



# 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 | $I_F = 200 \text{ mA}$ | <a href="#">[1]</a> - | -   | 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     | <a href="#">[1]</a> |                |
| 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;<br>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.

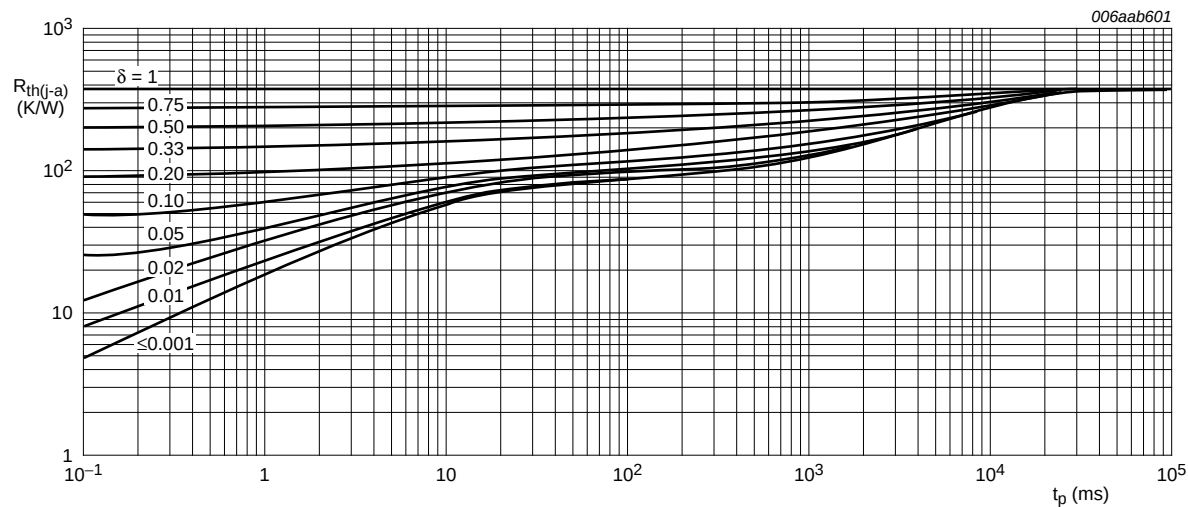


Fig 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

7. Characteristics

Table 7. Characteristics  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

| Symbol         | Parameter       | Conditions              | Min                   | Typ | Max | Unit |
|----------------|-----------------|-------------------------|-----------------------|-----|-----|------|
| V <sub>F</sub> | forward voltage | I <sub>F</sub> = 200 mA | <a href="#">[1]</a> - | -   | 1.5 | V    |

[1] Pulse test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02.

Table 8. Characteristics per type; NZX2V1B to NZX18C  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage<br>V <sub>Z</sub> (V) |     | Differential<br>resistance<br>r <sub>dif</sub> (Ω) | Reverse current<br>I <sub>R</sub> (μA) |                    |
|--------|-----|---------------------------------------|-----|----------------------------------------------------|----------------------------------------|--------------------|
|        |     | I <sub>Z</sub> = 5 mA                 |     | I <sub>Z</sub> = 5 mA                              |                                        |                    |
|        |     | Min                                   | Max | Max                                                | Max                                    | V <sub>R</sub> (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 |                                                    |                                        |                    |

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

| NZXxxx | Sel | Working voltage<br>$V_Z$ (V) |     | Differential<br>resistance<br>$r_{dif}$ ( $\Omega$ ) | Reverse current<br>$I_R$ ( $\mu\text{A}$ ) |           |
|--------|-----|------------------------------|-----|------------------------------------------------------|--------------------------------------------|-----------|
|        |     | $I_Z = 5\text{ mA}$          |     | $I_Z = 5\text{ mA}$                                  |                                            |           |
|        |     | 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 |                                                      |                                            |           |

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

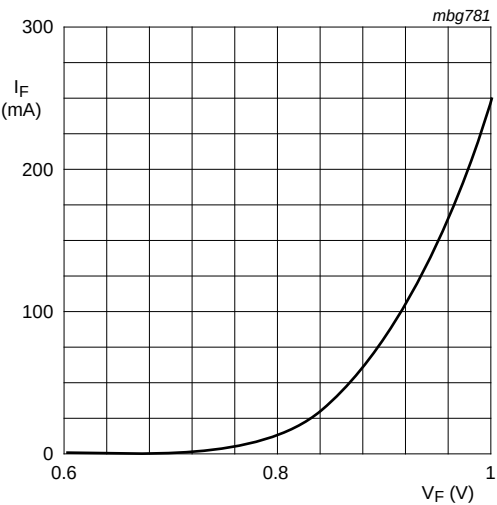
| NZXxxx | Sel | Working voltage<br>$V_Z$ (V) |       | Differential<br>resistance<br>$r_{dif}$ ( $\Omega$ ) | Reverse current<br>$I_R$ ( $\mu\text{A}$ ) |           |
|--------|-----|------------------------------|-------|------------------------------------------------------|--------------------------------------------|-----------|
|        |     | $I_Z = 5\text{ mA}$          |       | $I_Z = 5\text{ mA}$                                  |                                            |           |
|        |     | 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  |                                                      |                                            |           |

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

| NZXxxx | Sel | Working voltage<br>$V_Z$ (V) |       | Differential<br>resistance<br>$r_{dif}$ ( $\Omega$ ) | Reverse current<br>$I_R$ ( $\mu\text{A}$ ) |           |
|--------|-----|------------------------------|-------|------------------------------------------------------|--------------------------------------------|-----------|
|        |     | $I_Z = 5\text{ mA}$          |       | $I_Z = 5\text{ mA}$                                  |                                            |           |
|        |     | 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  |                                                      |                                            |           |

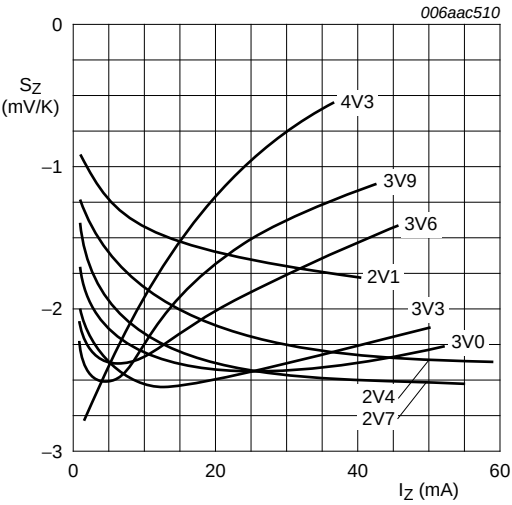
**Table 9. Characteristics per type; NZX20A to NZX36X***T<sub>j</sub> = 25 °C unless otherwise specified.*

| NZXxxx | Sel | Working voltage<br>V <sub>Z</sub> (V) |       | Differential<br>resistance<br>r <sub>dif</sub> (Ω) | Reverse current<br>I <sub>R</sub> (μA) |                    |
|--------|-----|---------------------------------------|-------|----------------------------------------------------|----------------------------------------|--------------------|
|        |     | I <sub>Z</sub> = 2 mA                 |       | I <sub>Z</sub> = 2 mA                              |                                        |                    |
|        |     | Min                                   | Max   | Max                                                | Max                                    | V <sub>R</sub> (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 |                                                    |                                        |                    |



$T_j = 25\text{ °C}$

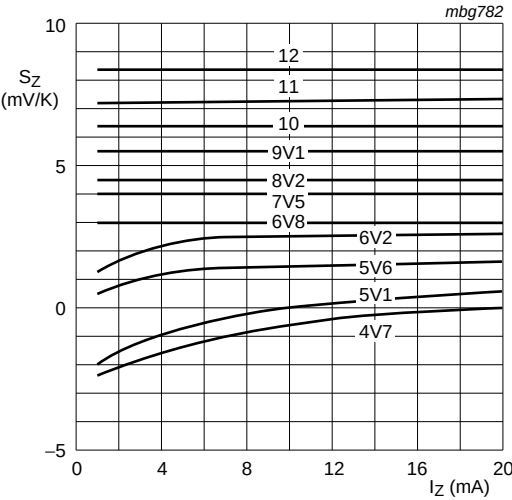
Fig 2. Forward current as a function of forward voltage; typical values



NZX2V1 to NZX4V3

$T_j = 25\text{ °C to }150\text{ °C}$

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



NZX4V7 to NZX12

$T_j = 25\text{ °C to }150\text{ °C}$

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

8. Package outline

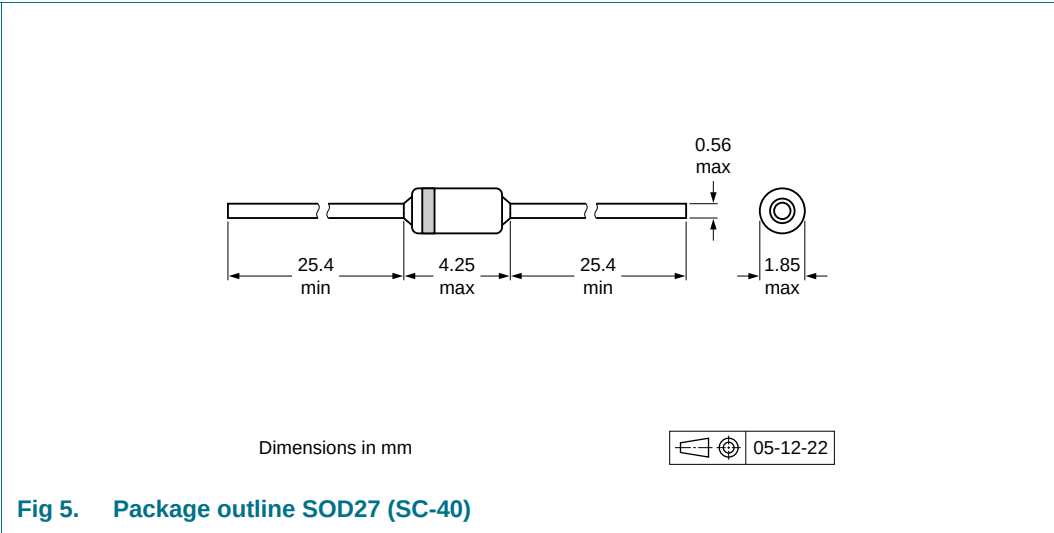


Fig 5. Package outline SOD27 (SC-40)

9. Packing information

Table 10. Packing methods

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

| 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.                                     |

[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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nexperia.com>.

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## 12. Contact information

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

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