



**THE DATASHEET OF  
NZX13B,133**





# NZX series

## Single Zener diodes

Rev. 4 — 28 November 2011

Product data sheet

## 1. Product profile

### 1.1 General description

General-purpose Zener diodes in a SOD27 (SC-40) small hermetically sealed glass package.

### 1.2 Features and benefits

- Total power dissipation:  $P_{\text{tot}} \leq 500 \text{ mW}$
- Low differential resistance
- Low leakage current

### 1.3 Applications

- General regulation functions

### 1.4 Quick reference data

**Table 1. Quick reference data**  
 $T_j = 25 \text{ }^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 200 \text{ mA}$	[1] -	-	1.5	V

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

## 2. Pinning information

**Table 2. Pinning**

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

[1] The marking band indicates the cathode.

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
NZX2V1B to NZX36X <sup>[1]</sup>	SC-40	hermetically sealed glass package; axial leaded; 2 leads	SOD27

[1] The series consists of 112 types with nominal working voltages from 2.1 V to 36 V.

### 4. Marking

**Table 4. Marking codes**

Type number	Marking code
NZX2V1B to NZX36X	the diodes are type branded

### 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
$P_{tot}$	total power dissipation	$T_{tp} \leq 25\text{ °C}$	-	500	mW
$T_j$	junction temperature		-	175	°C
$T_{amb}$	ambient temperature		-55	+175	°C
$T_{stg}$	storage temperature		-65	+175	°C

### 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	<sup>[1]</sup> -	-	380	K/W
$R_{th(j-t)}$	thermal resistance from junction to tie-point		<sup>[1]</sup> -	-	300	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) without metallization pad; maximum lead length 8 mm.



Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 7. Characteristics

Table 7. Characteristics

$T_j = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 200\text{ mA}$	[1]	-	1.5	V

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

Table 8. Characteristics per type; NZX2V1B to NZX18C

$T_j = 25\text{ °C}$  unless otherwise specified.

NZXxxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )	Reverse current $I_R$ ( $\mu\text{A}$ )	
		$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$	Max	$V_R$ (V)
		Min	Max	Max		
2V1	B	2.0	2.2	100	5	0.5
2V4	A	2.3	2.5	100	50	1
	B	2.4	2.6			
2V7	A	2.5	2.7	100	20	1
	B	2.6	2.8			
	C	2.7	2.9			
3V0	A	2.8	3.0	100	10	1
	B	2.9	3.1			
	C	3.0	3.2			
3V3	A	3.1	3.3	100	5	1
	B	3.2	3.4			
	C	3.3	3.5			

**Table 8. Characteristics per type; NZX2V1B to NZX18C ...continued**  
 $T_j = 25\text{ °C}$  unless otherwise specified.

NZXxxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )	Reverse current $I_R$ ( $\mu\text{A}$ )	
		$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$	Max	$V_R$ (V)
		Min	Max	Max		
3V6	A	3.4	3.6	100	5	1
	B	3.5	3.7			
	C	3.6	3.8			
3V9	A	3.7	3.9	100	3	1
	B	3.8	4.0			
	C	3.9	4.1			
4V3	A	4.0	4.2	100	3	1
	B	4.1	4.3			
	C	4.2	4.4			
	D	4.3	4.5			
4V7	A	4.4	4.6	100	3	2
	B	4.5	4.7			
	C	4.6	4.8			
	D	4.7	4.9			
5V1	A	4.8	5.0	100	2	2
	B	4.9	5.1			
	C	5.0	5.2			
	D	5.1	5.3			
5V6	A	5.2	5.5	40	1	2
	B	5.3	5.6			
	C	5.4	5.7			
	D	5.5	5.8			
	E	5.6	5.9			
6V2	A	5.7	6.0	15	3	4
	B	5.8	6.1			
	C	6.0	6.3			
	D	6.1	6.4			
	E	6.3	6.6			
6V8	A	6.4	6.7	15	2	4
	B	6.6	6.9			
	C	6.7	7.0			
	D	6.9	7.2			

**Table 8. Characteristics per type; NZX2V1B to NZX18C ...continued**  
 $T_j = 25\text{ °C}$  unless otherwise specified.

NZXxxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )	Reverse current $I_R$ ( $\mu\text{A}$ )	
		$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$	Max	$V_R$ (V)
		Min	Max	Max		
7V5	A	7.0	7.3	15	1	5
	B	7.2	7.6			
	C	7.3	7.7			
	D	7.5	7.9			
	X	7.07	7.45			
8V2	A	7.7	8.1	20	0.7	5
	B	7.9	8.3			
	C	8.1	8.5			
	D	8.3	8.7			
9V1	A	8.5	8.9	20	0.5	6
	B	8.7	9.1			
	C	8.9	9.3			
	D	9.1	9.5			
	E	9.3	9.7			
10	A	9.5	9.9	25	0.2	7
	B	9.7	10.1			
	C	9.9	10.3			
	D	10.2	10.6			
11	A	10.4	10.8	25	0.1	8
	B	10.7	11.1			
	C	10.9	11.3			
	D	11.1	11.6			
12	A	11.4	11.9	35	0.1	8
	B	11.6	12.1			
	C	11.9	12.4			
	D	12.2	12.7			
	X	11.44	12.03			
13	A	12.4	12.9	35	0.1	8
	B	12.6	13.1			
	C	12.9	13.4			
14	A	13.2	13.7	35	0.05	9.8
	B	13.5	14.0			
	C	13.8	14.3			

**Table 8. Characteristics per type; NZX2V1B to NZX18C ...continued**  
 $T_j = 25\text{ °C}$  unless otherwise specified.

NZXxxx	Sel	Working voltage $V_Z$ (V)		Differential resistance $r_{dif}$ ( $\Omega$ )	Reverse current $I_R$ ( $\mu\text{A}$ )	
		$I_Z = 5\text{ mA}$		$I_Z = 5\text{ mA}$	Max	$V_R$ (V)
		Min	Max	Max		
15	A	14.1	14.7	40	0.05	10.5
	B	14.5	15.1			
	C	14.9	15.5			
	X	14.35	15.09			
16	A	15.3	15.9	45	0.05	11.2
	B	15.7	16.5			
	C	16.3	17.1			
18	A	16.9	17.7	55	0.05	12.6
	B	17.5	18.3			
	C	18.1	19.0			

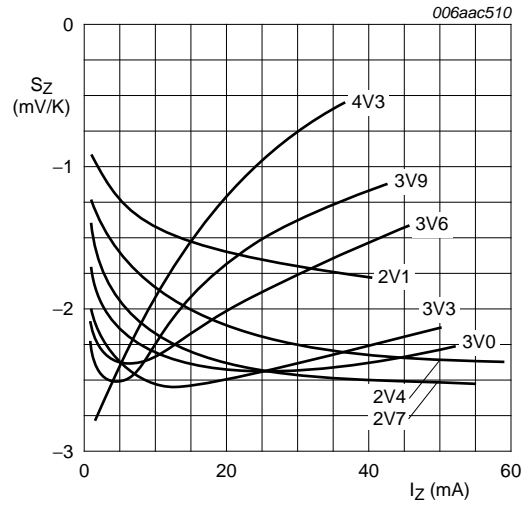
**Table 9. Characteristics per type; NZX20A to NZX36X***T<sub>j</sub> = 25 °C unless otherwise specified.*

NZXxxx	Sel	Working voltage V <sub>Z</sub> (V)		Differential resistance r <sub>dif</sub> (Ω)	Reverse current I <sub>R</sub> (μA)	
		I <sub>Z</sub> = 2 mA		I <sub>Z</sub> = 2 mA	Max	V <sub>R</sub> (V)
		Min	Max	Max		
20	A	18.8	19.7	60	0.05	14
	B	19.5	20.4			
	C	20.2	21.2			
22	A	20.9	21.9	65	0.05	15.4
	B	21.6	22.6			
	C	22.3	23.3			
24	A	22.9	24.0	70	0.05	16.8
	B	23.6	24.7			
	C	24.3	25.5			
	X	22.61	23.77			
27	A	25.2	26.6	80	0.05	18.9
	B	26.2	27.6			
	C	27.2	28.6			
	X	26.99	28.39			
30	A	28.2	29.6	100	0.05	21
	B	29.2	30.6			
	C	30.2	31.6			
	X	29.02	30.51			
33	A	31.2	32.6	120	0.05	23.1
	B	32.2	33.6			
	C	33.2	34.5			
36	A	34.2	35.7	140	0.05	25.2
	B	35.3	36.8			
	C	36.4	38.0			
	X	35.36	37.19			



$T_j = 25\text{ }^\circ\text{C}$

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



NZX2V1 to NZX4V3

$T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

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



NZX4V7 to NZX12

$T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

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

## 8. Package outline



Fig 5. Package outline SOD27 (SC-40)

## 9. Packing information

**Table 10. Packing methods**

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

Type number <sup>[2]</sup>	Package	Description	Packing quantity	
			5000	10000
NZX2V1B to NZX36X	SOD27	26 mm tape ammopack, axial	-143	-
		52 mm tape ammopack, axial	-	-133
		52 mm reel pack, axial	-	-113

[1] For further information and the availability of packing methods, see [Section 12](#).

[2] The series consists of 112 types with nominal working voltages from 2.1 V to 36 V.

## 10. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NZX_SER v.4	20111128	Product data sheet	-	NZX_SER v.3
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">Section 1.2</a>: corrected.</li><li>• <a href="#">Section 11 "Legal information"</a>: updated.</li></ul>			
NZX_SER v.3	20110121	Product data sheet	-	NZX_SER v.2
NZX_SER v.2	20090603	Product data sheet	-	NZX_SER v.1
NZX_SER v.1	20080724	Product data sheet	-	-

## 11. Legal information

### 11.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.

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[2] The term 'short data sheet' is explained in section "Definitions".

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