



PESD5V0L1ULD-Q

Low capacitance unidirectional ESD protection diode

18 August 2022

Product data sheet

1. General description

Low capacitance unidirectional ElectroStatic Discharge (ESD) protection diode designed to protect one signal line from the damage caused by ESD and other transients. The device is housed in a SOD882D leadless ultra small Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- ESD protection of one line
- Ultra small SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm
- Low diode capacitance $C_d = 25$ pF
- ESD protection up to 26 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PPM} = 3.5$ A
- Low clamping voltage: $V_{CL} = 12$ V
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Computers and peripherals
- Audio and video equipment
- Communication systems
- Portable electronics

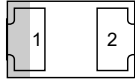
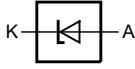
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|---|-----|-----|-----|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25$ °C | - | - | 5 | V |
| C_d | diode capacitance | $f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C | - | 25 | 30 | pF |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|--|
| 1 | K | cathode[1] |  <p>Transparent top view</p> <p>DFN1006D-2 (SOD882D)</p> |  <p>006aaa152</p> |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

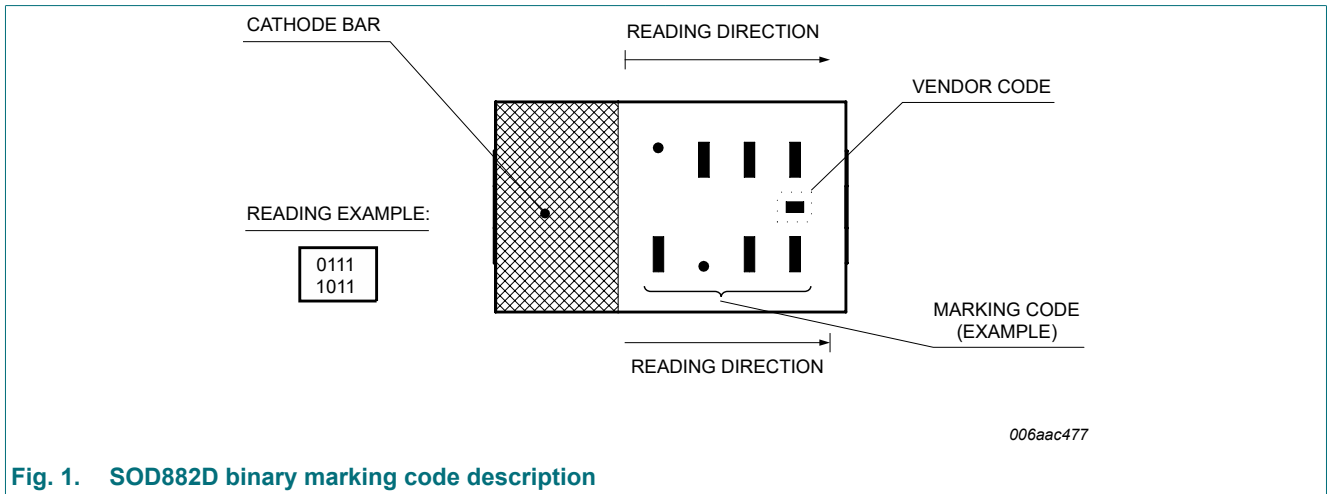
Table 3. Ordering information

| Type number | Package | | |
|----------------|------------|---|---------|
| | Name | Description | Version |
| PESD5V0L1ULD-Q | DFN1006D-2 | leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.4 mm body | SOD882D |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|----------------|--------------|
| PESD5V0L1ULD-Q | 1110 0000 |



8. Limiting values

Table 5. Limiting values

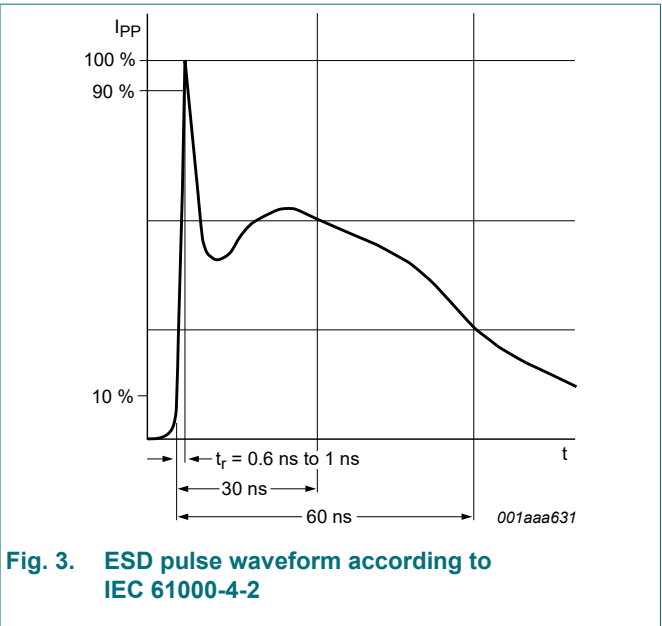
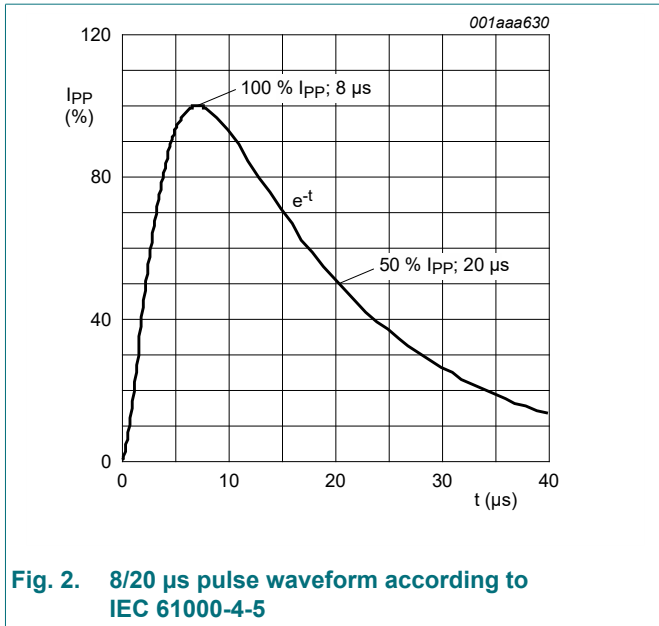
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|----------------------------|---------------------------------|---|---------|-----|-----|------|
| P_{PPM} | rated peak pulse power | $t_p = 8/20 \mu s$ | [1] [2] | - | 42 | W |
| I_{PPM} | rated peak pulse current | | [1] [2] | - | 3.5 | 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), $T_{amb} = 25 \text{ °C}$ | [3] [2] | - | 26 | kV |
| | | IEC 61000-4-2 (air discharge), $T_{amb} = 25 \text{ °C}$ | | - | 15 | kV |
| | | machine model, $T_{amb} = 25 \text{ °C}$ | | - | 400 | V |
| | | MIL-STD-883 (human body model), $T_{amb} = 25 \text{ °C}$ | [2] | - | 10 | kV |

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

[2] Measured from pin 1 to pin 2.

[3] Device stressed with ten non-repetitive ESD pulses.

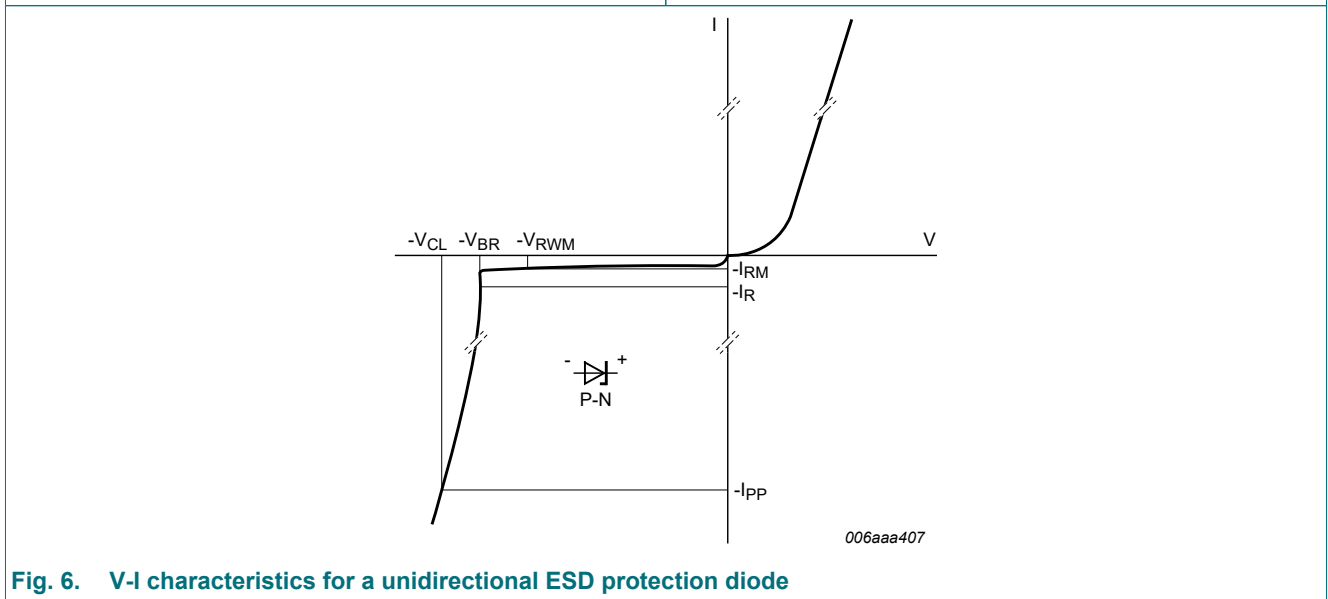
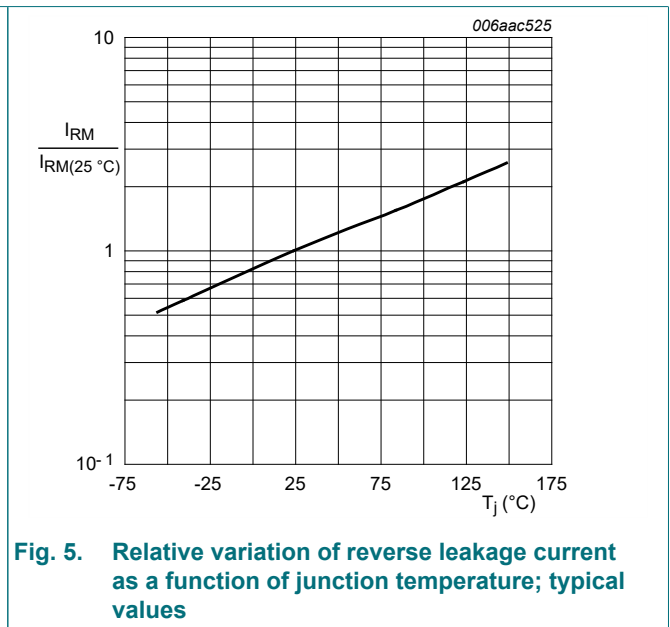
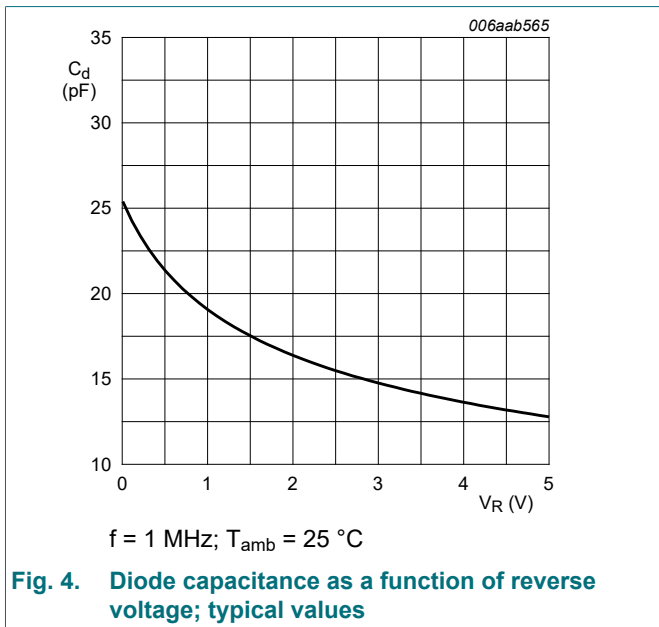


9. Characteristics

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 | $I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | 6.4 | 6.8 | 7.2 | V |
| I_{RM} | reverse leakage current | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 10 | 100 | nA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 25 | 30 | pF |
| V_{CL} | clamping voltage | $I_{PPM} = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] [2] | - | 9 | V |
| | | $I_{PPM} = 3.5\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] [2] | - | 12 | V |
| R_{dyn} | dynamic resistance | $I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [3] | 0.7 | - | Ω |

- [1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.
- [2] Measured from pin 1 to pin 2.
- [3] Non-repetitive current pulse, Transmission Line Pulse (TLP) $t_p = 100\text{ ns}$; square pulse; ANSI / ESD STM5.5.1-2008.



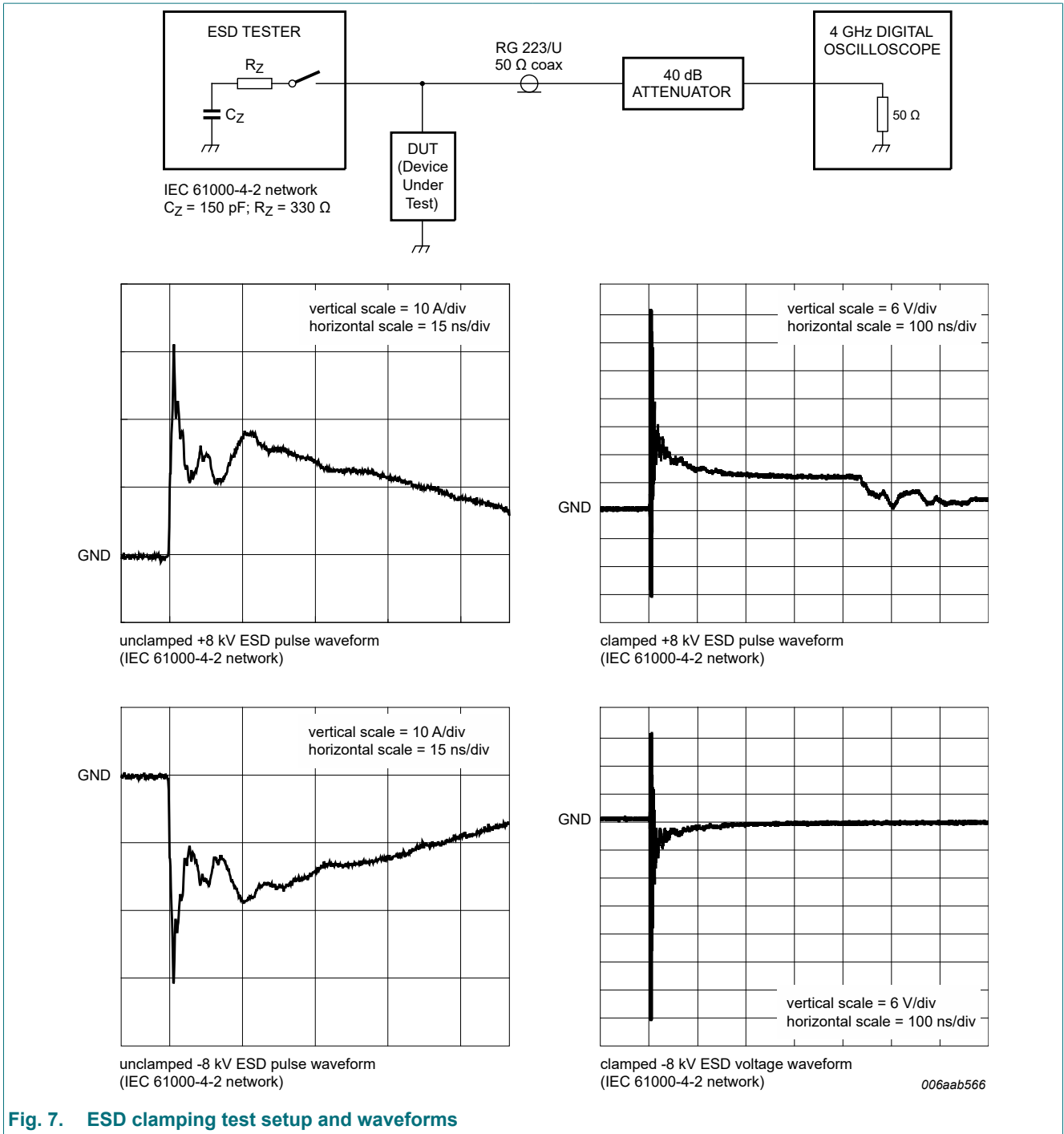


Fig. 7. ESD clamping test setup and waveforms

10. Application information

The device is designed for protection of one unidirectional data or signal line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are either positive or negative with respect to ground.

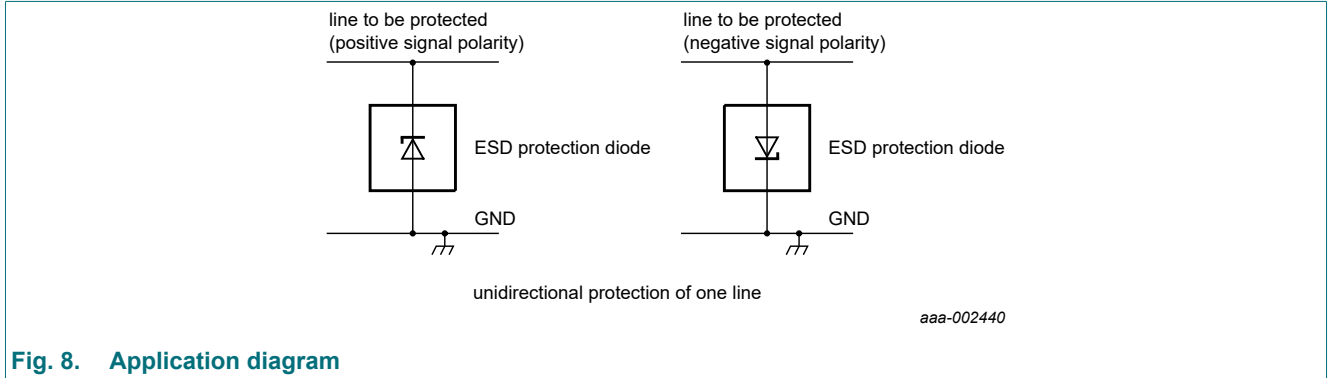


Fig. 8. Application diagram

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. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. 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

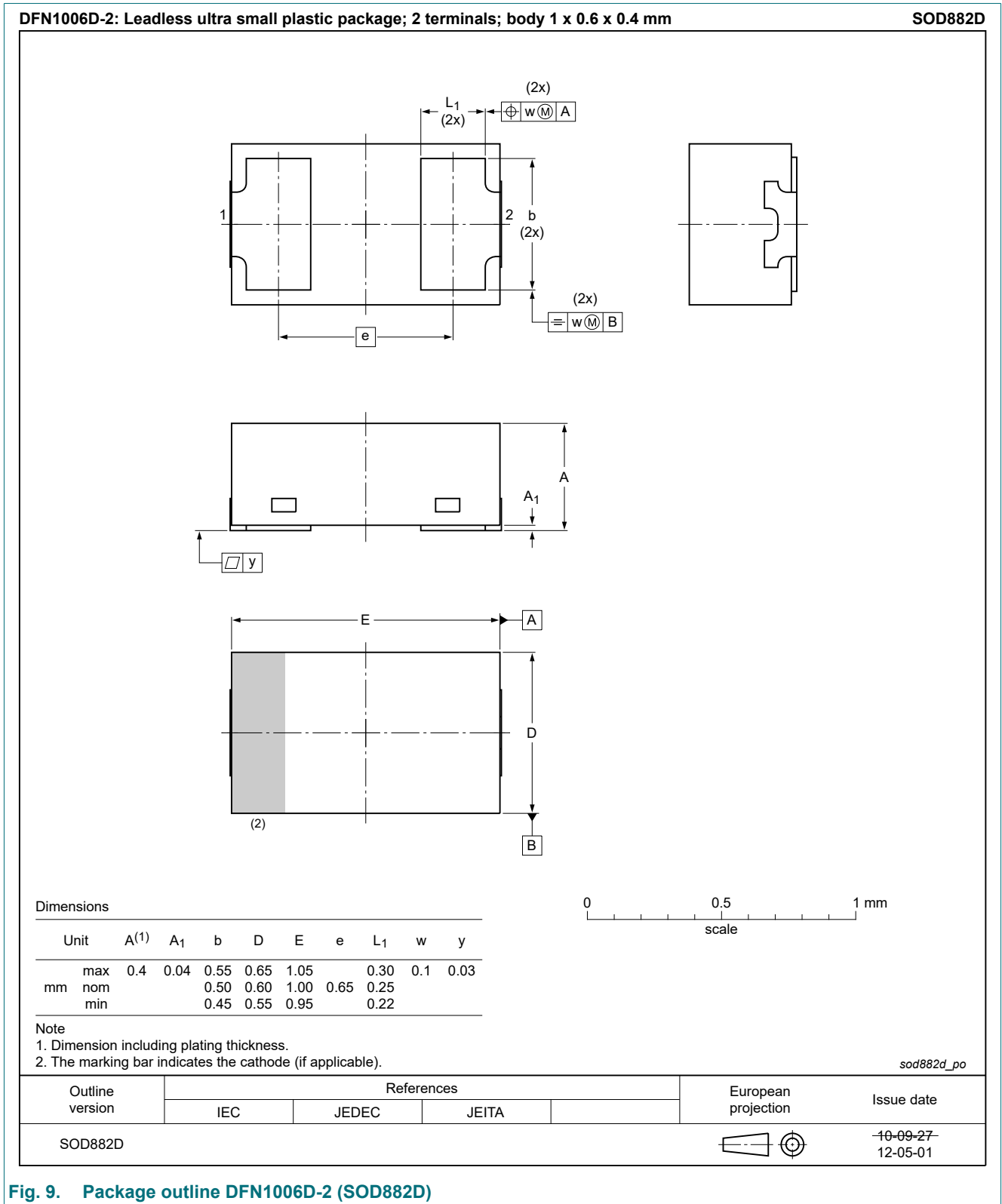


Fig. 9. Package outline DFN1006D-2 (SOD882D)

13. Soldering

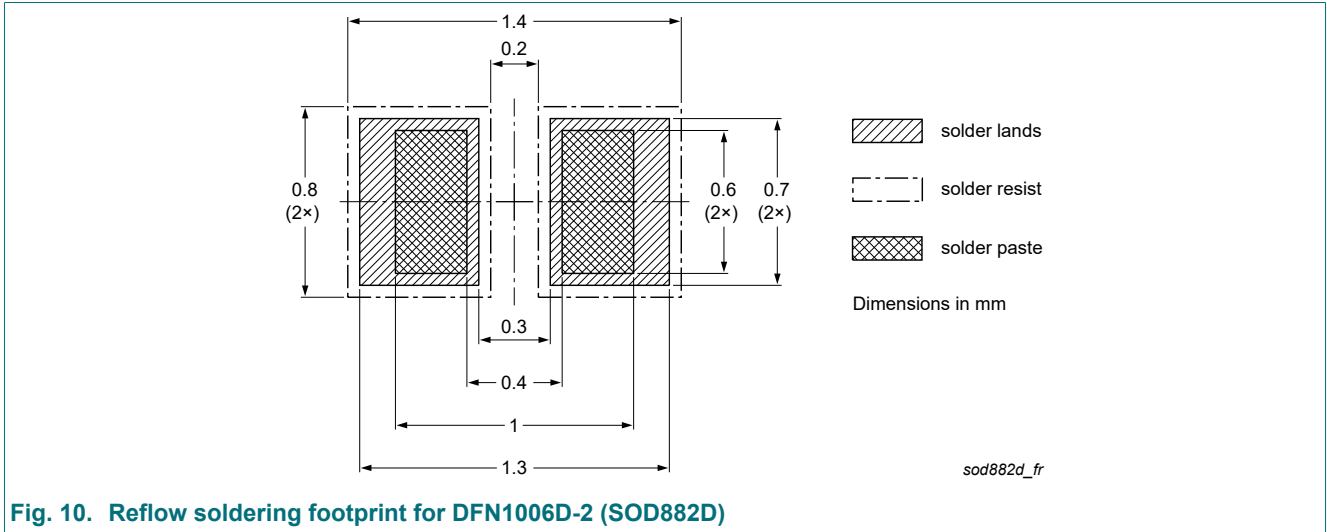


Fig. 10. Reflow soldering footprint for DFN1006D-2 (SOD882D)

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------|--------------|--------------------|---------------|------------|
| PESD5V0L1ULD-Q v.1 | 20220818 | 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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- [2] The term 'short data sheet' is explained in section "Definitions".
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