

BZT52H series

Single Zener diodes in a SOD123F package

Rev. 01 — 22 December 2005 Product data sheet

1. Product profile

1.1 General description

General-purpose Zener diodes in a SOD123F small and flat lead Surface Mounted Device (SMD) plastic package.

1.2 Features

- Total power dissipation: ≤ 830 mW
- Small plastic package suitable for surface mounted design
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- 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 = 10 mA	[1]	-	-	0.9	V
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	-	375	mW
			[3]	-	-	830	mW

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

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

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

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2. Pinning information

Table 2: Pinning

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

sym001

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
BZT52H-C2V4 to BZT52H-C75 [1]	-	plastic surface mounted package; 2 leads	SOD123F

[1] The series consists of 37 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
BZT52H-C2V4	B3	BZT52H-C8V2	BG	BZT52H-C30	BV
BZT52H-C2V7	B4	BZT52H-C9V1	BH	BZT52H-C33	BW
BZT52H-C3V0	B5	BZT52H-C10	BJ	BZT52H-C36	BX
BZT52H-C3V3	B6	BZT52H-C11	BK	BZT52H-C39	BY
BZT52H-C3V6	B7	BZT52H-C12	BL	BZT52H-C43	BZ
BZT52H-C3V9	B8	BZT52H-C13	BM	BZT52H-C47	C1
BZT52H-C4V3	B9	BZT52H-C15	BN	BZT52H-C51	C2
BZT52H-C4V7	BA	BZT52H-C16	BP	BZT52H-C56	C3
BZT52H-C5V1	BB	BZT52H-C18	BQ	BZT52H-C62	C4
BZT52H-C5V6	BC	BZT52H-C20	BR	BZT52H-C68	C5
BZT52H-C6V2	BD	BZT52H-C22	BS	BZT52H-C75	C6
BZT52H-C6V8	BE	BZT52H-C24	BT	-	-
BZT52H-C7V5	BF	BZT52H-C27	BU	-	-

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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			-	see Table 8, 9 and 10	
P_{ZSM}	non-repetitive peak reverse power dissipation		[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	375	mW
			[3]	-	830	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–65	+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 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 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]	-	-	330	K/W
			[2]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	70	K/W

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

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

[3] Soldering point of cathode tab.

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7. 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: $t_p \leq 300\ \mu s$; $\delta \leq 0.02$.

Table 8: Characteristics per type; BZT52H-C2V4 to BZT52H-C24

T_j = 25 °C unless otherwise specified.

BZT52H -Cxxx	Working voltage V_Z (V); I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K); I_Z = 5 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
2V4	2.2	2.6	400	85	50	1	–3.5	0.0	450	6.0
2V7	2.5	2.9	500	83	20	1	–3.5	0.0	450	6.0
3V0	2.8	3.2	500	95	10	1	–3.5	0.0	450	6.0
3V3	3.1	3.5	500	95	5	1	–3.5	0.0	450	6.0
3V6	3.4	3.8	500	95	5	1	–3.5	0.0	450	6.0
3V9	3.7	4.1	500	95	3	1	–3.5	0.0	450	6.0
4V3	4.0	4.6	500	95	3	1	–3.5	0.0	450	6.0
4V7	4.4	5.0	500	78	3	2	–3.5	0.2	300	6.0
5V1	4.8	5.4	480	60	2	2	–2.7	1.2	300	6.0
5V6	5.2	6.0	400	40	1	2	–2.0	2.5	300	6.0
6V2	5.8	6.6	150	10	3	4	0.4	3.7	200	6.0
6V8	6.4	7.2	80	8	2	4	1.2	4.5	200	6.0
7V5	7.0	7.9	80	10	1	5	2.5	5.3	150	4.0
8V2	7.7	8.7	80	10	0.7	5	3.2	6.2	150	4.0
9V1	8.5	9.6	100	10	0.5	6	3.8	7.0	150	3.0
10	9.4	10.6	70	10	0.2	7	4.5	8.0	90	3.0
11	10.4	11.6	70	10	0.1	8	5.4	9.0	85	2.5
12	11.4	12.7	90	10	0.1	8	6.0	10.0	85	2.5
13	12.4	14.1	110	10	0.1	8	7.0	11.0	80	2.5
15	13.8	15.6	110	15	0.05	10.5	9.2	13.0	75	2.0
16	15.3	17.1	170	20	0.05	11.2	10.4	14.0	75	1.5
18	16.8	19.1	170	20	0.05	12.6	12.4	16.0	70	1.5
20	18.8	21.2	220	20	0.05	14	14.4	18.0	60	1.5
22	20.8	23.3	220	25	0.05	15.4	16.4	20.0	60	1.25
24	22.8	25.6	220	30	0.05	16.8	18.4	22.0	55	1.25

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

[2] t_p = 100 μs; T_{amb} = 25 °C

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Table 9: Characteristics per type; BZT52H-C27 to BZT52H-C51

T_j = 25 °C unless otherwise specified.

BZT52H -Cxxx	Working voltage V_Z (V); I_Z = 2 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K); I_Z = 5 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
27	25.1	28.9	250	40	0.05	18.9	21.4	25.3	50	1.0
30	28.0	32.0	250	40	0.05	21	24.4	29.4	50	1.0
33	31.0	35.0	250	40	0.05	23.1	27.4	33.4	45	0.9
36	34.0	38.0	250	60	0.05	25.2	30.4	37.4	45	0.8
39	37.0	41.0	300	75	0.05	27.3	33.4	41.2	45	0.7
43	40.0	46.0	325	80	0.05	30.1	37.6	46.6	40	0.6
47	44.0	50.0	325	90	0.05	32.9	42.0	51.8	40	0.5
51	48.0	54.0	350	100	0.05	35.7	46.6	57.2	40	0.4

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

[2] t_p = 100 μs; T_{amb} = 25 °C

Table 10: Characteristics per type; BZT52H-C56 to BZT52H-C75

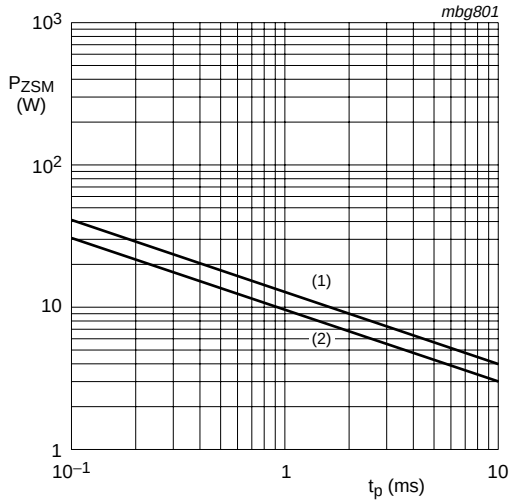
T_j = 25 °C unless otherwise specified.

BZT52H -Cxxx	Working voltage V_Z (V); I_Z = 2 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K); I_Z = 5 mA		Diode capacitance C_d (pF) [1]	Non-repetitive peak reverse current I_{ZSM} (A) [2]
	Min	Max	I_Z = 0.5 mA	I_Z = 2 mA	Max	V_R (V)	Min	Max	Max	Max
56	52.0	60.0	375	120	0.05	39.2	52.2	63.8	40	0.3
62	58.0	66.0	400	140	0.05	43.4	58.8	71.6	35	0.3
68	64.0	72.0	400	160	0.05	47.6	65.6	79.8	35	0.25
75	70.0	79.0	400	175	0.05	52.5	73.4	88.6	35	0.20

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

[2] t_p = 100 μs; T_{amb} = 25 °C

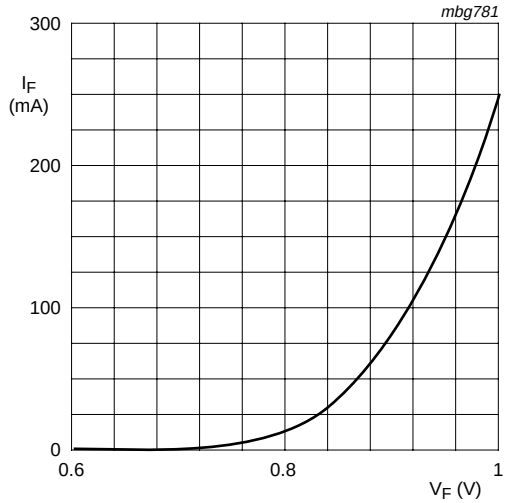
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(1) T_j = 25 °C (prior to surge)

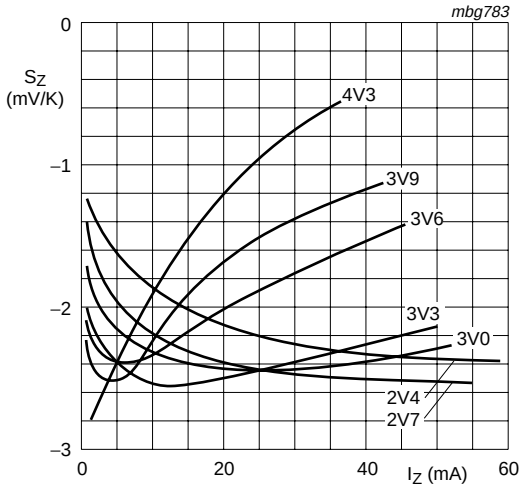
(2) T_j = 150 °C (prior to surge)

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



T_j = 25 °C

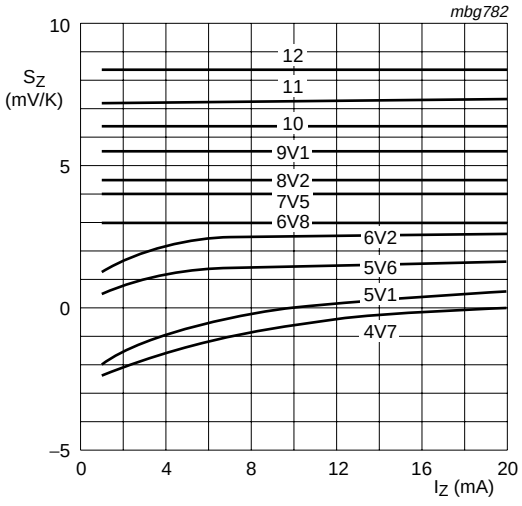
Fig 2. Forward current as a function of forward voltage; typical values



BZT52H-C2V4 to BZT52H-C4V3

T_j = 25 °C to 150 °C

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



BZT52H-C4V7 to BZT52H-C12

T_j = 25 °C to 150 °C

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

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8. Package outline

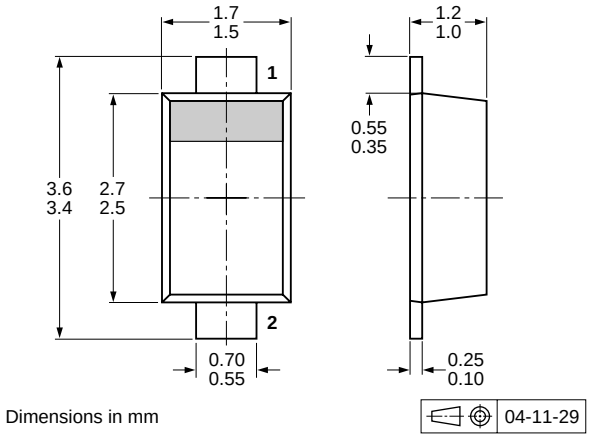


Fig 5. Package outline SOD123F

9. Packing information

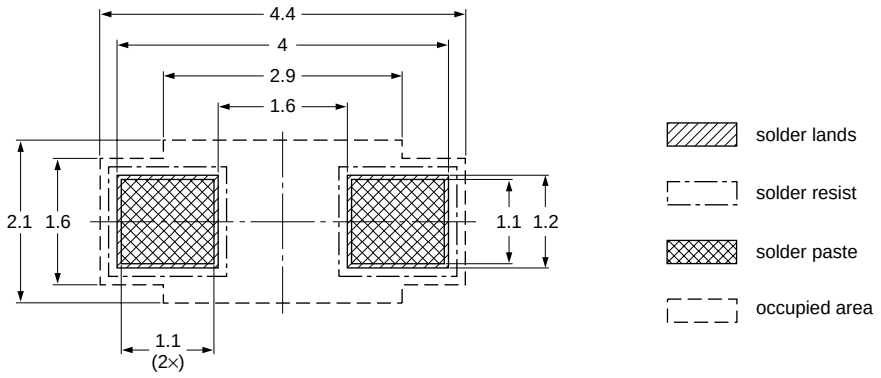
Table 11: Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
BZT52H-C2V4 to BZT52H-C75	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see Section 16.

10. Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 6. Reflow soldering footprint SOD123F

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11. Revision history

Table 12: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BZT52H_SER_1	20051222	Product data sheet	-	9397 750 15082	-

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Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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