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	Тур	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: $t_p \le 100 \ \mu s$; $\delta \le 0.02$.



^[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

Voltage regulator diodes

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	Α	anode	3	K
2	n.c.	not connected		A n.c.
3	K	cathode		aaa-006592
				200 110002
			1 📙 🗀 2	

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.

BZX84 series

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

Voltage regulator diodes

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} ≤ 25 °C	[2]	-	250	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	+150	°C
T _{stg}	storage temperature			-65	+150	°C

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]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	330	K/W

Device mounted on an FR4 PCB, single-sided 70 µm copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

 T_i = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V _F	forward voltage	I _F = 10 mA	[1]	-	-	0.9	V

[1] Pulse test: $t_p \le 100 \mu s$; $\delta \le 0.02$

 t_p = 100 μ s; square wave; T_j = 25 °C prior to surge. Device mounted on an FR4 PCB, single-sided 70 μ m copper, tin-plated and standard footprint.

Soldering point of cathode tab.

Voltage regulator diodes

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 $r_{dif}(\Omega)$		se nt)			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	Α	2.37	2.43	600	100	50	1	-3.5	0.0	450	6.0	
	В	2.35	2.45									
	С	2.20	2.60									
2V7	Α	2.67	2.73	600	100	20	1	-3.5	0.0	450	6.0	
	В	2.65	2.75									
	С	2.50	2.90									
3V0	Α	2.97	3.03	600	95	10	1	-3.5	0.0	450	6.0	
	В	2.94	3.06									
	С	2.80	3.20									
3V3	Α	3.26	3.34	600	95	5	1	-3.5	0.0	450	6.0	
	В	3.23	3.37									
	С	3.10	3.50									
3V6	Α	3.56	3.64	600	90	5	1	-3.5	0.0	450	6.0	
	В	3.53	3.67									
	С	3.40	3.80									
3V9	Α	3.86	3.94	600	90	3	1	-3.5	0.0	450	6.0	
	В	3.82	3.98									
	С	3.70	4.10									
4V3	Α	4.25	4.35	600	90	3	1	-3.5	0.0	450	6.0	
	В	4.21	4.39									
	С	4.00	4.60									
4V7	Α	4.65	4.75	500	80	3	2	-3.5	0.2	300	6.0	
	В	4.61	4.79									
	С	4.40	5.00	_								
5V1	Α	5.04	5.16	480	60	2	2	-2.7	1.2	300	6.0	
	В	5.00	5.20									
	С	4.80	5.40	1								
5V6	Α	5.54	5.66	400	40	1	2	-2.0	2.5	300	6.0	
	В	5.49	5.71	1								
	С	5.20	6.00	1								
6V2	Α	6.13	6.27	150	10	3	4	0.4	3.7	200	6.0	
	В	6.08	6.32									
	С	5.80	6.60									
6V8	Α	6.73	6.87	80	15	2	4	1.2	4.5	200	6.0	
	В	6.66	6.94									
	С	6.40	7.20									
7V5	Α	7.42	7.58	80	15	1	5	2.5	5.3	150	4.0	
	В	7.35	7.65				1 3					
	С	7.00	7.90	1								

Voltage regulator diodes

BZX84 -xxx			e	$\begin{array}{c} \text{Maximum differential} \\ \text{resistance} \\ \text{r}_{\text{dif}}\left(\Omega\right) \end{array}$		curren	current I _R (μA)		erature cient V/K) 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	А	8.11	8.29	80	15	0.7	5	3.2	6.2	150	4.0	
	В	8.04	8.36]								
	С	7.70	8.70									
9V1	Α	9.00	9.20	100	15	0.5	6	3.8	7.0	150	3.0	
	В	8.92	9.28									
	С	8.50	9.60									
10	Α	9.90	10.10	150	20	0.2	7	4.5	8.0	90	3.0	
	В	9.80	10.20									
	С	9.40	10.60									
11	А	10.89	11.11	150	20	0.1	8	5.4	9.0	85	2.5	
	В	10.80	11.20									
	С	10.40	11.60									
12	А	11.88	12.12	150	25	0.1	8	6.0	10.0	85	2.5	
	В	11.80	12.20									
	С	11.40	12.70									
13	Α	12.87	13.13	170	30	0.1	8	7.0	11.0	80	2.5	
	В	12.70	13.30									
	С	12.40	14.10									
15	Α	14.85	15.15	200	30	0.05	10.5	9.2	13.0	75	2.0	
	В	14.70	15.30									
	С	13.80	15.60									
16	Α	15.84	16.16	200	40	0.05	11.2	10.4	14.0	75	1.5	
	В	15.70	16.30									
	С	15.30	17.10									
18	Α	17.82	18.18	225	45	0.05	12.6	12.4	16.0	70	1.5	
	В		18.40									
	С	16.80	19.10									
20	Α	19.80	20.20	225	55	0.05	14	14.4	18.0	60	1.5	
	В	19.60	20.40									
	С	18.80	21.20									
22	Α	21.78	22.22	250	55	0.05	15.4	16.4	20.0	60	1.25	
	В	21.60	22.40									
	С	20.80	23.30									
24	Α	23.76	24.24	250	70	0.05	16.8	18.4	22.0	55	1.25	
	В	23.50	24.50									
	С	22.80	25.60									

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

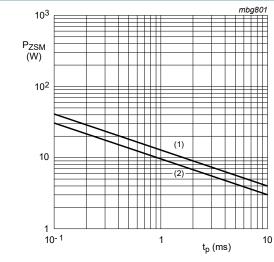
Table 9. Characteristics per type; BZX84-A27 to BZX84-C75

 T_i = 25 °C unless otherwise specified.

BZX84 Sel -xxx		Working voltage V _Z (V) I _Z = 2 mA		$\begin{array}{l} \text{Maximum differential} \\ \text{resistance} \\ \text{r}_{\text{dif}}\left(\Omega\right) \end{array}$		currer	Reverse current I _R (μA)		erature cient V/K) mA	Diode capacitance C _d (pF) [1]	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	Α	26.73	27.27	300	80	0.05	18.9	21.4	25.3	50	1.0	
	В	26.50	27.50									
	С	25.10	28.90									
30	Α	29.70	30.30	300	80	0.05	21	24.4	29.4	50	1.0	
	В	29.40	30.60									
	С	28.00	32.00									
33	Α	32.67	33.33	325	80	0.05	23.1	27.4	33.4	45	0.9	
	В	32.30	33.70									
	С	31.00	35.00									
36	Α	35.64	36.36	350	90	0.05	25.2	30.4	37.4	45	0.8	
	В	35.30	36.70									
	С	34.00	38.00									
39	Α	38.61	39.39	350	130	0.05	27.3	33.4	41.2	45	0.7	
	В	38.20	39.80									
	С	37.00	41.00									
43	Α	42.57	43.43	375	150	0.05	30.1	37.6	46.6	40	0.6	
	В	42.10	43.90									
	С	40.00	46.00									
47	В	46.10	47.90	375	170	0.05	32.9	42.0	51.8	40	0.5	
	С	44.00	50.00									
51	Α	50.49	51.51	400	180	0.05	35.7	46.6	57.2	40	0.4	
	В	50.00	52.00									
	С	48.00	54.00									
56	В	54.90	57.10	425	200	0.05	39.2	52.2	63.8	40	0.3	
	С	52.00	60.00									
62	В	60.80	63.20	450	215	0.05	43.4	58.8	71.6	35	0.3	
	С	58.00	66.00									
68	В	66.60	69.40	475	240	0.05	47.6	65.6	79.8	35	0.25	
	С	64.00	72.00									
75	Α	74.25	75.75	500	255	0.05	52.5	73.4	88.6	35	0.20	
	В	73.50	76.50									
	С	70.00	79.00									

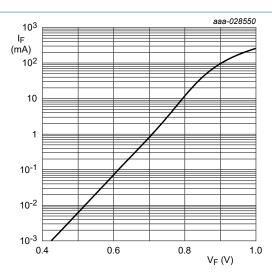
^[1] $f = 1 \text{ MHz}; V_R = 0 \text{ V}$

^[2] $t_p = 100 \mu s$; square wave; $T_j = 25 \text{ °C}$



- (1) T_i = 25 °C (before surge)
- (2) $T_i = 150 \,^{\circ}\text{C}$ (before surge)

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



 $T_i = 25 \,^{\circ}C$

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

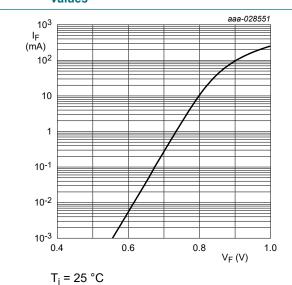
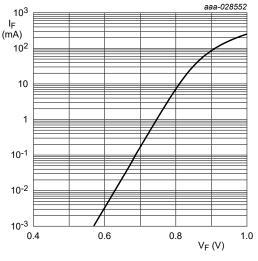


Fig. 3. Forward current as a function of forward voltage; typical values (BZX84-A/B/C6V8)



T_i = 25 °C

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

Voltage regulator diodes

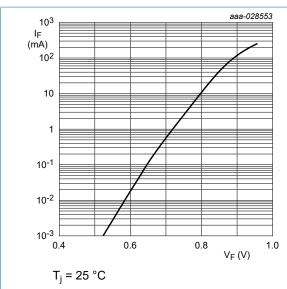


Fig. 5. Forward current as a function of forward voltage; typical values (BZX84-A/B/C75)

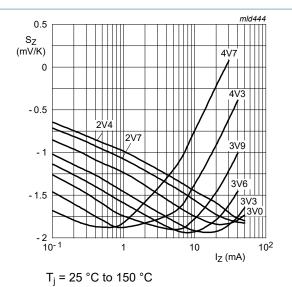


Fig. 6. Temperature coefficient as a function of working current; typical values (BZX84-A/B/C2V4 to BZX84-A/B/C4V7)

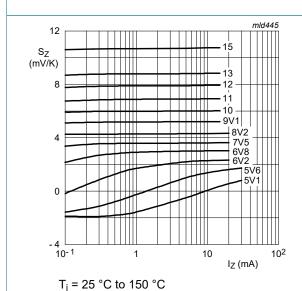


Fig. 7. Temperature coefficient as a function of working current; typical values (BZX84-A/B/C5V1 to BZX84-A/B/C15)

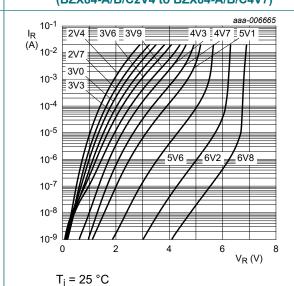
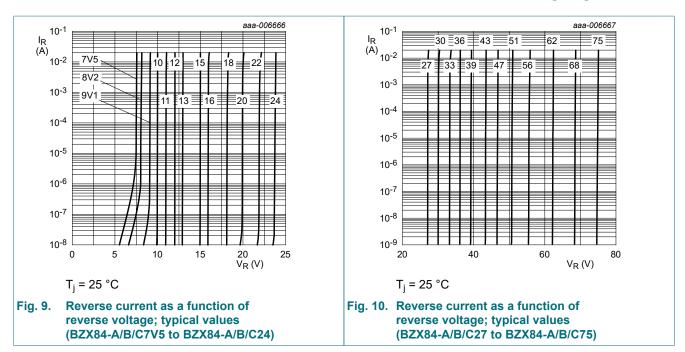
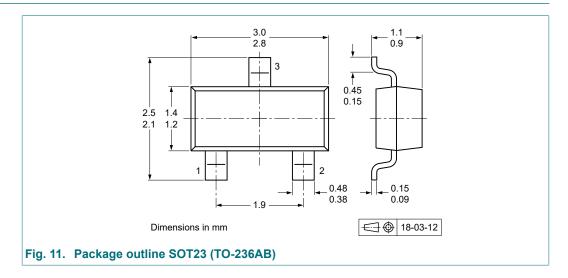


Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX84-A/B/C2V4 to BZX84-A/B/C6V8)

Voltage regulator diodes

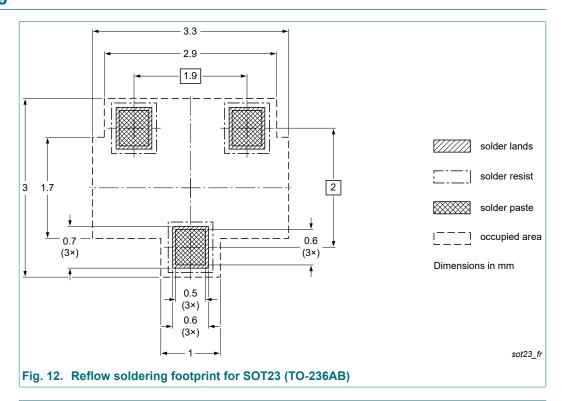


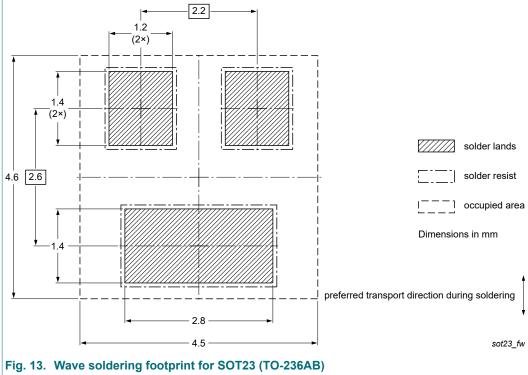
11. Package outline



Voltage regulator diodes

12. Soldering





Voltage regulator diodes

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:	Limiting valueProducts char	 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						

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.

- 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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BZX84 series

Voltage regulator diodes

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