



# 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                       | $T_{amb} \leq 25 \text{ °C}$ | [3] - | -   | 250 | mW   |
|           |                                               |                              | [4] - | -   | 550 | mW   |

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

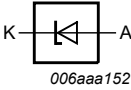
[2]  $t_p = 100 \text{ } \mu\text{s}$ ; square wave;  $T_j = 25 \text{ °C}$  prior to surge

[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] | <br>Transparent<br>top view |  |
| 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]  $t_p = 100\text{ }\mu\text{s}$ ; 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:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$

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

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

| PZU<br>xBL | Sel | Working<br>voltage<br>$V_Z$ (V); |       | Maximum differential<br>resistance<br>$r_{\text{dif}}$ ( $\Omega$ ) |                     | Reverse<br>current<br>$I_R$ ( $\mu\text{A}$ ) |           | Temperature<br>coefficient<br>$S_Z$ (mV/K); | Diode<br>capacitance<br>$C_d$ (pF) ;<br>$V_R = 0\text{ V}$ | Non-repetitive<br>peak<br>reverse current<br>$I_{ZSM}$ (A)<br>$t_p = 100\text{ }\mu\text{s}$ ;<br>square wave;<br>$T_j = 25\text{ }^{\circ}\text{C}$ ;<br>prior to surge |
|------------|-----|----------------------------------|-------|---------------------------------------------------------------------|---------------------|-----------------------------------------------|-----------|---------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |     | $I_Z = 5\text{ mA}$              |       | $I_Z = 0.5\text{ mA}$                                               | $I_Z = 5\text{ mA}$ |                                               |           | $I_Z = 5\text{ mA}$                         | $f = 1\text{ MHz}$ ;                                       |                                                                                                                                                                          |
|            |     | Min                              | Max   | Max                                                                 | Max                 | Max                                           | $V_R$ (V) | Typ                                         | 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<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)<br>$t_p = 100 \mu s$ ;<br>square wave;<br>$T_j = 25^\circ C$ ;<br>prior to surge |
|------------|-----|----------------------------------|-------|--------------------------------------------------------------|--------------|-----------------------------------------|-----------|---------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|            |     | $I_Z = 5$ mA                     |       | $I_Z = 0.5$ mA                                               | $I_Z = 5$ mA |                                         |           | $I_Z = 5$ mA                                | $f = 1$ MHz;                                        |                                                                                                                                             |
|            |     | Min                              | Max   | Max                                                          | Max          | Max                                     | $V_R$ (V) | Typ                                         | 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                                                                                                                                         |

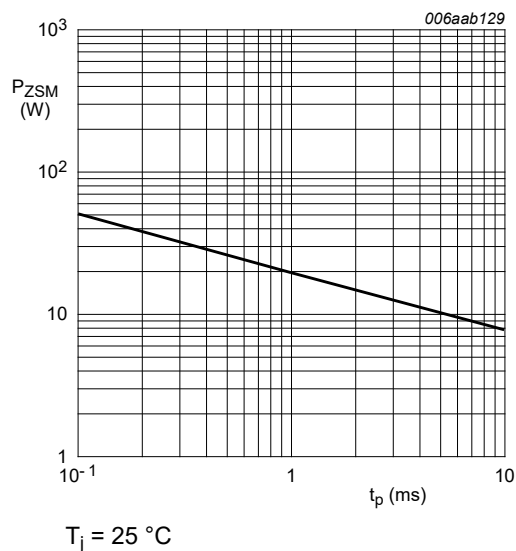


**Fig. 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values**

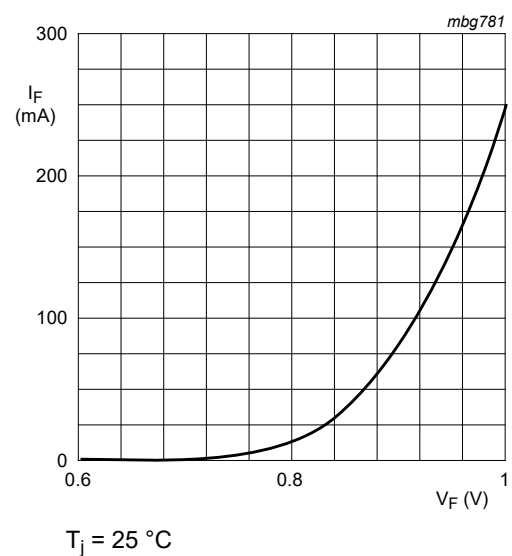
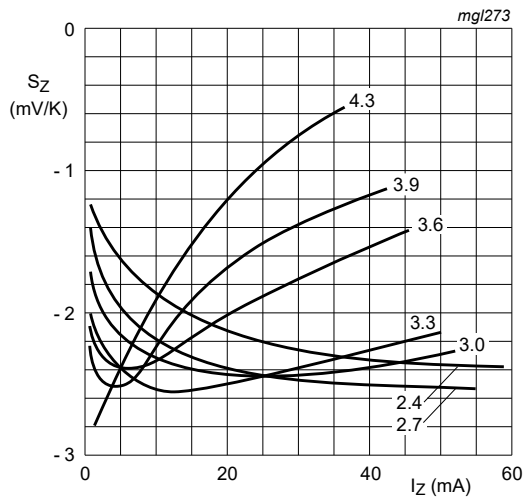
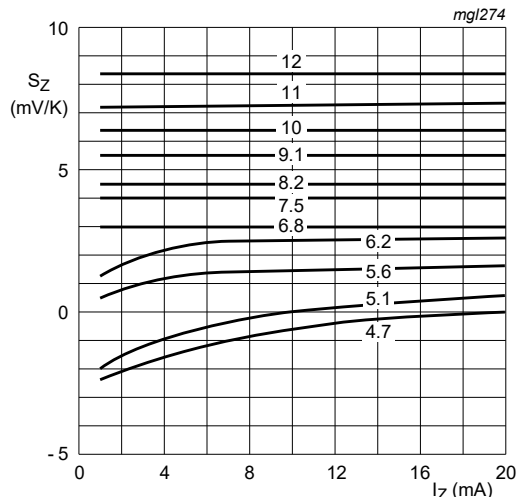


**Fig. 2. Forward current as a function of forward voltage; typical values**



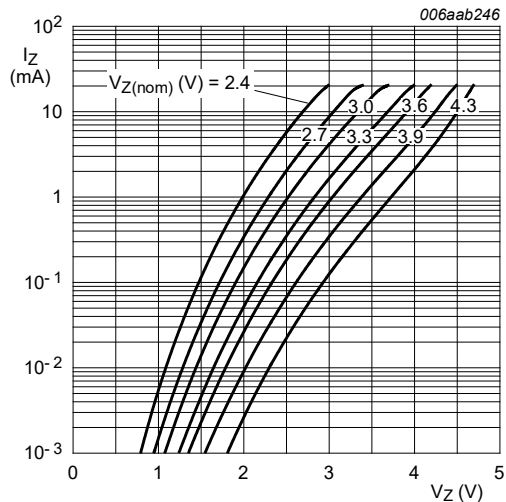
PZU2.4BL to PZU4.3B2L  
 $T_j = 25\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$

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



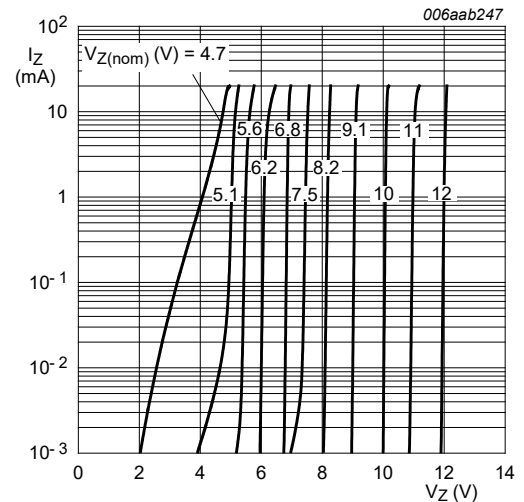
PZU4.7BL to PZU12B2L  
 $T_j = 25\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$

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



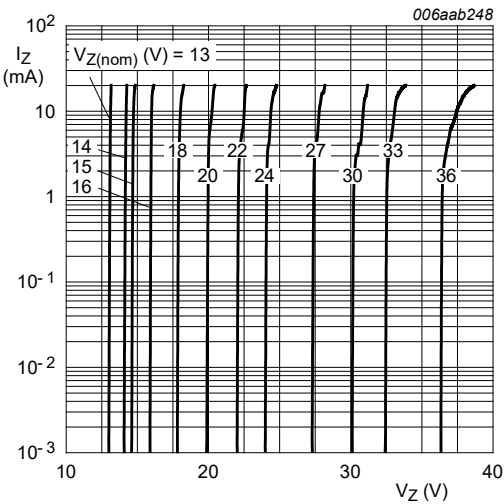
PZU2.4BL to PZU4.3B2L  
 $T_j = 25\text{ }^{\circ}\text{C}$

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



PZU13BL to PZU36BL  
 $T_j = 25\text{ }^{\circ}\text{C}$

Fig. 7. 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

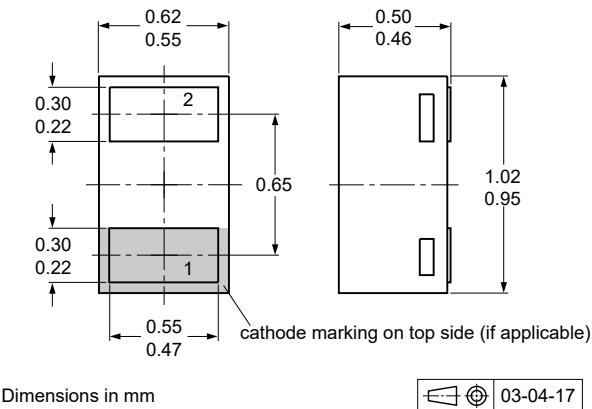
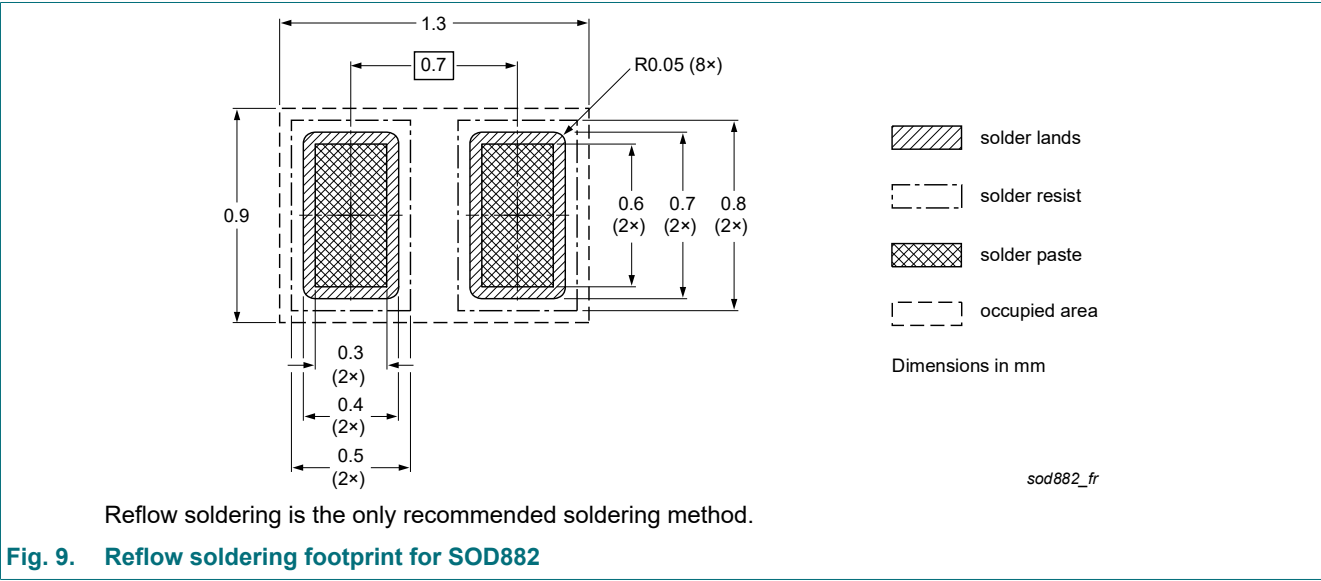


Fig. 8. Package outline SOD882

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<br>[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".
- [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 <https://www.nexperia.com>.

### Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

**Short data sheet** — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

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