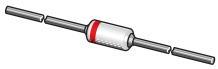


# NZX series

## 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: $P_{tot} \leq 500$ mW
- Low differential resistance
- Low leakage current

### 1.3 Applications

- General regulation functions

### 1.4 Quick reference data

**Table 1. Quick reference data**

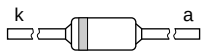
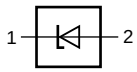
*$T_j$ = 25 °C unless otherwise specified.*

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

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

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | cathode | [1] |   |   006aaa152 |
| 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[1] | 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 | $T_{tp} \leq 25$ °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 | [1] | - | - | 380 | K/W |
| $R_{th(j-t)}$ | thermal resistance from junction to tie-point | | [1] | - | - | 300 | K/W |

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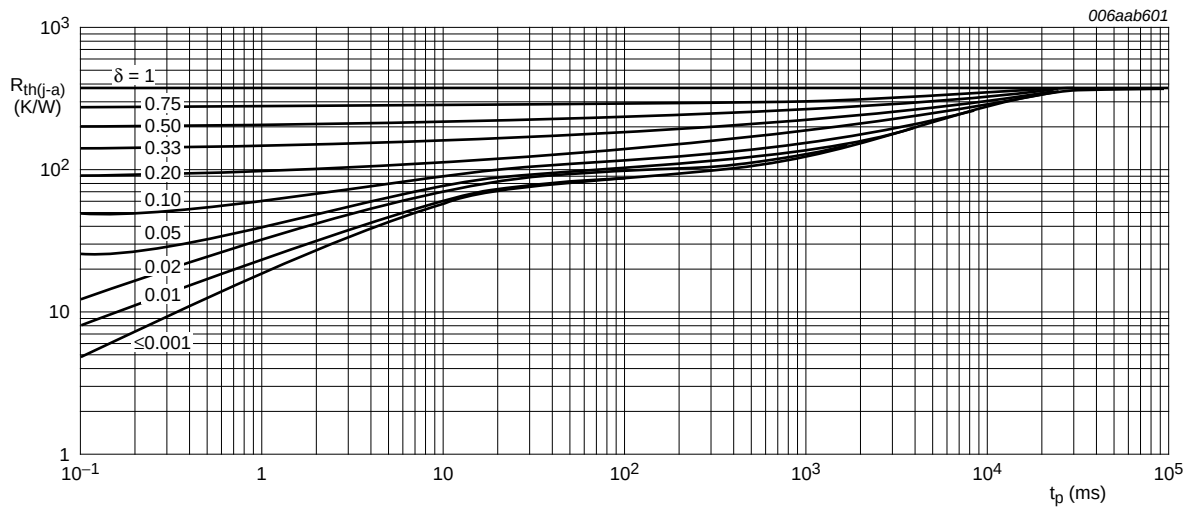


**Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 7. Characteristics

**Table 7. Characteristics**

*$T_j$ = 25 °C unless otherwise specified.*

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

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

**Table 8. Characteristics per type; NZX2V1B to NZX18C**

*$T_j$ = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{dif}$ (Ω) | Reverse current $I_R$ (μA) | |
|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 5 mA | | |
| | | Min | Max | Max | Max | $V_R$ (V) |
| 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 | | | |


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**Table 8. Characteristics per type; NZX2V1B to NZX18C** *...continued*

*$T_j$ = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{dif}$ (Ω) | Reverse current $I_R$ (μA) | |
|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 5 mA | | |
| | | Min | Max | Max | Max | $V_R$ (V) |
| 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 | | | |


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**Table 8. Characteristics per type; NZX2V1B to NZX18C** *...continued*

*$T_j$ = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{dif}$ (Ω) | Reverse current $I_R$ (μA) | |
|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 5 mA | | |
| | | Min | Max | Max | Max | $V_R$ (V) |
| 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 | | | |


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**Table 8. Characteristics per type; NZX2V1B to NZX18C** *...continued*

*$T_j$ = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{dif}$ (Ω) | Reverse current $I_R$ (μA) | |
|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 5 mA | | |
| | | Min | Max | Max | Max | $V_R$ (V) |
| 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 | | | |


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**Table 9. Characteristics per type; NZX20A to NZX36X**

*$T_j$ = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{dif}$ (Ω) | Reverse current $I_R$ (μA) | |
|---|---|---|---|---|---|---|
| | | $I_Z$ = 2 mA | | $I_Z$ = 2 mA | | |
| | | Min | Max | Max | Max | $V_R$ (V) |
| 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 | | | |


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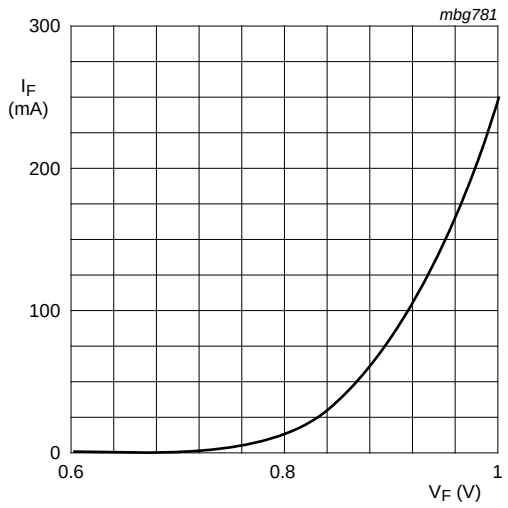
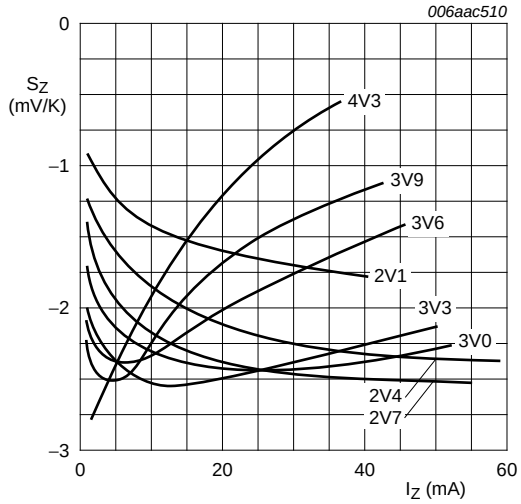



$T_j$ = 25 °C

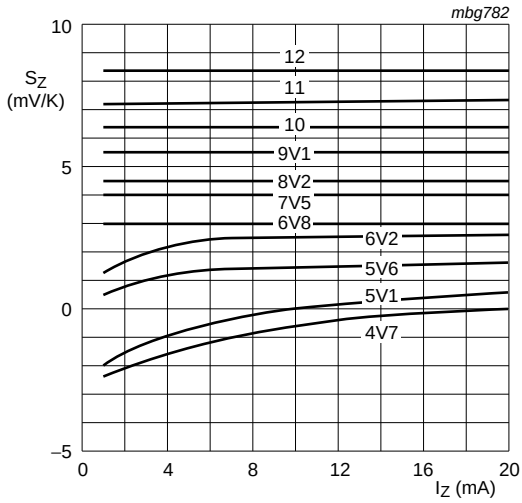
**Fig 2. Forward current as a function of forward voltage; typical values**




NZX2V1 to NZX4V3

$T_j$ = 25 °C to 150 °C

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




NZX4V7 to NZX12

$T_j$ = 25 °C to 150 °C

**Fig 4. Temperature coefficient as a function of working current; typical values**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## 8. Package outline

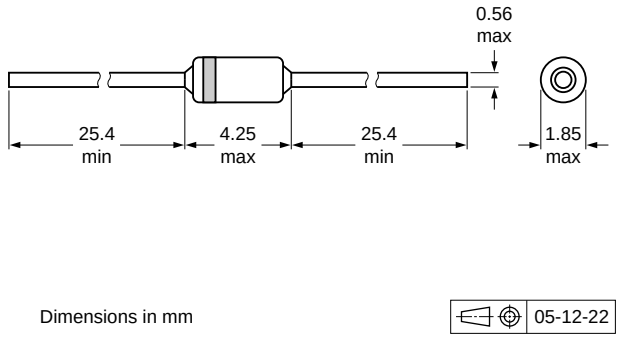


**Fig 5. Package outline SOD27 (SC-40)**

## 9. Packing information

**Table 10. Packing methods**

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

| Type number[2] | 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.


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## 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: | • Section 1.2: corrected.<br>• Section 11 “Legal information”: updated. | | | |
| 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 | - | - |


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| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
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| 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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