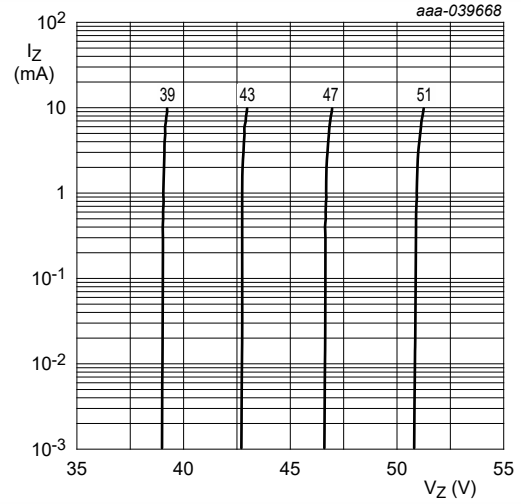


**Fig. 6.** Reverse current as a function of reverse voltage; typical values (BZX8450-B/C7V5 to BZX8450-B/C10)



T<sub>amb</sub> = 25 °C

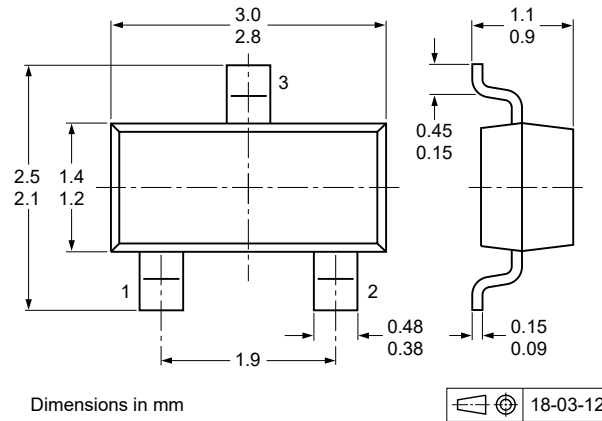
**Fig. 7. Reverse current as a function of reverse voltage; typical values (BZX8450-B/C11 to BZX8450-B/C36)**



T<sub>amb</sub> = 25 °C

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

## 11. Package outline



**Fig. 9. Package outline SOT23**



## 12. Soldering

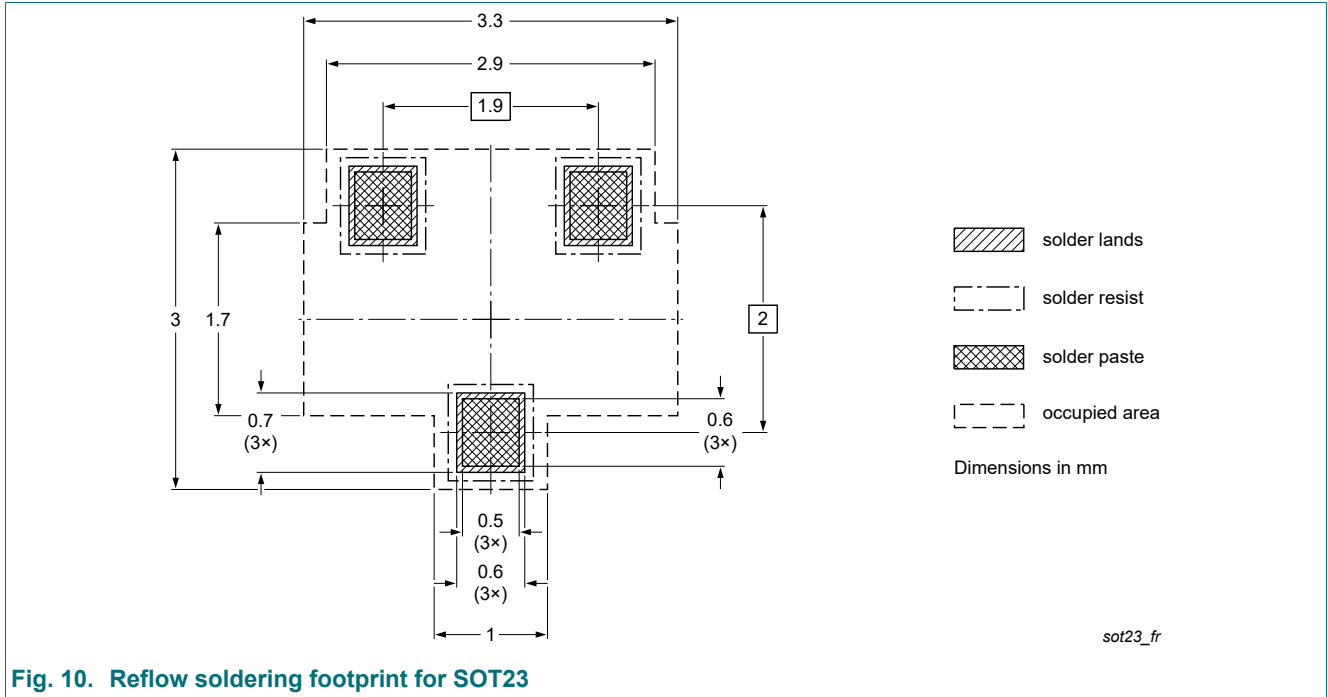


Fig. 10. Reflow soldering footprint for SOT23

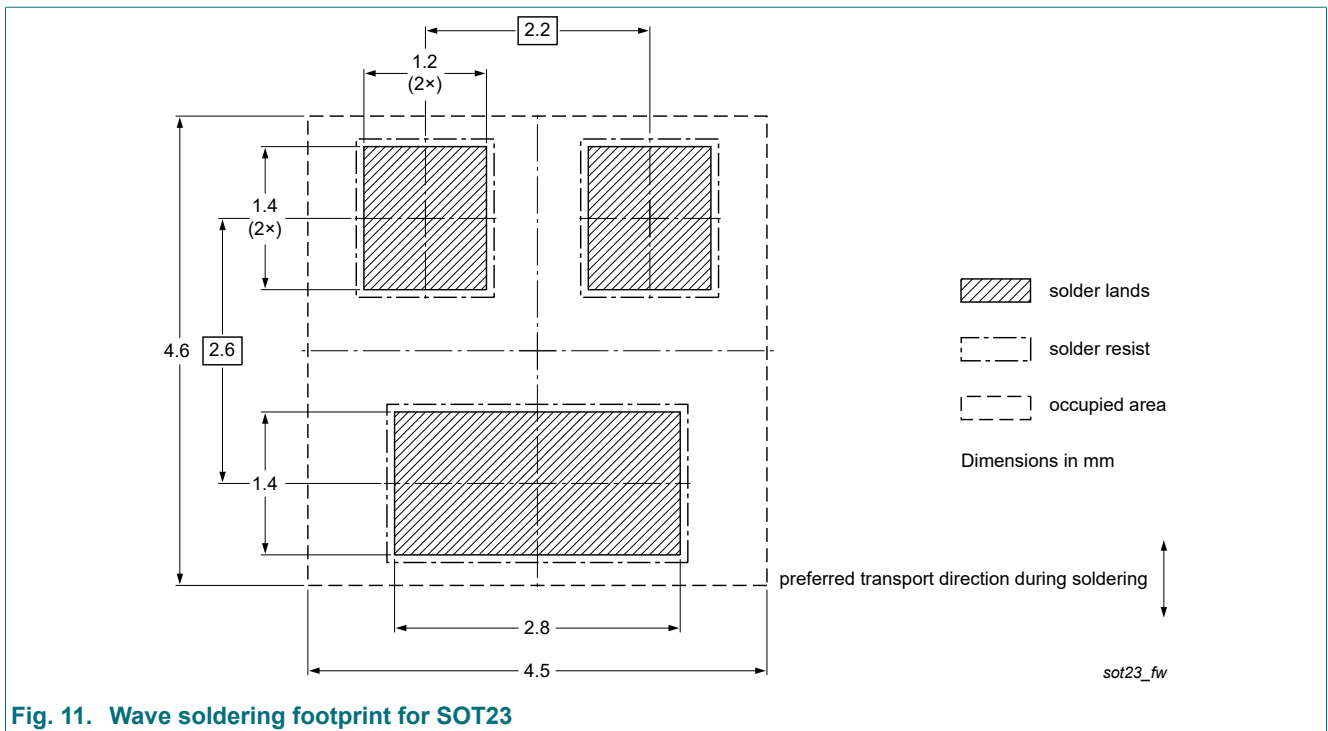


Fig. 11. Wave soldering footprint for SOT23

## 13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX8450_SER v.3	20240717	Product data sheet	-	BZX8450_SER v.2
Modifications:	• Products added: B selections 1V8 to 51 V and C selections 11V to 51 V			
BZX8450_SER v.2	20230118	Product data sheet	-	BZX8450_SER v.1
BZX8450_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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