



PESD5V0L1BSL

ESD protection device

13 July 2021

Product data sheet

1. General description

Bidirectional ElectroStatic Discharge (ESD) protection diode in a DFN1006-2 (SOD882-S1) 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 protection of one line
- Reverse stand-off voltage: $V_{RWM} = 5\text{ V}$
- Surge robustness: $I_{PPM} = 7.5\text{ A}$ for 8/20 μs pulse
- Ultra low clamping voltage: $V_{CL} = 11.3\text{ V max.}$ at $I_{PPM} = 7.5\text{ A}$

3. Applications

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

4. Quick reference data

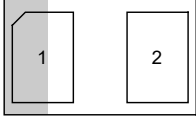
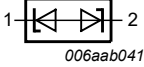
Table 1. Quick reference data

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------|--------------------------|---|-----|-----|-----|------|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | - | - | 5 | V |
| I_{PPM} | rated peak pulse current | $t_p = 8/20\text{ }\mu\text{s}$ | [1] | - | - | 7.5 | A |
| V_{CL} | clamping voltage | $I_{PPM} = 7.5\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | - | - | 11.3 | V |

[1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|---|--|
| 1 | K1 | cathode (diode 1) |  <p>Transparent top view DFN1006-2 (SOD882-S1)</p> |  <p>006aab041</p> |
| 2 | K2 | cathode (diode 2) | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--------------|-----------|--|-----------|
| | Name | Description | Version |
| PESD5V0L1BSL | DFN1006-2 | plastic, leadless ultra small outline package; 2 terminals; 0.60 mm pitch; 1 mm x 0.6 mm x 0.4 mm body | SOD882-S1 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|--------------|--------------|
| PESD5V0L1BSL | 1H |

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] | - | 7.5 | A |
| T_j | junction temperature | | | - | 125 | °C |
| T_{amb} | ambient temperature | | | -55 | 125 | °C |
| T_{stg} | storage temperature | | | -55 | 150 | °C |
| ESD maximum ratings | | | | | | |
| V_{ESD} | electrostatic discharge voltage | IEC 61000-4-2; contact discharge | [2] | - | 25 | kV |
| | | IEC 61000-4-2; air discharge | [2] | - | 25 | kV |

- [1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.
- [2] Device stressed with ten non-repetitive ESD pulses.

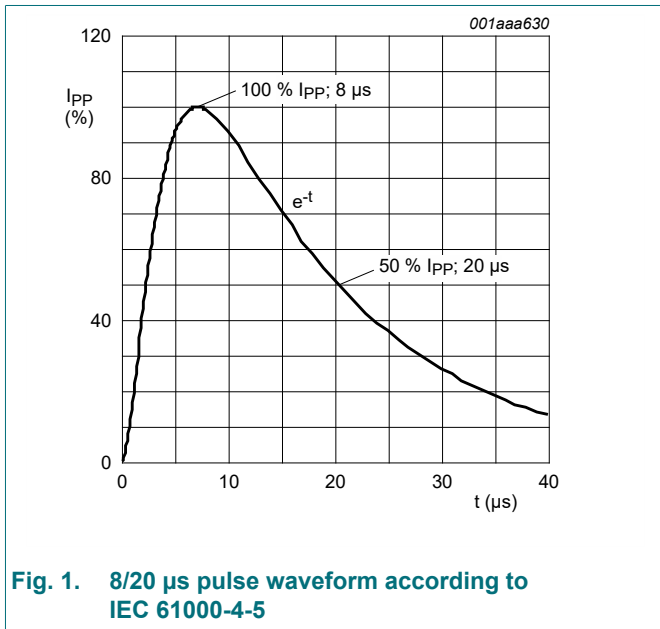


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5

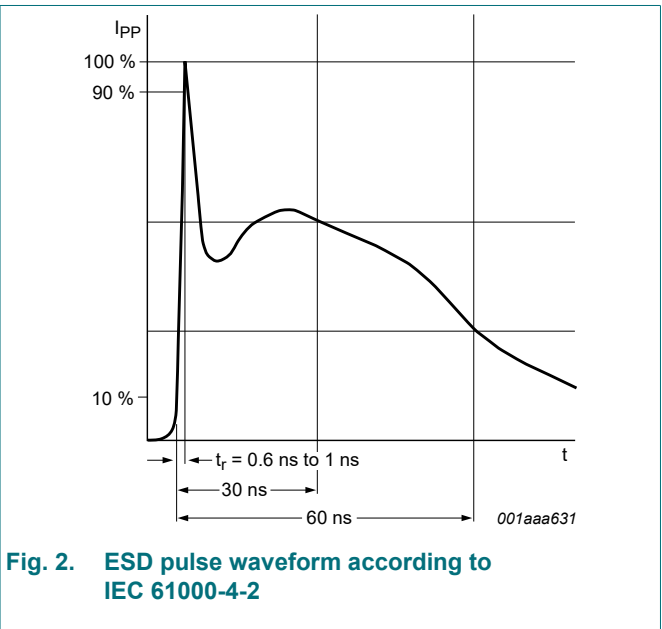


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

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 | $I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | 5.6 | 6.5 | 8.4 | V | |
| I_{RM} | reverse leakage current | $V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | - | 100 | nA | |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 15.5 | 18 | pF | |
| V_{CL} | clamping voltage | $I_{PP} = 1\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | - | - | 8.3 | V |
| | | $I_{PPM} = 7.5\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | - | - | 11.3 | V |
| | | $I_{PPM} = 16\text{ A}; t_p = \text{TLP}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [2] | - | 9 | - | V |
| R_{dyn} | dynamic resistance | $I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [2] | - | 0.18 | Ω | |

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

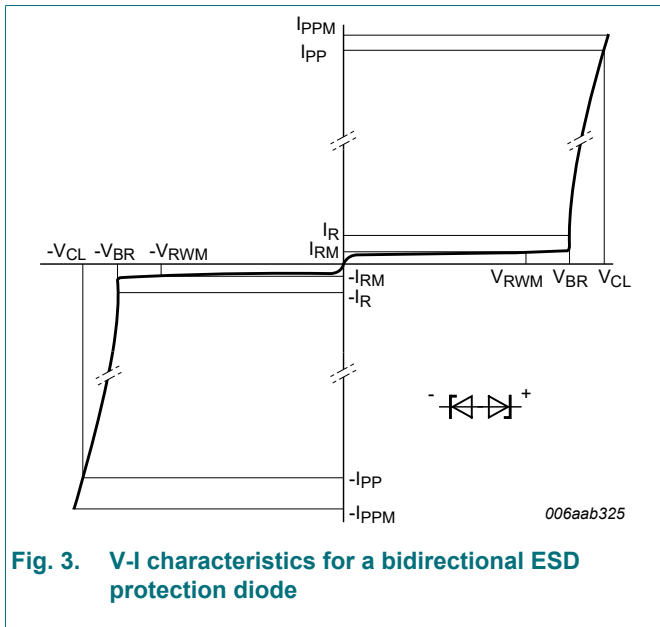


Fig. 3. V-I characteristics for a bidirectional ESD protection diode

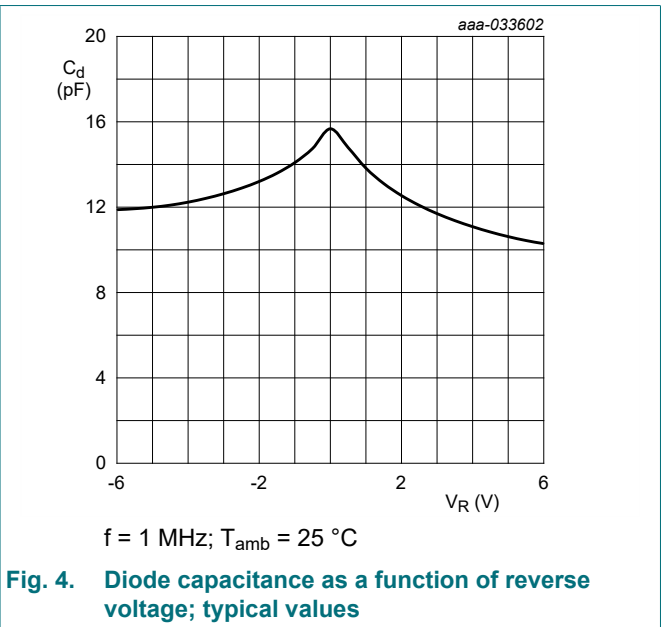
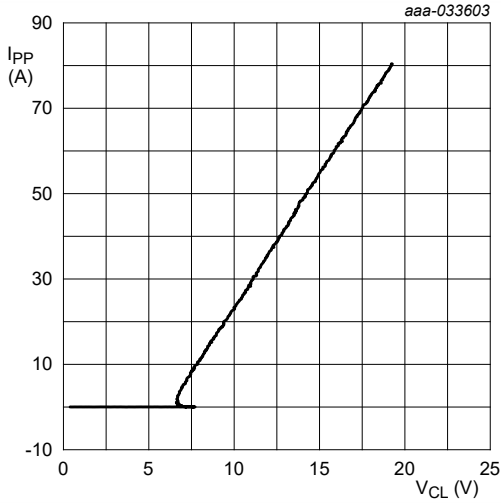
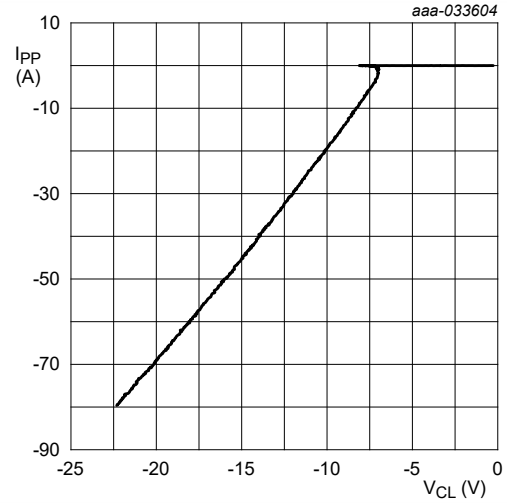


Fig. 4. Diode capacitance as a function of reverse voltage; typical values



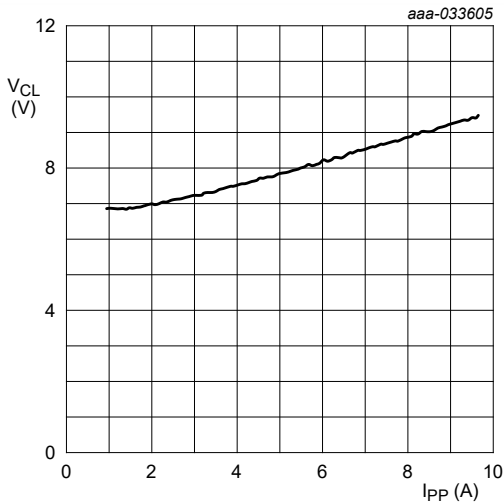
Transmission Line Pulse (TLP);
 $t_p = 100 \text{ ns}$; $t_r = 1 \text{ ns}$

Fig. 5. Dynamic resistance with positive clamping; typical values



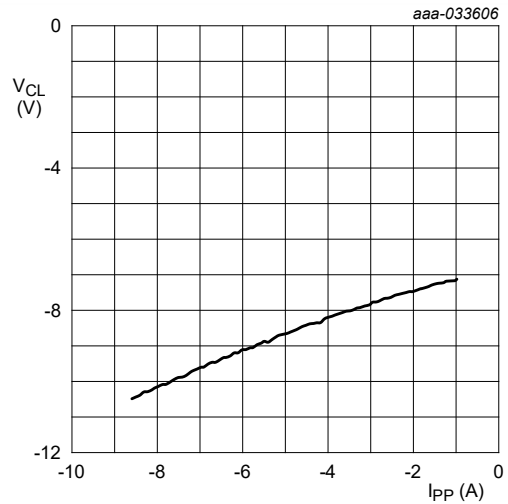
Transmission Line Pulse (TLP);
 $t_p = 100 \text{ ns}$; $t_r = 1 \text{ ns}$

Fig. 6. Dynamic resistance with negative clamping; typical values



IEC 61000-4-5; $t_p = 8/20 \text{ }\mu\text{s}$; positive pulse

Fig. 7. Dynamic resistance with positive clamping; typical values



IEC 61000-4-5; $t_p = 8/20 \text{ }\mu\text{s}$; negative pulse

Fig. 8. Dynamic resistance with negative clamping; typical values

10. Application information

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

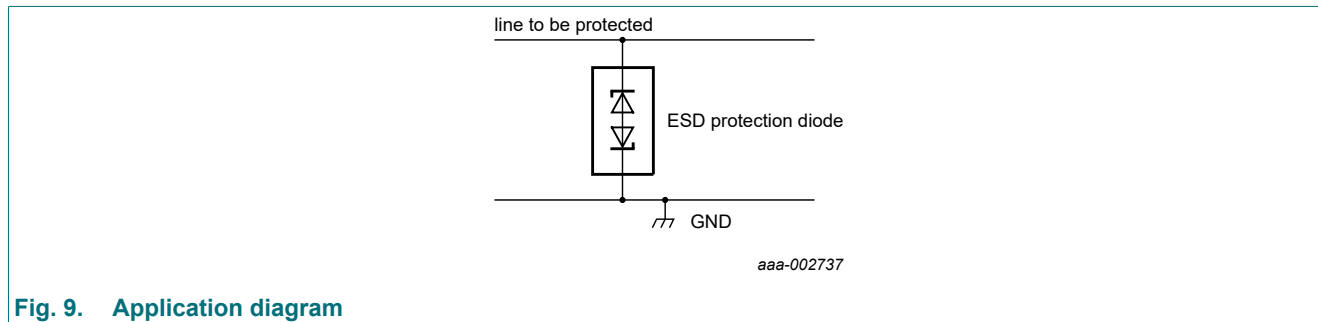


Fig. 9. Application diagram

Circuit board layout and protection device placement

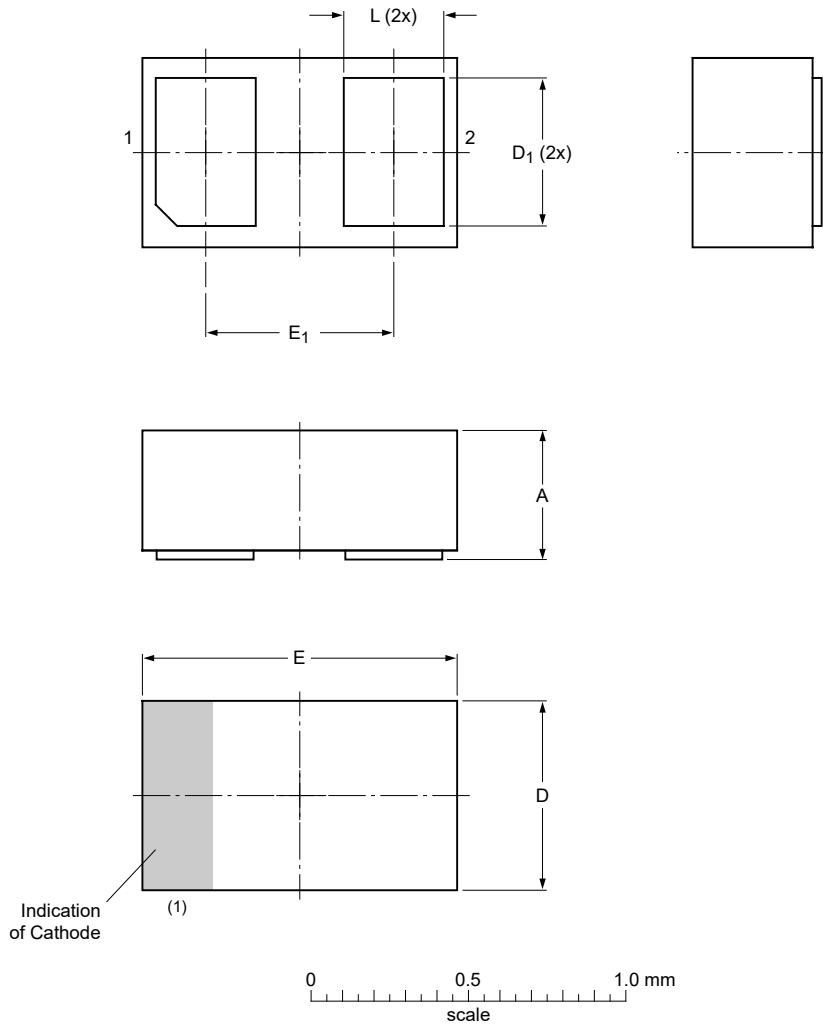
Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

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. Package outline

DFN1006-2: plastic, leadless ultra small outline package; 2 terminals;
0.60 mm pitch; 1 mm x 0.6 mm x 0.4 mm body

SOD882-S1



Dimensions (mm are the original dimensions)

| Unit | A | D | D ₁ | E | E ₁ | L |
|------|----------|------|----------------|------|----------------|------|
| mm | max 0.45 | 0.65 | 0.52 | 1.05 | 0.65 | 0.37 |
| | nom 0.35 | 0.55 | 0.42 | 0.95 | 0.55 | 0.27 |
| | min | | | | | |

Note

1. The marking bar indicates the cathode.

sod882-s1_po

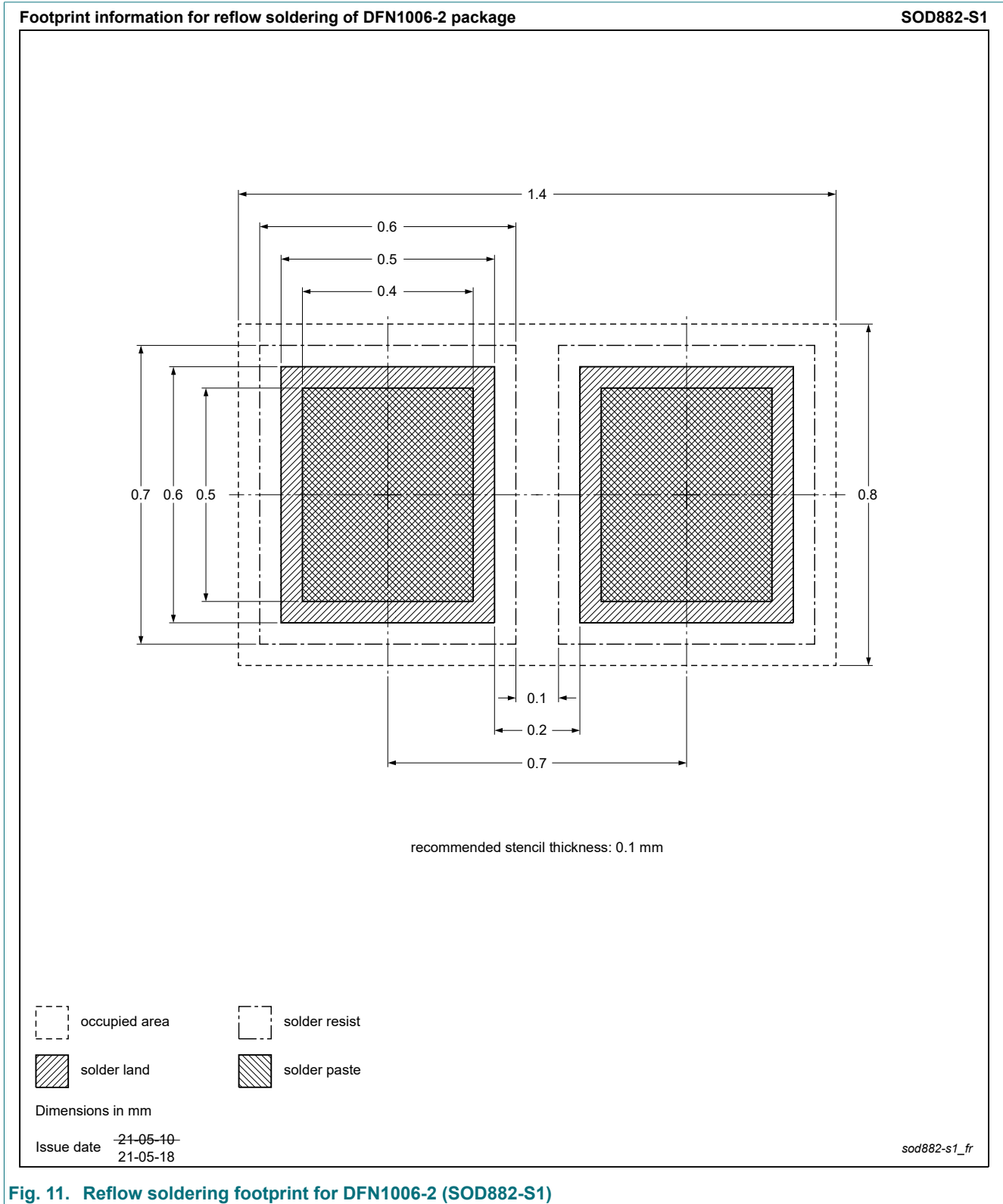
| Outline version | References | | | European projection | Issue date |
|-----------------|------------|-------|-------|---------------------|---------------------------------|
| | IEC | JEDEC | JEITA | | |
| SOD882-S1 | --- | --- | --- | | 21-05-09 21-05-18 |

Fig. 10. Package outline DFN1006-2 (SOD882-S1)

12. Soldering

The PESD5V0L1BSL fulfills the whisker requirements according to JESD201A class 1A.

It has a shelf life time from date code until soldering of maximum 12 months.



13. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|--------------|--------------------|---------------|------------|
| PESD5V0L1BSL v.1 | 20210713 | Product data sheet | - | - |

14. 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. |
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| Product [short] data sheet | Production | This document contains the product specification. |

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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. Package outline..... | 7 |
| 12. Soldering..... | 8 |
| 13. Revision history..... | 9 |
| 14. Legal information..... | 10 |

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