



# PDZ-B series

## Single Zener diodes

Rev. 3 — 5 March 2019

Product data sheet

## 1. Product profile

### 1.1. General description

Low-power general purpose voltage regulator diodes in a small plastic SMD SOD323 (SC-76) package.

### 1.2. Features and benefits

- Total power dissipation:  $P_{\text{tot}} \leq 400 \text{ mW}$
- Small plastic package suitable for surface mounted design
- Wide variety of voltage ranges: nominal 2.4 V to 36 V (E24 range)
- Tolerance approximately  $\pm 2 \%$

### 1.3. Applications

- General voltage regulation

### 1.4. Quick reference data

Table 1. Quick reference data

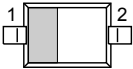
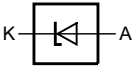
| Symbol           | Parameter               | Conditions  | Min | Typ | Max | Unit |
|------------------|-------------------------|---|-----|-----|-----|------|
| $V_F$            | forward voltage         | $I_F = 10 \text{ mA}$ [1]                           | -   | -   | 0.9 | V    |
| $P_{\text{tot}}$ | total power dissipation | $T_{\text{amb}} \leq 25 \text{ }^\circ\text{C}$ [2] | -   | -   | 400 | mW   |

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

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

## 2. Pinning information

Table 2. Pinning

| Pin | Symbol | Description | Simplified outline   | Graphic symbol   |
|-----|--------|-------------|--|--|
| 1   | K      | cathode[1]  |  | <br>006aaa152 |
| 2   | A      | anode       |  |  |

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 3. Ordering information

| Type number          | Package |  |         |
|----------------------|---------|--|---------|
|                      | Name    | Description                              | Version |
| PDZ2.4B to PDZ36B[1] | -       | plastic surface-mounted package; 2 leads | SOD323  |

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

## 4. Marking

Table 4. Marking Codes

| Type number | Marking Code | Type number | Marking Code | Type number | Marking Code |
|-------------|--------------|-------------|--------------|-------------|--------------|
| PDZ2.4B     | Z0           | PDZ6.2B     | ZA           | PDZ16B      | ZL           |
| PDZ2.7B     | Z1           | PDZ6.8B     | ZB           | PDZ18B      | ZM           |
| PDZ3.0B     | Z2           | PDZ7.5B     | ZC           | PDZ20B      | ZN           |
| PDZ3.3B     | Z3           | PDZ8.2B     | ZD           | PDZ22B      | ZP           |
| PDZ3.6B     | Z4           | PDZ9.1B     | ZE           | PDZ24B      | ZQ           |
| PDZ3.9B     | Z5           | PDZ10B      | ZF           | PDZ27B      | ZR           |
| PDZ4.3B     | Z6           | PDZ11B      | ZG           | PDZ30B      | ZS           |
| PDZ4.7B     | Z7           | PDZ12B      | ZH           | PDZ33B      | ZT           |
| PDZ5.1B     | Z8           | PDZ13B      | ZJ           | PDZ36B      | ZU           |
| PDZ5.6B     | Z9           | PDZ15B      | ZK           |             |              |

## 5. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol           | Parameter                           | Conditions  | Min | Max                       | Unit             |
|------------------|-------------------------------------|---|-----|---------------------------|------------------|
| $I_F$            | continuous forward current          |   | -   | 200                       | mA               |
| $I_{ZSM}$        | non-repetitive peak reverse current | $t_p = 100 \mu\text{s}$ ; square wave;<br>$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ prior to surge | -   | see characteristics table |                  |
| $P_{\text{tot}}$ | total power dissipation             | $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ [1]  | -   | 400                       | mW               |
| $T_{\text{stg}}$ | storage temperature                 |   | -65 | +150                      | $^\circ\text{C}$ |
| $T_j$            | junction temperature                |   | -   | +150                      | $^\circ\text{C}$ |

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

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol                       | Parameter  | Conditions  | Min | Typ | Max | Unit |
|------------------------------|--|-------------|-----|-----|-----|------|
| $R_{\text{th}(j\text{-sp})}$ | thermal resistance from junction to solder point | in free air | -   | -   | 130 | K/W  |
| $R_{\text{th}(j\text{-a})}$  | thermal resistance from junction to ambient      | [1]         | -   | -   | 340 | K/W  |

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

## 7. Characteristics

**Table 7. Characteristics**

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

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

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

**Table 8. Characteristics per type; PDZ2.4B to PDZ36B**

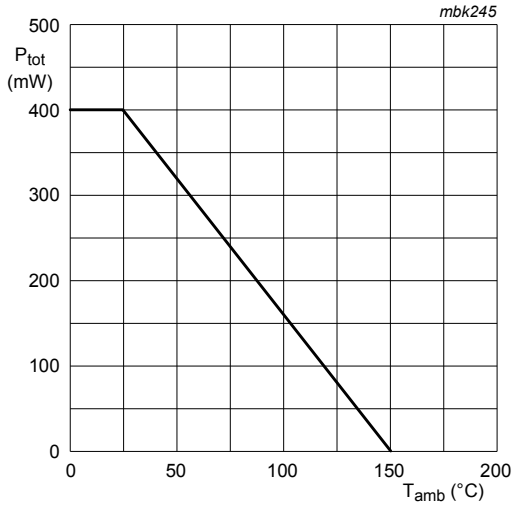
$T_j = 25 \text{ }^\circ\text{C}$  unless otherwise specified.

| Type    | Working voltage<br>$V_Z$ (V);<br>$I_Z = 5 \text{ mA}$ |      | Maximum differential resistance<br>$r_{\text{dif}}$ ( $\Omega$ ) |                      | Reverse current<br>$I_R$ ( $\mu\text{A}$ ) |           | Temperature coefficient<br>$S_Z$ (mV/K);<br>$I_Z = 5 \text{ mA}$ | Diode capacitance<br>$C_d$ (pF)[1] | Non-repetitive peak reverse current<br>$I_{ZSM}$ (A)[2] |
|---------|---|------|--|----------------------|--|-----------|--|------------------------------------|---|
|         | Min   | Max  | $I_Z = 0.5 \text{ mA}$   | $I_Z = 5 \text{ mA}$ | Max  | $V_R$ (V) | Typ  | Max                                | Max   |
| PDZ2.4B | 2.43  | 2.63 | 1000   | 100                  | 50   | 1.0       | -1.6   | 450                                | 8.0   |
| PDZ2.7B | 2.69  | 2.91 | 1000   | 100                  | 20   | 1.0       | -2.0   | 440                                | 8.0   |
| PDZ3.0B | 2.85  | 3.07 | 1000   | 95                   | 10   | 1.0       | -2.1   | 425                                | 8.0   |
| PDZ3.3B | 3.32  | 3.53 | 1000   | 95                   | 5  | 1.0       | -2.4   | 410                                | 8.0   |
| PDZ3.6B | 3.60  | 3.85 | 500 @ 1 mA   | 90                   | 5  | 1.0       | -2.4   | 390                                | 8.0   |
| PDZ3.9B | 3.89  | 4.16 | 500 @ 1 mA   | 90                   | 3  | 1.0       | -2.5   | 370                                | 8.0   |
| PDZ4.3B | 4.17  | 4.48 | 600 @ 1 mA   | 90                   | 3  | 1.0       | -2.5   | 350                                | 8.0   |

| Type    | Working voltage<br>$V_Z$ (V);<br>$I_Z = 5$ mA |       | Maximum differential<br>resistance<br>$r_{dif}$ ( $\Omega$ ) |              | Reverse<br>current<br>$I_R$ ( $\mu$ A) |           | Temperature<br>coefficient<br>$S_Z$ (mV/K);<br>$I_Z = 5$ mA | Diode<br>capacitance<br>$C_d$ (pF)[1] | Non-<br>repetitive<br>peak reverse<br>current<br>$I_{ZSM}$ (A)[2] |
|---------|---|-------|--|--------------|--|-----------|---|---------------------------------------|---|
|         | Min   | Max   | $I_Z = 0.5$ mA   | $I_Z = 5$ mA | Max                                    | $V_R$ (V) | Typ   | Max                                   | Max   |
| PDZ4.7B | 4.55  | 4.75  | 600 @ 1 mA   | 90           | 2                                      | 1.0       | -1.4  | 325                                   | 8.0   |
| PDZ5.1B | 4.96  | 5.20  | 250  | 60           | 2                                      | 1.5       | 0.3   | 300                                   | 5.5   |
| PDZ5.6B | 5.48  | 5.73  | 100  | 50           | 1                                      | 2.5       | 1.9   | 275                                   | 5.5   |
| PDZ6.2B | 6.06  | 6.33  | 80   | 50           | 0.5                                    | 3.0       | 2.7   | 250                                   | 5.5   |
| PDZ6.8B | 6.65  | 6.93  | 60   | 40           | 0.5                                    | 3.5       | 3.4   | 215                                   | 5.5   |
| PDZ7.5B | 7.28  | 7.60  | 60   | 10           | 0.5                                    | 4.0       | 4.0   | 170                                   | 3.5   |
| PDZ8.2B | 8.02  | 8.36  | 60   | 10           | 0.5                                    | 5.0       | 4.6   | 150                                   | 3.5   |
| PDZ9.1B | 8.85  | 9.23  | 60   | 10           | 0.5                                    | 6.0       | 5.5   | 120                                   | 3.5   |
| PDZ10B  | 9.77  | 10.21 | 60   | 10           | 0.1                                    | 7.0       | 6.4   | 110                                   | 3.5   |
| PDZ11B  | 10.78   | 11.22 | 60   | 10           | 0.1                                    | 8.0       | 7.4   | 108                                   | 3.0   |
| PDZ12B  | 11.74   | 12.24 | 80   | 10           | 0.1                                    | 9.0       | 8.4   | 105                                   | 3.0   |
| PDZ13B  | 12.91   | 13.49 | 80   | 10           | 0.1                                    | 10.0      | 9.4   | 103                                   | 2.5   |
| PDZ15B  | 14.34   | 14.98 | 80   | 15           | 0.05                                   | 11.0      | 11.4  | 99                                    | 2.0   |
| PDZ16B  | 15.85   | 16.51 | 80   | 20           | 0.05                                   | 12.0      | 12.4  | 97                                    | 1.5   |
| PDZ18B  | 17.56   | 18.35 | 80   | 20           | 0.05                                   | 13.0      | 14.4  | 93                                    | 1.5   |
| PDZ20B  | 19.52   | 20.39 | 100  | 20           | 0.05                                   | 15.0      | 16.4  | 88                                    | 1.5   |
| PDZ22B  | 21.54   | 22.47 | 100  | 25           | 0.05                                   | 17.0      | 18.4  | 84                                    | 1.3   |
| PDZ24B  | 23.72   | 24.78 | 120  | 30           | 0.05                                   | 19.0      | 20.4  | 80                                    | 1.3   |
| PDZ27B  | 26.19   | 27.53 | 150  | 40           | 0.05                                   | 21.0      | 23.4  | 73                                    | 1.0   |
| PDZ30B  | 29.19   | 30.69 | 200  | 40           | 0.05                                   | 23.0      | 26.6  | 66                                    | 1.0   |
| PDZ33B  | 32.15   | 33.79 | 250  | 40           | 0.05                                   | 25.0      | 29.7  | 60                                    | 0.9   |
| PDZ36B  | 35.07   | 36.87 | 300  | 60           | 0.05                                   | 27.0      | 33.0  | 59                                    | 0.8   |

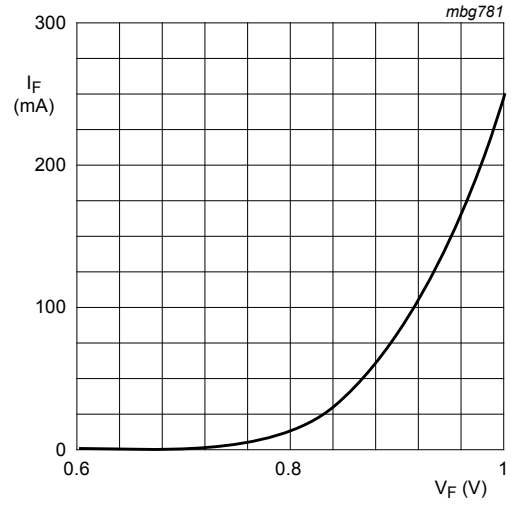
[1]  $f = 1$  MHz;  $V_R = 0$  V.

[2]  $t_p = 100$   $\mu$ s;  $T_{amb} = 25$  °C.



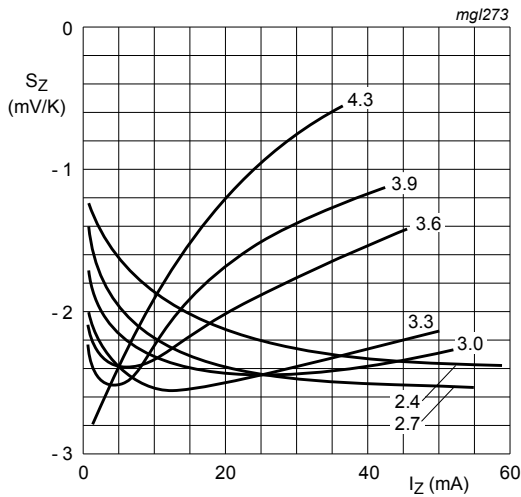
$T_j = 25\text{ °C}$  (prior to surge)

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



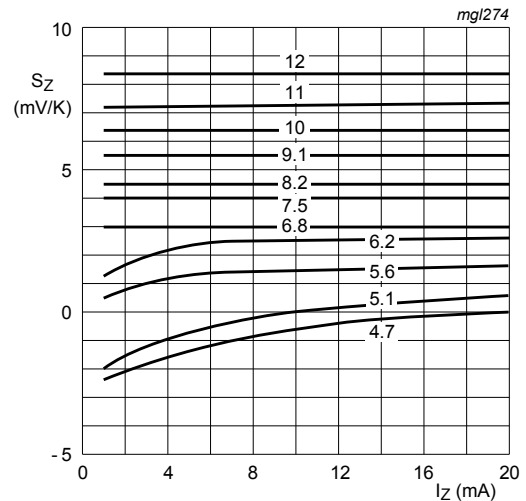
$T_j = 25\text{ °C}$

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



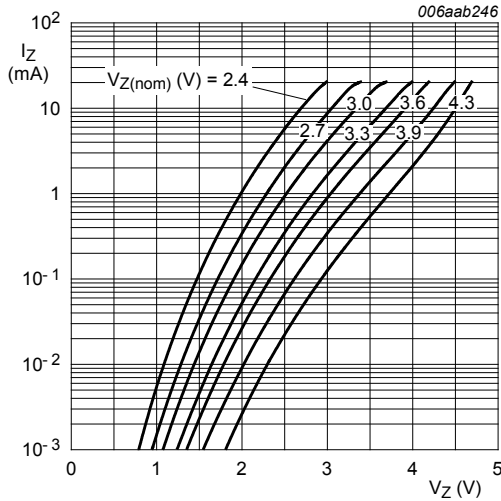
PDZ2.4B to PDZ4.3B  
 $T_j = 25\text{ °C}$  to  $150\text{ °C}$

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



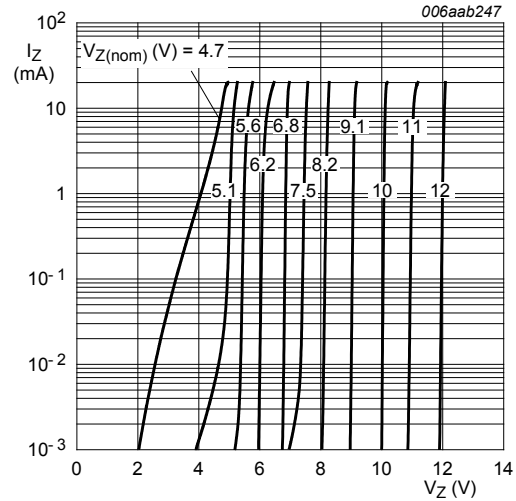
PDZ4.7B to PDZ12B  
 $T_j = 25\text{ °C}$  to  $150\text{ °C}$

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



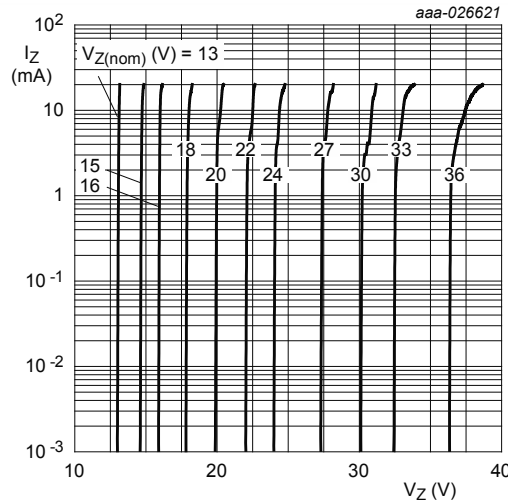
PDZ2.4B to PDZ4.3B  
 $T_j = 25\text{ }^\circ\text{C}$

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



PDZ4.7B to PDZ12B  
 $T_j = 25\text{ }^\circ\text{C}$

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



PDZ13B to PDZ36B  
 $T_j = 25\text{ }^\circ\text{C}$

**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

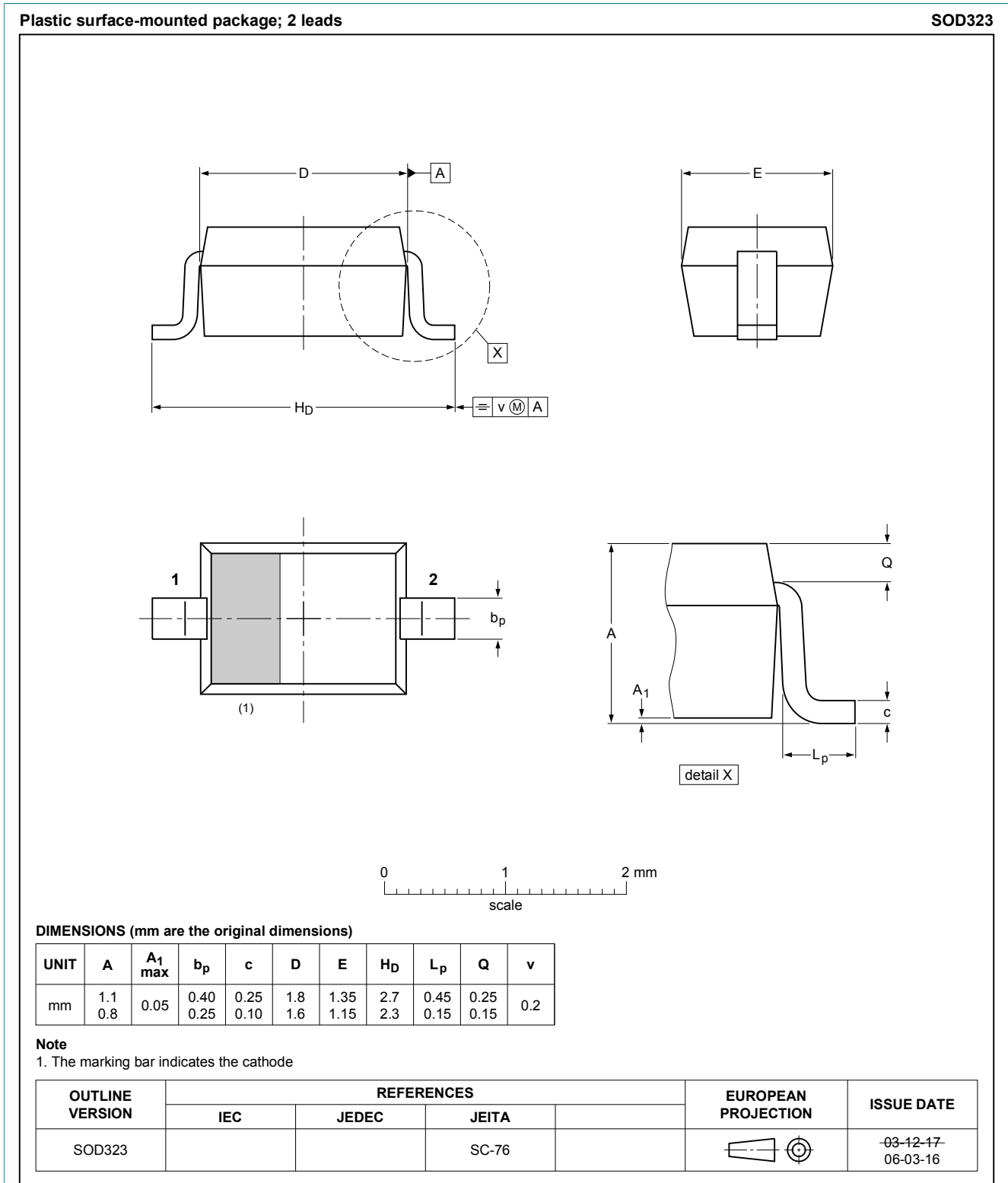


Fig. 8. Package outline SOD323

### 10. Soldering

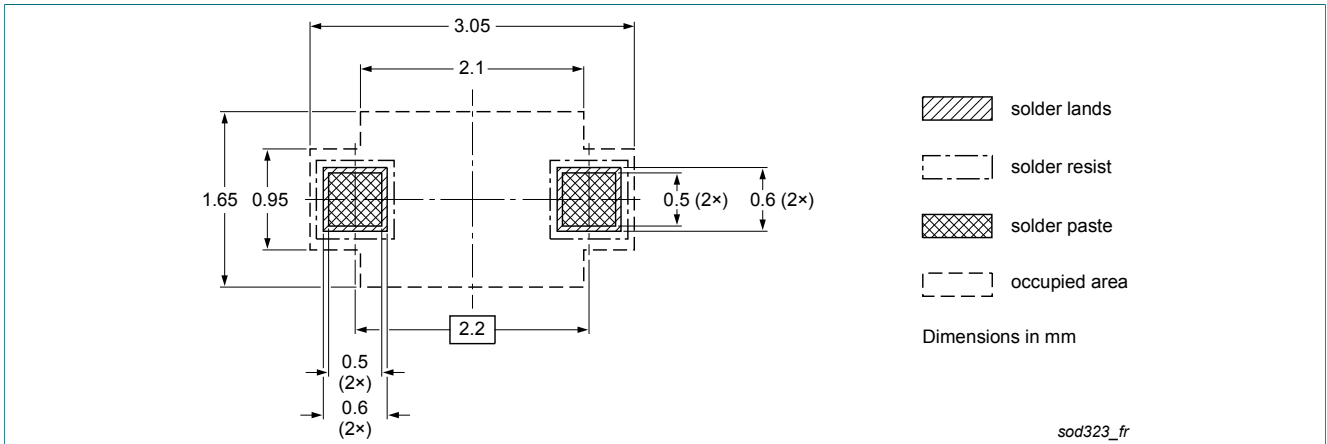


Fig. 9. Reflow soldering footprint SOD323

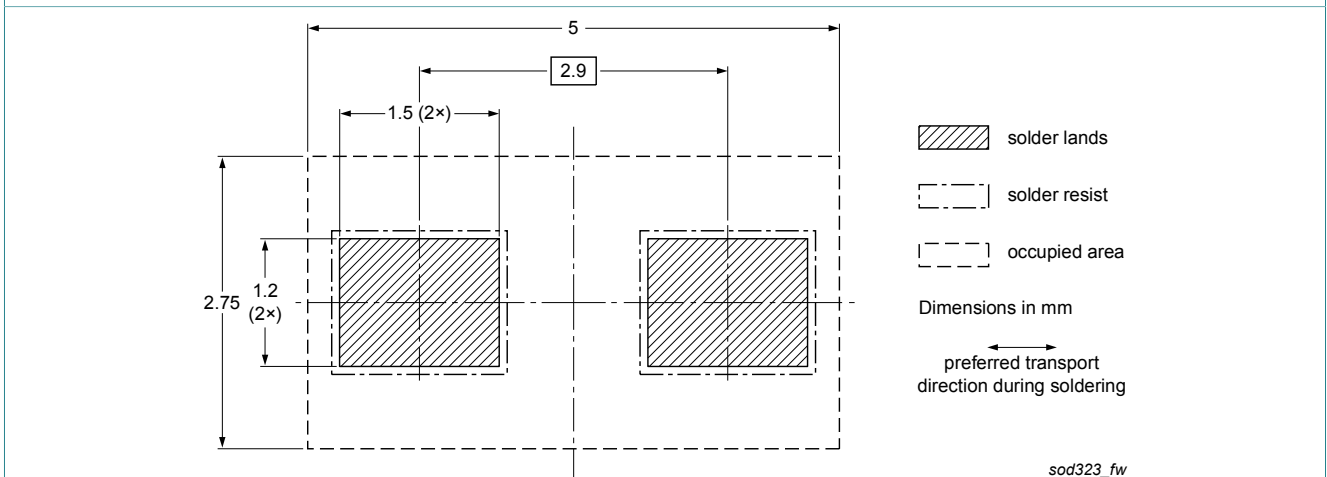


Fig. 10. Wave soldering footprint SOD323



## 11. Revision history

**Table 9. Revision history**

| Document ID    | Release date   | Data sheet status  | Change notice | Supersedes    |
|----------------|--|--------------------|---------------|---------------|
| PDZ-B_SER v.3  | 20190305   | Product data sheet | -             | PDZ-B_SER v.2 |
| 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> |                    |               |               |
| PDZ-B_SER v.2  | 20040322   | Product data sheet | -             | PDZ-B_SER v.1 |
| PDZ-B_SER v.1  | 20020218   | 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. |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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