



# PZUxBL series

Single Zener diodes in a SOD882 package

Rev. 2 — 11 November 2019

Product data sheet

## 1. Product profile

### 1.1. General description

General-purpose Zener diodes in a SOD882 leadless ultra small Surface-Mounted Device (SMD) plastic package.

### 1.2. Features

- Non-repetitive peak reverse power dissipation:  $P_{ZSM} \leq 40 \text{ W}$
- Total power dissipation:  $P_{tot} \leq 250 \text{ mW}$
- Tolerance series: B: approximately  $\pm 5 \%$ ; B2: approximately  $\pm 2 \%$
- Wide working voltage range: nominal 2.4 V to 36 V (E24 range)
- Low reverse current  $I_R$  range
- Small plastic package suitable for surface-mounted design
- AEC-Q101 qualified

### 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                               | $I_F = 100 \text{ mA}$                   | [1] - | -   | 1.1 | V    |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation |  | [2] - | -   | 40  | W    |
| $P_{tot}$ | total power dissipation                       | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ | [3] - | -   | 250 | mW   |
|           |   |  | [4] - | -   | 550 | mW   |

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

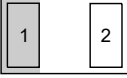
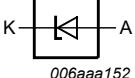
[2]  $t_p = 100 \text{ } \mu\text{s}$ ; square wave;  $T_j = 25 \text{ }^\circ\text{C}$  prior to surge

[3] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

## 2. Pinning information

Table 2. Pinning

| Pin | Description |     | Simplified outline  | Symbol   |
|-----|-------------|-----|---|--|
| 1   | cathode     | [1] |  <p>Transparent top view</p> |  <p>006aaa152</p> |
| 2   | anode       |     |   |  |

[1] The marking bar indicates the cathode

## 3. Ordering information

Table 3. Ordering information

| Type number                  | Package   |  |         |
|------------------------------|-----------|--|---------|
|                              | Name      | Description  | Version |
| PZU2.4BL to PZU36BL<br>[1]   | DFN1006-2 | leadless ultra small plastic package;<br>2 terminals | SOD882  |
| PZU2.7B2L to PZU24B2L<br>[2] |           |  |         |

[1] The series consists of 29 types with nominal working voltages from 2.4 V to 36 V.

[2] The series consists of 25 types with nominal working voltages from 2.7 V to 24 V.

## 4. Marking

Table 4. Marking codes

| Type number | Marking code | Type number | Marking code |
|-------------|--------------|-------------|--------------|
| PZU2.4BL    | H2           | PZU2.7B2L   | HZ           |
| PZU2.7BL    | H3           | PZU3.0B2L   | K1           |
| PZU3.0BL    | H4           | PZU3.3B2L   | K2           |
| PZU3.3BL    | H5           | PZU3.6B2L   | K3           |
| PZU3.6BL    | H6           | PZU3.9B2L   | K4           |
| PZU3.9BL    | H7           | PZU4.3B2L   | K5           |
| PZU4.3BL    | H8           | PZU4.7B2L   | K6           |
| PZU4.7BL    | H9           | PZU5.1B2L   | K7           |
| PZU5.1BL    | HA           | PZU5.6B2L   | K8           |
| PZU5.6BL    | HB           | PZU6.2B2L   | H1           |
| PZU6.2BL    | HC           | PZU6.8B2L   | K9           |
| PZU6.8BL    | HD           | PZU7.5B2L   | KA           |
| PZU7.5BL    | HE           | PZU8.2B2L   | KB           |
| PZU8.2BL    | HF           | PZU9.1B2L   | KC           |
| PZU9.1BL    | HG           | PZU10B2L    | KD           |
| PZU10BL     | HH           | PZU11B2L    | KE           |
| PZU11BL     | HK           | PZU12B2L    | KF           |
| PZU12BL     | HL           | PZU13B2L    | KG           |
| PZU13BL     | HM           | PZU14B2L    | KH           |
| PZU15BL     | HN           | PZU15B2L    | KK           |
| PZU16BL     | HP           | PZU16B2L    | KL           |
| PZU18BL     | HR           | PZU18B2L    | KM           |
| PZU20BL     | HS           | PZU20B2L    | KN           |
| PZU22BL     | HT           | PZU22B2L    | KP           |
| PZU24BL     | HU           | PZU24B2L    | KR           |
| PZU27BL     | HV           | -           | -            |
| PZU30BL     | HW           | -           | -            |
| PZU33BL     | HX           | -           | -            |
| PZU36BL     | HY           | -           | -            |

## 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                               |                             | -     | 200          | mA   |
| $I_{ZSM}$ | non-repetitive peak reverse current           |                             | [1] - | see: Table 8 |      |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation |                             | [1] - | 40           | W    |
| $P_{tot}$ | total power dissipation                       | $T_{amb} \leq 25\text{ °C}$ | [2] - | 250          | mW   |
|           |   |                             | [3] - | 500          | mW   |
| $T_j$     | junction temperature                          |                             | -     | 150          | °C   |
| $T_{amb}$ | ambient temperature                           |                             | -55   | +150         | °C   |
| $T_{stg}$ | storage temperature                           |                             | -65   | +150         | °C   |

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

## 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] - | -   | 500 | K/W  |
|                |  |             | [2] - | -   | 250 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [3] - | -   | 55  | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

[3] Soldering point of cathode tab.

## 7. Characteristics

**Table 7. Characteristics**

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

| Symbol | Parameter       | Conditions            | Min   | Typ | Max | Unit |
|--------|-----------------|-----------------------|-------|-----|-----|------|
| $V_F$  | forward voltage | $I_F = 10\text{ mA}$  | [1] - | -   | 0.9 | V    |
|        |                 | $I_F = 100\text{ mA}$ | [1] - | -   | 1.1 | V    |

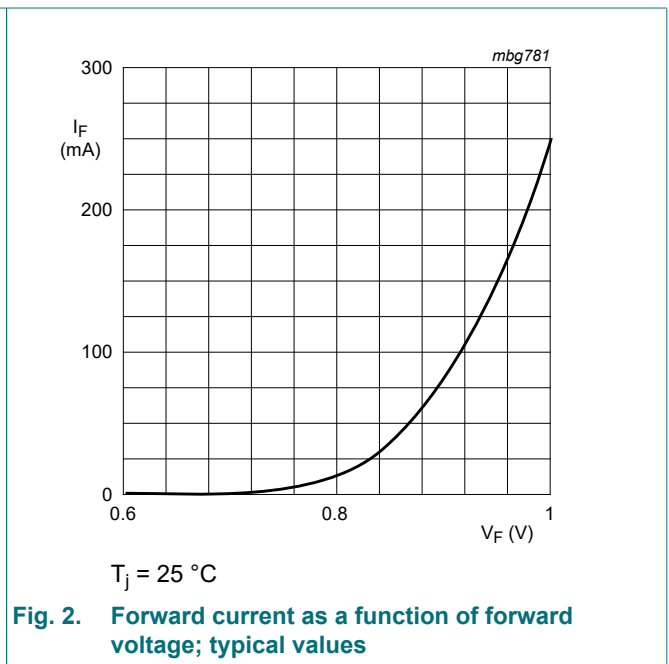
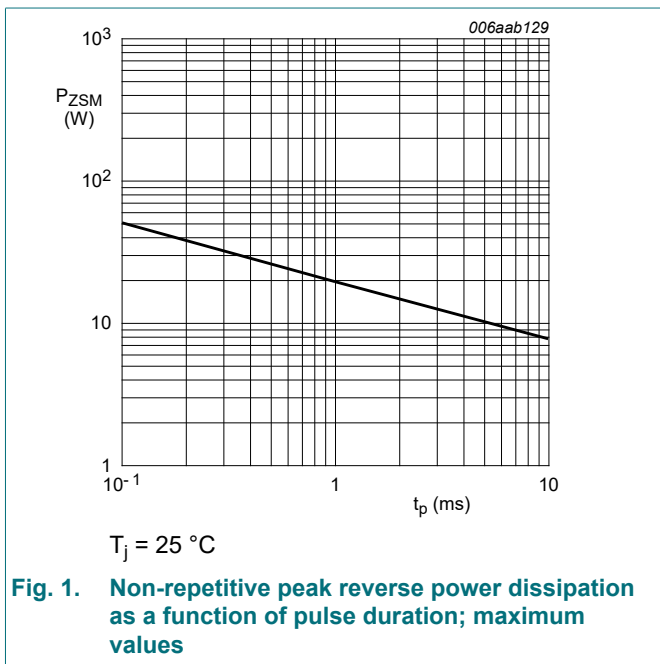
[1] Pulse test:  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$

Table 8. Characteristics per type; PZU2.4BL to PZU36BL

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

| PZU<br>xBL | Sel | Working<br>voltage<br>$V_Z$ (V); |       | Maximum differential<br>resistance<br>$r_{dif}$ ( $\Omega$ ) |              | Reverse<br>current<br>$I_R$ ( $\mu$ A) |           | Temperature<br>coefficient<br>$S_Z$ (mV/K); | Diode<br>capacitance<br>$C_d$ (pF) ;<br>$V_R = 0$ V | Non-repetitive<br>peak<br>reverse current<br>$I_{ZSM}$ (A)                      |
|------------|-----|----------------------------------|-------|--|--------------|--|-----------|---|---|---|
|            |     | $I_Z = 5$ mA                     |       | $I_Z = 0.5$ mA   | $I_Z = 5$ mA | Max                                    | $V_R$ (V) | Typ   | Max   | $t_p = 100\ \mu$ s;<br>square wave;<br>$T_j = 25\text{ °C}$ ;<br>prior to surge |
|            |     | Min                              | Max   | Max  | Max          |  |           |   |   |   |
| 2.4        | B   | 2.3                              | 2.6   | 1000   | 100          | 50                                     | 1         | -1.6  | 450   | 8   |
| 2.7        | B   | 2.5                              | 2.9   | 1000   | 100          | 20                                     | 1         | -2.0  | 440   | 8   |
|            | B2  | 2.65                             | 2.9   |  |              |  |           |   |   |   |
| 3.0        | B   | 2.80                             | 3.20  | 1000   | 95           | 10                                     | 1         | -2.1  | 425   | 8   |
|            | B2  | 2.95                             | 3.20  |  |              |  |           |   |   |   |
| 3.3        | B   | 3.10                             | 3.50  | 1000   | 95           | 5                                      | 1         | -2.4  | 410   | 8   |
|            | B2  | 3.25                             | 3.50  |  |              |  |           |   |   |   |
| 3.6        | B   | 3.40                             | 3.80  | 1000   | 90           | 5                                      | 1         | -2.4  | 390   | 8   |
|            | B2  | 3.55                             | 3.80  |  |              |  |           |   |   |   |
| 3.9        | B   | 3.70                             | 4.10  | 1000   | 90           | 3                                      | 1         | -2.5  | 370   | 8   |
|            | B2  | 3.87                             | 4.10  |  |              |  |           |   |   |   |
| 4.3        | B   | 4.01                             | 4.48  | 1000   | 90           | 3                                      | 1         | -2.5  | 350   | 8   |
|            | B2  | 4.15                             | 4.34  |  |              |  |           |   |   |   |
| 4.7        | B   | 4.42                             | 4.90  | 800  | 80           | 2                                      | 1         | -1.4  | 325   | 8   |
|            | B2  | 4.55                             | 4.75  |  |              |  |           |   |   |   |
| 5.1        | B   | 4.84                             | 5.37  | 250  | 60           | 2                                      | 1.5       | 0.3   | 300   | 5.5   |
|            | B2  | 4.98                             | 5.20  |  |              |  |           |   |   |   |
| 5.6        | B   | 5.31                             | 5.92  | 100  | 40           | 1                                      | 2.5       | 1.9   | 275   | 5.5   |
|            | B2  | 5.49                             | 5.73  |  |              |  |           |   |   |   |
| 6.2        | B   | 5.86                             | 6.53  | 80   | 30           | 0.5                                    | 3         | 2.7   | 250   | 5.5   |
|            | B2  | 6.06                             | 6.33  |  |              |  |           |   |   |   |
| 6.8        | B   | 6.47                             | 7.14  | 60   | 20           | 0.5                                    | 3.5       | 3.4   | 215   | 5.5   |
|            | B2  | 6.65                             | 6.93  |  |              |  |           |   |   |   |
| 7.5        | B   | 7.06                             | 7.84  | 60   | 10           | 0.5                                    | 4         | 4.0   | 170   | 3.5   |
|            | B2  | 7.28                             | 7.60  |  |              |  |           |   |   |   |
| 8.2        | B   | 7.76                             | 8.64  | 60   | 10           | 0.5                                    | 5         | 4.6   | 150   | 3.5   |
|            | B2  | 8.02                             | 8.36  |  |              |  |           |   |   |   |
| 9.1        | B   | 8.56                             | 9.55  | 60   | 10           | 0.5                                    | 6         | 5.5   | 120   | 3.5   |
|            | B2  | 8.85                             | 9.23  |  |              |  |           |   |   |   |
| 10         | B   | 9.45                             | 10.55 | 60   | 10           | 0.1                                    | 7         | 6.4   | 110   | 3.5   |
|            | B2  | 9.77                             | 10.21 |  |              |  |           |   |   |   |
| 11         | B   | 10.44                            | 11.56 | 60   | 10           | 0.1                                    | 8         | 7.4   | 108   | 3   |
|            | B2  | 10.76                            | 11.22 |  |              |  |           |   |   |   |
| 12         | B   | 11.42                            | 12.60 | 80   | 10           | 0.1                                    | 9         | 8.4   | 105   | 3   |
|            | B2  | 11.74                            | 12.24 |  |              |  |           |   |   |   |

| PZU xBL | Sel | Working voltage $V_Z$ (V); |       | Maximum differential resistance $r_{dif}$ ( $\Omega$ ) |              | Reverse current $I_R$ ( $\mu A$ ) |           | Temperature coefficient $S_Z$ (mV/K); | Diode capacitance $C_d$ (pF); $V_R = 0$ V | Non-repetitive peak reverse current $I_{ZSM}$ (A)<br>$t_p = 100 \mu s$ ; square wave; $T_j = 25^\circ C$ ; prior to surge |
|---------|-----|----------------------------|-------|--|--------------|-----------------------------------|-----------|---------------------------------------|---|---|
|         |     | $I_Z = 5$ mA               |       | $I_Z = 0.5$ mA   | $I_Z = 5$ mA | Max                               | $V_R$ (V) | Typ                                   | Max                                       |   |
|         |     | Min                        | Max   | Max  | Max          |                                   |           |                                       |   |   |
| 13      | B   | 12.47                      | 13.96 | 80   | 10           | 0.1                               | 10        | 9.4                                   | 103                                       | 2.5   |
|         | B2  | 12.91                      | 13.49 |  |              |                                   |           |                                       |   |   |
| 14      | B2  | 13.70                      | 14.30 | 80   | 10           | 0.1                               | 11        | 10.4                                  | 101                                       | 2   |
| 15      | B   | 13.84                      | 15.52 | 80   | 15           | 0.05                              | 11        | 11.4                                  | 99  | 2   |
|         | B2  | 14.34                      | 14.98 |  |              |                                   |           |                                       |   |   |
| 16      | B   | 15.37                      | 17.09 | 80   | 20           | 0.05                              | 12        | 12.4                                  | 97  | 1.5   |
|         | B2  | 15.85                      | 16.51 |  |              |                                   |           |                                       |   |   |
| 18      | B   | 16.94                      | 19.03 | 80   | 20           | 0.05                              | 13        | 14.4                                  | 93  | 1.5   |
|         | B2  | 17.56                      | 18.35 |  |              |                                   |           |                                       |   |   |
| 20      | B   | 18.86                      | 21.08 | 100  | 20           | 0.05                              | 15        | 16.4                                  | 88  | 1.5   |
|         | B2  | 19.52                      | 20.39 |  |              |                                   |           |                                       |   |   |
| 22      | B   | 20.88                      | 23.17 | 100  | 25           | 0.05                              | 17        | 18.4                                  | 84  | 1.3   |
|         | B2  | 21.54                      | 22.47 |  |              |                                   |           |                                       |   |   |
| 24      | B   | 22.93                      | 25.57 | 120  | 30           | 0.05                              | 19        | 20.4                                  | 80  | 1.3   |
|         | B2  | 23.72                      | 24.78 |  |              |                                   |           |                                       |   |   |
| 27      | B   | 25.1                       | 28.9  | 150  | 40           | 0.05                              | 21        | 23.4                                  | 73  | 1   |
| 30      | B   | 28                         | 32    | 200  | 40           | 0.05                              | 23        | 26.6                                  | 66  | 1   |
| 33      | B   | 31                         | 35    | 250  | 40           | 0.05                              | 25        | 29.7                                  | 60  | 0.9   |
| 36      | B   | 34                         | 38    | 300  | 60           | 0.05                              | 27        | 33.0                                  | 59  | 0.8   |





PZU2.4BL to PZU4.3B2L  
 $T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

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



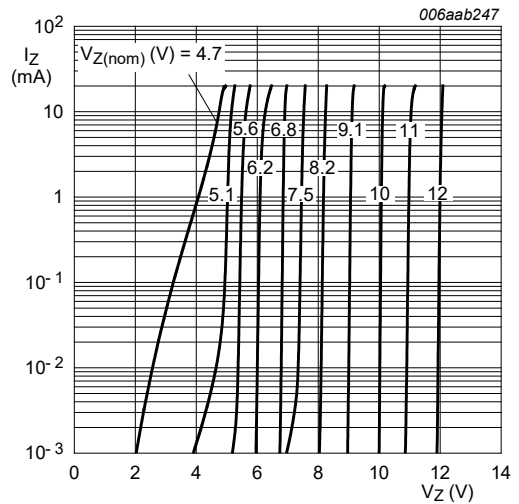
PZU4.7BL to PZU12B2L  
 $T_j = 25\text{ }^\circ\text{C}$  to  $150\text{ }^\circ\text{C}$

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



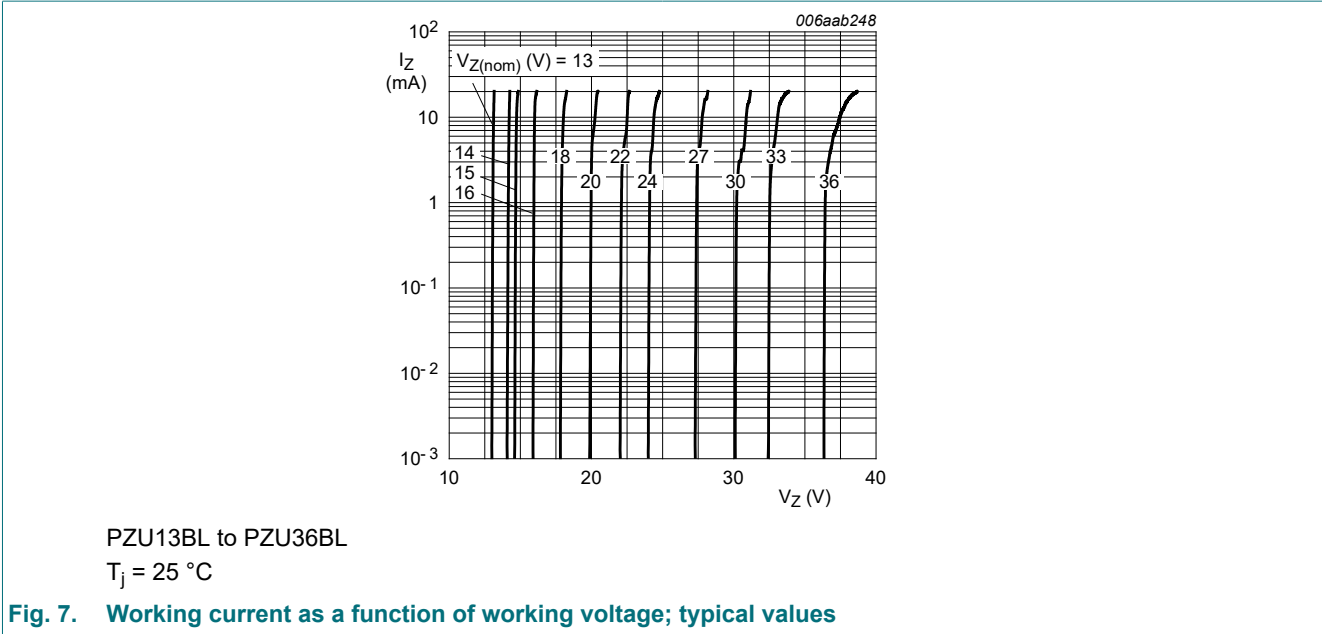
PZU2.4BL to PZU4.3B2L  
 $T_j = 25\text{ }^\circ\text{C}$

**Fig. 5. Working current as a function of working voltage; typical values**



PZU4.7BL to PZU12B2L  
 $T_j = 25\text{ }^\circ\text{C}$

**Fig. 6. Working current as a function of working voltage; typical values**

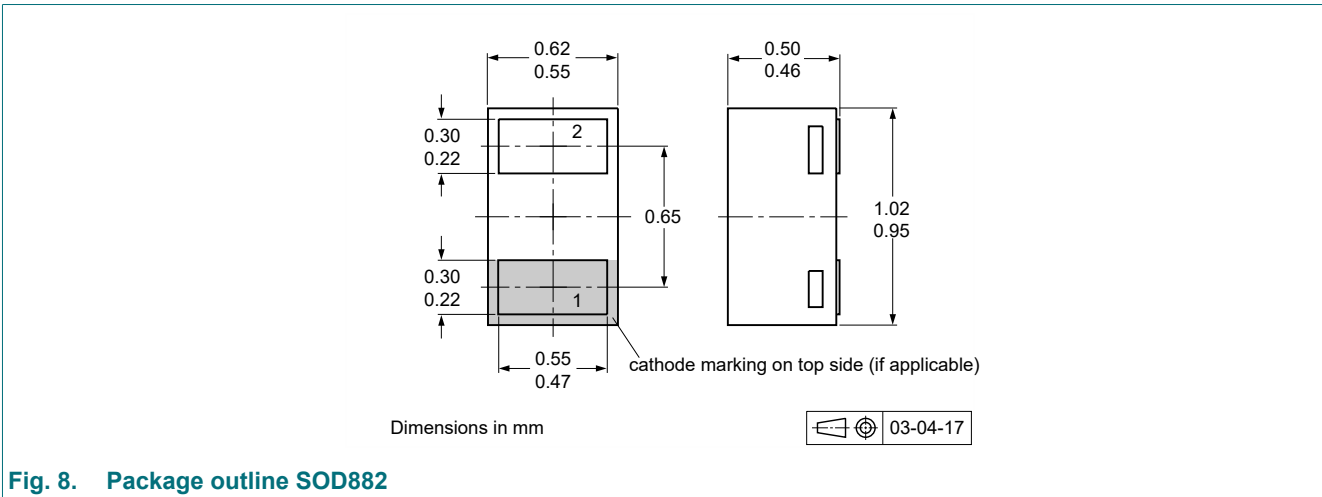


## 8. Test information

### 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.

## 9. Package outline





### 10. Soldering



## 11. Revision history

**Table 9. Revision history**

| Document ID     | Release date   | Data sheet status  | Change notice | Supersedes      |
|-----------------|--|--------------------|---------------|-----------------|
| PZUXBL_SER v. 2 | 20191111   | Product data sheet | -             | PZUXBL_SER v. 1 |
| Modifications:  | <ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul> |                    |               |                 |
| PZUXBL_SER v. 1 | 20080506   | Product data sheet | -             | -               |

## 12. 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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