



**THE DATASHEET OF
PMEG060V100EPE-QZ**





PESD5V0S1BA-Q

Bidirectional ESD protection diode

10 June 2022

Product data sheet

1. General description

Bidirectional ElectroStatic Discharge (ESD) protection diode in very small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and other transients.

2. Features and benefits

- Bidirectional ESD protection of one line
- Max. peak pulse power: $P_{PPM} = 130 \text{ W}$
- Low clamping voltage: $V_{(CL)R} = 14 \text{ V}$
- Low leakage current: $I_{RM} = 5 \text{ nA}$
- ESD protection $> 30 \text{ kV}$
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PPM} = 12 \text{ A}$
- Very small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Cellular handsets and accessories
- Portable electronics
- Computers and peripherals
- Communication systems
- Audio and video equipment

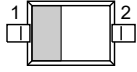
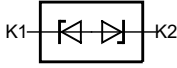
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|---|-----|-----|-----|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25 \text{ }^\circ\text{C}$ | - | - | 5 | V |
| C_d | diode capacitance | $f = 1 \text{ MHz}; V_R = 0 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$ | - | 35 | 45 | pF |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|---|---|
| 1 | K1 | cathode (diode 1) |  SOD323 |  sym045 |
| 2 | K2 | cathode (diode 2) | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|---------------|---------|--|---------|
| | Name | Description | Version |
| PESD5V0S1BA-Q | SOD323 | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|---------------|--------------|
| PESD5V0S1BA-Q | E6 |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|----------------------------|---------------------------------|-----------------------------------|---------|-----|-----|------|
| Per diode | | | | | | |
| P_{PPM} | rated peak pulse power | $t_p = 8/20 \mu s$ | [1] [2] | - | 130 | W |
| I_{PPM} | rated peak pulse current | | [1] [2] | - | 12 | A |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |
| ESD maximum ratings | | | | | | |
| V_{ESD} | electrostatic discharge voltage | IEC 61000-4-2 (contact discharge) | [2] [3] | - | 30 | kV |
| | | HBM MIL-Std 883 | | - | 10 | kV |

[1] Non-repetitive current pulse 8/20 μs exponentially decaying waveform according to IEC 61000-4-5

[2] Measured from pin 1 to pin 2.

[3] Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses

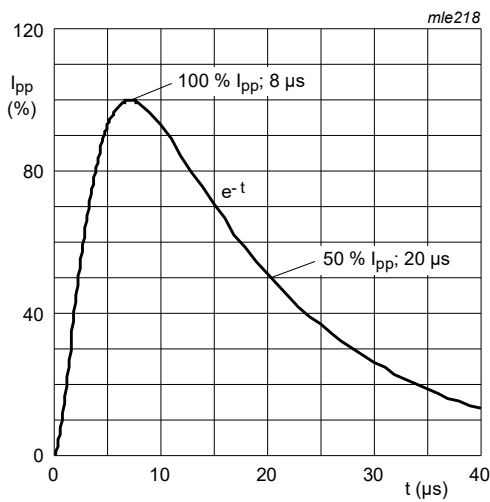


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5

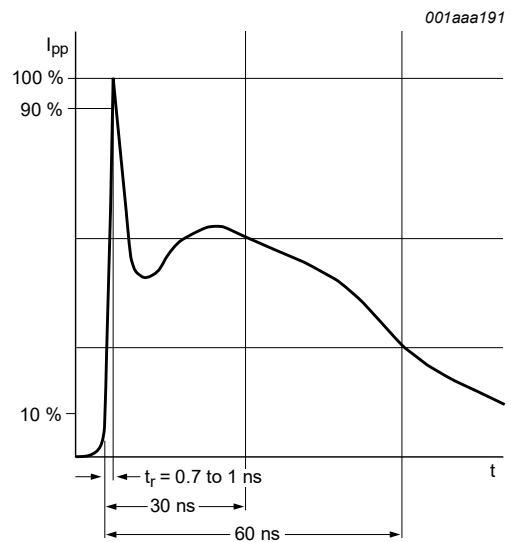


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

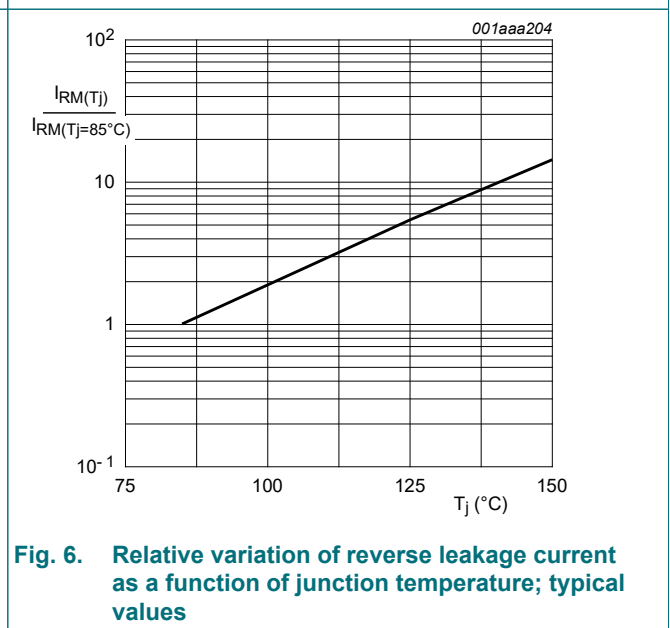
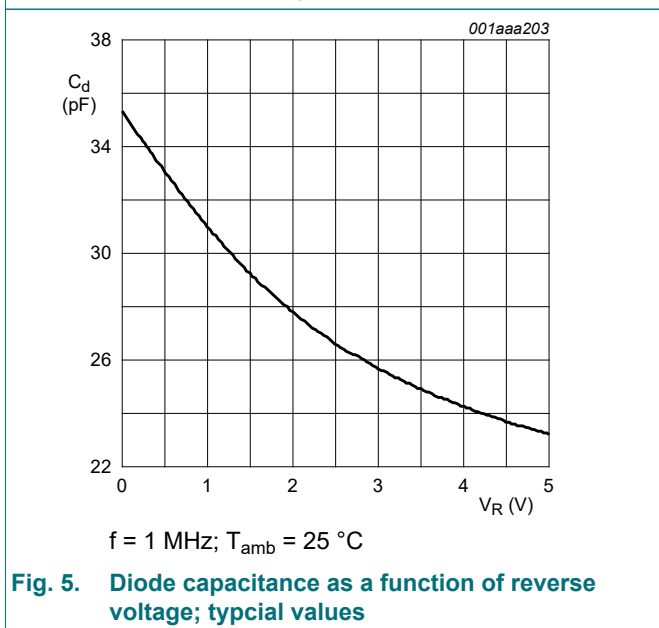
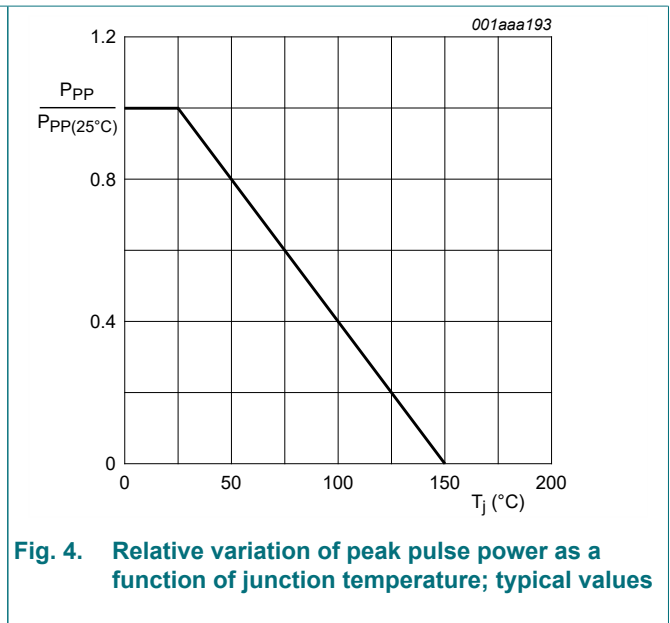
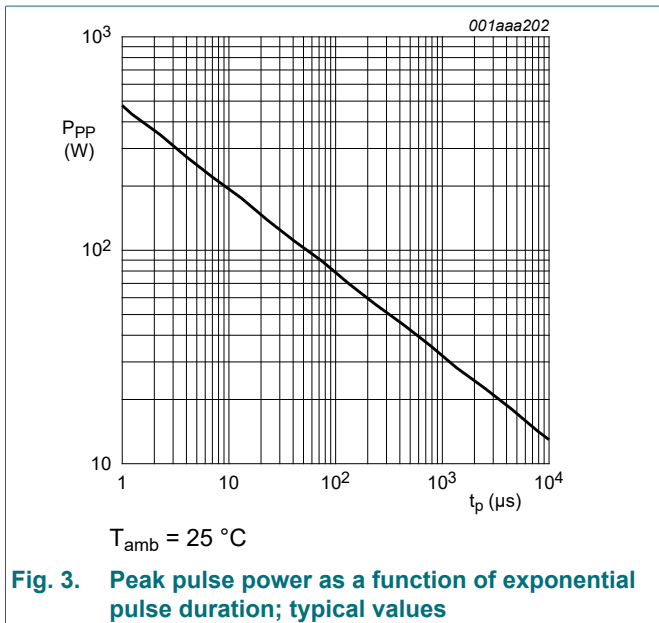
9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------|--------------------------|--|---------|-----|-----|----------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | - | 5 | V |
| V_{BR} | breakdown voltage | $I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | 5.5 | - | 9.5 | V |
| I_{RM} | reverse leakage current | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 5 | 100 | nA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 35 | 45 | pF |
| V_{CL} | clamping voltage | $I_{PP} = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] [2] | - | 10 | V |
| | | $I_{PPM} = 12\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] [2] | - | 14 | V |
| R_{diff} | differential resistance | $I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | - | 50 | Ω |

[1] Non-repetitive current pulse 8/20 μs exponentially decaying waveform according to IEC61000-4-5.

[2] Measures from pin 1 to pin 2.



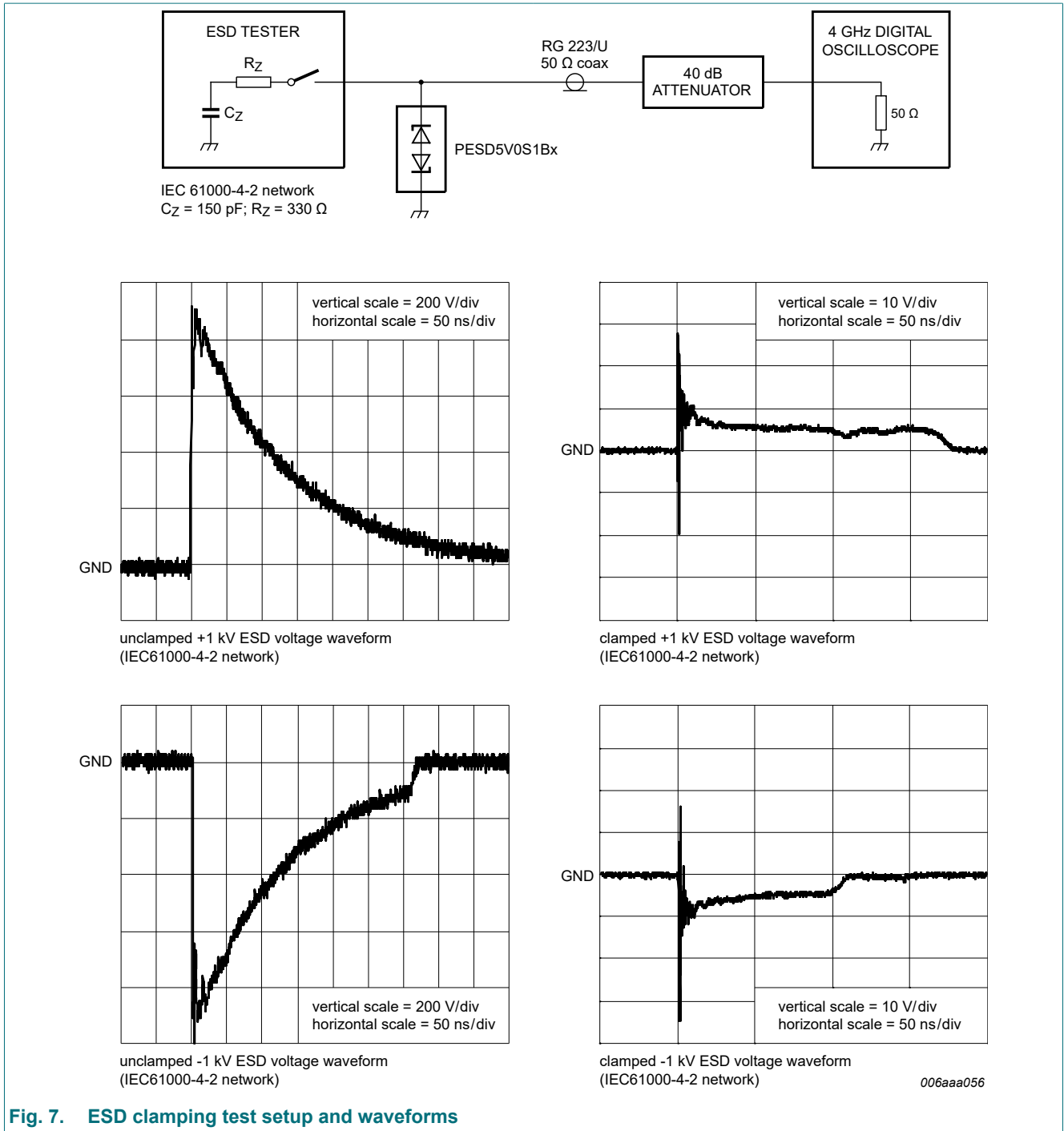


Fig. 7. ESD clamping test setup and waveforms

10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and/or other surge pulses. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground. It provides a surge capability of 130 W per line for an 8/20 μ s waveform.

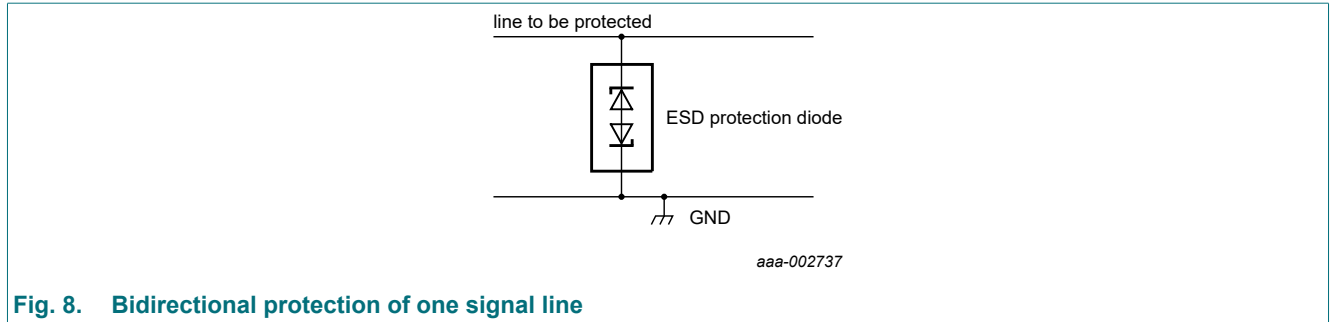


Fig. 8. Bidirectional protection of one signal line

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Avoid running protected conductors in parallel with unprotected conductors.
4. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.
7. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

11. 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.

12. Package outline

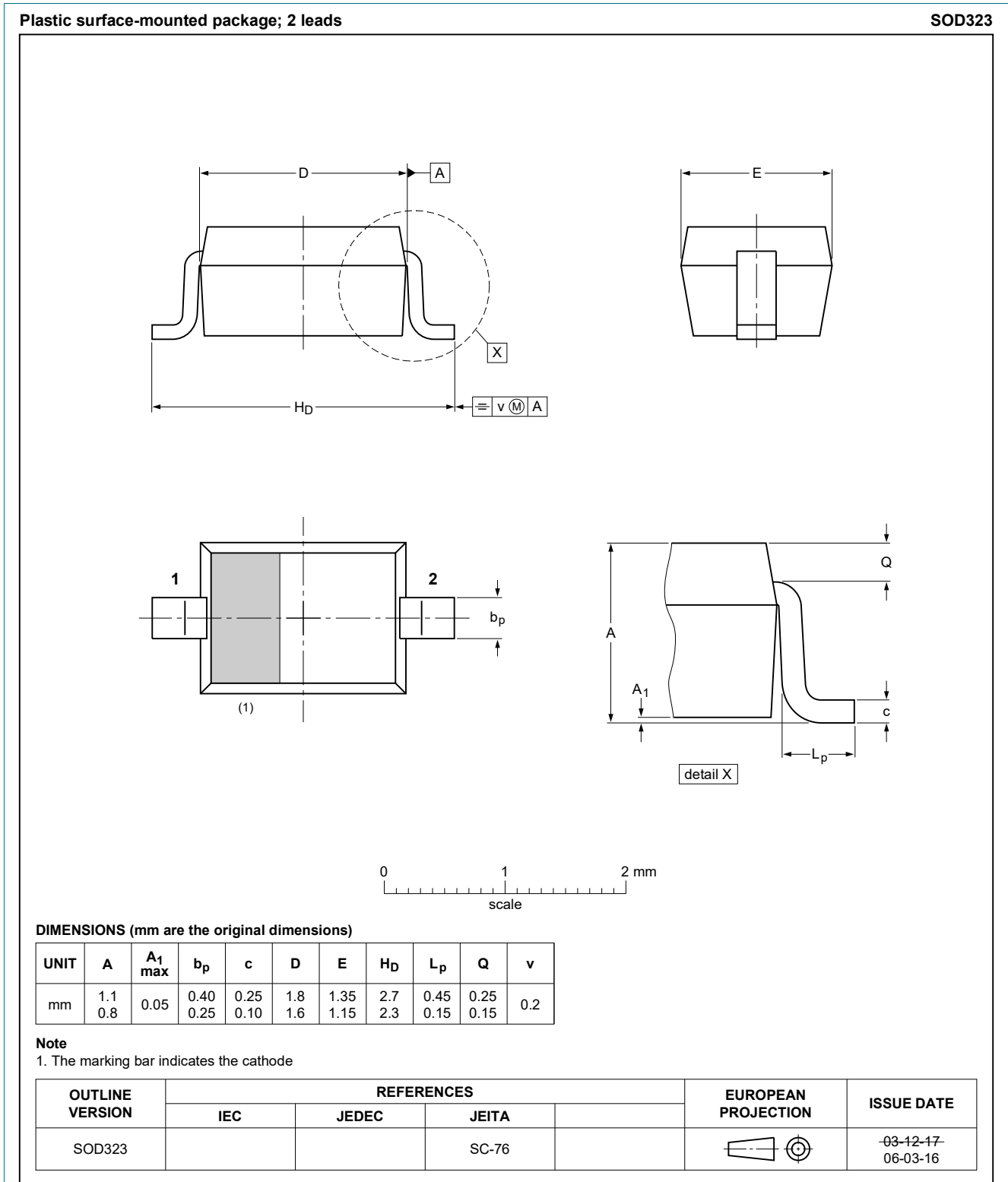


Fig. 9. Package outline SOD323

13. Soldering

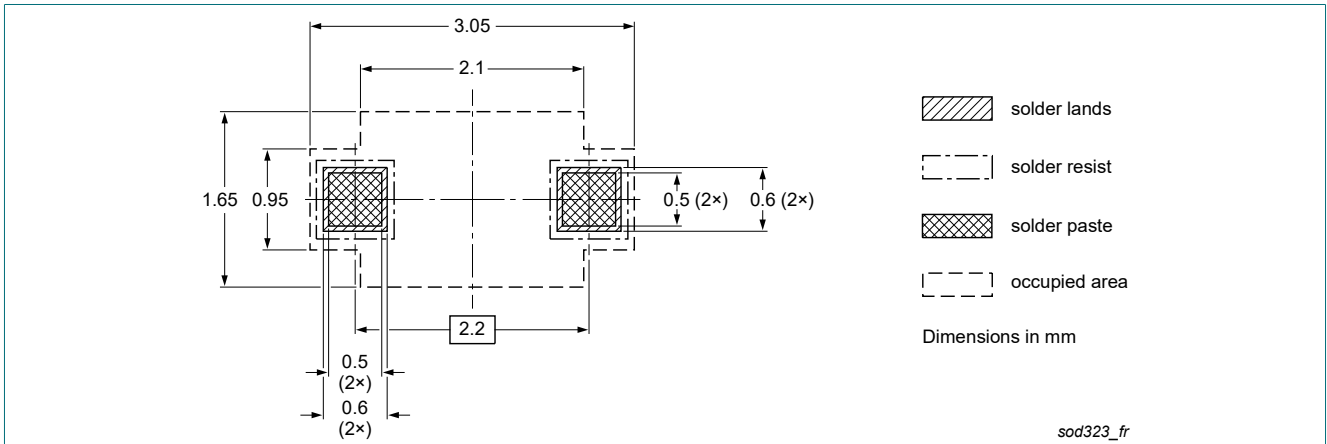


Fig. 10. Reflow soldering footprint for SOD323

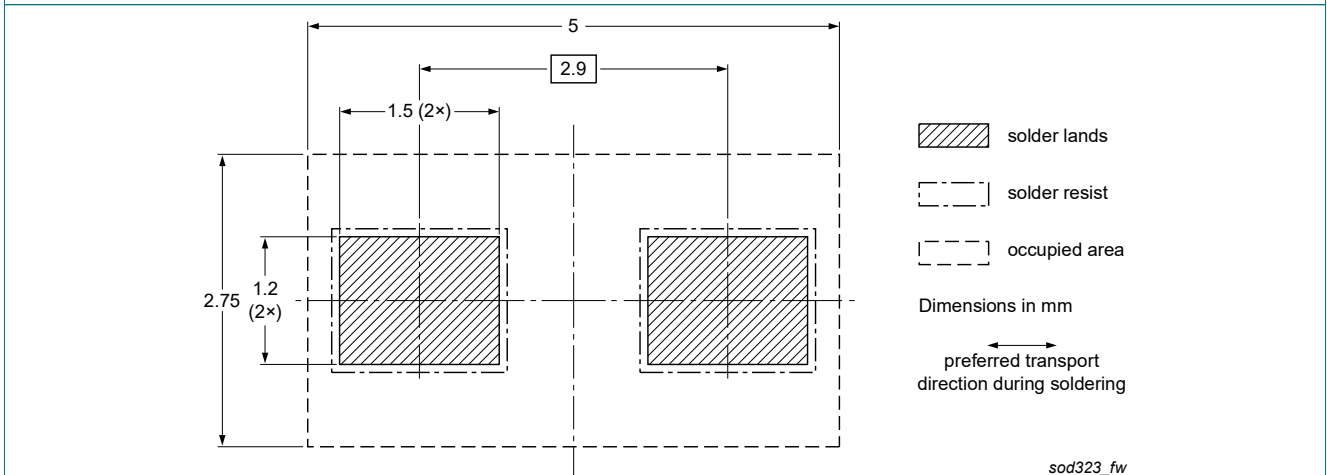


Fig. 11. Wave soldering footprint for SOD323

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|-------------------|--------------|--------------------|---------------|------------|
| PESD5V0S1BA-Q v.1 | 20220610 | Product data sheet | - | - |

15. 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. |

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