

BZX84W-Q series

Voltage regulator diodes

Rev. 1 — 19 November 2021

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: ± 2 % and ± 5 %
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- · General regulation functions
- · High-frequency applications

4. Quick reference data

Table 1. Quick reference data

 T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _F	forward voltage	I _F = 10 mA [1	-	-	0.9	V
P _{tot}	total power dissipation	[2		-	275	mW

- [1] Pulse test: $tp \le 100 \mu s$; $\delta \le 0.02$
- [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	<u></u> 3	K
2	n.c.	not connected		A n.c.
3	K	cathode		aaa-006592
				udu 000032



6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX84W-B2V4-Q to BZX84W-C75-Q [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-Q	D3%	BZX84W-B15-Q	J5%	BZX84W-C2V4-Q	M3%	BZX84W-C15-Q	R8%
BZX84W-B2V7-Q	D4%	BZX84W-B16-Q	J6%	BZX84W-C2V7-Q	M4%	BZX84W-C16-Q	R9%
BZX84W-B3V0-Q	D5%	BZX84W-B18-Q	J7%	BZX84W-C3V0-Q	M5%	BZX84W-C18-Q	S2%
BZX84W-B3V3-Q	D6%	BZX84W-B20-Q	J8%	BZX84W-C3V3-Q	M6%	BZX84W-C20-Q	S3%
BZX84W-B3V6-Q	D7%	BZX84W-B22-Q	J9%	BZX84W-C3V6-Q	M7%	BZX84W-C22-Q	S4%
BZX84W-B3V9-Q	D8%	BZX84W-B24-Q	K5%	BZX84W-C3V9-Q	M9%	BZX84W-C24-Q	S5%
BZX84W-B4V3-Q	D9%	BZX84W-B27-Q	K6%	BZX84W-C4V3-Q	N3%	BZX84W-C27-Q	S6%
BZX84W-B4V7-Q	E4%	BZX84W-B30-Q	K7%	BZX84W-C4V7-Q	P3%	BZX84W-C30-Q	S7%
BZX84W-B5V1-Q	E5%	BZX84W-B33-Q	K8%	BZX84W-C5V1-Q	P4%	BZX84W-C33-Q	S8%
BZX84W-B5V6-Q	E6%	BZX84W-B36-Q	K9%	BZX84W-C5V6-Q	P5%	BZX84W-C36-Q	S9%
BZX84W-B6V2-Q	E7%	BZX84W-B39-Q	L2%	BZX84W-C6V2-Q	P6%	BZX84W-C39-Q	U2%
BZX84W-B6V8-Q	E8%	BZX84W-B43-Q	L3%	BZX84W-C6V8-Q	P7%	BZX84W-C43-Q	U3%
BZX84W-B7V5-Q	E9%	BZX84W-B47-Q	L5%	BZX84W-C7V5-Q	P8%	BZX84W-C47-Q	U4%
BZX84W-B8V2-Q	F5%	BZX84W-B51-Q	L6%	BZX84W-C8V2-Q	P9%	BZX84W-C51-Q	U5%
BZX84W-B9V1-Q	F7%	BZX84W-B56-Q	L7%	BZX84W-C9V1-Q	R3%	BZX84W-C56-Q	U6%
BZX84W-B10-Q	F9%	BZX84W-B62-Q	L8%	BZX84W-C10-Q	R4%	BZX84W-C62-Q	U7%
BZX84W-B11-Q	J2%	BZX84W-B68-Q	L9%	BZX84W-C11-Q	R5%	BZX84W-C68-Q	U8%
BZX84W-B12-Q	J3%	BZX84W-B75-Q	M2%	BZX84W-C12-Q	R6%	BZX84W-C75-Q	U9%
BZX84W-B13-Q	J4%	-	-	BZX84W-C13-Q	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 μs; square wave; T _{amb} = 25 °C; prior to surge		-	40	W
P _{tot}	total power dissipation	T _{amb} = 25 °C	[1]	-	275	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	+150	°C
T _{stg}	storage temperature			-65	+150	°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	Тур	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-Q to BZX84W-C75-Q

 T_i = 25 °C unless otherwise specified.

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

^[1] Pulse test: $t_p \le 300 \ \mu s; \ \delta \le 0.02$.

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

 T_i = 25 °C unless otherwise specified.

BZX84W-	Sel	Working voltage V _Z (V)		Differential $r_{dif}(\Omega)$	resistance	Temperature coefficient S _Z (mV/K)	Diode capacit. C _d (pF) [1]	Non-repetitive peak reverse current I _{ZSM} (A)
		I _Z = 5 m Tol. ± 2 Tol. ± 5	% (B)	I _Z = 1 mA	I _Z = 5 mA	I _Z = 5 mA		t _p = 100 μs; T _{amb} = 25 °C
		Min	Max	Max	Max	Тур	Max	Max
2V4-Q	В	2.35	2.45	600	100	-1.6	450	6
	С	2.20	2.60					
2V7-Q	В	2.65	2.75	600	100	-2.0	450	6
	С	2.50	2.90					
3V0-Q	В	2.94	3.06	600	95	-2.1	450	6
	С	2.80	3.20					
3V3-Q	В	3.23	3.37	600	95	-2.4	450	6
	С	3.10	3.50					
3V6-Q	В	3.53	3.67	600	90	-2.4	450	6
	С	3.40	3.80					
3V9-Q	В	3.82	3.82 3.98 600	600	90	-2.5	450	6
	С	3.70	4.10					
4V3-Q	В	4.21	4.39	600	90	-2.5	450	6
	С	4.00	4.60					
4V7-Q	В	4.61	4.79	500	80	80 -1.4	300	6
	С	4.40	5.00					
5V1-Q	В	5.00	5.20	480	60	-0.8	300	6
	С	4.80	5.40					
5V6-Q	В	5.49	5.71	400	40	1.2	300	6
	С	5.20	6.00					
6V2-Q	В	6.08	6.32	150	10	2.3	200	6
	С	5.80	6.60					
6V8-Q	В	6.66	6.94	80	15	3.0	200	6
	С	6.40	7.20					
7V5-Q	В	7.35	7.65	80	15	4.0	150	4
	С	7.00	7.90					
8V2-Q	В	8.04	8.36	80	15	4.6	150	4
	С	7.70	8.70					
9V1-Q	В	8.92	9.28	100	15	5.5	150	3
	С	8.50	9.60					
10-Q	В	9.80	10.20	150	20	6.4	90	3
	С	9.40	10.60	-				
11-Q	В	10.80	11.20	150	20	7.4	85	2.5
	С	10.40	11.60	\dashv		1.7	00	
12-Q	В	11.80	12.20	150	25	8.4	85	2.5
•	С	11.40	12.70	\dashv				

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

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

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

 T_i = 25 °C unless otherwise specified.

BZX84W-	Sel	Working voltage V _Z (V)	g	Differential r r _{dif} (Ω)	esistance	Tempe rature coeffic ient S _Z (mV/K)	capacitance	Non-repetitive peak reverse current	
		I _Z = 2 mA Tol. ± 2% (B) Tol. ± 5% (C)		I _Z = 0.5 mA	I _Z = 2 mA	I _Z = 2 mA		I _{ZSM} (A) at t _p = 100 μs; T _{amb} = 25 °C	
		Min	Max	Max	Max	Тур	Max	Max	
27-Q	В	26.50	27.50	300	80	23.4	50	1.0	
	С	25.10	28.90						
30-Q	В	29.40	30.60	300	80	26.6	50	1.0	
	С	28.50	32.00						
33-Q	В	32.30	33.70	325	80	29.7	45	0.9	
	С	31.00	35.00						
36-Q	В	35.30	36.70	350	90	33.0	45	0.8	
	С	34.00	38.00						
39-Q	В	38.20	39.80	350	130	36.4	45	0.7	
	С	37.00	41.00						
43-Q	В	42.10	43.90	375	150	41.2	40	0.6	
	С	40.00	46.00						
47-Q	В	46.10	47.90	375	170	46.1	40	0.5	
	С	44.00	50.00						
51-Q	В	50.00	52.00	400	180	51.0	40	0.4	
	С	48.00	54.00						
56-Q	В	54.90	57.10	425	200	57.0	40	0.3	
	С	52.00	60.00						
62-Q	В	60.80	63.20	450	215	64.4	35	0.3	
	С	58.00	66.00						
68-Q	В	66.60	69.40	475	240	71.7	35	0.25	
	С	64.00	72.00						
75-Q	В	73.50	76.50	500	255	80.2	35	0.2	
	С	70.00	79.00						

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

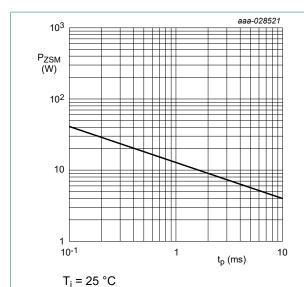


Fig. 1. Non-repetitive peak reverse power dissipation as a function of pulse duration, maximum values

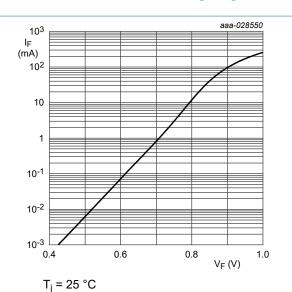


Fig. 2. Forward current as a function of forward voltage; typical values (BZX84W-B/C2V4-Q)

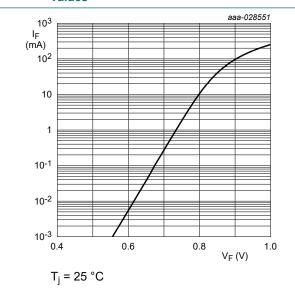


Fig. 3. Forward current as a function of forward voltage; typical values (BZX84W-B/C6V8-Q)

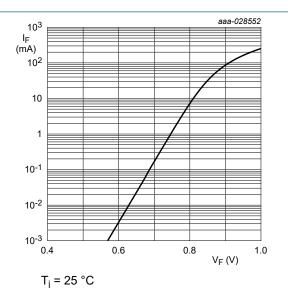


Fig. 4. Forward current as a function of forward voltage; typical values (BZX84W-B/C7V5-Q)

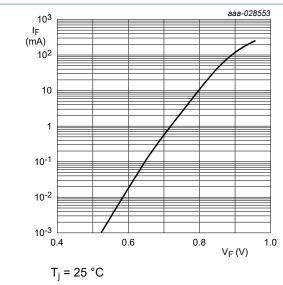
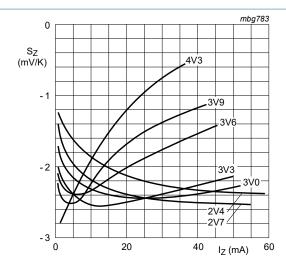


Fig. 5. Forward current as a function of forward voltage; typical values (BZX84W-B/C75-Q)



 T_i = 25 °C to 150 °C

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

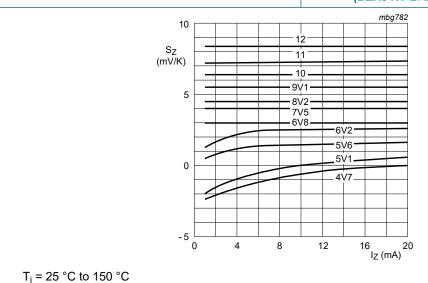


Fig. 7. Temperature coefficient as a function of working current; typical values (BZX84W-B/C4V7-Q to B/C12-Q)

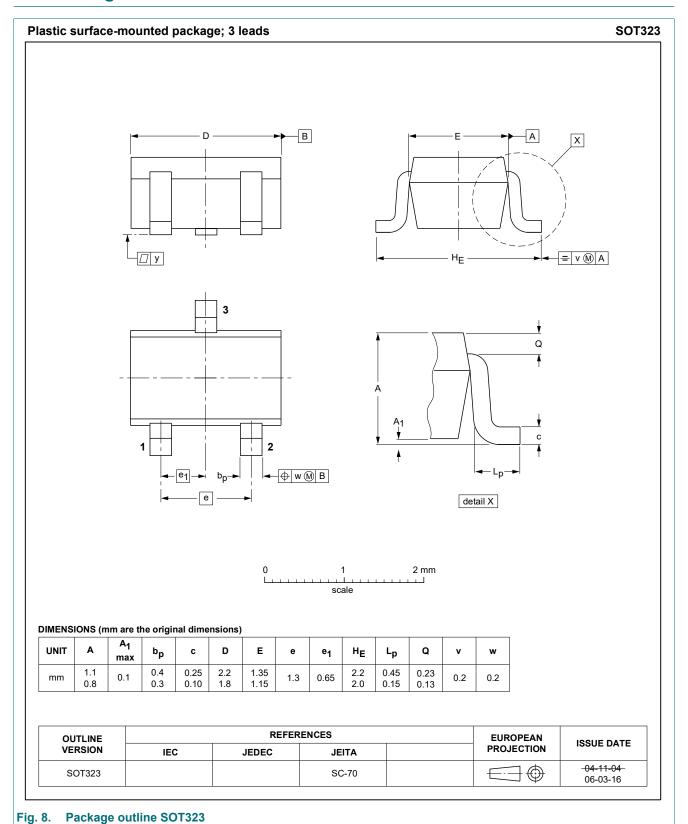
11. Test information

Quality information

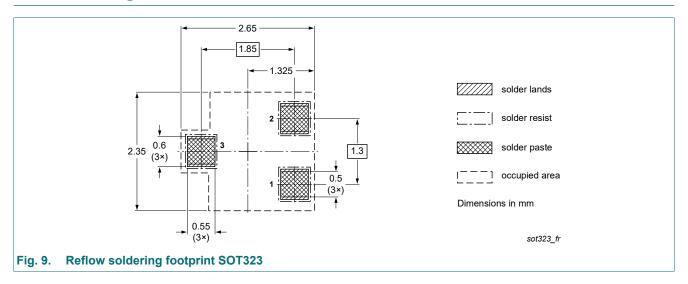
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

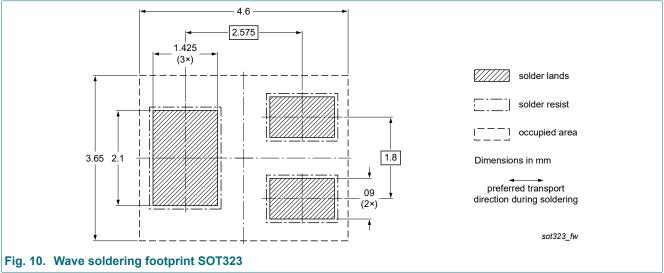
9 / 14

12. Package outline



13. Soldering





14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX84W-Q_SER v.1	20211119	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.

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