



PESD5V0X1BL

Ultra low capacitance bidirectional ESD protection diode

10 July 2020

Product data sheet

1. General description

Ultra low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode in a SOD882 leadless ultra small 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
- ESD protection up to 9 kV
- Ultra low diode capacitance: $C_d = 0.9$ pF
- Very low leakage current: $I_{RM} = 1$ nA
- IEC 61000-4-2; level 4 (ESD)
- AEC-Q101 qualified

3. Applications

- USB interfaces
- Cellular handsets and accessories
- Antenna protection
- Portable electronics
- 10/100/1000 Mbit/s Ethernet
- Communication systems
- Computers and peripherals
- High-speed data lines
- Audio and video equipment
- SIM card protection


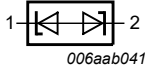
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|---------------------------------------------|-----|-----|-----|------|
| C_d | diode capacitance | $f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C | - | 0.9 | 1.3 | pF |
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25$ °C | - | - | 5 | V |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1 | K1 | cathode (diode 1) |  <p>Transparent top view</p> <p>DFN1006-2 (SOD882)</p> |  |
| 2 | K2 | cathode (diode 2) | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|-----------|-------------------------------------------------------------------------------------------------|---------|
| | Name | Description | Version |
| PESD5V0X1BL | DFN1006-2 | plastic, leadless ultra small package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.48 mm body | SOD882 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD5V0X1BL | XX |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|----------------------------|---------------------------------|-----------------------------------|-----|-----|-----|------|
| I_{PPM} | rated peak pulse current | $t_p = 8/20 \mu s$ | [1] | - | 1.3 | 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] | - | 9 | kV |
| | | MIL-STD-883 (human body model) | | - | 10 | kV |

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

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

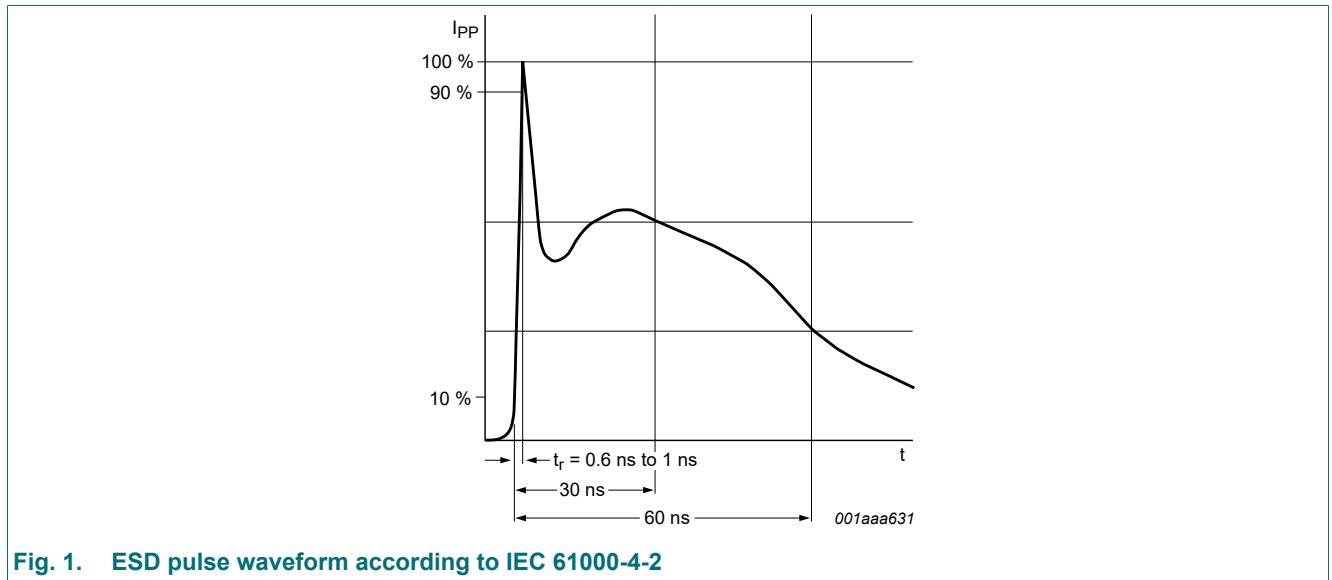
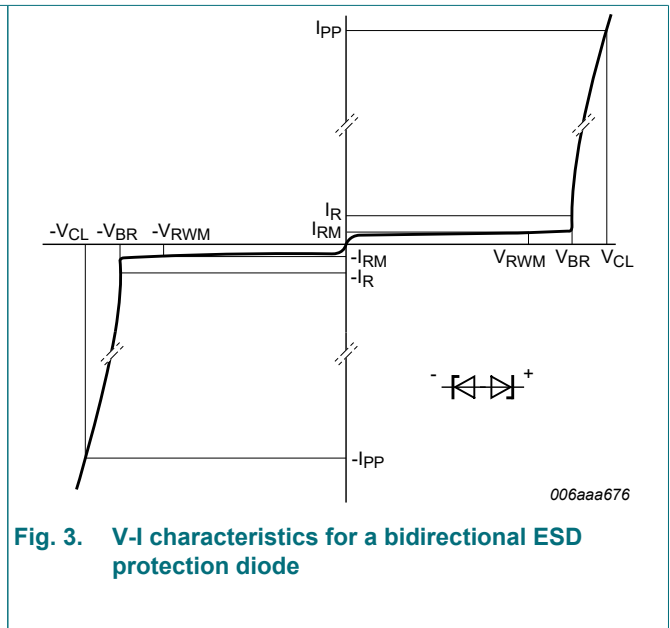
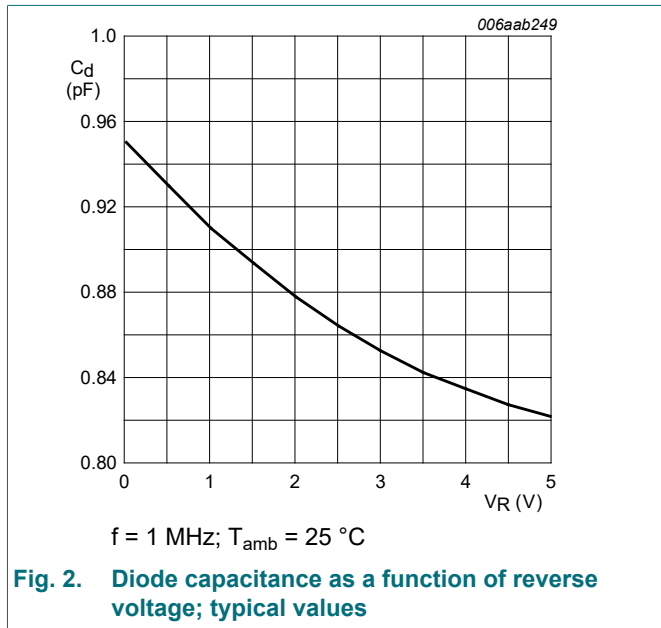


Fig. 1. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|--------------------------------------------------------------|-----|-----|-----|----------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ °C}$ | - | - | 5 | V |
| V_{BR} | breakdown voltage | $I_R = 5\text{ mA}; T_{amb} = 25\text{ °C}$ | 6 | 7.5 | 9.5 | V |
| I_{RM} | reverse leakage current | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ °C}$ | - | 1 | 100 | nA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ °C}$ | - | 0.9 | 1.3 | pF |
| | | $f = 1\text{ MHz}; V_R = 5\text{ V}; T_{amb} = 25\text{ °C}$ | - | 0.8 | 1.2 | pF |
| r_{dif} | differential resistance | $I_R = 1\text{ mA}; T_{amb} = 25\text{ °C}$ | - | - | 100 | Ω |



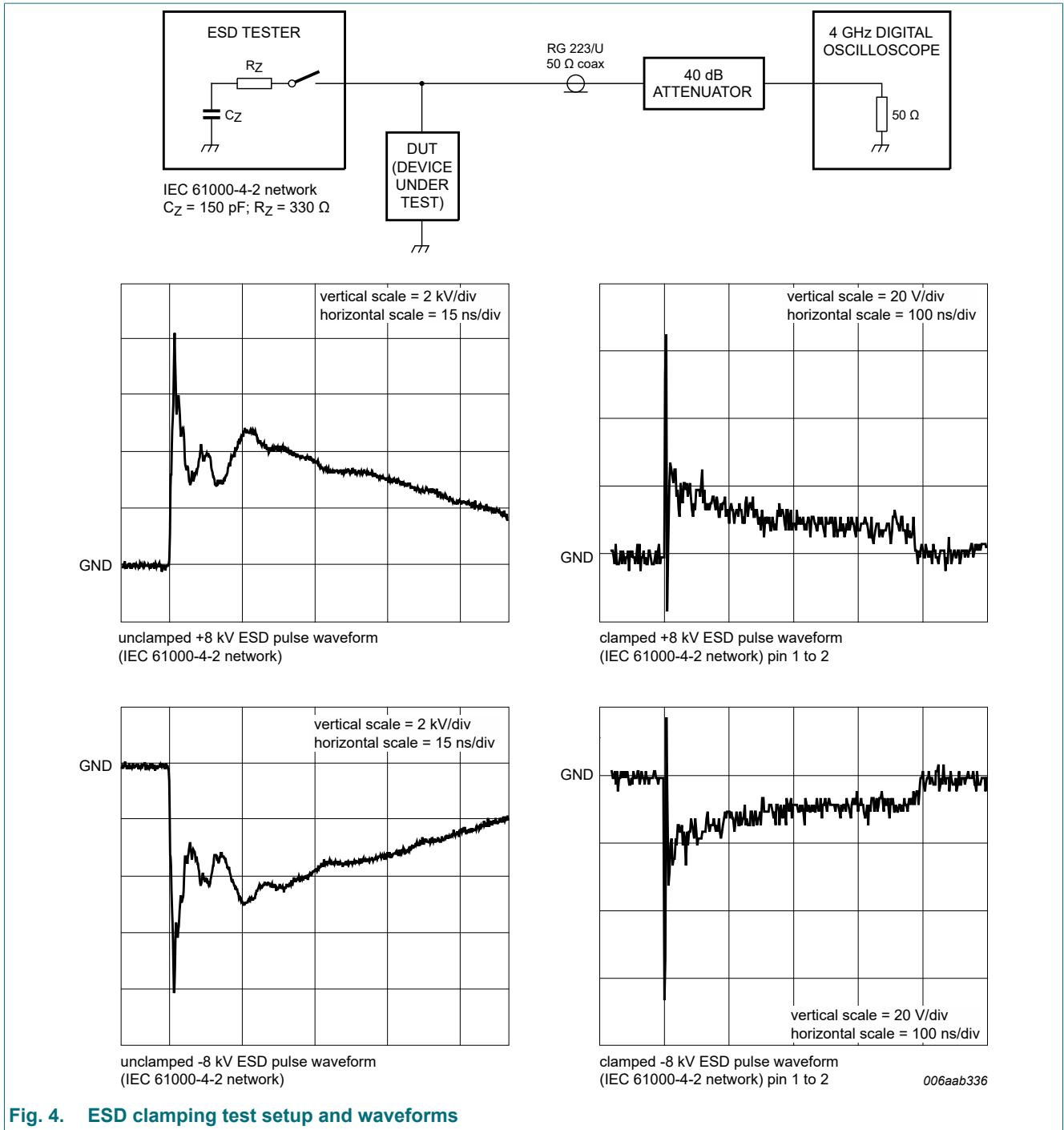


Fig. 4. ESD clamping test setup and waveforms

10. Application information

PESD5V0X1BL is designed for the protection of one bidirectional data or signal line from the damage caused by ESD. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground.

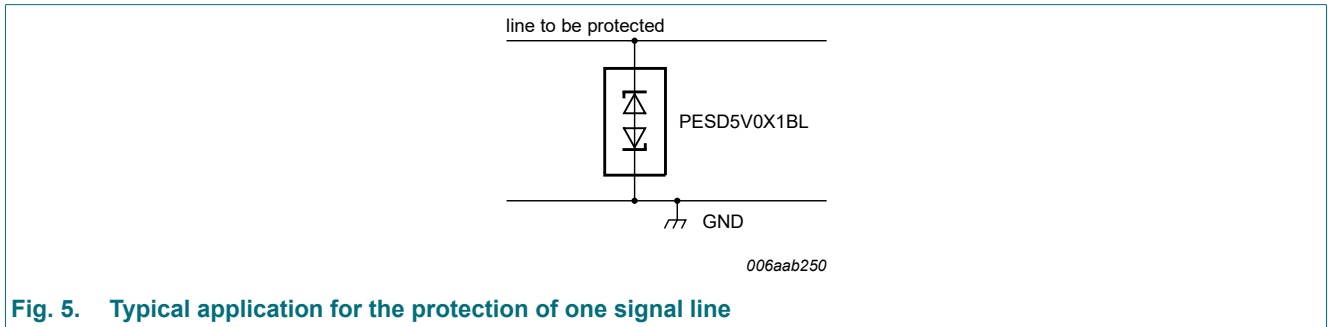


Fig. 5. Typical application for the protection of one signal line

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. 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

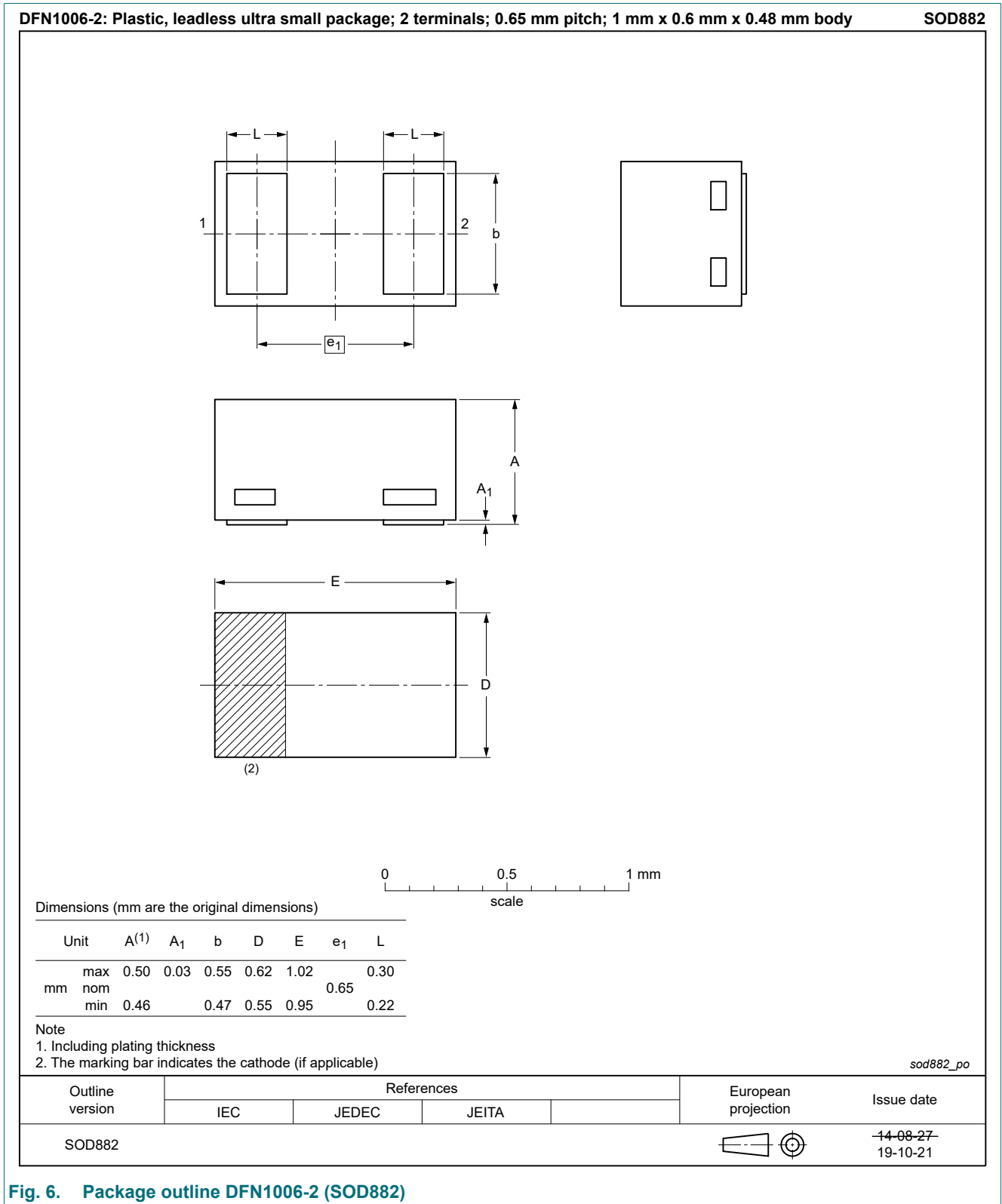


Fig. 6. Package outline DFN1006-2 (SOD882)

13. Soldering

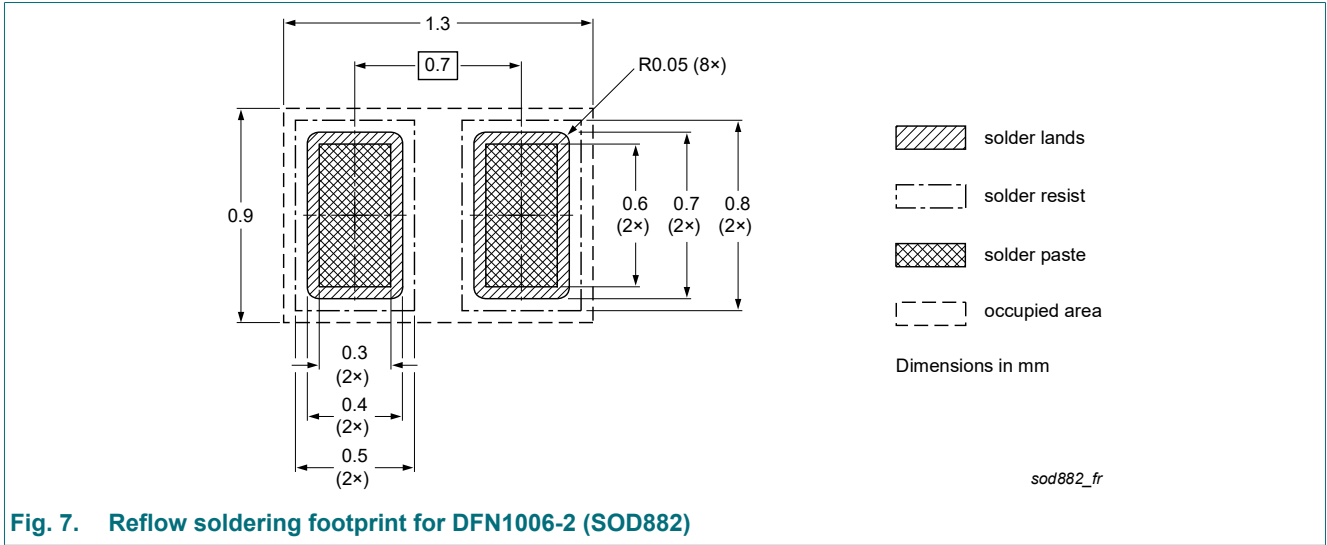


Fig. 7. Reflow soldering footprint for DFN1006-2 (SOD882)

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------------------|-----------------------------------------------|--------------------|---------------|--------------------------------|
| PESD5V0X1BL v.4 | 20200710 | Product data sheet | - | PESD5V0X1BL v.3 |
| Modifications: | • Limiting values: Parameter I_{PPM} added. | | | |
| PESD5V0X1BL v.3 | 20180731 | Product data sheet | - | PESD5V0X1BL v.2 |
| PESD5V0X1BL v.2 | 20090716 | Product data sheet | - | PESD5V0X1BA_ PESD5V0XBL v.1 |
| PESD5V0X1BA_ PESD5V0XBL v.1 | 20081104 | 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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Contents

| | |
|----------------------------------|----|
| 1. General description..... | 1 |
| 2. Features and benefits..... | 1 |
| 3. Applications..... | 1 |
| 4. Quick reference data..... | 1 |
| 5. Pinning information..... | 2 |
| 6. Ordering information..... | 2 |
| 7. Marking..... | 2 |
| 8. Limiting values..... | 3 |
| 9. Characteristics..... | 4 |
| 10. Application information..... | 6 |
| 11. Test information..... | 6 |
| 12. Package outline..... | 7 |
| 13. Soldering..... | 8 |
| 14. Revision history..... | 9 |
| 15. Legal information..... | 10 |

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