BZX84J series

Single Zener diodes

Rev. 2 — 1 August 2011 Product data sheet

1. Product profile

1.1 General description

General-purpose Zener diodes in a SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 40 W
- Total power dissipation: ≤ 550 mW
- AEC-Q101 qualified
- Small plastic package suitable for surface-mounted design
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: ±2 % and ±5 %
- Low differential resistance

1.3 Applications

- General regulation functions

1.4 Quick reference data

Table 1. Quick reference data

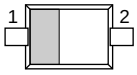
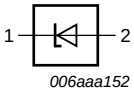
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA	[1]	-	-	1.1	V
P_{ZSM}	non-repetitive peak reverse power dissipation		[2]	-	-	40	W

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

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

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Symbol
1	cathode	[1]		
2	anode			

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZX84J-B2V4 to BZX84J-C75[1]	SC-90	plastic surface-mounted package; 2 leads	SOD323F

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

4. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZX84J-B2V4	SL	BZX84J-B15	SC	BZX84J-C2V4	U3	BZX84J-C15	TV
BZX84J-B2V7	SM	BZX84J-B16	SD	BZX84J-C2V7	U4	BZX84J-C16	TW
BZX84J-B3V0	ST	BZX84J-B18	SE	BZX84J-C3V0	U9	BZX84J-C18	TX
BZX84J-B3V3	SU	BZX84J-B20	SF	BZX84J-C3V3	UA	BZX84J-C20	TY
BZX84J-B3V6	SV	BZX84J-B22	SG	BZX84J-C3V6	UB	BZX84J-C22	TZ
BZX84J-B3V9	SW	BZX84J-B24	SH	BZX84J-C3V9	UC	BZX84J-C24	U1
BZX84J-B4V3	SZ	BZX84J-B27	SK	BZX84J-C4V3	UF	BZX84J-C27	U2
BZX84J-B4V7	TA	BZX84J-B30	SN	BZX84J-C4V7	UG	BZX84J-C30	U5
BZX84J-B5V1	TD	BZX84J-B33	SP	BZX84J-C5V1	UL	BZX84J-C33	U6
BZX84J-B5V6	TE	BZX84J-B36	SR	BZX84J-C5V6	UM	BZX84J-C36	U7
BZX84J-B6V2	TH	BZX84J-B39	SS	BZX84J-C6V2	UR	BZX84J-C39	U8
BZX84J-B6V8	TK	BZX84J-B43	SX	BZX84J-C6V8	US	BZX84J-C43	UD
BZX84J-B7V5	TM	BZX84J-B47	SY	BZX84J-C7V5	UU	BZX84J-C47	UE
BZX84J-B8V2	TN	BZX84J-B51	TB	BZX84J-C8V2	UV	BZX84J-C51	UH
BZX84J-B9V1	TP	BZX84J-B56	TC	BZX84J-C9V1	UW	BZX84J-C56	UK
BZX84J-B10	S8	BZX84J-B62	TF	BZX84J-C10	TR	BZX84J-C62	UN
BZX84J-B11	S9	BZX84J-B68	TG	BZX84J-C11	TS	BZX84J-C68	UP
BZX84J-B12	SA	BZX84J-B75	TL	BZX84J-C12	TT	BZX84J-C75	UT
BZX84J-B13	SB	-	-	BZX84J-C13	TU	-	-

5. 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			-	250	mA
I_{ZSM}	non-repetitive peak reverse current		[1]	-	see Table 8 and 9	
P_{ZSM}	non-repetitive peak reverse power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	550	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 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

6. 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]	-	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	55	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[2] Soldering point of cathode tab.

7. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage		[1]				
		I_F = 10 mA		-	-	0.9	V
		I_F = 100 mA		-	-	1.1	V

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

Table 8. Characteristics per type; BZX84J-B2V4 to BZX84J-C24

T_j = 25 °C unless otherwise specified.

BZX84J-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 1 mA	I_Z = 5 mA			I_Z = 5 mA			
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
2V4	B	2.35	2.45	400	100	50	1	−3.5	0	450	12
	C	2.2	2.6								
2V7	B	2.65	2.75	450	100	20	1	−3.5	0	440	12
	C	2.5	2.9								
3V0	B	2.94	3.06	500	95	10	1	−3.5	0	425	12
	C	2.8	3.2								
3V3	B	3.23	3.37	500	95	5	1	−3.5	0	410	12
	C	3.1	3.5								
3V6	B	3.53	3.67	500	90	5	1	−3.5	0	390	12
	C	3.4	3.8								
3V9	B	3.82	3.98	500	90	3	1	−3.5	0	370	12
	C	3.7	4.1								
4V3	B	4.21	4.39	600	90	3	1	−3.5	0	350	12
	C	4	4.6								
4V7	B	4.61	4.79	500	80	3	2	−3.5	0.2	325	12
	C	4.4	5								
5V1	B	5	5.2	480	60	2	2	−2.7	1.2	300	12
	C	4.8	5.4								
5V6	B	5.49	5.71	400	40	1	2	−2	2.5	275	12
	C	5.2	6								
6V2	B	6.08	6.32	150	10	3	4	0.4	3.7	250	12
	C	5.8	6.6								
6V8	B	6.66	6.94	80	15	2	4	1.2	4.5	215	12
	C	6.4	7.2								
7V5	B	7.35	7.65	80	10	1	5	2.5	5.3	170	4
	C	7	7.9								
8V2	B	8.04	8.36	80	10	0.7	5	3.2	6.2	150	4
	C	7.7	8.7								
9V1	B	8.92	9.28	100	10	0.5	6	3.8	7	120	3
	C	8.5	9.6								
10	B	9.8	10.2	150	10	0.2	7	4.5	8	110	3
	C	9.4	10.6								
11	B	10.8	11.2	150	10	0.1	8	5.4	9	108	2.5
	C	10.4	11.6								
12	B	11.8	12.2	150	10	0.1	8	6	10	105	2.5
	C	11.4	12.7								

Table 8. Characteristics per type; BZX84J-B2V4 to BZX84J-C24 *…continued*

T_j = 25 °C unless otherwise specified.

BZX84J-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 5 mA		I_Z = 1 mA	I_Z = 5 mA			I_Z = 5 mA			
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
13	B	12.7	13.3	170	10	0.1	8	7	11	103	2.5
	C	12.4	14.1								
15	B	14.7	15.3	200	15	0.05	10.5	9.2	13	99	2
	C	13.8	15.6								
16	B	15.7	16.3	200	20	0.05	11.2	10.4	14	97	1.5
	C	15.3	17.1								
18	B	17.6	18.4	225	20	0.05	12.6	12.4	16	93	1.5
	C	16.8	19.1								
20	B	19.6	20.4	225	20	0.05	14	14.4	18	88	1.5
	C	18.8	21.2								
22	B	21.6	22.4	250	25	0.05	15.4	16.4	20	84	1.25
	C	20.8	23.3								
24	B	23.5	24.5	250	30	0.05	16.8	18.4	22	80	1.25
	C	22.8	25.6								

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

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

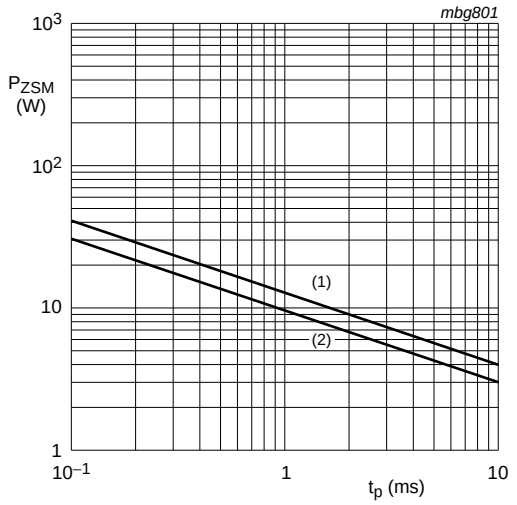
Table 9. Characteristics per type; BZX84J-B27 to BZX84J-C75

T_j = 25 °C unless otherwise specified.

BZX84J-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 2 mA		I_Z = 0.5 mA	I_Z = 2 mA			I_Z = 2 mA			
		Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
27	B	26.5	27.5	250	40	0.05	18.9	21.4	25.3	73	1
	C	25.1	28.9								
30	B	29.4	30.6	250	40	0.05	21	24.4	29.4	66	1
	C	28	32								
33	B	32.3	33.7	275	40	0.05	23.1	27.4	33.4	60	0.9
	C	31	35								
36	B	35.3	36.7	300	60	0.05	25.2	30.4	37.4	59	0.8
	C	34	38								
39	B	38.2	39.8	300	75	0.05	27.3	33.4	41.2	58	0.7
	C	37	41								
43	B	42.1	43.9	325	80	0.05	30.1	37.6	46.6	56	0.6
	C	40	46								
47	B	46.1	47.9	325	90	0.05	32.9	42	51.8	55	0.5
	C	44	50								
51	B	50	52	350	110	0.05	35.7	46.6	57.2	52	0.4
	C	48	54								
56	B	54.9	57.1	375	120	0.05	39.2	52.2	63.8	49	0.3
	C	52	60								
62	B	60.8	63.2	400	140	0.05	43.4	58.8	71.6	44	0.3
	C	58	66								
68	B	66.6	69.4	400	160	0.05	47.6	65.6	79.8	40	0.25
	C	64	72								
75	B	73.5	76.5	400	175	0.05	52.5	73.4	88.6	35	0.2
	C	70	79								

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

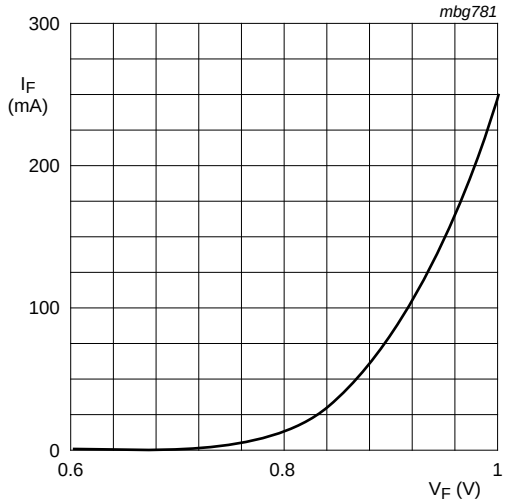
[2] t_p = 100 μs; square wave; T_j = 25 °C prior to surge



(1) T_j = 25 °C (prior to surge)

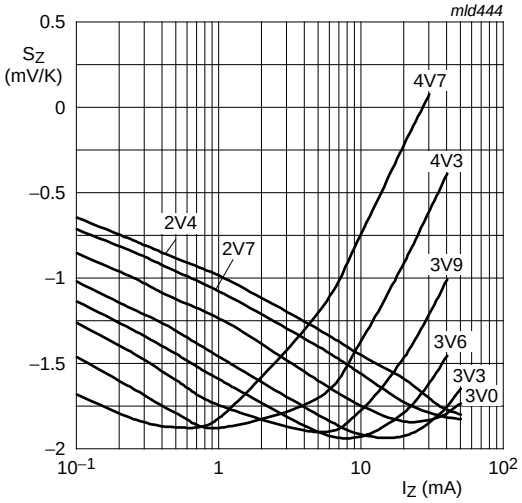
(2) T_j = 150 °C (prior to surge)

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



T_j = 25 °C

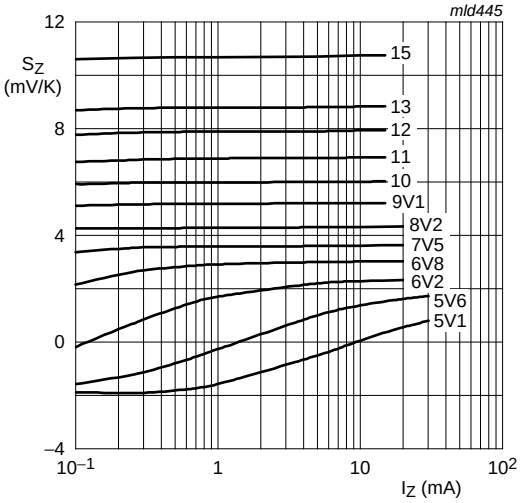
Fig 2. Forward current as a function of forward voltage; typical values



BZX84J-B/C2V4 to BZX84J-B/C4V7

T_j = 25 °C to 150 °C

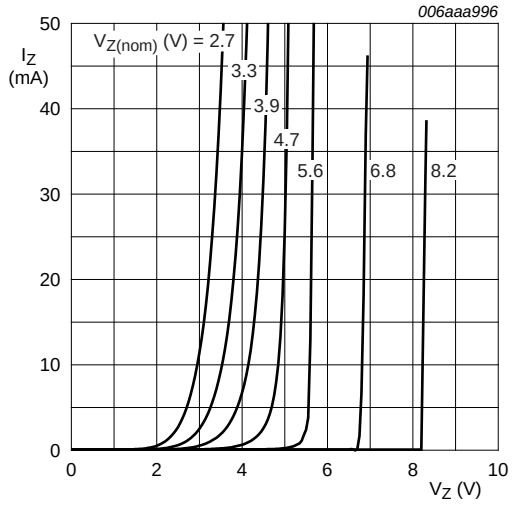
Fig 3. Temperature coefficient as a function of working current; typical values



BZX84J-B/C5V1 to BZX84J-B/C15

T_j = 25 °C to 150 °C

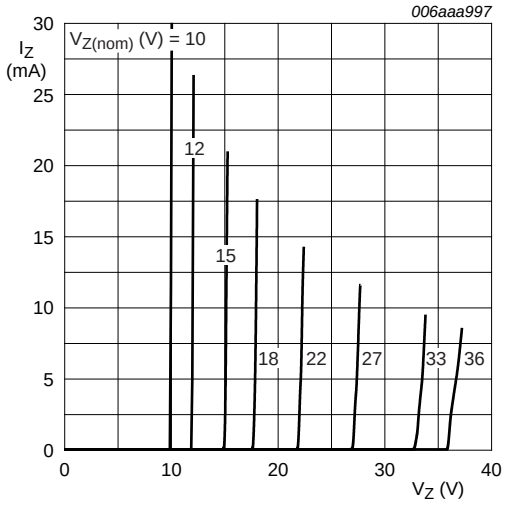
Fig 4. Temperature coefficient as a function of working current; typical values



T_j = 25 °C

BZX84J-B/C2V7 to BZX84J-B/C8V2

Fig 5. Working current as a function of working voltage; typical values



T_j = 25 °C

BZX84J-B/C10 to BZX84J-B/C36

Fig 6. Working current as a function of working voltage; typical values

8. Test information

8.1 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. Package outline

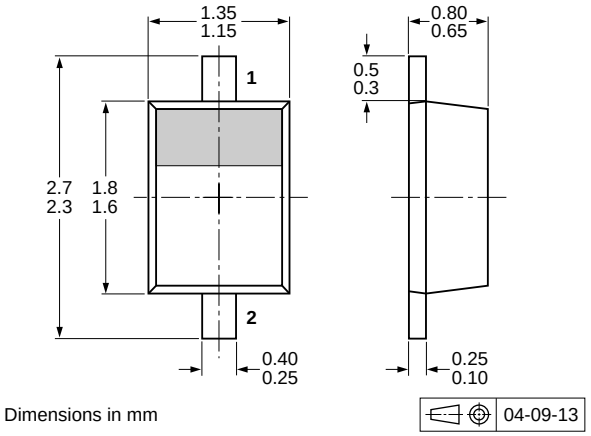


Fig 7. Package outline SOD323F (SC-90)

10. Packing information

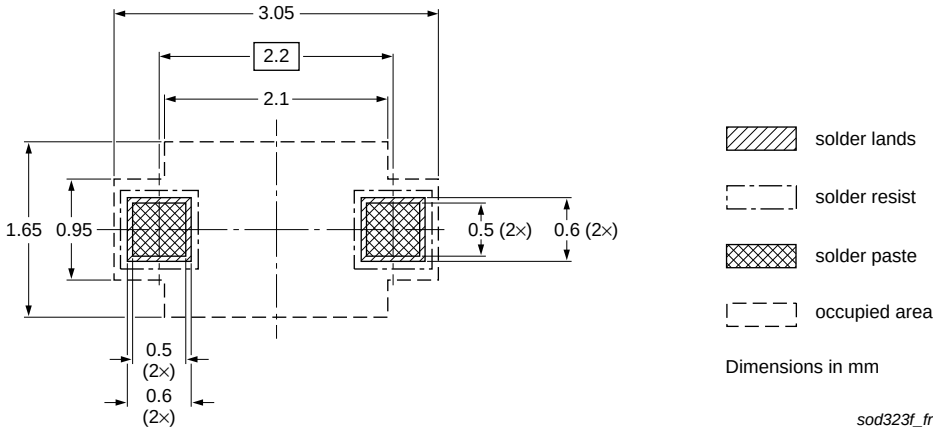
Table 10. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

Type number	Package	Description	Packing quantity	
			3000	10000
BZX84J-B2V4 to BZX84J-C75	SOD323F	4 mm pitch, 8 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 8. Reflow soldering footprint SOD323F (SC-90)

12. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZX84J_SER v.2	20110801	Product data sheet	-	BZX84J_SER v.1
Modifications:	• Figure 5 and Figure 6 updated • Figure 8 updated • Section 1.2 “Features and benefits” updated • Section 5 “Limiting values” updated • Section 8 “Test information” added • Section 13 “Legal information” updated			
BZX84J_SER v.1	20070301	Product data sheet	-	-

13. Legal information

13.1 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".

[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 URL http://www.nxp.com.

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15. Contents

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