



# PDZ-B series

## Single Zener diodes

Rev. 5 — 21 December 2022

Product data sheet

## 1. General description

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

## 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  $\pm 2 \%$
- PDZ5.1B - 10B: Very low dynamic impedances at low currents, very low leakage current, hard breakdown knee

## 3. Applications

- General voltage regulation

## 4. Quick reference data

Table 1. Quick reference data

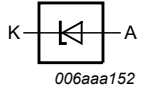
| Symbol           | Parameter               | Conditions                              | Min | Typ | Max | Unit |
|------------------|-------------------------|-----------------------------------------|-----|-----|-----|------|
| $V_F$            | forward voltage         | $I_F = 10 \text{ mA}$ [1]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

## 5. Pinning information

Table 2. Pinning

| Pin | Symbol | Description | Simplified outline                                                                 | Graphic symbol                                                                      |
|-----|--------|-------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | K      | cathode[1]  |  |  |
| 2   | A      | anode       |                                                                                    |                                                                                     |

[1] The marking bar indicates the cathode.

## 6. 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.

## 7. 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           |             |              |

## 8. 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 | $t_p = 100 \mu s$ ; square wave;<br>$T_{amb} = 25^\circ C$ prior to surge | -   | see characteristics table |            |
| $P_{tot}$ | total power dissipation             | $T_{amb} = 25^\circ C$ [1]                                                | -   | 400                       | mW         |
| $T_{stg}$ | storage temperature                 |                                                                           | -65 | +150                      | $^\circ C$ |
| $T_j$     | junction temperature                |                                                                           | -   | +150                      | $^\circ C$ |

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

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

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

## 10. Characteristics

**Table 7. Characteristics**

$T_j = 25^\circ C$  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    |

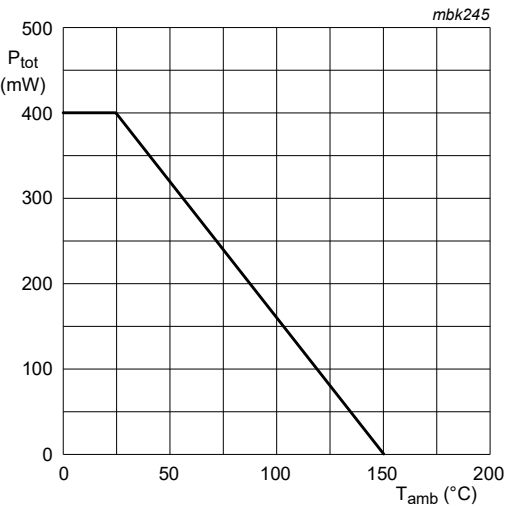
[1] Pulse test:  $t_p \leq 300 \mu s$ ;  $\delta \leq 0.02$ .

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

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

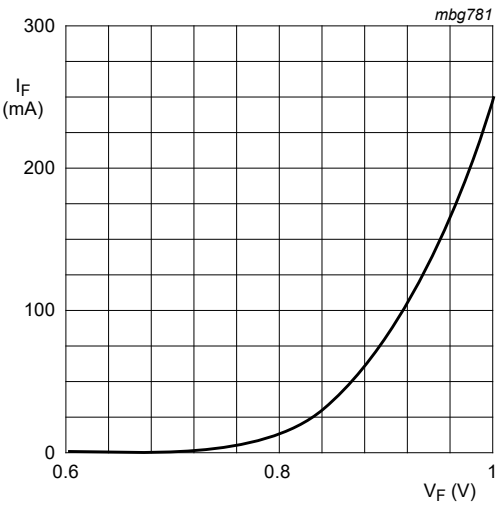
| Type    | Working voltage<br>$V_Z$ (V);<br>$I_Z = 5\text{ mA}$ |       | Maximum differential resistance<br>$r_{dif}$ ( $\Omega$ ) |                     | Reverse current<br>$I_R$ ( $\mu\text{A}$ ) |           | Temperature coefficient<br>$S_Z$ (mV/K);<br>$I_Z = 5\text{ mA}$ | Diode capacitance<br>$C_d$ (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                                                     |
| 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]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ .[2]  $t_p = 100\text{ }\mu\text{s}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .



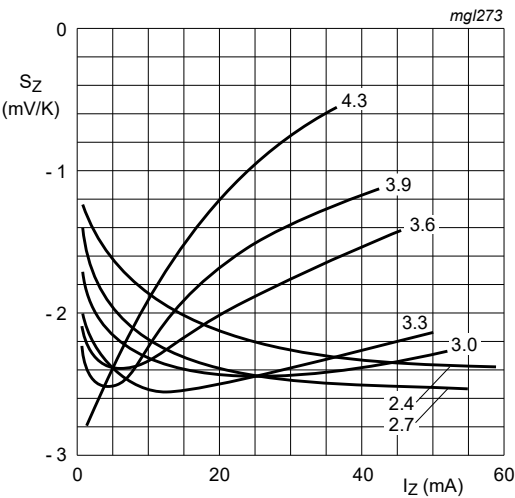
FR4 PCB, standard footprint

Fig. 1. Power derating curve



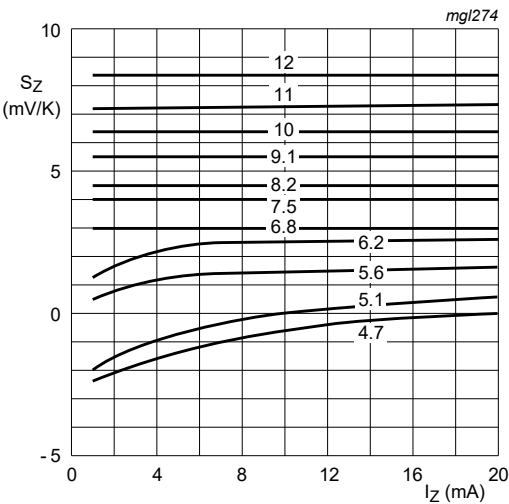
$T_j = 25\text{ °C}$

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



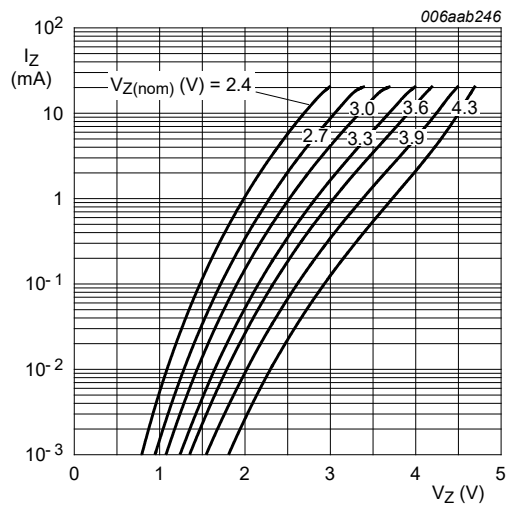
PDZ2.4B to PDZ4.3B  
 $T_j = 25\text{ °C to }150\text{ °C}$

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



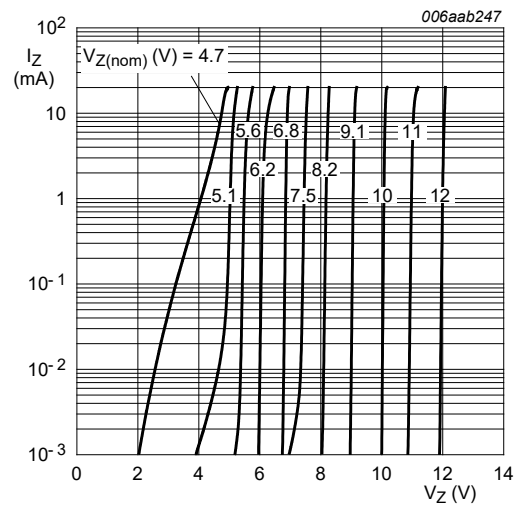
PDZ4.7B to PDZ12B  
 $T_j = 25\text{ °C to }150\text{ °C}$

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



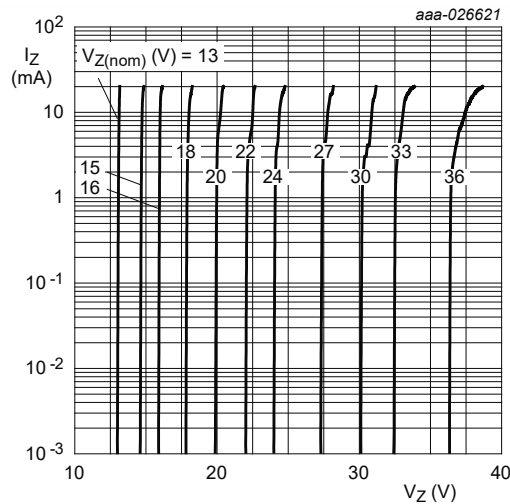
PDZ2.4B to PDZ4.3B  
 $T_j = 25\text{ }^{\circ}\text{C}$

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

11. Package outline

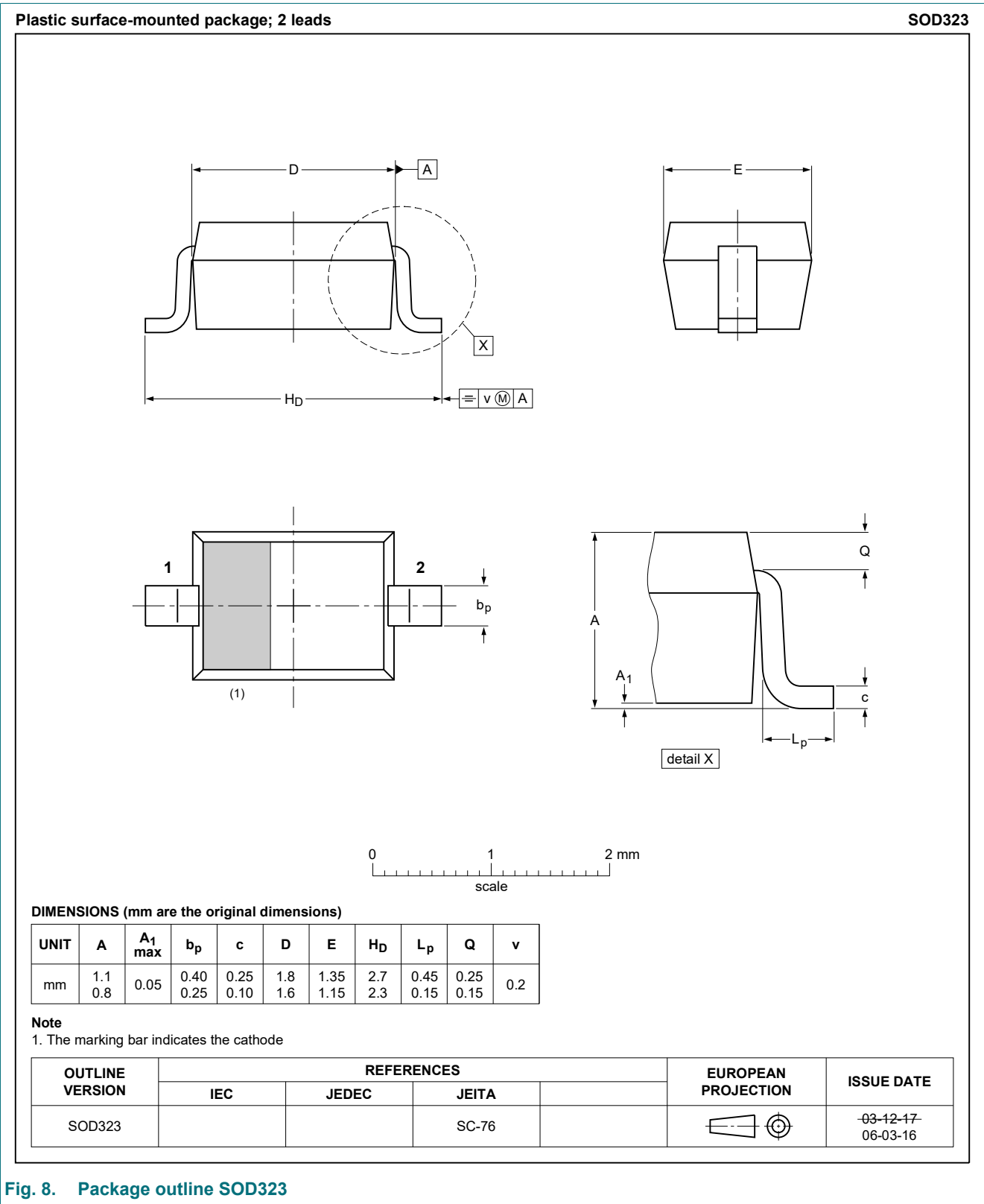
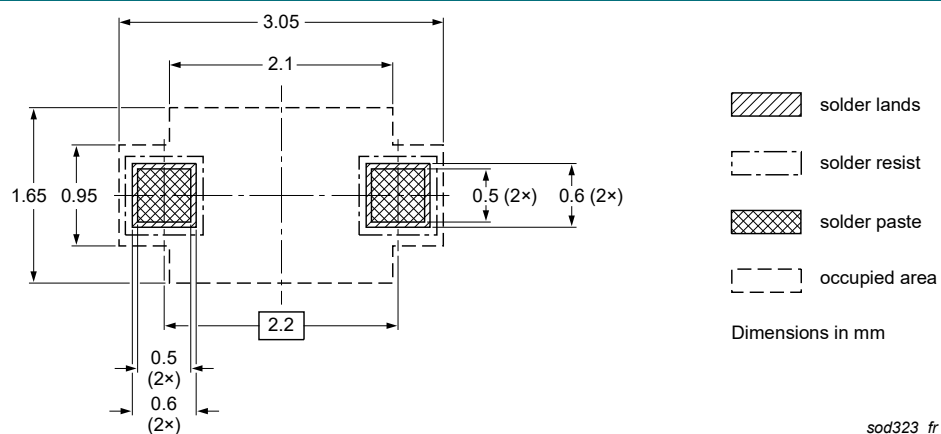
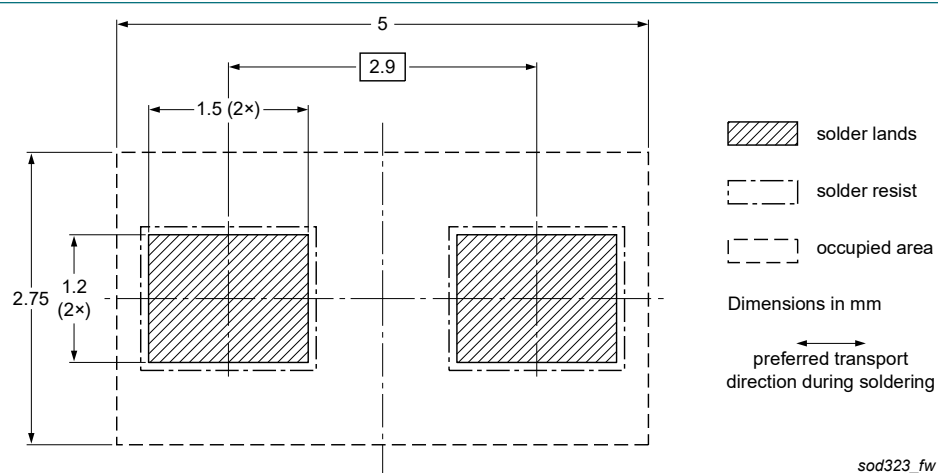


Fig. 8. Package outline SOD323

## 12. Soldering



**Fig. 9. Reflow soldering footprint SOD323**



**Fig. 10. Wave soldering footprint SOD323**

## 13. Revision history

**Table 9. Revision history**

| Document ID    | Release date                          | Data sheet status  | Change notice | Supersedes    |
|----------------|---------------------------------------|--------------------|---------------|---------------|
| PDZ-B_SER v.5  | 20221221                              | Product data sheet | -             | PDZ-B_SER v.4 |
| Modifications: | • Figure 1: Notes and title corrected |                    |               |               |
| PDZ-B_SER v.4  | 20220701                              | Product data sheet | -             | PDZ-B_SER v.3 |
| PDZ-B_SER v.3  | 20190305                              | Product data sheet | -             | PDZ-B_SER v.2 |
| PDZ-B_SER v.2  | 20040322                              | Product data sheet | -             | PDZ-B_SER v.1 |
| PDZ-B_SER v.1  | 20020218                              | Product data sheet | -             | -             |

## 14. 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.                       |
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