



**THE DATASHEET OF  
BZV55-B12,135**





# BZV55 series

## Voltage regulator diodes

Rev. 5 — 26 January 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Low-power voltage regulator diodes in small hermetically sealed glass SOD80C Surface-Mounted Device (SMD) packages. The diodes are available in the normalized E24  $\pm 2\%$  (BZV55-B) and approximately  $\pm 5\%$  (BZV55-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 V to 75 V.

### 1.2 Features and benefits

- Non-repetitive peak reverse power dissipation:  $\leq 40$  W
- Total power dissipation:  $\leq 500$  mW
- Two tolerance series:  $\pm 2\%$  and  $\pm 5\%$
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Low differential resistance
- Small hermetically sealed glass SMD package

### 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 | -   | -   | 0.9 | V    |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation |               | [1] | -   | 40  | W    |

[1]  $t_p = 100$   $\mu$ s; square wave;  $T_j = 25$  °C prior to surge

## 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 |   | Version |
|--|---------|---|---------|
|  | Name    | Description   |         |
| BZV55-B2V4 to BZV55-C75 <sup>[1]</sup> | -       | hermetically sealed glass surface-mounted package; 2 connectors | SOD80C  |

[1] The series consists of 74 types with nominal working voltages from 2.4 V to 75 V.

### 4. Marking

**Table 4. Marking codes**

| Type number             | Marking code |
|-------------------------|--------------|
| BZV55-B2V4 to BZV55-C75 | marking band |

### 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           |                             | <sup>[1]</sup> - | see <a href="#">Table 8</a> and <a href="#">9</a> |      |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation |                             | <sup>[1]</sup> - | 40  | W    |
| $P_{tot}$ | total power dissipation                       | $T_{amb} \leq 50\text{ °C}$ | <sup>[2]</sup> - | 400   | mW   |
|           |   | $T_{tp} \leq 50\text{ °C}$  | <sup>[2]</sup> - | 500   | mW   |
| $T_{stg}$ | storage temperature                           |                             | -65              | +200  | °C   |
| $T_j$     | junction temperature                          |                             | -65              | +200  | °C   |

[1]  $t_p = 100\ \mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge

[2] Device mounted on a ceramic substrate of  $10 \times 10 \times 0.6\text{ mm}$ .

### 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  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | -                | -   | 300 | K/W  |

[1] Device mounted on a ceramic substrate of  $10 \times 10 \times 0.6\text{ mm}$ .



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> = 10 mA                  | -   | -   | 0.9 | V    |
| I <sub>R</sub> | reverse current            |   |     |     |     |      |
|                | BZV55-B/C2V4               | V <sub>R</sub> = 1 V                    | -   | -   | 50  | μA   |
|                | BZV55-B/C2V7               | V <sub>R</sub> = 1 V                    | -   | -   | 20  | μA   |
|                | BZV55-B/C3V0               | V <sub>R</sub> = 1 V                    | -   | -   | 10  | μA   |
|                | BZV55-B/C3V3               | V <sub>R</sub> = 1 V                    | -   | -   | 5   | μA   |
|                | BZV55-B/C3V6               | V <sub>R</sub> = 1 V                    | -   | -   | 5   | μA   |
|                | BZV55-B/C3V9               | V <sub>R</sub> = 1 V                    | -   | -   | 3   | μA   |
|                | BZV55-B/C4V3               | V <sub>R</sub> = 1 V                    | -   | -   | 3   | μA   |
|                | BZV55-B/C4V7               | V <sub>R</sub> = 2 V                    | -   | -   | 3   | μA   |
|                | BZV55-B/C5V1               | V <sub>R</sub> = 2 V                    | -   | -   | 2   | μA   |
|                | BZV55-B/C5V6               | V <sub>R</sub> = 2 V                    | -   | -   | 1   | μA   |
|                | BZV55-B/C6V2               | V <sub>R</sub> = 4 V                    | -   | -   | 3   | μA   |
|                | BZV55-B/C6V8               | V <sub>R</sub> = 4 V                    | -   | -   | 2   | μA   |
|                | BZV55-B/C7V5               | V <sub>R</sub> = 5 V                    | -   | -   | 1   | μA   |
|                | BZV55-B/C8V2               | V <sub>R</sub> = 5 V                    | -   | -   | 700 | nA   |
|                | BZV55-B/C9V1               | V <sub>R</sub> = 6 V                    | -   | -   | 500 | nA   |
|                | BZV55-B/C10                | V <sub>R</sub> = 7 V                    | -   | -   | 200 | nA   |
|                | BZV55-B/C11                | V <sub>R</sub> = 8 V                    | -   | -   | 100 | nA   |
|                | BZV55-B/C12                | V <sub>R</sub> = 8 V                    | -   | -   | 100 | nA   |
|                | BZV55-B/C13                | V <sub>R</sub> = 8 V                    | -   | -   | 100 | nA   |
|                | BZV55-B/C15 to BZV55-B/C75 | V <sub>R</sub> = 0.7V <sub>Z(nom)</sub> | -   | -   | 50  | nA   |

**Table 8. Characteristics per type; BZV55-B2V4 to BZV55-C24** $T_j = 25\text{ °C}$  unless otherwise specified.

| BZV55-xxx | Sel | Working voltage $V_Z$ (V) |      | Differential resistance $r_{dif}$ ( $\Omega$ ) |     |                     |     | Temperature coefficient $S_Z$ (mV/K) |      |      | Diode capacitance $C_d$ (pF) <sup>[1]</sup> | Non-repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup> |
|-----------|-----|---------------------------|------|--|-----|---------------------|-----|--------------------------------------|------|------|---|--|
|           |     | $I_Z = 5\text{ mA}$       |      | $I_Z = 1\text{ mA}$                            |     | $I_Z = 5\text{ mA}$ |     | $I_Z = 5\text{ mA}$                  |      |      |   |  |
|           |     | Min                       | Max  | Typ  | Max | Typ                 | Max | Min                                  | Typ  | Max  |   |  |
| 2V4       | B   | 2.35                      | 2.45 | 275  | 600 | 70                  | 100 | -3.5                                 | -1.6 | 0    | 450   | 6.0  |
|           | C   | 2.2                       | 2.6  |  |     |                     |     |                                      |      |      |   |  |
| 2V7       | B   | 2.65                      | 2.75 | 300  | 600 | 75                  | 100 | -3.5                                 | -2.0 | 0    | 450   | 6.0  |
|           | C   | 2.5                       | 2.9  |  |     |                     |     |                                      |      |      |   |  |
| 3V0       | B   | 2.94                      | 3.06 | 325  | 600 | 80                  | 95  | -3.5                                 | -2.1 | 0    | 450   | 6.0  |
|           | C   | 2.8                       | 3.2  |  |     |                     |     |                                      |      |      |   |  |
| 3V3       | B   | 3.23                      | 3.37 | 350  | 600 | 85                  | 95  | -3.5                                 | -2.4 | 0    | 450   | 6.0  |
|           | C   | 3.1                       | 3.5  |  |     |                     |     |                                      |      |      |   |  |
| 3V6       | B   | 3.53                      | 3.67 | 375  | 600 | 85                  | 90  | -3.5                                 | -2.4 | 0    | 450   | 6.0  |
|           | C   | 3.4                       | 3.8  |  |     |                     |     |                                      |      |      |   |  |
| 3V9       | B   | 3.82                      | 3.98 | 400  | 600 | 85                  | 90  | -3.5                                 | -2.5 | 0    | 450   | 6.0  |
|           | C   | 3.7                       | 4.1  |  |     |                     |     |                                      |      |      |   |  |
| 4V3       | B   | 4.21                      | 4.39 | 410  | 600 | 80                  | 90  | -3.5                                 | -2.5 | 0    | 450   | 6.0  |
|           | C   | 4.0                       | 4.6  |  |     |                     |     |                                      |      |      |   |  |
| 4V7       | B   | 4.61                      | 4.79 | 425  | 500 | 50                  | 80  | -3.5                                 | -1.4 | 0.2  | 300   | 6.0  |
|           | C   | 4.4                       | 5.0  |  |     |                     |     |                                      |      |      |   |  |
| 5V1       | B   | 5.0                       | 5.2  | 400  | 480 | 40                  | 60  | -2.7                                 | -0.8 | 1.2  | 300   | 6.0  |
|           | C   | 4.8                       | 5.4  |  |     |                     |     |                                      |      |      |   |  |
| 5V6       | B   | 5.49                      | 5.71 | 80   | 400 | 15                  | 40  | -2.0                                 | 1.2  | 2.5  | 300   | 6.0  |
|           | C   | 5.2                       | 6.0  |  |     |                     |     |                                      |      |      |   |  |
| 6V2       | B   | 6.08                      | 6.32 | 40   | 150 | 6                   | 10  | 0.4                                  | 2.3  | 3.7  | 200   | 6.0  |
|           | C   | 5.8                       | 6.6  |  |     |                     |     |                                      |      |      |   |  |
| 6V8       | B   | 6.66                      | 6.94 | 30   | 80  | 6                   | 15  | 1.2                                  | 3.0  | 4.5  | 200   | 6.0  |
|           | C   | 6.4                       | 7.2  |  |     |                     |     |                                      |      |      |   |  |
| 7V5       | B   | 7.35                      | 7.65 | 30   | 80  | 6                   | 15  | 2.5                                  | 4.0  | 5.3  | 150   | 4.0  |
|           | C   | 7.0                       | 7.9  |  |     |                     |     |                                      |      |      |   |  |
| 8V2       | B   | 8.04                      | 8.36 | 40   | 80  | 6                   | 15  | 3.2                                  | 4.6  | 6.2  | 150   | 4.0  |
|           | C   | 7.7                       | 8.7  |  |     |                     |     |                                      |      |      |   |  |
| 9V1       | B   | 8.92                      | 9.28 | 40   | 100 | 6                   | 15  | 3.8                                  | 5.5  | 7.0  | 150   | 3.0  |
|           | C   | 8.5                       | 9.6  |  |     |                     |     |                                      |      |      |   |  |
| 10        | B   | 9.8                       | 10.2 | 50   | 150 | 8                   | 20  | 4.5                                  | 6.4  | 8.0  | 90  | 3.0  |
|           | C   | 9.4                       | 10.6 |  |     |                     |     |                                      |      |      |   |  |
| 11        | B   | 10.8                      | 11.2 | 50   | 150 | 10                  | 20  | 5.4                                  | 7.4  | 9.0  | 85  | 2.5  |
|           | C   | 10.4                      | 11.6 |  |     |                     |     |                                      |      |      |   |  |
| 12        | B   | 11.8                      | 12.2 | 50   | 150 | 10                  | 25  | 6.0                                  | 8.4  | 10.0 | 85  | 2.5  |
|           | C   | 11.4                      | 12.7 |  |     |                     |     |                                      |      |      |   |  |

Table 8. Characteristics per type; BZV55-B2V4 to BZV55-C24 ...continued

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

| BZV55-xxx | Sel | Working voltage $V_Z$ (V) |      | Differential resistance $r_{dif}$ ( $\Omega$ ) |     |                     |                     | Temperature coefficient $S_Z$ (mV/K) |                     |      | Diode capacitance $C_d$ (pF) <sup>[1]</sup> | Non-repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup> |
|-----------|-----|---------------------------|------|--|-----|---------------------|---------------------|--------------------------------------|---------------------|------|---|--|
|           |     |                           |      | $I_Z = 5\text{ mA}$                            |     | $I_Z = 1\text{ mA}$ | $I_Z = 5\text{ mA}$ |                                      | $I_Z = 5\text{ mA}$ |      |   |  |
|           |     | Min                       | Max  | Typ  | Max | Typ                 | Max                 | Min                                  | Typ                 | Max  | Max   | Max  |
| 13        | B   | 12.7                      | 13.3 | 50   | 170 | 10                  | 30                  | 7.0                                  | 9.4                 | 11.0 | 80  | 2.5  |
|           | C   | 12.4                      | 14.1 |  |     |                     |                     |                                      |                     |      |   |  |
| 15        | B   | 14.7                      | 15.3 | 50   | 200 | 10                  | 30                  | 9.2                                  | 11.4                | 13.0 | 75  | 2.0  |
|           | C   | 13.8                      | 15.6 |  |     |                     |                     |                                      |                     |      |   |  |
| 16        | B   | 15.7                      | 16.3 | 50   | 200 | 10                  | 40                  | 10.4                                 | 12.4                | 14.0 | 75  | 1.5  |
|           | C   | 15.3                      | 17.1 |  |     |                     |                     |                                      |                     |      |   |  |
| 18        | B   | 17.6                      | 18.4 | 50   | 225 | 10                  | 45                  | 12.4                                 | 14.4                | 16.0 | 70  | 1.5  |
|           | C   | 16.8                      | 19.1 |  |     |                     |                     |                                      |                     |      |   |  |
| 20        | B   | 19.6                      | 20.4 | 60   | 225 | 15                  | 55                  | 12.3                                 | 15.6                | 18.0 | 60  | 1.5  |
|           | C   | 18.8                      | 21.2 |  |     |                     |                     |                                      |                     |      |   |  |
| 22        | B   | 21.6                      | 22.4 | 60   | 250 | 20                  | 55                  | 14.1                                 | 17.6                | 20.0 | 60  | 1.25   |
|           | C   | 20.8                      | 23.3 |  |     |                     |                     |                                      |                     |      |   |  |
| 24        | B   | 23.5                      | 24.5 | 60   | 250 | 25                  | 70                  | 15.9                                 | 19.6                | 22.0 | 55  | 1.25   |
|           | C   | 22.8                      | 25.6 |  |     |                     |                     |                                      |                     |      |   |  |

[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge

**Table 9. Characteristics per type; BZV55-B27 to BZV55-C75** $T_j = 25\text{ °C}$  unless otherwise specified.

| BZV55-xxx | Sel | Working voltage $V_Z$ (V) |      | Differential resistance $r_{dif}$ ( $\Omega$ ) |     |                     |     | Temperature coefficient $S_Z$ (mV/K) |      |      | Diode capacitance $C_d$ (pF) <sup>[1]</sup> | Non-repetitive peak reverse current $I_{ZSM}$ (A) <sup>[2]</sup> |
|-----------|-----|---------------------------|------|--|-----|---------------------|-----|--------------------------------------|------|------|---|--|
|           |     | $I_Z = 2\text{ mA}$       |      | $I_Z = 0.5\text{ mA}$                          |     | $I_Z = 2\text{ mA}$ |     | $I_Z = 2\text{ mA}$                  |      |      |   |  |
|           |     | Min                       | Max  | Typ  | Max | Typ                 | Max | Min                                  | Typ  | Max  |   |  |
| 27        | B   | 26.5                      | 27.5 | 65   | 300 | 25                  | 80  | 18.0                                 | 22.7 | 25.3 | 50  | 1.0  |
|           | C   | 25.1                      | 28.9 |  |     |                     |     |                                      |      |      |   |  |
| 30        | B   | 29.4                      | 30.6 | 70   | 300 | 30                  | 80  | 20.6                                 | 25.7 | 29.4 | 50  | 1.0  |
|           | C   | 28.0                      | 32.0 |  |     |                     |     |                                      |      |      |   |  |
| 33        | B   | 32.3                      | 33.7 | 75   | 325 | 35                  | 80  | 23.3                                 | 28.7 | 33.4 | 45  | 0.9  |
|           | C   | 31.0                      | 35.0 |  |     |                     |     |                                      |      |      |   |  |
| 36        | B   | 35.3                      | 36.7 | 80   | 350 | 35                  | 90  | 26.0                                 | 31.8 | 37.4 | 45  | 0.8  |
|           | C   | 34.0                      | 38.0 |  |     |                     |     |                                      |      |      |   |  |
| 39        | B   | 38.2                      | 39.8 | 80   | 350 | 40                  | 130 | 28.7                                 | 34.8 | 41.2 | 45  | 0.7  |
|           | C   | 37.0                      | 41.0 |  |     |                     |     |                                      |      |      |   |  |
| 43        | B   | 42.1                      | 43.9 | 85   | 375 | 45                  | 150 | 31.4                                 | 38.8 | 46.6 | 40  | 0.6  |
|           | C   | 40.0                      | 46.0 |  |     |                     |     |                                      |      |      |   |  |
| 47        | B   | 46.1                      | 47.9 | 85   | 375 | 50                  | 170 | 35.0                                 | 42.9 | 51.8 | 40  | 0.5  |
|           | C   | 44.0                      | 50.0 |  |     |                     |     |                                      |      |      |   |  |
| 51        | B   | 50.0                      | 52.0 | 90   | 400 | 60                  | 180 | 38.6                                 | 46.9 | 57.2 | 40  | 0.4  |
|           | C   | 48.0                      | 54.0 |  |     |                     |     |                                      |      |      |   |  |
| 56        | B   | 54.9                      | 57.1 | 100  | 425 | 70                  | 200 | 42.2                                 | 52.0 | 63.8 | 40  | 0.3  |
|           | C   | 52.0                      | 60.0 |  |     |                     |     |                                      |      |      |   |  |
| 62        | B   | 60.8                      | 63.2 | 120  | 450 | 80                  | 215 | 58.8                                 | 64.4 | 71.6 | 35  | 0.3  |
|           | C   | 58.0                      | 66.0 |  |     |                     |     |                                      |      |      |   |  |
| 68        | B   | 66.6                      | 69.4 | 150  | 475 | 90                  | 240 | 65.6                                 | 71.7 | 79.8 | 35  | 0.25   |
|           | C   | 64.0                      | 72.0 |  |     |                     |     |                                      |      |      |   |  |
| 75        | B   | 73.5                      | 76.5 | 170  | 500 | 95                  | 255 | 73.4                                 | 80.2 | 88.6 | 35  | 0.2  |
|           | C   | 70.0                      | 79.0 |  |     |                     |     |                                      |      |      |   |  |

[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ °C}$  prior to surge



- (1)  $T_j = 25^\circ\text{C}$  (prior to surge)
- (2)  $T_j = 150^\circ\text{C}$  (prior to surge)

**Fig 2. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values**



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

**Fig 3. Forward current as a function of forward voltage; typical values**



BZV55-B/C2V4 to BZV55-B/C4V3  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

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



BZV55-B/C4V7 to BZV55-B/C12  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

**Fig 5. Temperature coefficient as a function of working current; typical values**

## 8. Package outline



## 9. Packing information

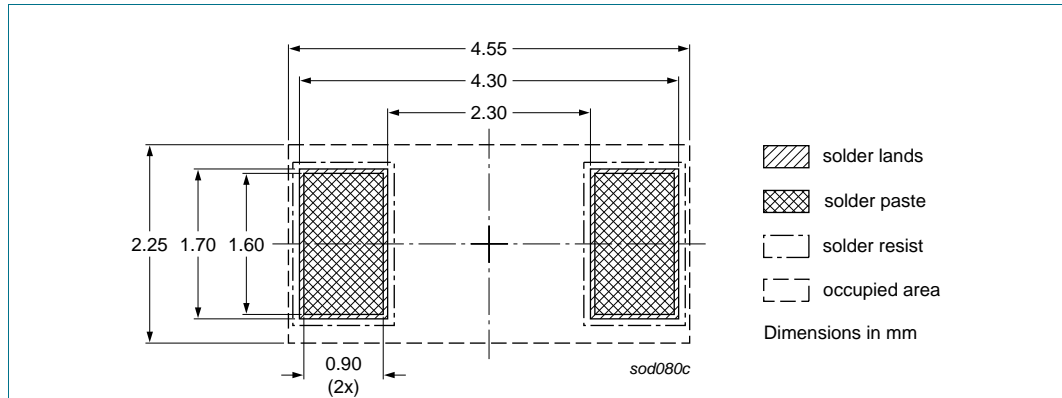
**Table 10. Packing methods**

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

| Type number                | Package | Description                    | Packing quantity |       |
|----------------------------|---------|--------------------------------|------------------|-------|
|                            |         |                                | 2500             | 10000 |
| BZV55-B2V4 to<br>BZV55-C75 | SOD80C  | 4 mm pitch, 8 mm tape and reel | -115             | -135  |

[1] For further information and the availability of packing methods, see [Section 13](#).

**10. Soldering**



**Fig 7. Reflow soldering footprint SOD80C**



**Fig 8. Wave soldering footprint SOD80C**

## 11. Revision history

Table 11. Revision history

| Document ID    | Release date  | Data sheet status     | Change notice  | Supersedes    |
|----------------|---|-----------------------|----------------|---------------|
| BZV55_SER v.5  | 20110126  | Product data sheet    | -              | BZV55_SER v.4 |
| Modifications: | <ul style="list-style-type: none"> <li>• <a href="#">Section 4 “Marking”</a>: updated</li> <li>• <a href="#">Table 6 “Thermal characteristics”</a>: changed <math>R_{th(j-t)}</math> for <math>R_{th(j-sp)}</math></li> <li>• <a href="#">Figure 6</a>: superseded by minimized outline drawing</li> <li>• <a href="#">Section 12 “Legal information”</a>: updated</li> </ul> |                       |                |               |
| BZV55_SER v.4  | 20070719  | Product data sheet    | CPCN200508022F | BZV55 v.3     |
| BZV55 v.3      | 20020228  | Product specification | -              | BZV55 v.2     |
| BZV55 v.2      | 19990521  | Product specification | -              | BZV55 v.1     |
| BZV55 v.1      | 19960426  | Product specification | -              | -             |

## 12. Legal information

### 12.1 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>.

### 12.2 Definitions

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## 13. 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)



## 14. Contents

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|           |  |           |
|-----------|--|-----------|
| <b>1</b>  | <b>Product profile</b> . . . . .         | <b>1</b>  |
| 1.1       | General description . . . . .            | 1         |
| 1.2       | Features and benefits . . . . .          | 1         |
| 1.3       | Applications . . . . .                   | 1         |
| 1.4       | Quick reference data . . . . .           | 1         |
| <b>2</b>  | <b>Pinning information</b> . . . . .     | <b>1</b>  |
| <b>3</b>  | <b>Ordering information</b> . . . . .    | <b>2</b>  |
| <b>4</b>  | <b>Marking</b> . . . . .                 | <b>2</b>  |
| <b>5</b>  | <b>Limiting values</b> . . . . .         | <b>2</b>  |
| <b>6</b>  | <b>Thermal characteristics</b> . . . . . | <b>2</b>  |
| <b>7</b>  | <b>Characteristics</b> . . . . .         | <b>3</b>  |
| <b>8</b>  | <b>Package outline</b> . . . . .         | <b>8</b>  |
| <b>9</b>  | <b>Packing information</b> . . . . .     | <b>8</b>  |
| <b>10</b> | <b>Soldering</b> . . . . .               | <b>9</b>  |
| <b>11</b> | <b>Revision history</b> . . . . .        | <b>10</b> |
| <b>12</b> | <b>Legal information</b> . . . . .       | <b>11</b> |
| 12.1      | Data sheet status . . . . .              | 11        |
| 12.2      | Definitions . . . . .                    | 11        |
| 12.3      | Disclaimers . . . . .                    | 11        |
| 12.4      | Trademarks . . . . .                     | 12        |
| <b>13</b> | <b>Contact information</b> . . . . .     | <b>12</b> |
| <b>14</b> | <b>Contents</b> . . . . .                | <b>13</b> |

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