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BZX84W series

Voltage regulator diodes

Rev. 1 — 29 May 2018

Product data sheet

1 Product profile

1.1 General description

General-purpose Zener diodes in an SOT323 (SC-70) leadless very small Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

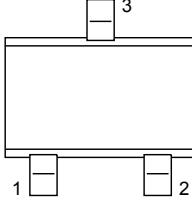
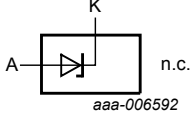
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: $\pm 2\%$ and $\pm 5\%$
- AEC-Q101 qualified

1.3 Applications

- General regulation functions
- High-frequency applications

2 Pinning information

Table 1. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		 aaa-006592
2	n.c.	not connected		
3	K	cathode		

3 Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BZX84W-B2V4 to BZX84W-C75 ^[1]	SC-70	Plastic surface-mounted package; 3 leads	SOT323

[1] The series consists of 74 types with nominal working voltages from 2.4 V to 75 V.

4 Marking

Table 3. Marking Codes

Type number	Marking Code	Type number	Marking Code	Type number	Marking Code	Type number	Marking Code
BZX84W-B2V4	D3%	BZX84W-B15	J5%	BZX84W-C2V4	M3%	BZX84W-C15	R8%
BZX84W-B2V7	D4%	BZX84W-B16	J6%	BZX84W-C2V7	M4%	BZX84W-C16	R9%
BZX84W-B3V0	D5%	BZX84W-B18	J7%	BZX84W-C3V0	M5%	BZX84W-C18	S2%
BZX84W-B3V3	D6%	BZX84W-B20	J8%	BZX84W-C3V3	M6%	BZX84W-C20	S3%
BZX84W-B3V6	D7%	BZX84W-B22	J9%	BZX84W-C3V6	M7%	BZX84W-C22	S4%
BZX84W-B3V9	D8%	BZX84W-B24	K5%	BZX84W-C3V9	M9%	BZX84W-C24	S5%
BZX84W-B4V3	D9%	BZX84W-B27	K6%	BZX84W-C4V3	N3%	BZX84W-C27	S6%
BZX84W-B4V7	E4%	BZX84W-B30	K7%	BZX84W-C4V7	P3%	BZX84W-C30	S7%
BZX84W-B5V1	E5%	BZX84W-B33	K8%	BZX84W-C5V1	P4%	BZX84W-C33	S8%
BZX84W-B5V6	E6%	BZX84W-B36	K9%	BZX84W-C5V6	P5%	BZX84W-C36	S9%
BZX84W-B6V2	E7%	BZX84W-B39	L2%	BZX84W-C6V2	P6%	BZX84W-C39	U2%
BZX84W-B6V8	E8%	BZX84W-B43	L3%	BZX84W-C6V8	P7%	BZX84W-C43	U3%
BZX84W-B7V5	E9%	BZX84W-B47	L5%	BZX84W-C7V5	P8%	BZX84W-C47	U4%
BZX84W-B8V2	F5%	BZX84W-B51	L6%	BZX84W-C8V2	P9%	BZX84W-C51	U5%
BZX84W-B9V1	F7%	BZX84W-B56	L7%	BZX84W-C9V1	R3%	BZX84W-C56	U6%
BZX84W-B10	F9%	BZX84W-B62	L8%	BZX84W-C10	R4%	BZX84W-C62	U7%
BZX84W-B11	J2%	BZX84W-B68	L9%	BZX84W-C11	R5%	BZX84W-C68	U8%
BZX84W-B12	J3%	BZX84W-B75	M2%	BZX84W-C12	R6%	BZX84W-C75	U9%
BZX84W-B13	J4%	-	-	BZX84W-C13	R7%	-	-

% = placeholder for manufacturing site code

5 Limiting values

Table 4. 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	$t_p = 100 \mu s$; square wave; $T_{amb} = 25 \text{ }^\circ\text{C}$; prior to surge	-	40	W
P_{tot}	total power dissipation	$T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	275	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 copper, tin-plated and standard footprint.

6 Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air [1]	-	-	455	K/W

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

7 Characteristics

Table 6. Electrical characteristics

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

Symbol	Parameter	Conditions	Max	Unit
V_F	forward voltage	$I_F = 10\text{ mA}$	0.9	V
I_R	reverse current			
	BZX84W-B/C2V4	$V_R = 1\text{ V}$	50	μA
	BZX84W-B/C2V7	$V_R = 1\text{ V}$	20	μA
	BZX84W-B/C3V0	$V_R = 1\text{ V}$	10	μA
	BZX84W-B/C3V3	$V_R = 1\text{ V}$	5	μA
	BZX84W-B/C3V6	$V_R = 1\text{ V}$	5	μA
	BZX84W-B/C3V9	$V_R = 1\text{ V}$	3	μA
	BZX84W-B/C4V3	$V_R = 1\text{ V}$	3	μA
	BZX84W-B/C4V7	$V_R = 2\text{ V}$	3	μA
	BZX84W-B/C5V1	$V_R = 2\text{ V}$	2	μA
	BZX84W-B/C5V6	$V_R = 2\text{ V}$	1	μA
	BZX84W-B/C6V2	$V_R = 4\text{ V}$	3	μA
	BZX84W-B/C6V8	$V_R = 4\text{ V}$	2	μA
	BZX84W-B/C7V5	$V_R = 5\text{ V}$	1	μA
	BZX84W-B/C8V2	$V_R = 5\text{ V}$	700	nA
	BZX84W-B/C9V1	$V_R = 6\text{ V}$	500	nA
	BZX84W-B/C10	$V_R = 7\text{ V}$	200	nA
	BZX84W-B/C11	$V_R = 8\text{ V}$	100	nA
	BZX84W-B/C12	$V_R = 8\text{ V}$	100	nA
	BZX84W-B/C13	$V_R = 8\text{ V}$	100	nA
BZX84W-B/C15 to 75	$V_R = 0.7 V_{Znom}$	50	nA	

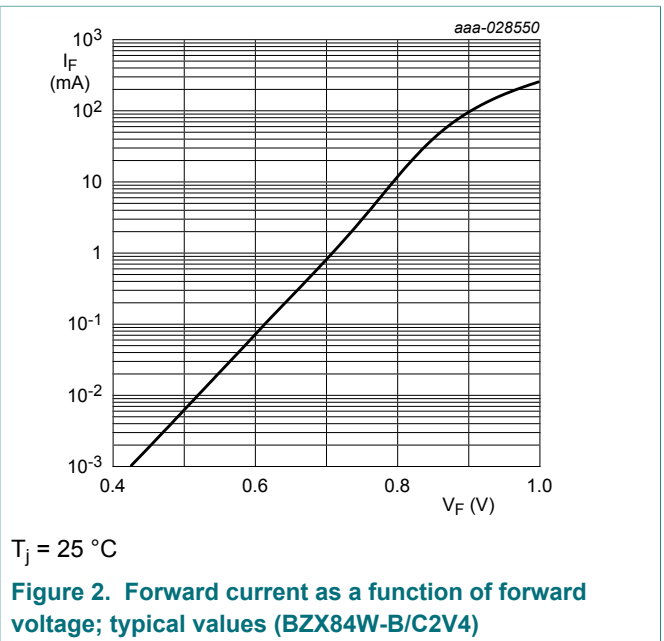
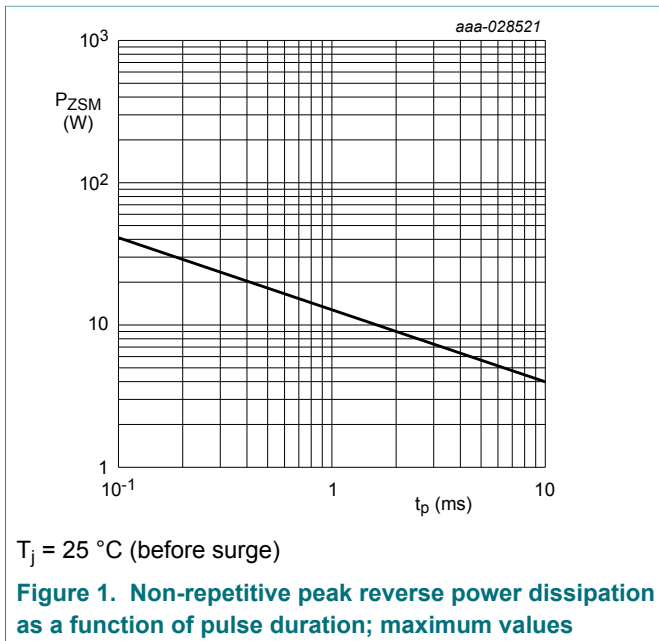
Table 7. Electrical characteristics per type

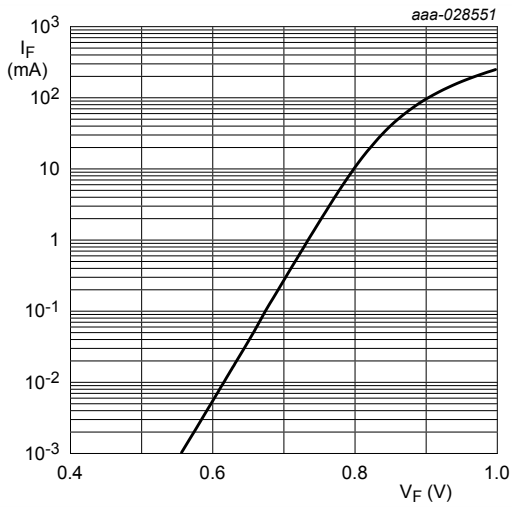
BZX84W- B or C	Working voltage V_Z (V); at $I_Z = 5$ mA				Differential resistance r_{diff} (Ω);				Temperature coefficient S_Z (mV/K); $I_{Ztest} = 5$ mA	Diode capacit. C_d (pF) ^[1]	Non- repetitive peak reverse current I_{ZSM} (A) at $t_p = 100$ μ s; $T_{amb} = 25^\circ$ C
	Tol. $\pm 2\%$ (B)		Tol. $\pm 5\%$ (C)		at $I_{Ztest} = 1$ mA		at $I_{Ztest} = 5$ mA				
	Min	Max	Min	Max	Typ	Max	Typ	Max			
2V4	2.35	2.45	2.2	2.6	275	600	70	100	-1.6	450	6
2V7	2.65	2.75	2.5	2.9	300	600	75	100	-2.0	450	6
3V0	2.94	3.06	2.8	3.2	325	600	80	95	-2.1	450	6
3V3	3.23	3.37	3.1	3.5	350	600	85	95	-2.4	450	6
3V6	3.53	3.67	3.4	3.8	375	600	85	90	-2.4	450	6
3V9	3.82	3.98	3.7	4.1	400	600	85	90	-2.5	450	6
4V3	4.21	4.39	4.0	4.6	410	600	80	90	-2.5	450	6
4V7	4.61	4.79	4.4	5.0	425	500	50	80	-1.4	300	6
5V1	5.00	5.20	4.8	5.4	400	480	40	60	-0.8	300	6
5V6	5.49	5.71	5.2	6.0	80	400	15	40	1.2	300	6
6V2	6.08	6.32	5.8	6.6	40	150	6	10	2.3	200	6
6V8	6.66	6.94	6.4	7.2	30	80	6	15	3.0	200	6
7V5	7.35	7.65	7.0	7.9	30	80	6	15	4.0	150	4
8V2	8.04	8.36	7.7	8.7	40	80	6	15	4.6	150	4
9V1	8.92	9.28	8.5	9.6	40	100	6	15	5.5	150	3
10	9.80	10.20	9.4	10.6	50	150	8	20	6.4	90	3
11	10.8	11.2	10.4	11.6	50	150	10	20	7.4	85	2.5
12	11.8	12.2	11.4	12.7	50	150	10	25	8.4	85	2.5
13	12.7	13.3	12.4	14.1	50	170	10	30	9.4	80	2.5
15	14.7	15.3	13.8	15.6	50	200	10	30	11.4	75	2.0
16	15.7	16.3	15.3	17.1	50	200	10	40	12.4	75	1.5
18	17.6	18.4	16.8	19.1	50	225	10	45	14.4	70	1.5
20	19.6	20.4	18.8	21.2	60	225	15	55	16.4	60	1.5
22	21.6	22.4	20.8	23.3	60	250	20	55	18.4	60	1.25
24	23.5	24.5	22.8	25.6	60	250	25	70	20.4	55	1.25

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

BZX84W-Working voltage B or C	Working voltage V_Z (V); at $I_Z = 2$ mA				Differential resistance r_{diff} (Ω);				Temperature coefficient S_Z (mV/K); $I_{Ztest} = 2$ mA	Diode capacit. C_d (pF) ^[1]	Non- repetitive peak reverse current I_{ZSM} (A) at $t_p = 100 \mu s$; $T_{amb} = 25^\circ C$
	Tol. $\pm 2\%$ (B)		Tol. $\pm 5\%$ (C)		at $I_{Ztest} = 0.5$ mA		at $I_{Ztest} = 2$ mA				
	Min	Max	Min	Max	Typ	Max	Typ	Max			
27	26.5	27.5	25.1	28.9	65	300	25	80	23.4	50	1.0
30	29.4	30.6	28.5	32.0	70	300	30	80	26.6	50	1.0
33	32.3	33.7	31.0	35.0	75	325	35	80	29.7	45	0.9
36	35.3	36.7	34.0	38.0	80	350	35	90	33.0	45	0.8
39	38.2	39.8	37.0	41.0	80	350	40	130	36.4	45	0.7
43	42.1	43.9	40.0	46.0	85	375	45	150	41.2	40	0.6
47	46.1	47.9	44.0	50.0	85	375	50	170	46.1	40	0.5
51	50.0	52.0	48.0	54.0	90	400	60	180	51.0	40	0.4
56	54.9	57.1	52.0	60.0	100	425	70	200	57.0	40	0.3
62	60.8	63.2	58.0	66.0	120	450	80	215	64.4	35	0.3
68	66.6	69.4	64.0	72.0	150	475	90	240	71.7	35	0.25
75	73.5	76.5	70.0	79.0	170	500	95	255	80.2	35	0.2

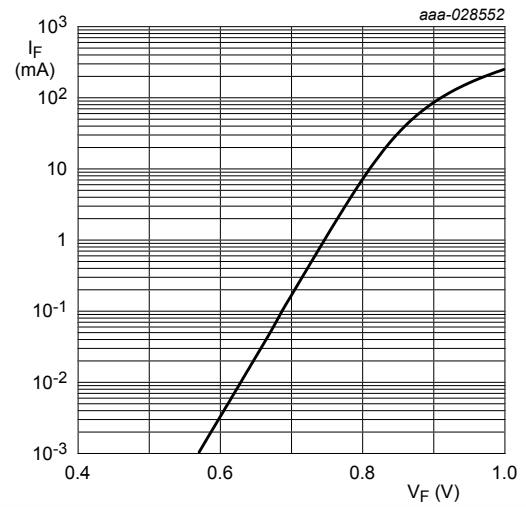
[1] $f = 1$ MHz; $V_R = 0$ V





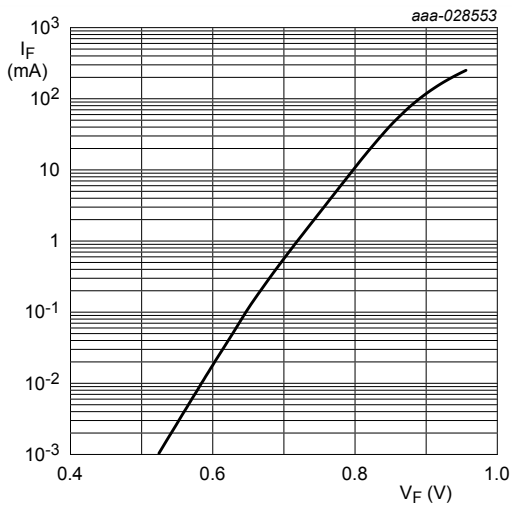
$T_j = 25\text{ }^\circ\text{C}$

Figure 3. Forward current as a function of forward voltage; typical values (BZX84W-B/C6V8)



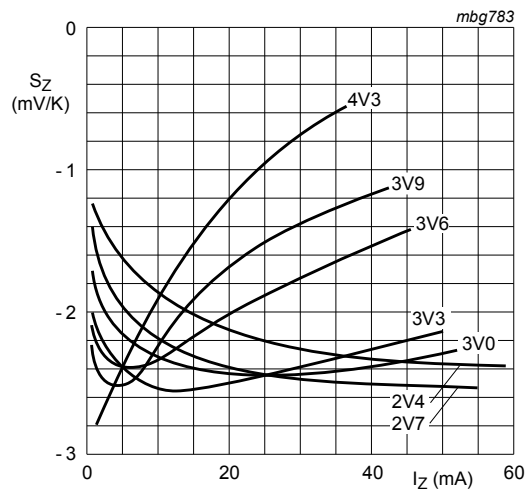
$T_j = 25\text{ }^\circ\text{C}$

Figure 4. Forward current as a function of forward voltage; typical values (BZX84W-B/C7V5)



$T_j = 25\text{ }^\circ\text{C}$

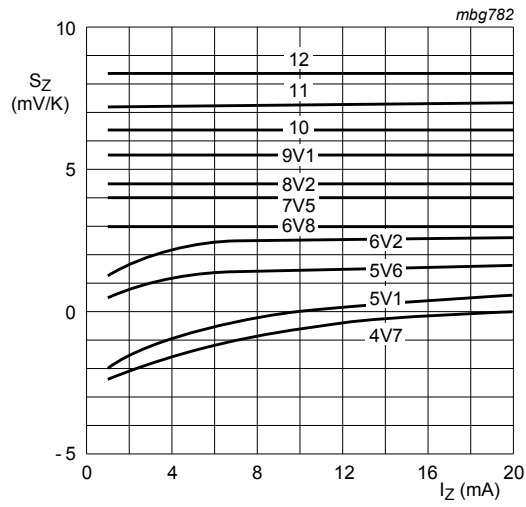
Figure 5. Forward current as a function of forward voltage; typical values (BZX84W-B/C75)



BZX84W_B/C2V4 to B/C4V3

$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$

Figure 6. Temperature coefficient as a function of working current; typical values



BZX84W_B/C4V7 to B/C12

$T_j = 25\text{ °C to }150\text{ °C}$

Figure 7. Temperature coefficient as a function of working current; typical values

8 Package outline

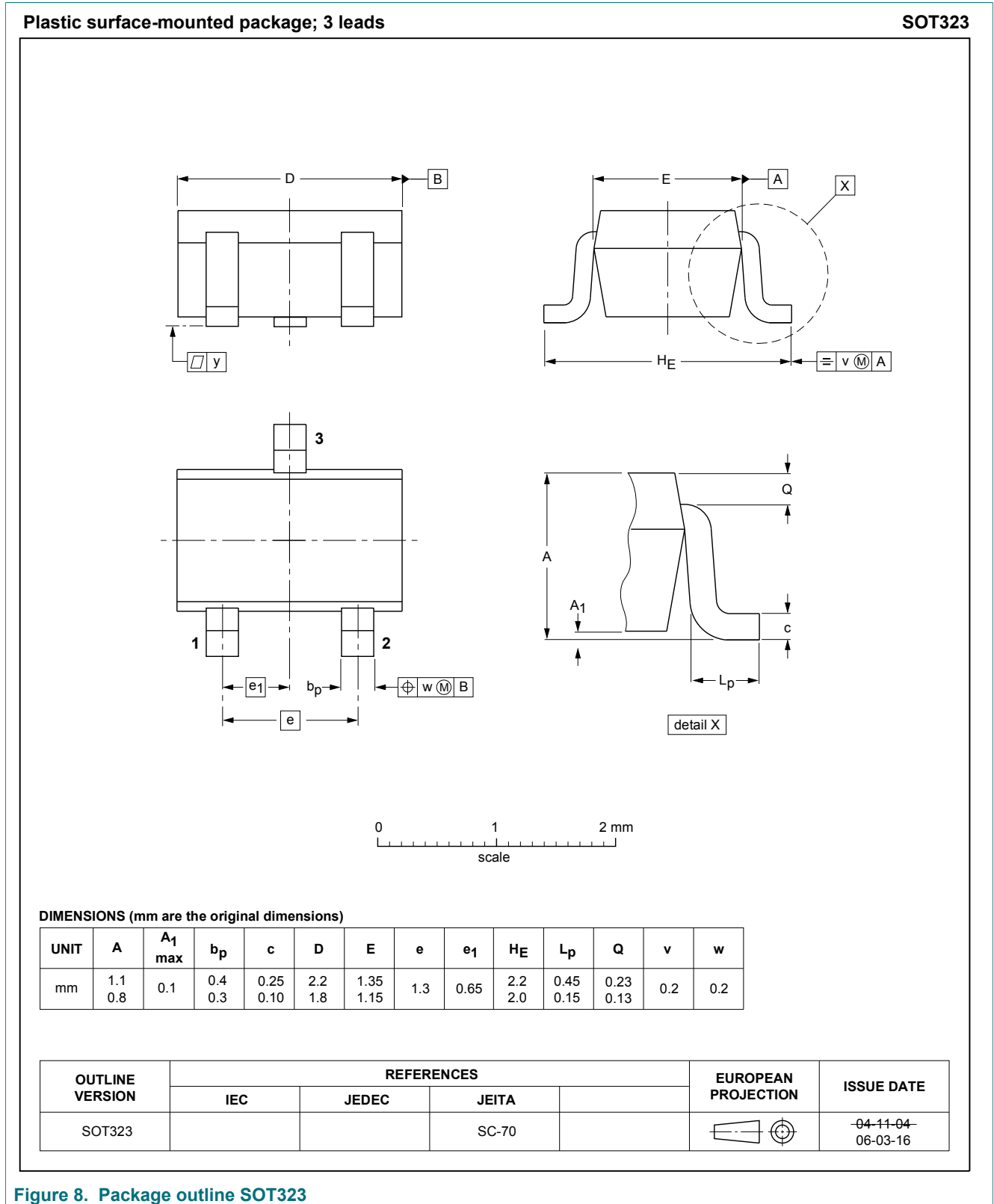


Figure 8. Package outline SOT323

9 Soldering

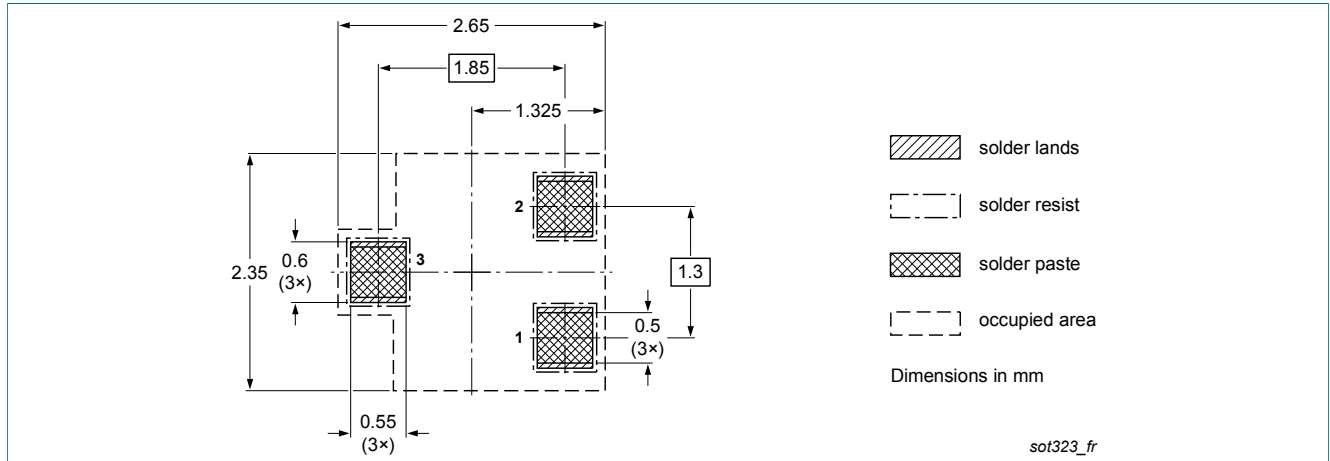


Figure 9. Reflow soldering footprint SOT323

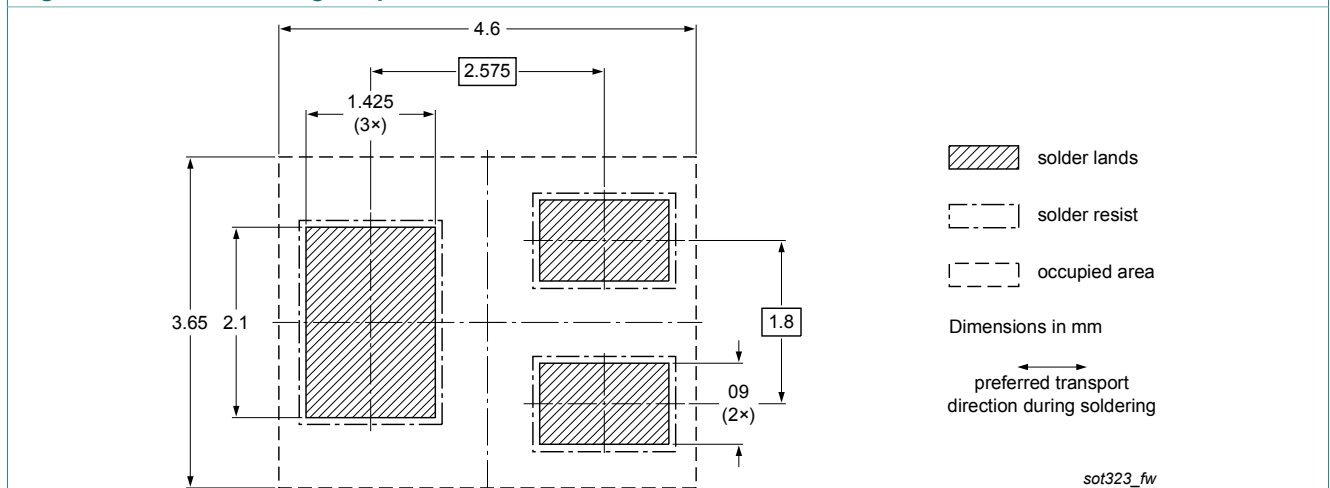


Figure 10. Wave soldering footprint SOT323

10 Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX84W_SER v.1	20180529	Product data sheet	-	-

11 Legal information

11.1 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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