



PESD5V0S1BLD

Bidirectional ESD protection diode

11 October 2018

Product data sheet

1. General description

Bidirectional 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

- Bidirectional ESD protection of one line
- Ultra small SMD plastic package
- Solderable side pads
- Package height typ. 0.37 mm
- Low clamping voltage: $V_{CL} = 14\text{ V}$
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PP} = 12\text{ A}$
- Max. peak pulse power: $P_{PPM} = 130\text{ W}$
- Ultra low leakage current: $I_{RM} = 5\text{ nA}$
- AEC-Q101 qualified

3. Applications

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

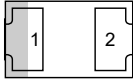
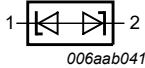
4. Quick reference data

Table 1. Quick reference data

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

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|---|--|
| 1 | K1 | cathode 1 |  <p>Transparent top view</p> <p>DFN1006D-2 (SOD882D)</p> |  <p>006aab041</p> |
| 2 | K2 | cathode 2 | | |

6. Ordering information

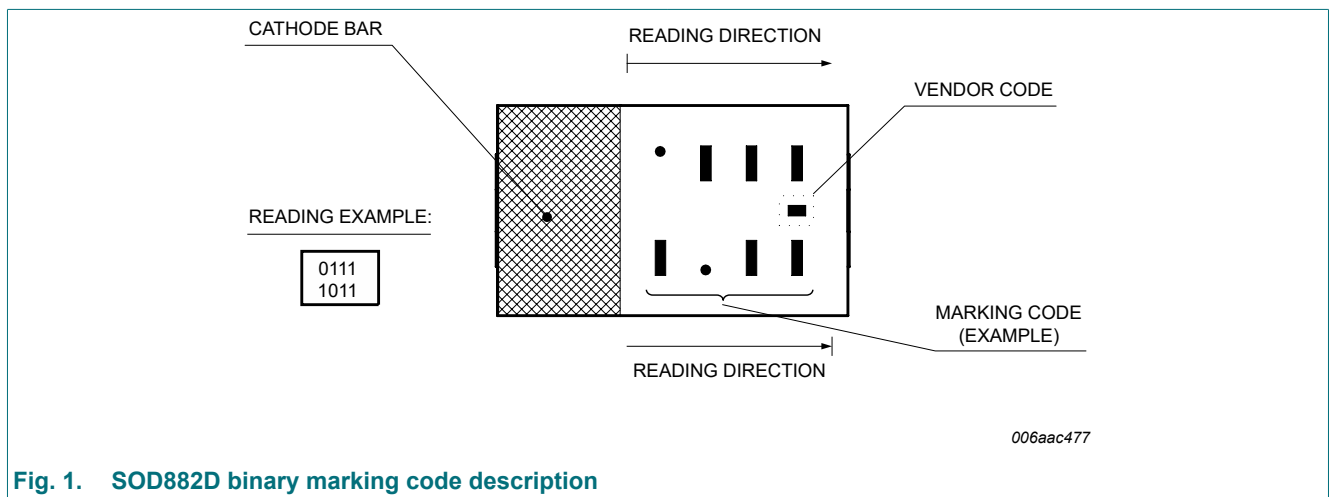
Table 3. Ordering information

| Type number | Package | | |
|--------------|------------|---|---------|
| | Name | Description | Version |
| PESD5V0S1BLD | DFN1006D-2 | leadless ultra small plastic package; 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 |
|--------------|--------------|
| PESD5V0S1BLD | 1100 0000 |



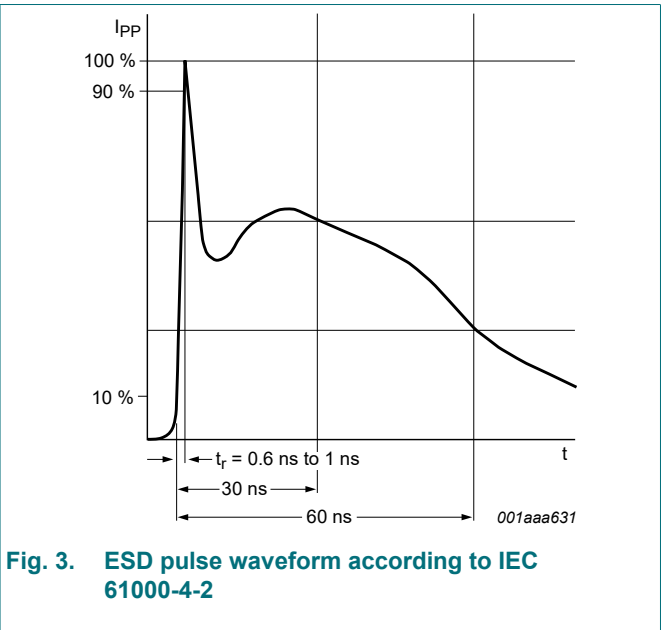
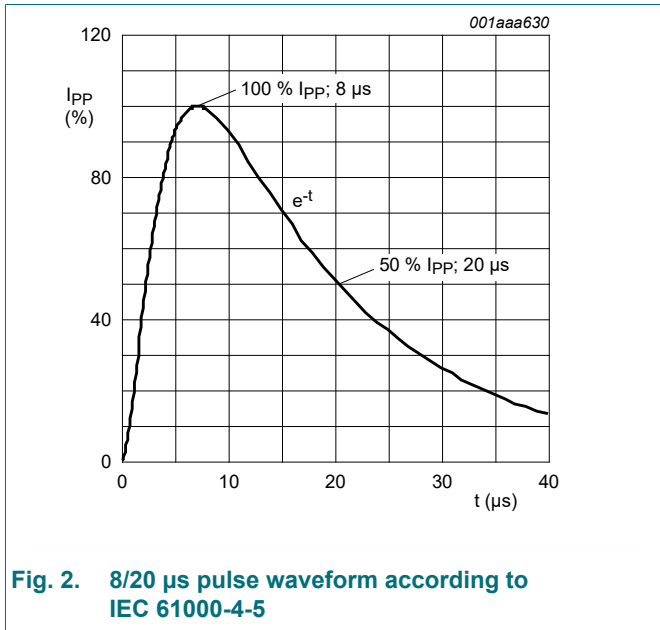
8. Limiting values

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] | - | 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) | [3] [2] | - | 30 | kV |
| | | MIL-STD-883 (human body model) | | - | 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

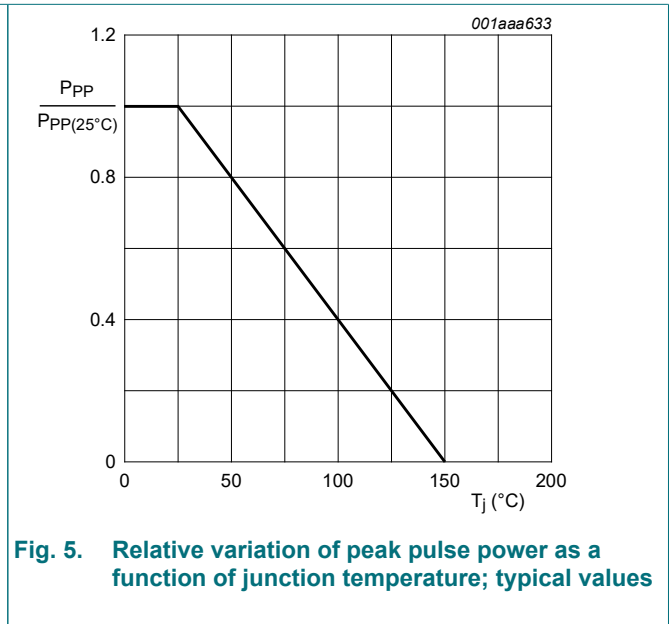
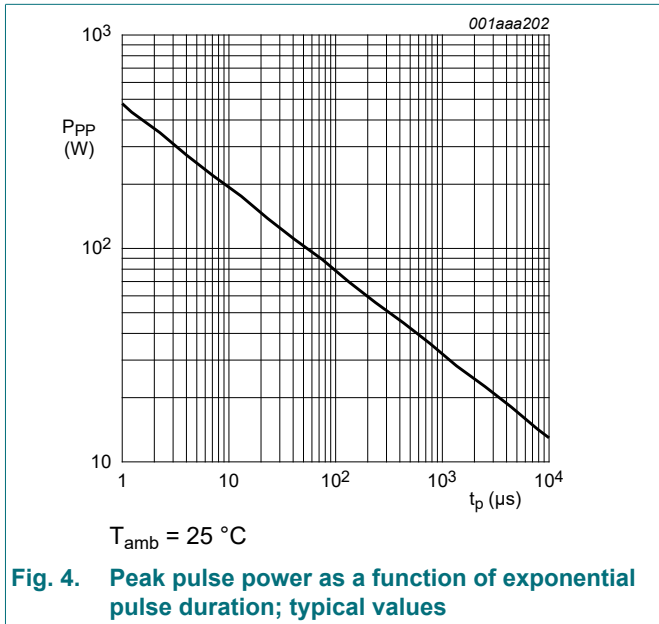
Table 6. Characteristics

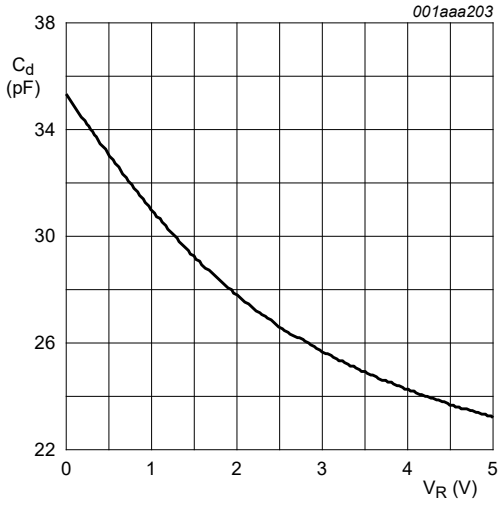
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|--|---------|-----|------|----------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ °C}$ | - | - | 5 | V |
| V_{BR} | breakdown voltage | $I_R = 1\text{ mA}; T_{amb} = 25\text{ °C}$ | 5.5 | - | 9.5 | V |
| I_{RM} | reverse leakage current | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ °C}$ | - | 5 | 100 | nA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ °C}$ | - | 35 | 45 | pF |
| V_{CL} | clamping voltage | $I_{PP} = 1\text{ A}; T_{amb} = 25\text{ °C}$ | [1] [2] | - | 10 | V |
| | | $I_{PP} = 12\text{ A}; T_{amb} = 25\text{ °C}$ | [1] [2] | - | 14 | V |
| R_{dyn} | dynamic resistance | $I_R = 10\text{ A}; T_{amb} = 25\text{ °C}$ | [2] [3] | - | 0.1 | Ω |
| | | $I_R = -10\text{ A}; T_{amb} = 25\text{ °C}$ | [2] [3] | - | 0.15 | 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.





f = 1 MHz; T_{amb} = 25 °C

Fig. 6. Diode capacitance as a function of reverse voltage; typical values

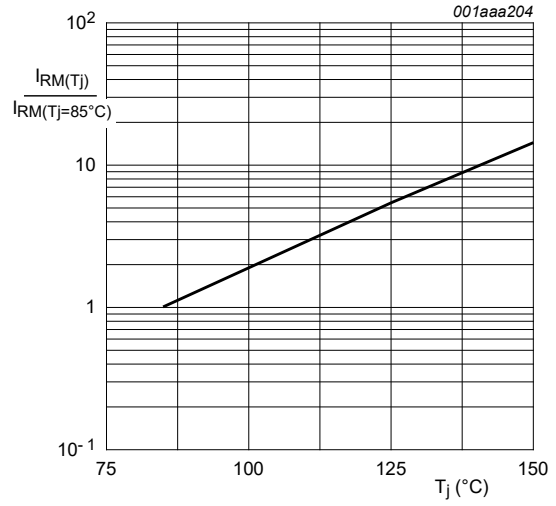


Fig. 7. Relative variation of reverse leakage current as a function of junction temperature; typical values

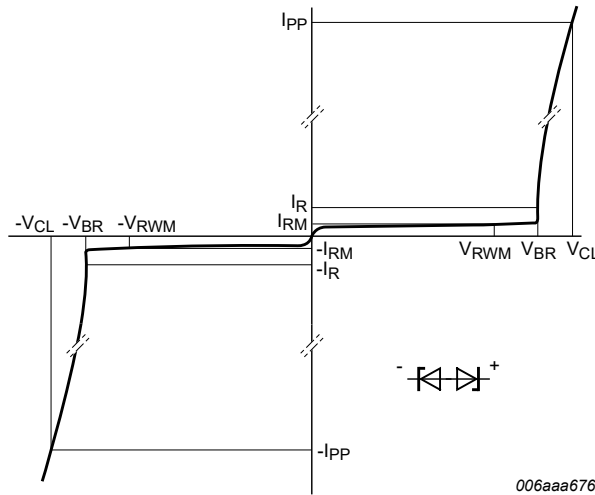


Fig. 8. V-I characteristics for a bidirectional ESD protection diode

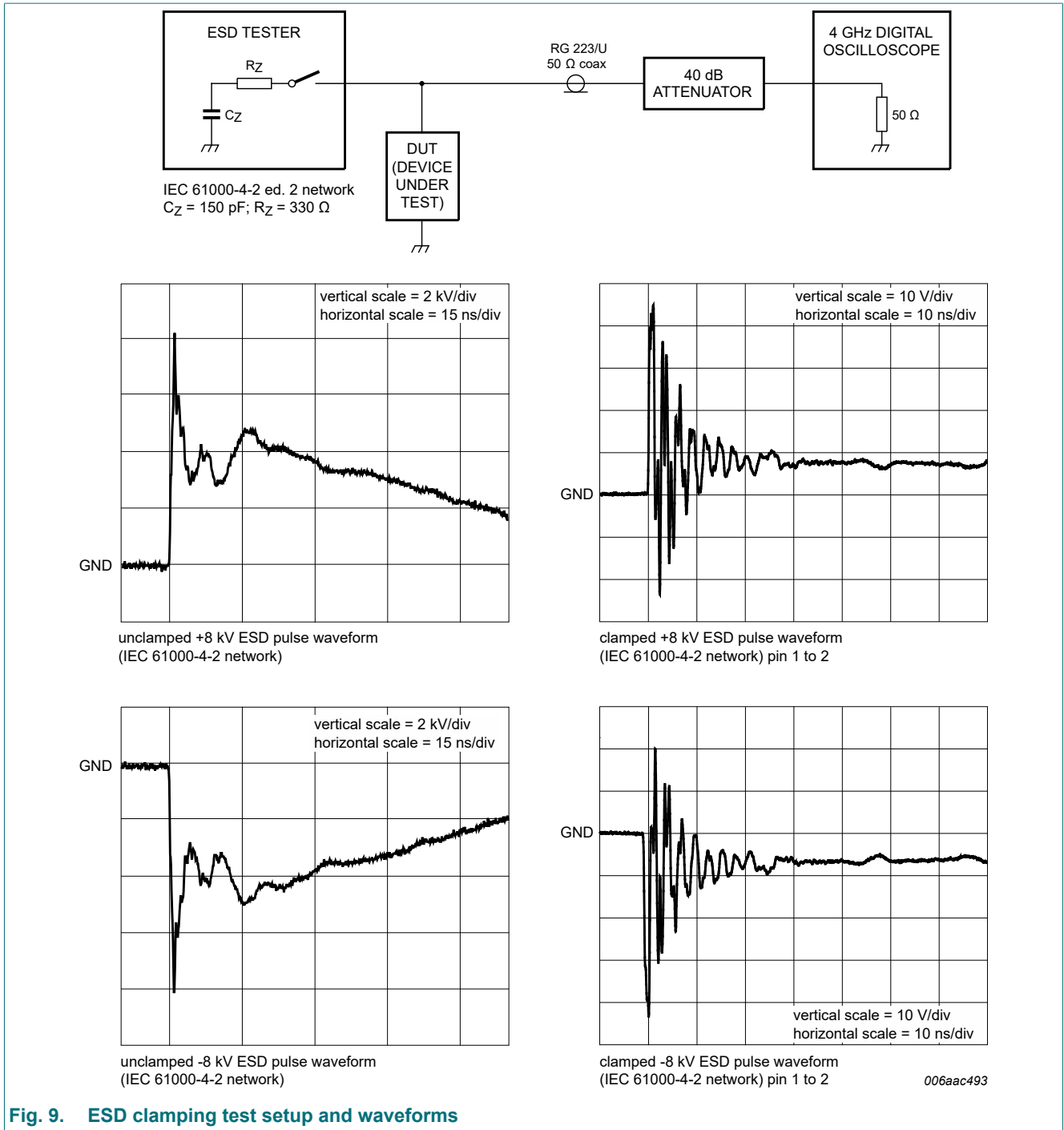


Fig. 9. ESD clamping test setup and waveforms

10. Application information

The PESD5V0S1BLD is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and surge pulses. The device may be used on lines where the signal polarities are both positive and negative with respect to ground. The PESD5V0S1BLD provides a surge capability of up to 130 W per line for an 8/20 μ s waveform.

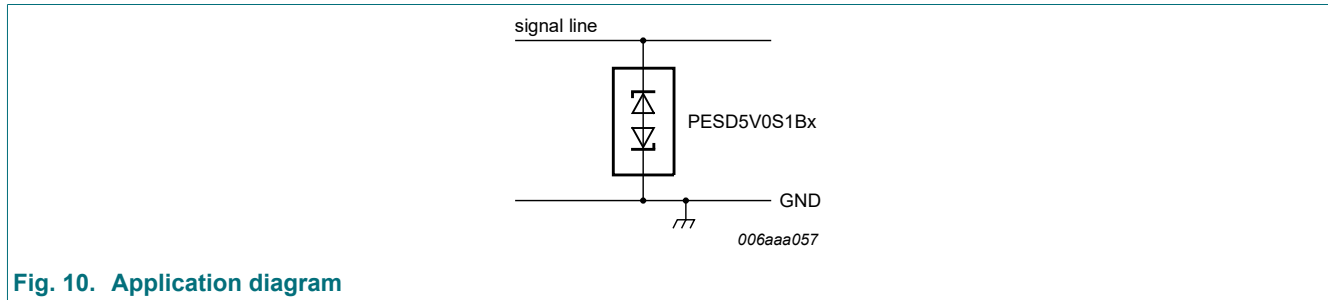


Fig. 10. Application diagram

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

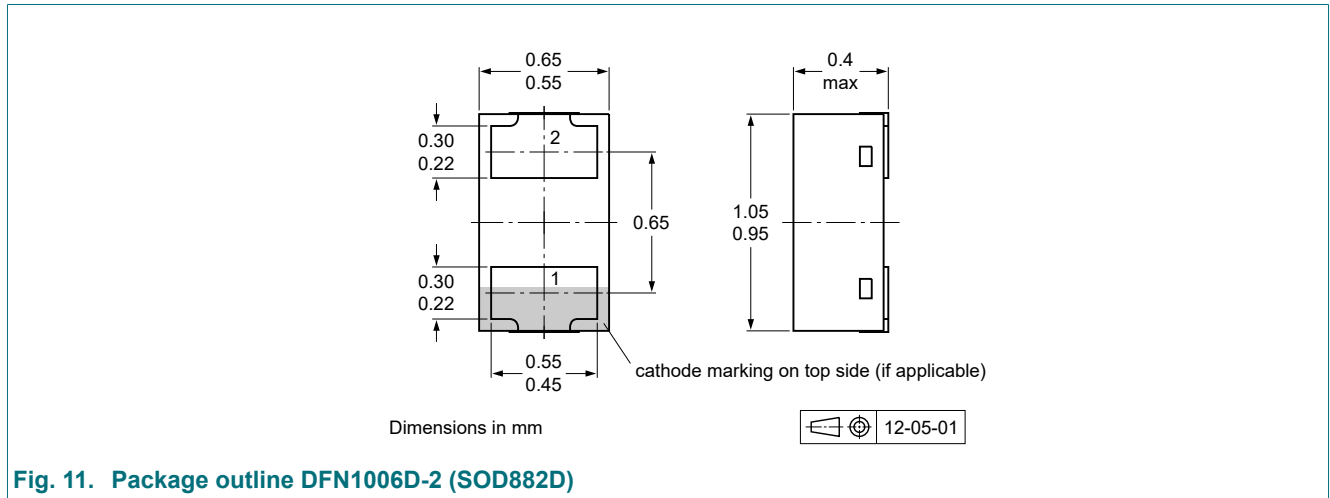


Fig. 11. Package outline DFN1006D-2 (SOD882D)

13. Soldering

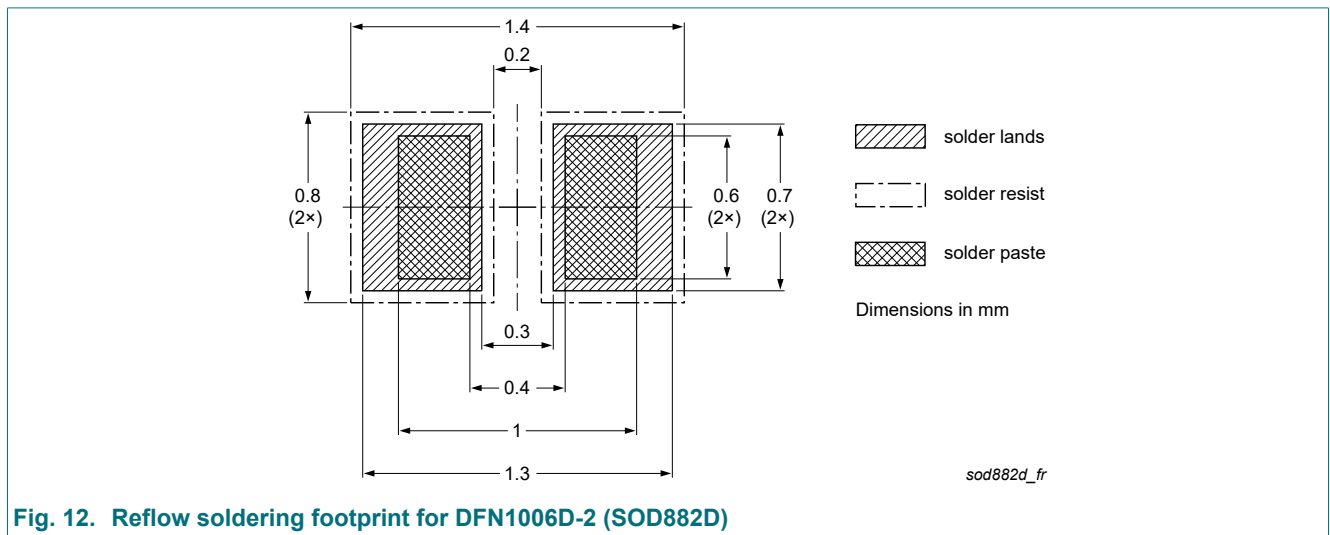


Fig. 12. Reflow soldering footprint for DFN1006D-2 (SOD882D)

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|--|--------------------|---------------|------------------|
| PESD5V0S1BLD v.2 | 20181011 | Product data sheet | - | PESD5V0S1BLD v.1 |
| Modifications | <ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.• Legal texts have been adapted to the new company name where appropriate. | | | |
| PESD5V0S1BLD v.1 | 20101012 | 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. |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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