



BZX84W series

Voltage regulator diodes

Rev. 2 — 1 January 2023

Product data sheet

1. General description

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

2. Features and benefits

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

3. Applications

- General regulation functions
- High-frequency applications

4. Quick reference data

Table 1. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 10\text{ mA}$ [1]	-	-	0.9	V
P_{tot}	total power dissipation	[2]	-	-	275	mW

[1] Pulse test: $t_p \leq 100\text{ }\mu\text{s}$; $\delta \leq 0.02$

[2] Device mounted on a FR4 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
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.

7. Marking

Table 4. Marking Codes

Type number	Mark. Code[1]	Type number	Mark. Code[1]	Type number	Mark. Code[1]	Type number	Mark. Code[1]
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%	-	-

[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	$t_p = 100 \mu s$; square wave; $T_{amb} = 25^\circ C$; prior to surge	-	40	W
P_{tot}	total power dissipation	$T_{amb} = 25^\circ C$ [1]	-	275	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 a FR4 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]	-	-	455	K/W

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

10. Characteristics

Table 7. Characteristics per type; BZX84W-B2V4 to BZX84W-C75

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

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

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

Table 8. Characteristics per type; BZX84W-B2V4 to BZX84W-C24

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

BZX84W-	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Temperature coefficient S_Z (mV/K)	Diode capacit. C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A)
		$I_Z = 5\text{ mA}$ Tol. $\pm 2\%$ (B) Tol. $\pm 5\%$ (C)		$I_Z = 1\text{ mA}$	$I_Z = 5\text{ mA}$	$I_Z = 5\text{ mA}$		$t_p = 100\text{ }\mu\text{s};$ $T_{amb} = 25\text{ }^{\circ}\text{C}$
		Min	Max	Max	Max	Typ	Max	Max
2V4	B	2.35	2.45	600	100	-1.6	450	6
	C	2.20	2.60					
2V7	B	2.65	2.75	600	100	-2.0	450	6
	C	2.50	2.90					
3V0	B	2.94	3.06	600	95	-2.1	450	6
	C	2.80	3.20					
3V3	B	3.23	3.37	600	95	-2.4	450	6
	C	3.10	3.50					
3V6	B	3.53	3.67	600	90	-2.4	450	6
	C	3.40	3.80					
3V9	B	3.82	3.98	600	90	-2.5	450	6
	C	3.70	4.10					
4V3	B	4.21	4.39	600	90	-2.5	450	6
	C	4.00	4.60					
4V7	B	4.61	4.79	500	80	-1.4	300	6
	C	4.40	5.00					
5V1	B	5.00	5.20	480	60	-0.8	300	6
	C	4.80	5.40					
5V6	B	5.49	5.71	400	40	1.2	300	6
	C	5.20	6.00					
6V2	B	6.08	6.32	150	10	2.3	200	6
	C	5.80	6.60					
6V8	B	6.66	6.94	80	15	3.0	200	6
	C	6.40	7.20					
7V5	B	7.35	7.65	80	15	4.0	150	4
	C	7.00	7.90					
8V2	B	8.04	8.36	80	15	4.6	150	4
	C	7.70	8.70					
9V1	B	8.92	9.28	100	15	5.5	150	3
	C	8.50	9.60					
10	B	9.80	10.20	150	20	6.4	90	3
	C	9.40	10.60					
11	B	10.80	11.20	150	20	7.4	85	2.5
	C	10.40	11.60					
12	B	11.80	12.20	150	25	8.4	85	2.5
	C	11.40	12.70					

BZX84W-	Sel	Working voltage V _Z (V)		Differential resistance r _{dif} (Ω)		Temperature coefficient S _Z (mV/K)	Diode capacit. C _d (pF) [1]	Non-repetitive peak reverse current I _{ZSM} (A)
		I _Z = 5 mA Tol. ± 2% (B) Tol. ± 5% (C)		I _Z = 1 mA	I _Z = 5 mA	I _Z = 5 mA		t _p = 100 μs; T _{amb} = 25 °C
		Min	Max	Max	Max	Typ		Max
13	B	12.70	13.30	170	30	9.4	80	2.5
	C	12.40	14.10					
15	B	14.70	15.30	200	30	11.4	75	2.0
	C	13.80	15.60					
16	B	15.70	16.30	200	40	12.4	75	1.5
	C	15.30	17.10					
18	B	17.60	18.40	225	45	14.4	70	1.5
	C	16.80	19.10					
20	B	19.60	20.40	225	55	16.4	60	1.5
	C	18.80	21.20					
22	B	21.60	22.40	250	55	18.4	60	1.25
	C	20.80	23.30					
24	B	23.50	24.50	250	70	20.4	55	1.25
	C	22.80	25.60					

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

Table 9. Characteristics per type; BZX84W-B27 to BZX84W-C75

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

BZX84W-	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Temperature coefficient S_Z (mV/K)	Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current
		$I_Z = 2\text{ mA}$ Tol. $\pm 2\%$ (B) Tol. $\pm 5\%$ (C)		$I_Z = 0.5\text{ mA}$	$I_Z = 2\text{ mA}$	$I_Z = 2\text{ mA}$		I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$
		Min	Max	Max	Max	Typ	Max	Max
27	B	26.50	27.50	300	80	23.4	50	1.0
	C	25.10	28.90					
30	B	29.40	30.60	300	80	26.6	50	1.0
	C	28.50	32.00					
33	B	32.30	33.70	325	80	29.7	45	0.9
	C	31.00	35.00					
36	B	35.30	36.70	350	90	33.0	45	0.8
	C	34.00	38.00					
39	B	38.20	39.80	350	130	36.4	45	0.7
	C	37.00	41.00					
43	B	42.10	43.90	375	150	41.2	40	0.6
	C	40.00	46.00					
47	B	46.10	47.90	375	170	46.1	40	0.5
	C	44.00	50.00					
51	B	50.00	52.00	400	180	51.0	40	0.4
	C	48.00	54.00					
56	B	54.90	57.10	425	200	57.0	40	0.3
	C	52.00	60.00					
62	B	60.80	63.20	450	215	64.4	35	0.3
	C	58.00	66.00					
68	B	66.60	69.40	475	240	71.7	35	0.25
	C	64.00	72.00					
75	B	73.50	76.50	500	255	80.2	35	0.2
	C	70.00	79.00					

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

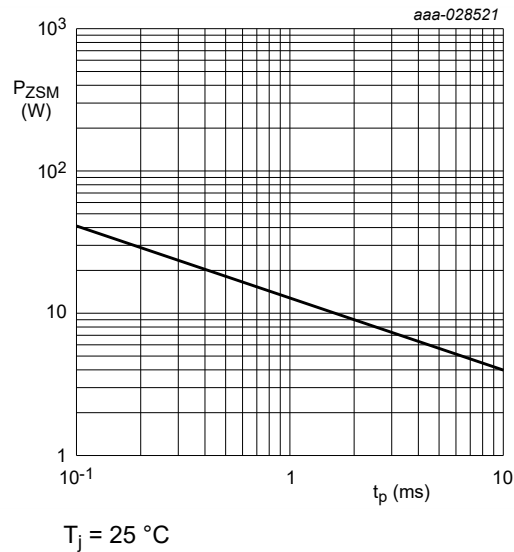


Fig. 1. Non-repetitive peak reverse power dissipation as a function of pulse duration, maximum values

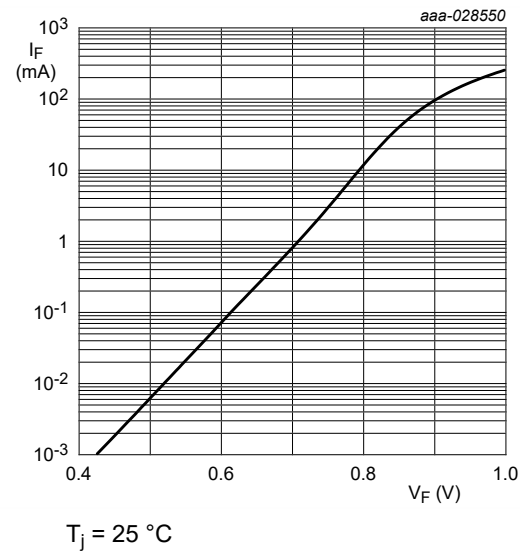


Fig. 2. Forward current as a function of forward voltage; typical values (BZX84W-B/C2V4)

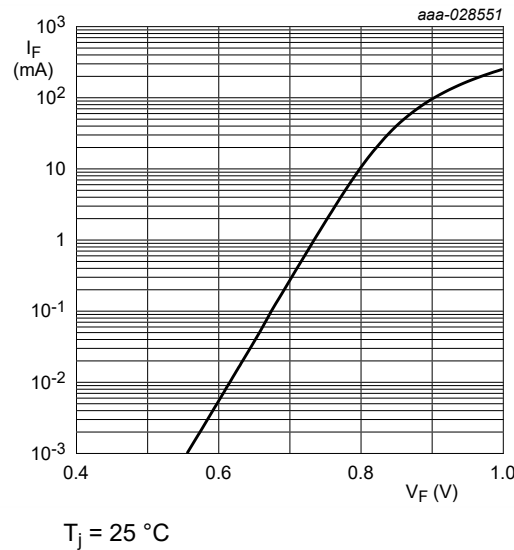


Fig. 3. Forward current as a function of forward voltage; typical values (BZX84W-B/C6V8)

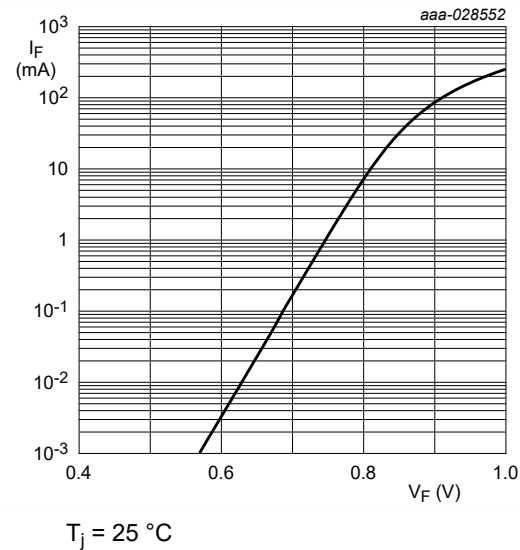


Fig. 4. Forward current as a function of forward voltage; typical values (BZX84W-B/C7V5)

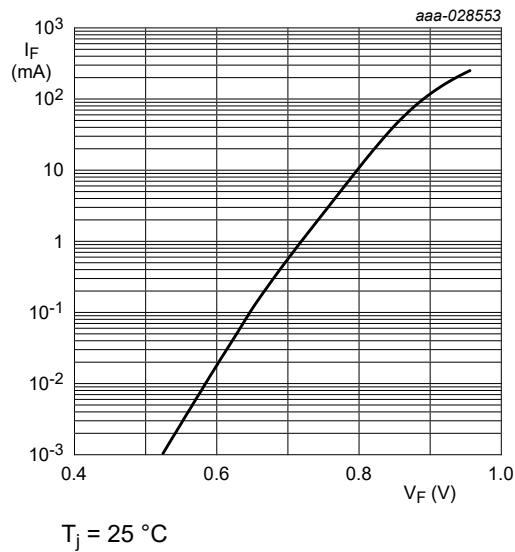


Fig. 5. Forward current as a function of forward voltage; typical values (BZX84W-B/C75)

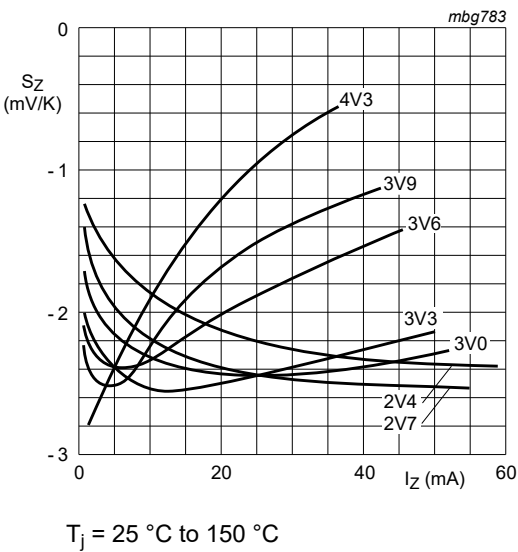


Fig. 6. Temperature coefficient as a function of working current; typical values (BZX84W-B/C2V4 to B/C4V3)

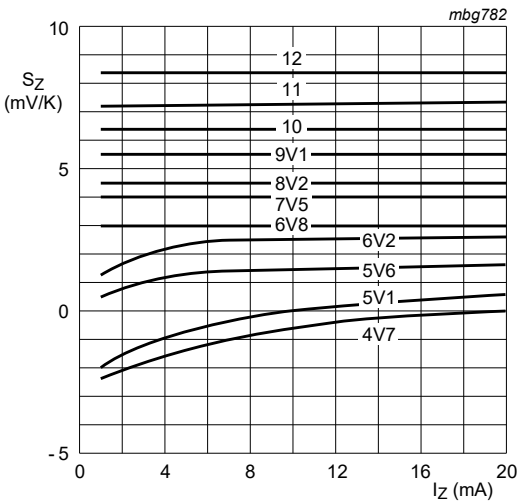


Fig. 7. Temperature coefficient as a function of working current; typical values (BZX84W-B/C4V7 to B/C12)

11. Package outline

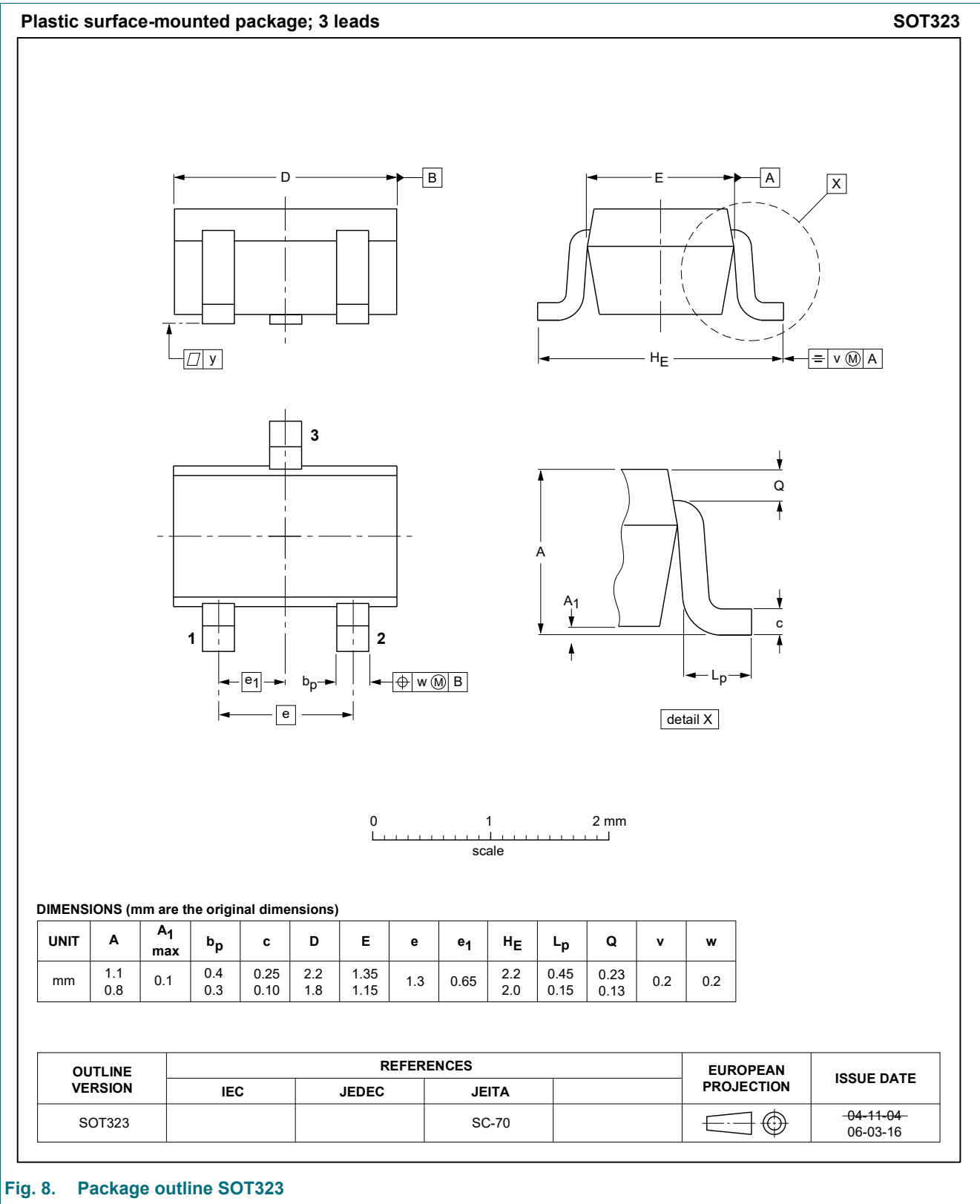


Fig. 8. Package outline SOT323

12. Soldering

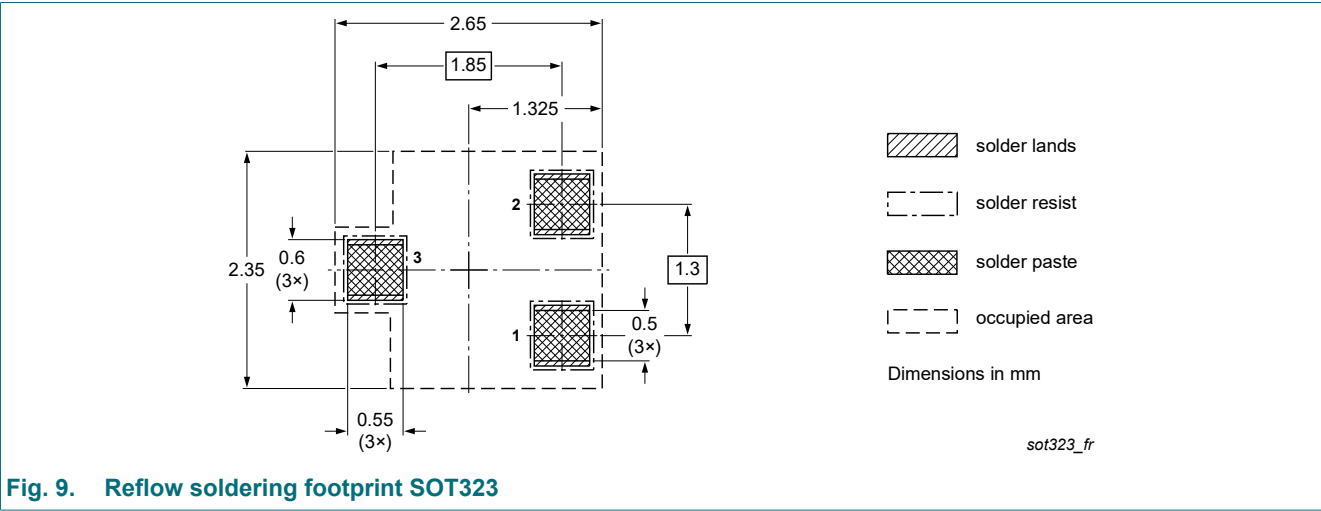


Fig. 9. Reflow soldering footprint SOT323

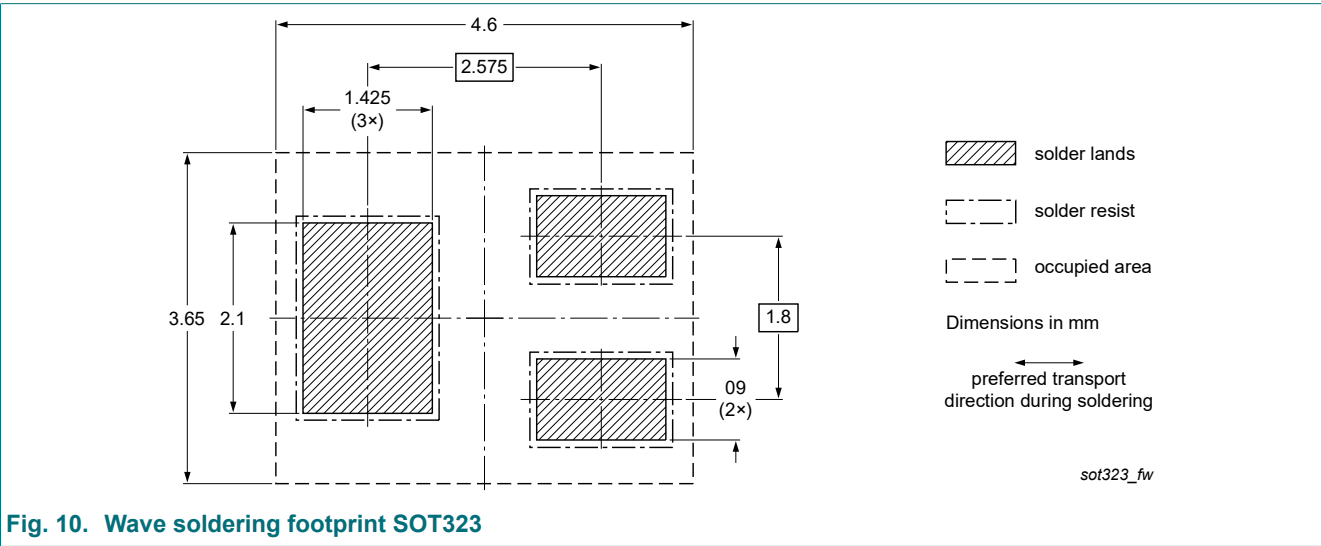


Fig. 10. Wave soldering footprint SOT323

13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX84W_SER v.2	20230101	Product data sheet	-	BZX84W_SER v.1
Modifications:	Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BZX84W_SER v.1	20180529	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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal

injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nexperia.com/profile/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

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..... 4

11. Package outline..... 10

12. Soldering..... 11

13. Revision history..... 12

14. Legal information..... 13

© Nexperia B.V. 2023. All rights reserved

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: salesaddresses@nexperia.com

Date of release: 1 January 2023

单击下面可查看定价，库存，交付和生命周期等信息

[>>Nexperia\(安世\)](#)