BZB984 series

Voltage regulator double diodes

Rev. 3 — 27 December 2022 Product data sheet

1. General description

Low-power voltage regulator diodes in a SOT663 ultra small plastic SMD package.

2. Features and benefits

- Total power dissipation: ≤ 425 mW
- Approximately 5% V_Z tolerance
- Ultra small flat plastic SMD package
- Working voltage range nominal 2.4 to 15 V (E24 range)

3. Applications

- General regulation functions
- ESD and surge protection

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	2 diodes loaded; T_{amb} ≤ 25 °C	[2]	-	-	425	mW
		1 diode loaded; T_{amb} ≤ 25 °C	[2]	-	-	265	mW

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 0.02.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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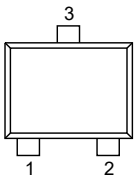
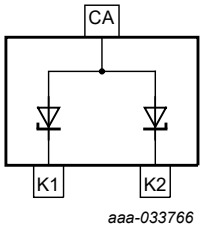
5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode 1		
2	K2	cathode 2		
3	CA	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BZB984-C2V4 to BZB984-C15 [1]	-	plastic surface-mounted package; 3 leads	SOT663

[1] The series consists of 20 types with nominal working voltages from 2.4 V to 15 V.

7. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
BZB984-C2V4	91	BZB984-C3V9	96	BZB984-C6V2	9B	BZB984-C10	9G
BZB984-C2V7	92	BZB984-C4V3	97	BZB984-C6V8	9C	BZB984-C11	9H
BZB984-C3V0	93	BZB984-C4V7	98	BZB984-C7V5	9D	BZB984-C12	9J
BZB984-C3V3	94	BZB984-C5V1	99	BZB984-C8V2	9E	BZB984-C13	9K
BZB984-C3V6	95	BZB984-C5V6	9A	BZB984-C9V1	9F	BZB984-C15	9L

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
I_{ZSM}	non-repetitive peak reverse current	t_p = 100 µs; square wave; T_{amb} = 25 °C		see Table 1		
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square wave; T_{amb} = 25 °C		-	40	W
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C 2 diodes loaded	[1]	-	425	mW
		T_{amb} ≤ 25 °C 1 diode loaded	[1]	-	265	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	+150	°C
T_{stg}	storage temperature			-65	+150	°C

[1] Device mounted on an 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; 2 diodes loaded	[1]	-	-	294	K/W
		in free air; 1 diode loaded	[1]	-	-	472	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	2 diodes loaded	[2]	-	-	125	K/W
		1 diode loaded	[2]	-	-	230	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

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

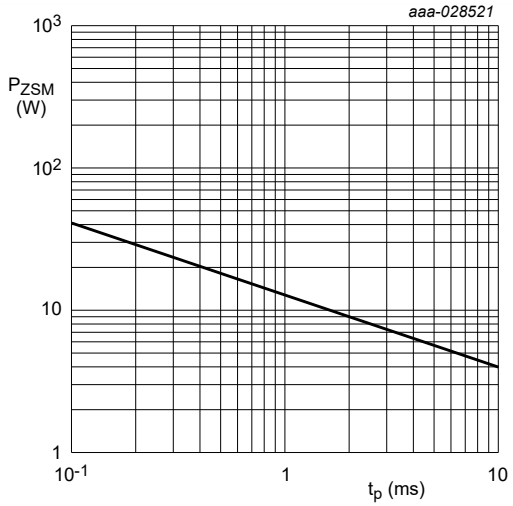
[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

Table 8. Characteristics per type; BZB984-C2V4 to BZB984-C15

T_j = 25 °C unless otherwise specified.

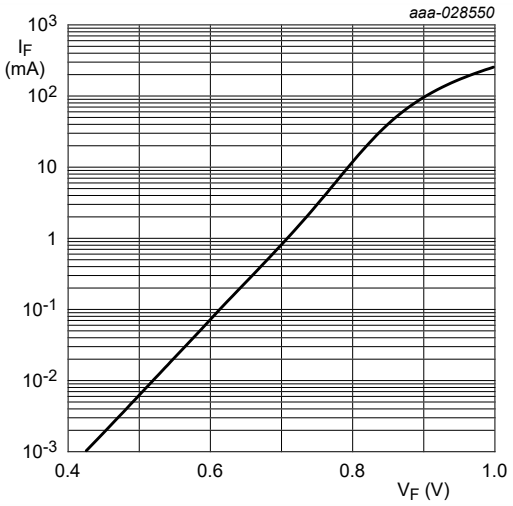
BZB984 -xxx	Sel	Working voltage V_Z (V);		Maximum differential resistance r_{dif} (Ω)				Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K);	Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A) [2]
		I_Z = 5 mA Tol. 5 %		I_Z = 1 mA		I_Z = 5 mA		I_F = 10 mA		I_{Ztest} = 5 mA		
		Min	Max	Typ	Max	Typ	Max	Max	V_R (V)	Typ	Max	Max
2V4	C	2.2	2.6	275	600	70	100	50	1	-1.3	450	6.0
2V7	C	2.5	2.9	300	600	75	100	20	1	-1.4	450	6.0
3V0	C	2.8	3.2	325	600	80	95	10	1	-1.6	450	6.0
3V3	C	3.1	3.5	350	600	85	95	5	1	-1.8	450	6.0
3V6	C	3.4	3.8	375	600	85	90	5	1	-1.9	450	6.0
3V9	C	3.7	4.1	400	600	85	90	3	1	-1.9	450	6.0
4V3	C	4.0	4.6	410	600	80	90	3	1	-1.7	450	6.0
4V7	C	4.4	5.0	425	500	50	80	3	2	-1.2	300	6.0
5V1	C	4.8	5.4	400	480	40	60	2	2	-0.5	300	6.0
5V6	C	5.2	6.0	80	400	15	40	1	2	1.0	300	6.0
6V2	C	5.8	6.6	40	150	6	10	3	4	2.2	200	6.0
6V8	C	6.4	7.2	30	80	6	15	2	4	3.0	200	6.0
7V5	C	7.0	7.9	30	80	6	15	1	5	3.6	150	4.0
8V2	C	7.7	8.7	40	80	6	15	0.7	5	4.3	150	4.0
9V1	C	8.5	9.6	40	100	6	15	0.5	6	5.2	150	3.0
10	C	9.4	10.6	50	150	8	20	0.2	7	6.0	90	3.0
11	C	10.4	11.6	50	150	10	20	0.1	8	6.9	90	2.5
12	C	11.4	12.7	50	150	10	25	0.1	8	7.9	85	2.5
13	C	12.4	14.1	50	170	10	30	0.1	8	8.8	80	2.5
15	C	13.8	15.6	50	200	10	30	0.05	10.5	10.7	75	2.0

[1] f = 1 MHz; V_R = 0 V
[2] t_p = 100 µs; T_{amb} = 25 °C



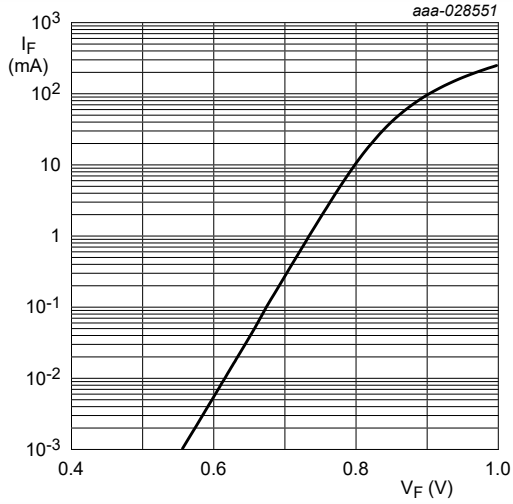
(1) T_j = 25 °C (before surge)

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



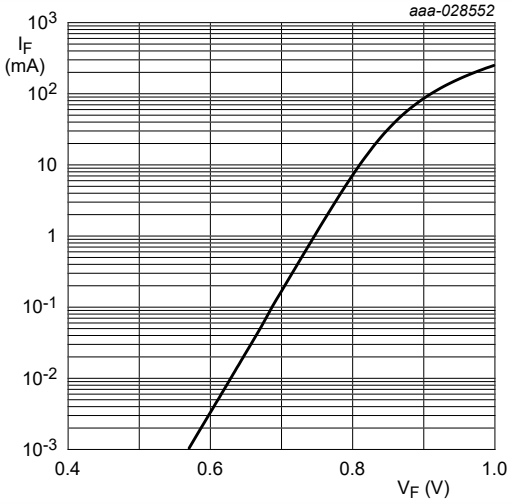
T_j = 25 °C

Fig. 2. Forward current as a function of forward voltage; typical values (BZB984-C2V4)



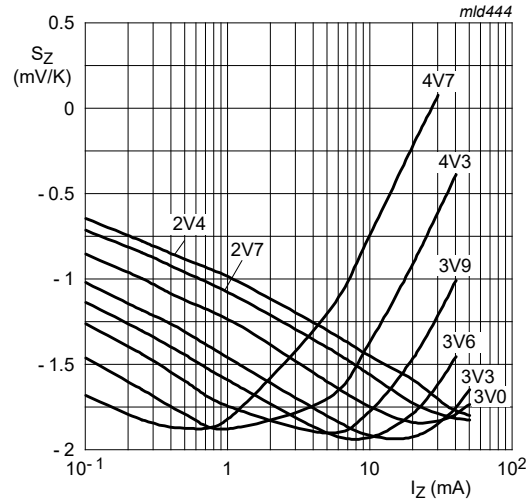
T_j = 25 °C

Fig. 3. Forward current as a function of forward voltage; typical values (BZB984-C6V8)



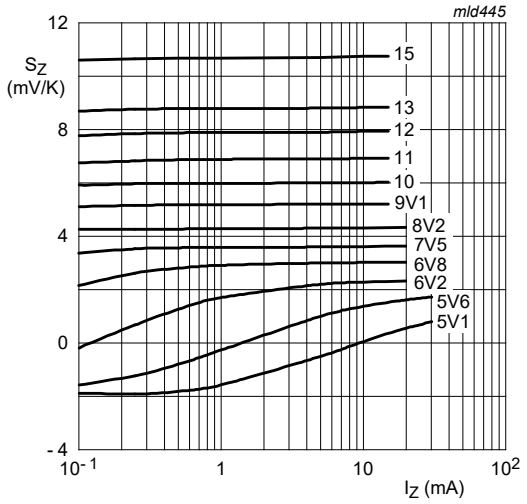
T_j = 25 °C

Fig. 4. Forward current as a function of forward voltage; typical values (BZB984-C7V5)



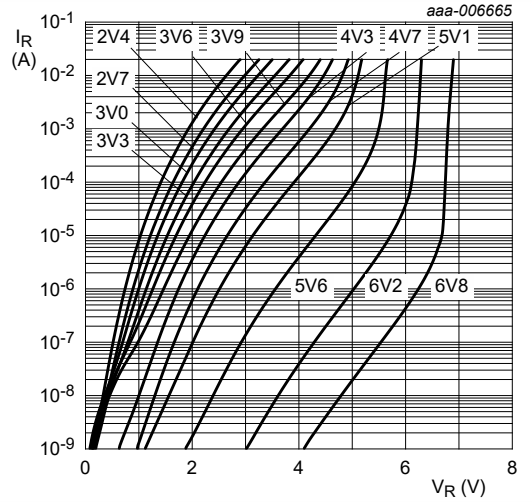
T_j = 25 °C to 150 °C

Fig. 5. Temperature coefficient as a function of working current; typical values (BZB984-C2V4 to C4V7)



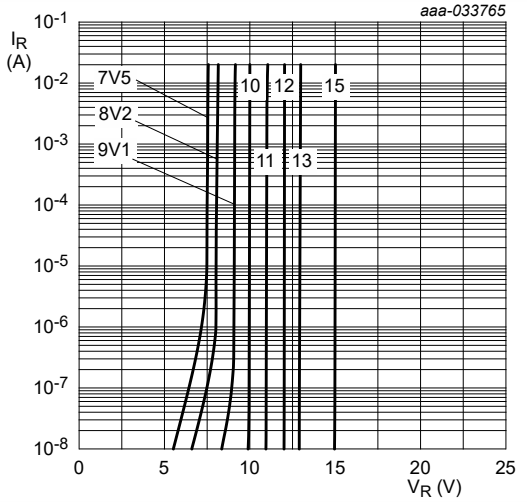
T_j = 25 °C to 150 °C

Fig. 6. Temperature coefficient as a function of working current; typical values (BZB984-C5V1 to C15)



T_j = 25 °C

Fig. 7. Reverse current as a function of reverse voltage; typical values (BZB984-C2V4 to BZB984-C6V8)



T_j = 25 °C

Fig. 8. Reverse current as a function of reverse voltage; typical values (BZB984-C7V5 to BZB984-C15)

11. Package outline

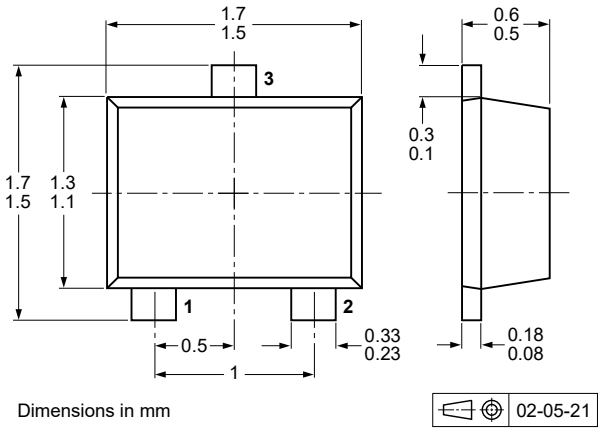
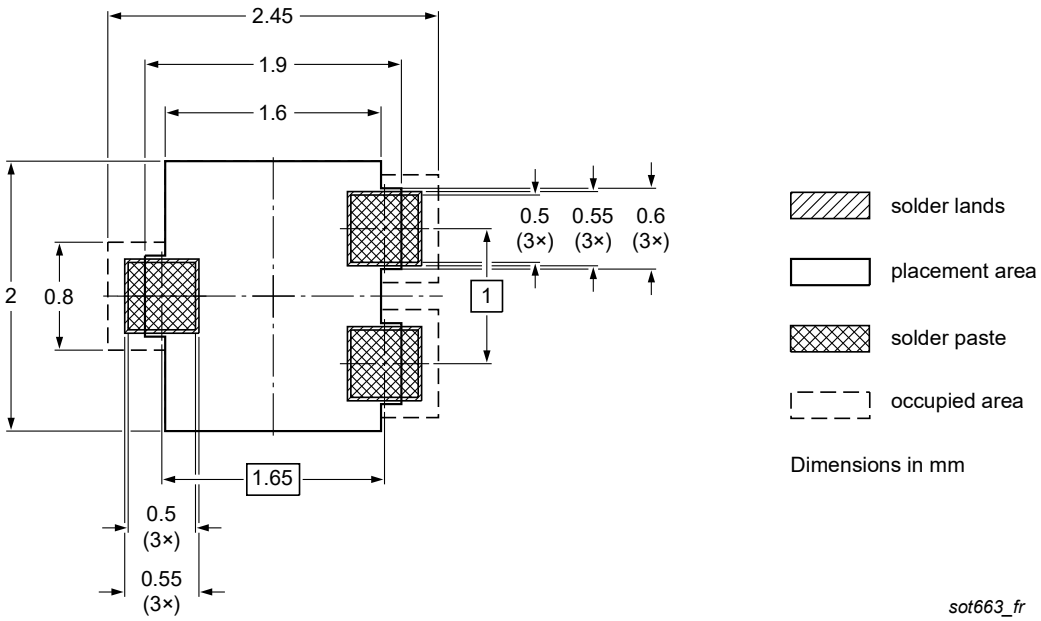


Fig. 9. Package outline SOT663

12. Soldering



Reflow soldering is the only recommended soldering method.

Fig. 10. Reflow soldering footprint SOT663

13. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BZB984_SER v.3	20221227	Product data sheet	-	BZB984_SER v.2
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Product changed to non-automotive qualification.			
BZB984_SER v.2	2002062	Product data sheet	-	BZB984_SER v.1
BZB984_SER v.1	20011128	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".
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