

BZX84 series

Voltage regulator diodes

Rev. 7 — 1 January 2023 Product data sheet

1. General description

Low-power voltage regulator diodes in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

The diodes are available in the normalized E24 ±1 % (BZX84-A), ±2 % (BZX84-B) and approximately ±5 % (BZX84-C) tolerance range. The series includes 37 breakdown voltages with nominal working voltages from 2.4 V to 75 V.

2. Features and benefits

- Total power dissipation: ≤250 mW
- Three tolerance series: ±1 %, ±2 % and approximately ±5 %
- Working voltage range: nominal 2.4 V to 75 V (E24 range)
- Non-repetitive peak reverse power dissipation: ≤ 40 W

3. Applications

- General regulation functions

4. Quick reference data

Table 1. Quick reference data

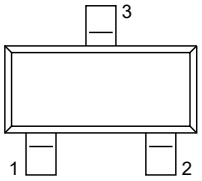
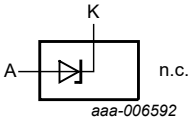
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[2]	-	-	250	mW

[1] Pulse test: t_p ≤ 100 µs; δ ≤ 0.02.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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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
BZX84 series[1]	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

[1] The series consists of 37 breakdown voltages with nominal working voltages from 2.4 V to 75 V and ±1 %, ±2 % and ±5 % tolerances.

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7. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code	Type number	Marking code
BZX84-A2V4	%50	BZX84-B2V4	%Z0	BZX84-C2V4	%T3
BZX84-A2V7	%51	BZX84-B2V7	%Z1	BZX84-C2V7	%T4
BZX84-A3V0	%52	BZX84-B3V0	%S1	BZX84-C3V0	%T9
BZX84-A3V3	%53	BZX84-B3V3	%S2	BZX84-C3V3	%B1
BZX84-A3V6	%C1	BZX84-B3V6	%S3	BZX84-C3V6	%B2
BZX84-A3V9	%55	BZX84-B3V9	%S4	BZX84-C3V9	%B3
BZX84-A4V3	%56	BZX84-B4V3	%S7	BZX84-C4V3	%B6
BZX84-A4V7	%57	BZX84-B4V7	%S8	BZX84-C4V7	Z1%
BZX84-A5V1	%58	BZX84-B5V1	%R1	BZX84-C5V1	Z2%
BZX84-A5V6	%59	BZX84-B5V6	%R2	BZX84-C5V6	Z3%
BZX84-A6V2	%60	BZX84-B6V2	%R5	BZX84-C6V2	Z4%
BZX84-A6V8	%61	BZX84-B6V8	%R6	BZX84-C6V8	Z5%
BZX84-A7V5	%62	BZX84-B7V5	%R8	BZX84-C7V5	Z6%
BZX84-A8V2	%63	BZX84-B8V2	%R9	BZX84-C8V2	Z7%
BZX84-A9V1	%64	BZX84-B9V1	%T1	BZX84-C9V1	Z8%
BZX84-A10	%65	BZX84-B10	%66	BZX84-C10	Z9%
BZX84-A11	%04	BZX84-B11	%Z6	BZX84-C11	Y1%
BZX84-A12	%67	BZX84-B12	%Z7	BZX84-C12	Y2%
BZX84-A13	%C0	BZX84-B13	%Z8	BZX84-C13	Y3%
BZX84-A15	%69	BZX84-B15	%Z9	BZX84-C15	Y4%
BZX84-A16	KE%	BZX84-B16	%70	BZX84-C16	Y5%
BZX84-A18	KF%	BZX84-B18	%71	BZX84-C18	Y6%
BZX84-A20	%C2	BZX84-B20	%72	BZX84-C20	Y7%
BZX84-A22	KG%	BZX84-B22	%73	BZX84-C22	Y8%
BZX84-A24	KH%	BZX84-B24	%74	BZX84-C24	Y9%
BZX84-A27	%75	BZX84-B27	%Z5	BZX84-C27	%T2
BZX84-A30	KJ%	BZX84-B30	%Z4	BZX84-C30	%T5
BZX84-A33	KK%	BZX84-B33	%Y1	BZX84-C33	%T6
BZX84-A36	%C3	BZX84-B36	%Y2	BZX84-C36	%T7
BZX84-A39	%C4	BZX84-B39	%S0	BZX84-C39	%T8
BZX84-A43	%C5	BZX84-B43	%S5	BZX84-C43	%B4
BZX84-A51	%C6	BZX84-B47	%S6	BZX84-C47	%B5
BZX84-A75	%86	BZX84-B51	%S9	BZX84-C51	%B7
-	-	BZX84-B56	%R0	BZX84-C56	%B8
-	-	BZX84-B62	%R3	BZX84-C62	%B9
-	-	BZX84-B68	%R4	BZX84-C68	%B0
-	-	BZX84-B75	%R7	BZX84-C75	%A1

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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		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	+150	°C
T_{stg}	storage temperature			-65	+150	°C

[1] t_p = 100 µs; square wave; T_j = 25 °C prior to surge.
[2] Device mounted on an FR4 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 PCB, single-sided 70 µm copper, tin-plated and standard footprint.
[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

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

[1] Pulse test: $t_p \leq 100$ µs; $\delta \leq 0.02$

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Table 8. Characteristics per type; BZX84-A2V4 to BZX84-C24

T_j = 25 °C unless otherwise specified.

BZX84 -xxx	Sel	Working voltage V_Z (V) I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K) I_Z = 5 mA		Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A) [2]
		Min	Max	I_Z = 1 mA	I_Z = 5 mA	Max	V_R (V)	Min	Max	Max	Max
2V4	A	2.37	2.43	600	100	50	1	-3.5	0.0	450	6.0
	B	2.35	2.45								
	C	2.20	2.60								
2V7	A	2.67	2.73	600	100	20	1	-3.5	0.0	450	6.0
	B	2.65	2.75								
	C	2.50	2.90								
3V0	A	2.97	3.03	600	95	10	1	-3.5	0.0	450	6.0
	B	2.94	3.06								
	C	2.80	3.20								
3V3	A	3.26	3.34	600	95	5	1	-3.5	0.0	450	6.0
	B	3.23	3.37								
	C	3.10	3.50								
3V6	A	3.56	3.64	600	90	5	1	-3.5	0.0	450	6.0
	B	3.53	3.67								
	C	3.40	3.80								
3V9	A	3.86	3.94	600	90	3	1	-3.5	0.0	450	6.0
	B	3.82	3.98								
	C	3.70	4.10								
4V3	A	4.25	4.35	600	90	3	1	-3.5	0.0	450	6.0
	B	4.21	4.39								
	C	4.00	4.60								
4V7	A	4.65	4.75	500	80	3	2	-3.5	0.2	300	6.0
	B	4.61	4.79								
	C	4.40	5.00								
5V1	A	5.04	5.16	480	60	2	2	-2.7	1.2	300	6.0
	B	5.00	5.20								
	C	4.80	5.40								
5V6	A	5.54	5.66	400	40	1	2	-2.0	2.5	300	6.0
	B	5.49	5.71								
	C	5.20	6.00								
6V2	A	6.13	6.27	150	10	3	4	0.4	3.7	200	6.0
	B	6.08	6.32								
	C	5.80	6.60								
6V8	A	6.73	6.87	80	15	2	4	1.2	4.5	200	6.0
	B	6.66	6.94								
	C	6.40	7.20								
7V5	A	7.42	7.58	80	15	1	5	2.5	5.3	150	4.0
	B	7.35	7.65								
	C	7.00	7.90								

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BZX84 -xxx	Sel	Working voltage V_Z (V) I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K) I_Z = 5 mA		Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A) [2]
		Min	Max	I_Z = 1 mA	I_Z = 5 mA	Max	V_R (V)	Min	Max	Max	Max
8V2	A	8.11	8.29	80	15	0.7	5	3.2	6.2	150	4.0
	B	8.04	8.36								
	C	7.70	8.70								
9V1	A	9.00	9.20	100	15	0.5	6	3.8	7.0	150	3.0
	B	8.92	9.28								
	C	8.50	9.60								
10	A	9.90	10.10	150	20	0.2	7	4.5	8.0	90	3.0
	B	9.80	10.20								
	C	9.40	10.60								
11	A	10.89	11.11	150	20	0.1	8	5.4	9.0	85	2.5
	B	10.80	11.20								
	C	10.40	11.60								
12	A	11.88	12.12	150	25	0.1	8	6.0	10.0	85	2.5
	B	11.80	12.20								
	C	11.40	12.70								
13	A	12.87	13.13	170	30	0.1	8	7.0	11.0	80	2.5
	B	12.70	13.30								
	C	12.40	14.10								
15	A	14.85	15.15	200	30	0.05	10.5	9.2	13.0	75	2.0
	B	14.70	15.30								
	C	13.80	15.60								
16	A	15.84	16.16	200	40	0.05	11.2	10.4	14.0	75	1.5
	B	15.70	16.30								
	C	15.30	17.10								
18	A	17.82	18.18	225	45	0.05	12.6	12.4	16.0	70	1.5
	B	17.60	18.40								
	C	16.80	19.10								
20	A	19.80	20.20	225	55	0.05	14	14.4	18.0	60	1.5
	B	19.60	20.40								
	C	18.80	21.20								
22	A	21.78	22.22	250	55	0.05	15.4	16.4	20.0	60	1.25
	B	21.60	22.40								
	C	20.80	23.30								
24	A	23.76	24.24	250	70	0.05	16.8	18.4	22.0	55	1.25
	B	23.50	24.50								
	C	22.80	25.60								

[1] f = 1 MHz; V_R = 0 V
[2] t_p = 100 μs; square wave; T_j = 25 °C

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Table 9. Characteristics per type; BZX84-A27 to BZX84-C75

T_j = 25 °C unless otherwise specified.

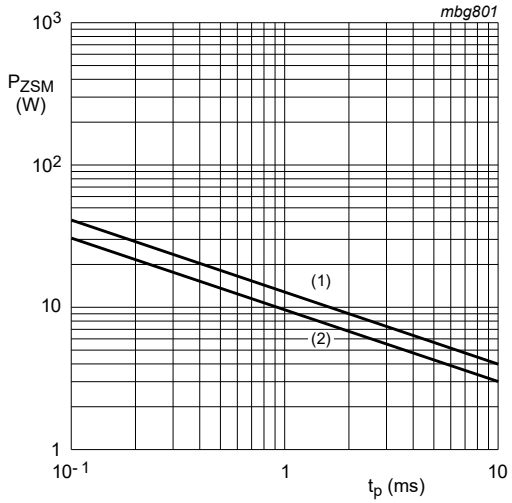
BZX84 -xxx	Sel	Working voltage V_Z (V) I_Z = 2 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K) I_Z = 2 mA		Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A) [2]
		Min	Max	I_Z = 0.5 mA	I_Z = 2 mA	Max	V_R (V)	Min	Max	Max	Max
27	A	26.73	27.27	300	80	0.05	18.9	21.4	25.3	50	1.0
	B	26.50	27.50								
	C	25.10	28.90								
30	A	29.70	30.30	300	80	0.05	21	24.4	29.4	50	1.0
	B	29.40	30.60								
	C	28.00	32.00								
33	A	32.67	33.33	325	80	0.05	23.1	27.4	33.4	45	0.9
	B	32.30	33.70								
	C	31.00	35.00								
36	A	35.64	36.36	350	90	0.05	25.2	30.4	37.4	45	0.8
	B	35.30	36.70								
	C	34.00	38.00								
39	A	38.61	39.39	350	130	0.05	27.3	33.4	41.2	45	0.7
	B	38.20	39.80								
	C	37.00	41.00								
43	A	42.57	43.43	375	150	0.05	30.1	37.6	46.6	40	0.6
	B	42.10	43.90								
	C	40.00	46.00								
47	B	46.10	47.90	375	170	0.05	32.9	42.0	51.8	40	0.5
	C	44.00	50.00								
51	A	50.49	51.51	400	180	0.05	35.7	46.6	57.2	40	0.4
	B	50.00	52.00								
	C	48.00	54.00								
56	B	54.90	57.10	425	200	0.05	39.2	52.2	63.8	40	0.3
	C	52.00	60.00								
62	B	60.80	63.20	450	215	0.05	43.4	58.8	71.6	35	0.3
	C	58.00	66.00								
68	B	66.60	69.40	475	240	0.05	47.6	65.6	79.8	35	0.25
	C	64.00	72.00								
75	A	74.25	75.75	500	255	0.05	52.5	73.4	88.6	35	0.20
	B	73.50	76.50								
	C	70.00	79.00								

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

[2] t_p = 100 μs; square wave; T_j = 25 °C

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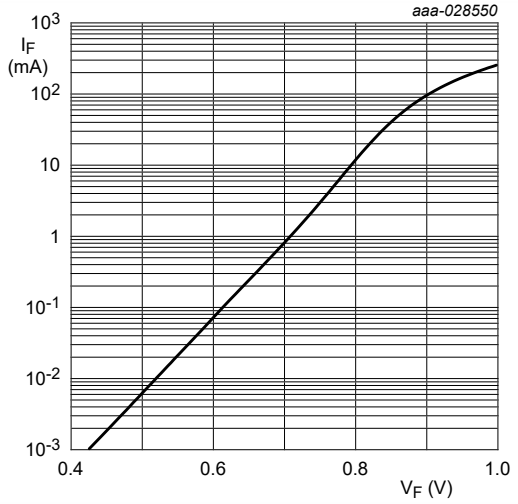
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(1) T_j = 25 °C (before surge)

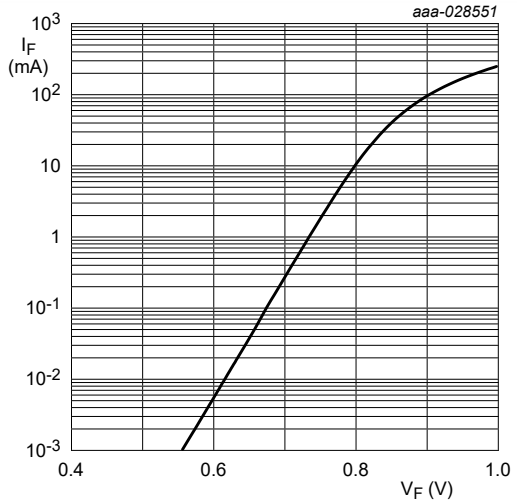
(2) T_j = 150 °C (before surge)

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



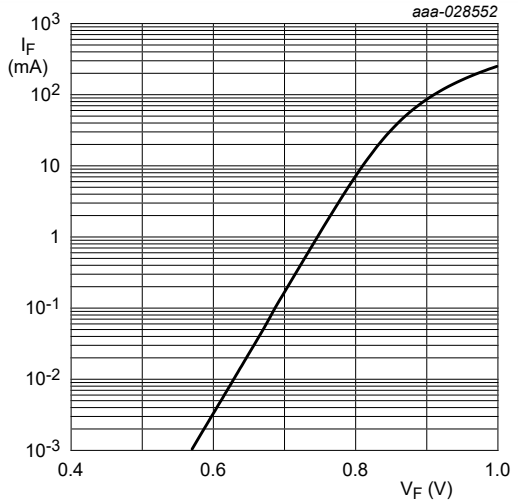
T_j = 25 °C

Fig. 2. Forward current as a function of forward voltage; typical values (BZX84-A/B/C2V4)



T_j = 25 °C

Fig. 3. Forward current as a function of forward voltage; typical values (BZX84-A/B/C6V8)

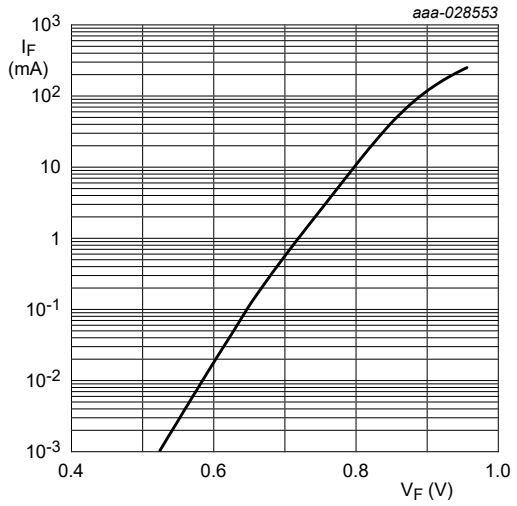


T_j = 25 °C

Fig. 4. Forward current as a function of forward voltage; typical values (BZX84-A/B/C7V5)

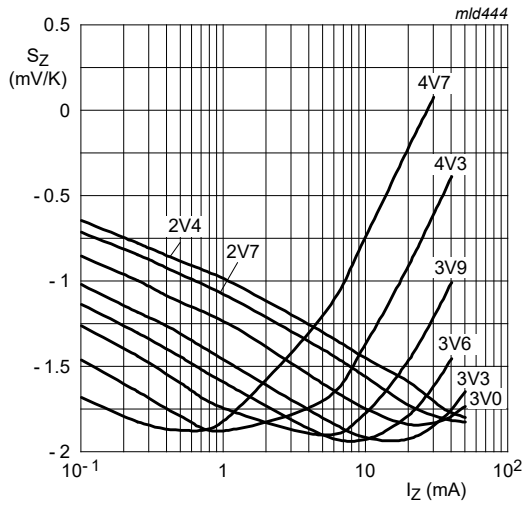
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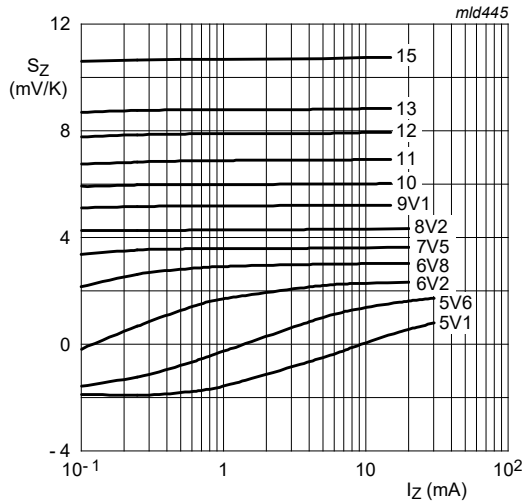
T_j = 25 °C

Fig. 5. Forward current as a function of forward voltage; typical values (BZX84-A/B/C75)



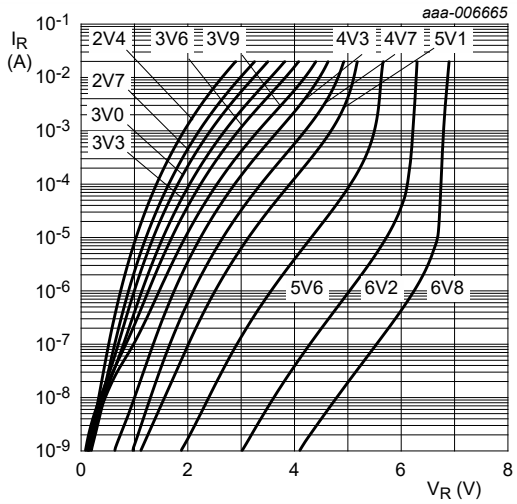
T_j = 25 °C to 150 °C

Fig. 6. Temperature coefficient as a function of working current; typical values (BZX84-A/B/C2V4 to BZX84-A/B/C4V7)



T_j = 25 °C to 150 °C

Fig. 7. Temperature coefficient as a function of working current; typical values (BZX84-A/B/C5V1 to BZX84-A/B/C15)

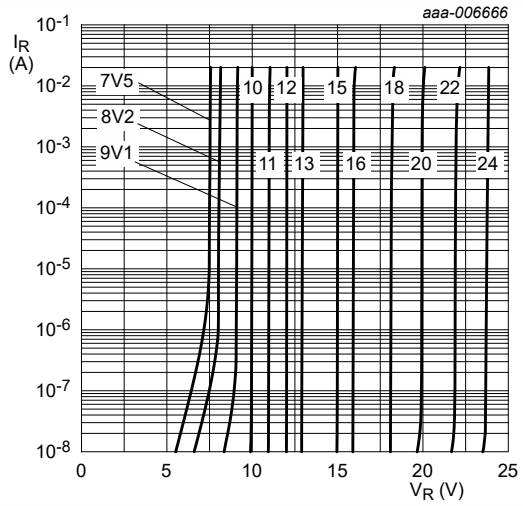


T_j = 25 °C

Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX84-A/B/C2V4 to BZX84-A/B/C6V8)

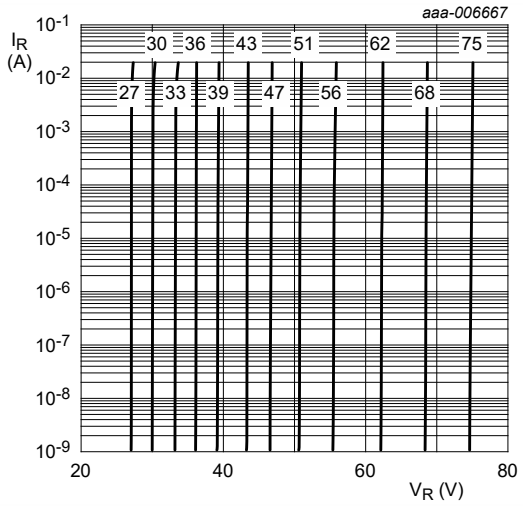
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T_j = 25 °C

Fig. 9. Reverse current as a function of reverse voltage; typical values (BZX84-A/B/C7V5 to BZX84-A/B/C24)



T_j = 25 °C

Fig. 10. Reverse current as a function of reverse voltage; typical values (BZX84-A/B/C27 to BZX84-A/B/C75)

11. Package outline

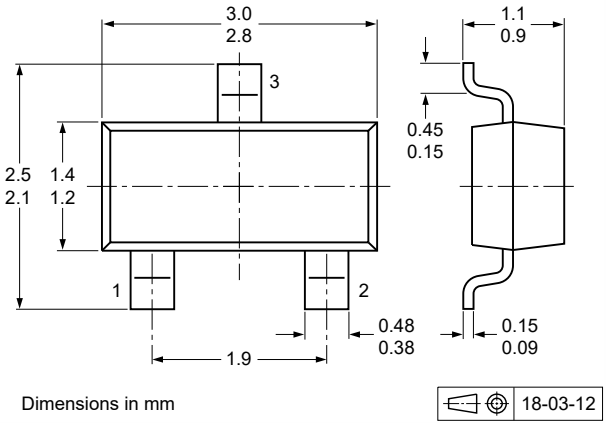


Fig. 11. Package outline SOT23 (TO-236AB)

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12. Soldering

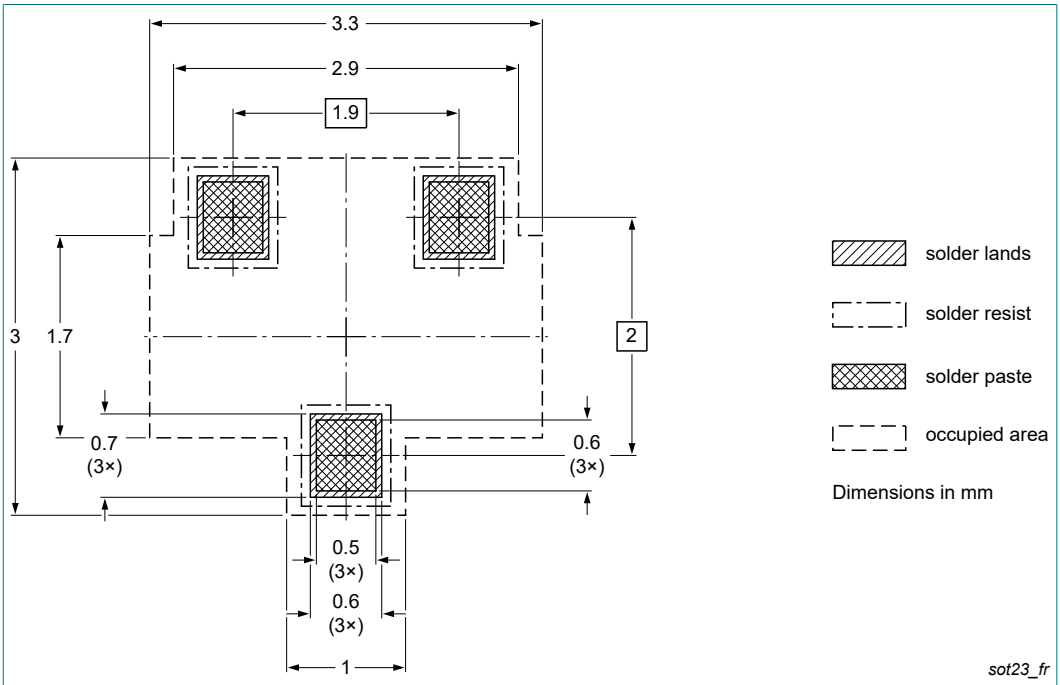


Fig. 12. Reflow soldering footprint for SOT23 (TO-236AB)

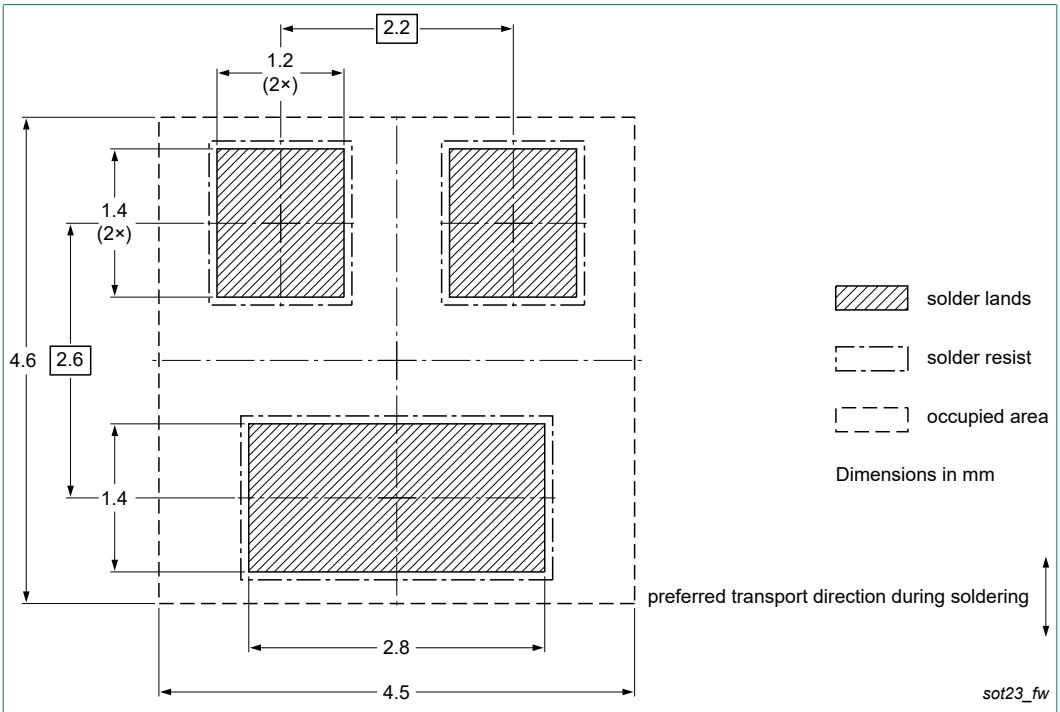


Fig. 13. Wave soldering footprint for SOT23 (TO-236AB)

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13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX84_SER v.7	20230101	Product data sheet	-	BZX84_SER v.6
Modifications:	• Section "Packing information" removed • Limiting values: Temperature specifications adjusted • Products changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternatives.			
BZX84_SER v.6	20140306	Product data sheet		BZX84_SER v.5
BZX84_SER v.5	20130918	Product data sheet	-	BZX84_SER v.4
BZX84_SER v.4	20130322	Product data sheet	-	BZX84_SERIES v.3
BZX84_SERIES v.3	20030410	Product data sheet	-	BZX84 v.2
BZX84 v.2	19990518	Product specification	-	BZX84 v.1
BZX84 v.1	19960426	Product specification	-	-

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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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