NZH series

Single Zener diodes

Rev. 2 — 15 May 2024 Product data sheet

1. General description

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

2. Features and benefits

- Total power dissipation: ≤ 500 mW
- Wide working voltage range
- Small plastic package suitable for surface-mounted design
- Low differential resistance
- AEC-Q101 qualified

3. Applications

General regulation functions

4. Quick reference data

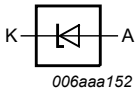
Table 1. Quick reference data

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} ≤ 25 °C	[2]	-	-	500	mW
			[3]	-	-	1	W

[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, mounting pad for cathode 1 cm^2.
[3] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description		Simplified outline	Graphic symbol
1	K	cathode	[1]		
2	A	anode			

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NZH3V0B to NZH30C [1]	-	plastic surface-mounted package; 2 leads	SOD123F

[1] The series consists of 25 types with nominal working voltages from 3.0 V to 30 V.

7. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code
NZH3V0B	CH	NZH10C	CW
NZH3V3A	CJ	NZH11C	CX
NZH3V6B	CK	NZH12B	CY
NZH3V9B	CL	NZH13B	D9
NZH4V3B	CM	NZH15B	D1
NZH4V7B	CN	NZH16C	D2
NZH5V1B	CP	NZH18C	D3
NZH5V6B	CQ	NZH20C	D4
NZH6V2B	CR	NZH22C	D5
NZH6V8B	CS	NZH24C	D6
NZH7V5C	CT	NZH27C	D7
NZH8V2B	CU	NZH30C	DA
NZH9V1B	CV	-	-

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			-	250	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	500	mW
			[2]	-	1	W
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, mounting pad for cathode 1 cm^2.
[2] Device mounted on a ceramic PCB, Al_2O_3, 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	[1]	-	-	250	K/W
			[2]	-	-	125	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, mounting pad for cathode 1 cm^2.
[2] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.
[3] 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; NZH3V0B to NZH10C

T_j = 25 °C unless otherwise specified.

NZHxxx	Working voltage V_Z (V) I_Z = 20 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Diode capacitance C_d (pF) [1]
	Min	Max	I_Z = 1 mA	I_Z = 20 mA	Max	V_R (V)	Max
3V0B	2.85	3.15	1000	80	50	1	450
3V3A	3.16	3.38	1000	70	20	1	450
3V6B	3.42	3.78	1000	60	5	1	450
3V9B	3.71	4.10	1000	50	5	1	450
4V3B	4.17	4.43	1000	40	5	1	450
4V7B	4.55	4.80	900	25	5	1	300
5V1B	4.94	5.20	800	20	5	1.5	300
5V6B	5.45	5.73	500	13	5	2.5	300
6V2B	5.96	6.27	300	10	5	3	200
6V8B	6.49	6.83	150	8	2	3.5	200
7V5C	7.29	7.67	120	8	0.5	4	150
8V2B	8.02	8.36	120	8	0.5	5	150
9V1B	8.85	9.23	120	8	0.5	6	150
10C	9.70	10.20	120	8	0.2	7	90

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

Table 9. Characteristics per type; NZH11C to NZH20C

T_j = 25 °C unless otherwise specified.

NZHxxx	Working voltage V_Z (V) I_Z = 10 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Diode capacitance C_d (pF) [1]
	Min	Max	I_Z = 1 mA	I_Z = 10 mA	Max	V_R (V)	Max
11C	10.82	11.38	120	10	0.04	8	85
12B	11.44	12.03	110	12	0.04	9	85
13B	12.35	13.65	110	14	0.04	10	80
15B	14.25	15.75	110	16	0.04	11	75
16C	15.69	16.51	150	18	0.04	12	75
18C	17.42	18.33	150	23	0.04	13	70
20C	19.23	20.22	200	28	0.04	15	60

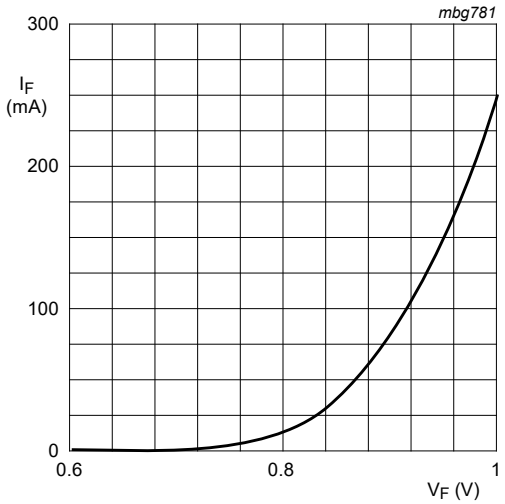
[1] f = 1 MHz; V_R = 0 V

Table 10. Characteristics per type; NZH22C to NZH30C

T_j = 25 °C unless otherwise specified.

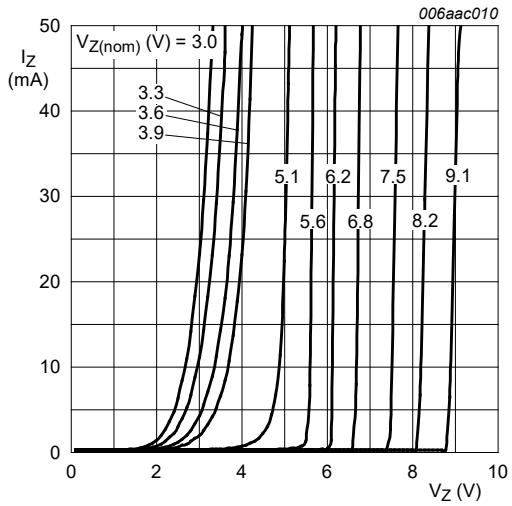
NZHxxx	Working voltage V_Z (V) I_Z = 5 mA		Maximum differential resistance r_{dif} (Ω)		Reverse current I_R (µA)		Diode capacitance C_d (pF) [1]
	Min	Max	I_Z = 1 mA	I_Z = 5 mA	Max	V_R (V)	Max
22C	21.08	22.17	200	30	0.04	17	60
24C	23.12	24.31	200	35	0.04	19	55
27C	25.63	26.95	250	45	0.04	21	50
30C	28.50	31.50	250	55	0.04	23	50

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



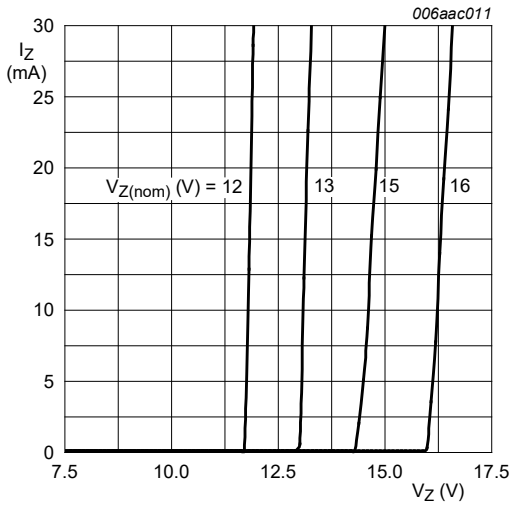
T_j = 25 °C

Fig. 1. Forward current as a function of forward voltage; typical values



T_j = 25 °C

Fig. 2. Working current as a function of working voltage; typical values



T_j = 25 °C

Fig. 3. Working current as a function of working voltage; typical values

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.

12. Package outline

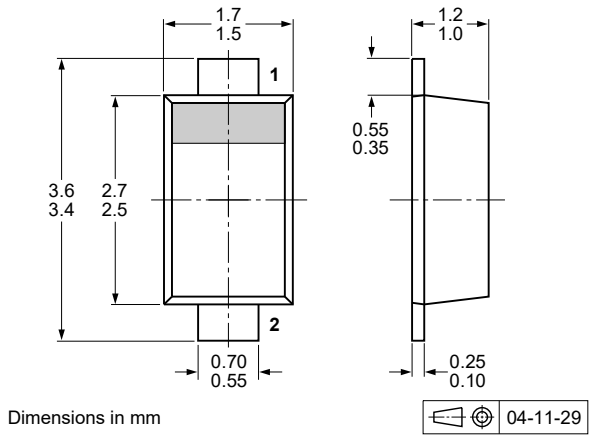
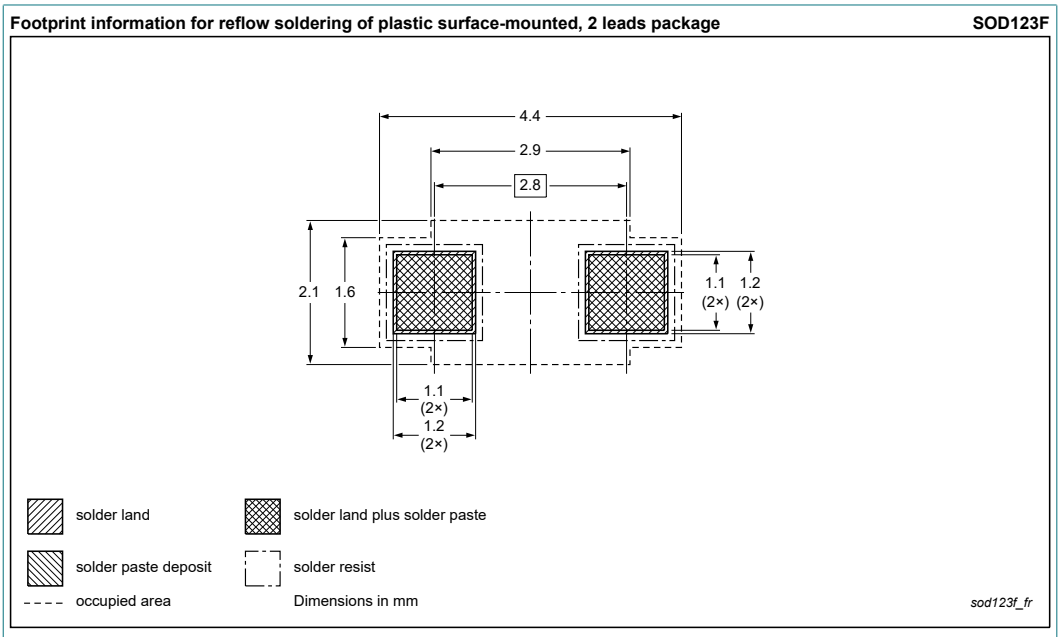


Fig. 4. Package outline SOD123F

13. Soldering



Reflow soldering is the only recommended soldering method.

Fig. 5. Reflow soldering footprint SOD123F

14. Revision history

Table 11. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
NZH_SER v.2	20240515	Product data sheet	-	NZH_SER v.1
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 • Chapter "Features and benefits": added recommendation for automotive applications • Chapter "Packing information": removed			
NZH_SER v.1	20100127	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.

[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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