



**THE DATASHEET OF
PESD5V0S1ULD,315**





PESD5V0S1ULD

Unidirectional ESD protection diode

8 March 2017

Product data sheet

1. General description

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
- ESD protection up to 30 kV
- Ultra small SMD plastic package
- IEC 61000-4-2; level 4 (ESD)
- Solderable side pads
- IEC 61000-4-5 (surge); $I_{PP} = 15\text{ A}$
- Package height typ. 0.37 mm
- Max. peak pulse power: $P_{PP} = 150\text{ W}$
- Low clamping voltage: $V_{CL} = 20\text{ V}$
- Ultra low leakage current: $I_{RM} = 100\text{ nA}$
- AEC-Q101 qualified

3. Applications

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

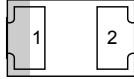
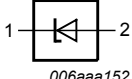
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|--|-----|-----|-----|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | - | 5.5 | V |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 152 | 200 | 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 |
| PESD5V0S1ULD | DFN1006D-2 | DFN1006D-2: leadless ultra small plastic package; 2 terminals | SOD882D |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|--------------|--------------|
| PESD5V0S1ULD | 0100 0000 |

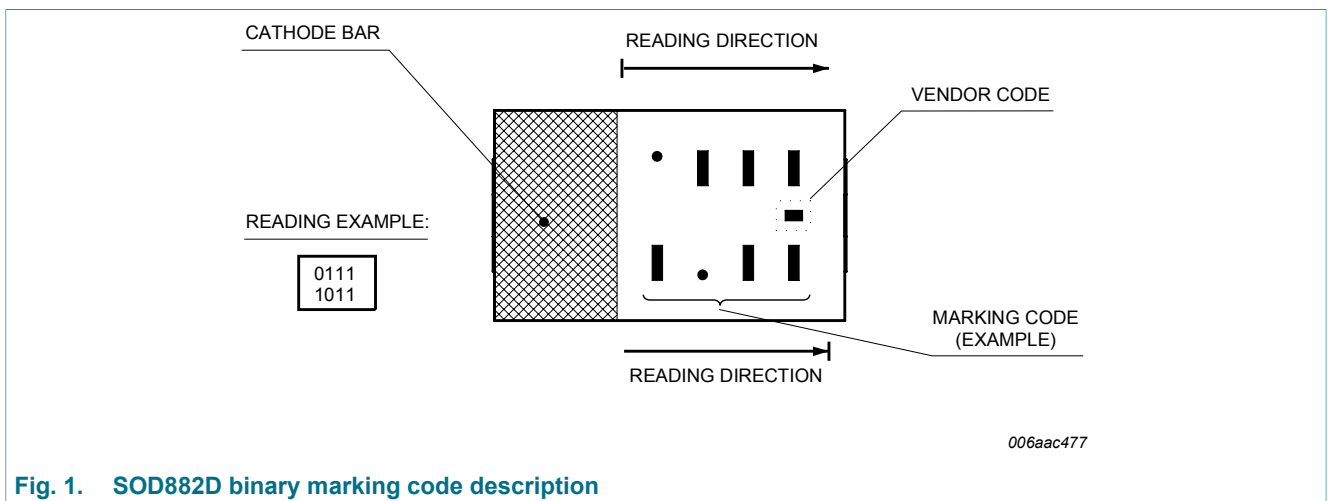


Fig. 1. SOD882D binary marking code description

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] | - | 150 | W |
| I_{PPM} | rated peak pulse current | | [1] | - | 15 | A |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 125 | °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 |
| | | 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] Device stressed with ten non-repetitive ESD pulses.
- [3] Measured from pin 1 to pin 2.

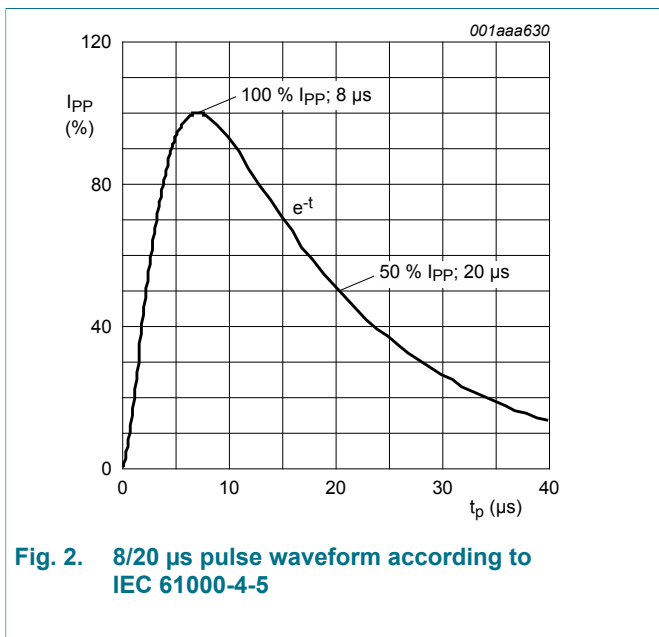


Fig. 2. 8/20 μs pulse waveform according to IEC 61000-4-5

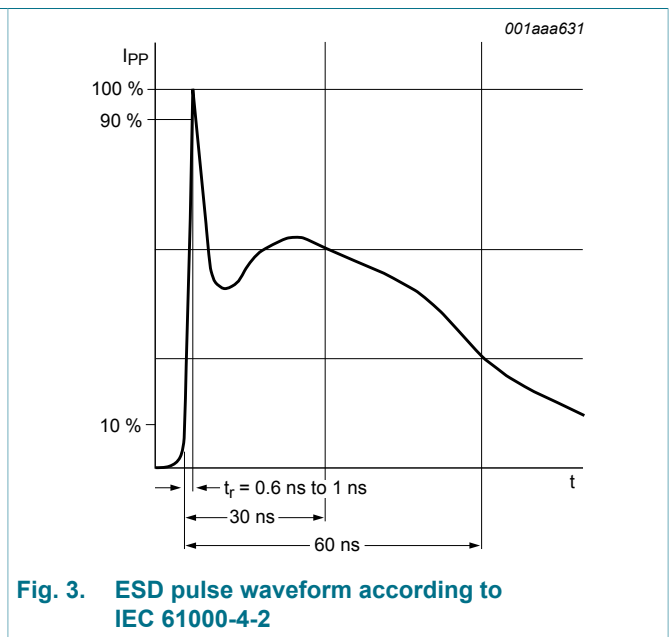


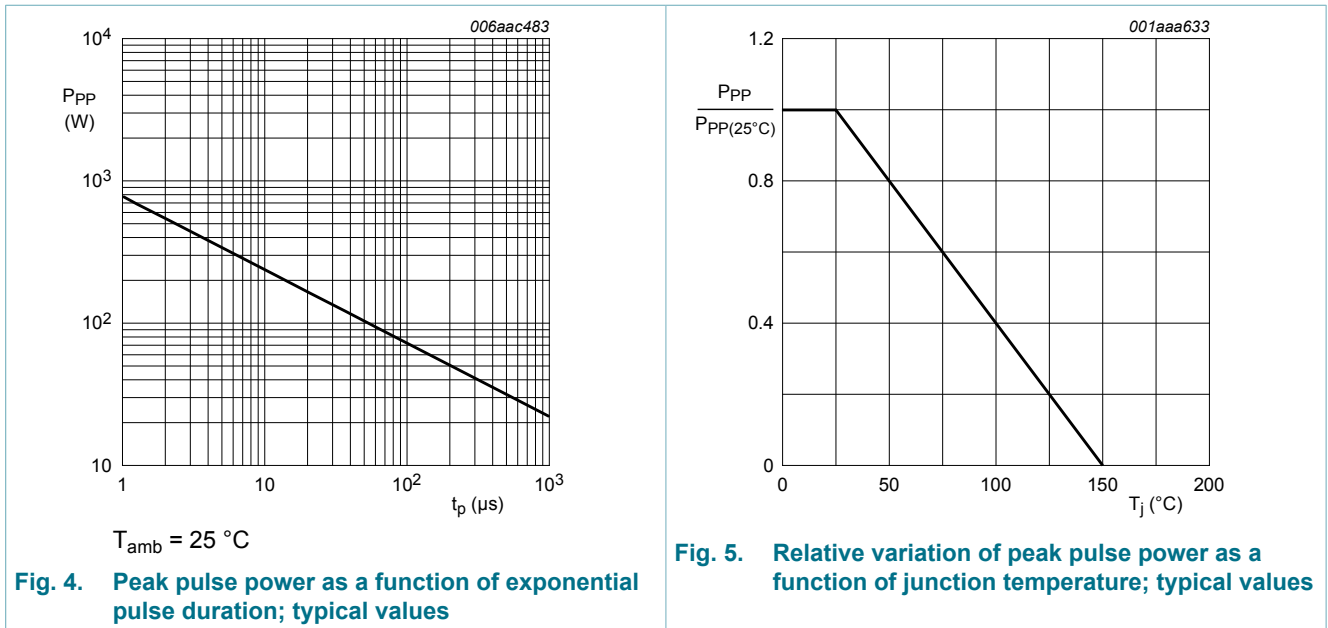
Fig. 3. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|--|---------|-----|-----|---------------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | - | 5.5 | 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 | $V_{RWM} = 5.5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] | 0.1 | 1 | μA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | - | 152 | 200 | pF |
| V_{CL} | clamping voltage | $I_{PP} = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [2] [1] | - | 9 | V |
| | | $I_{PP} = 15\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [2] [1] | - | 20 | V |
| R_{dyn} | dynamic resistance | $I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | [1] [3] | 0.3 | - | Ω |

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



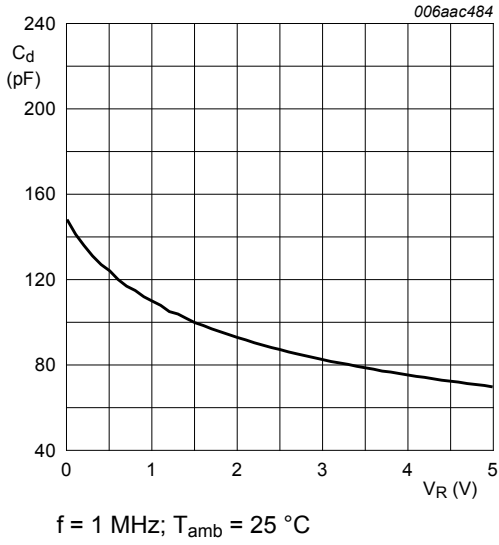


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

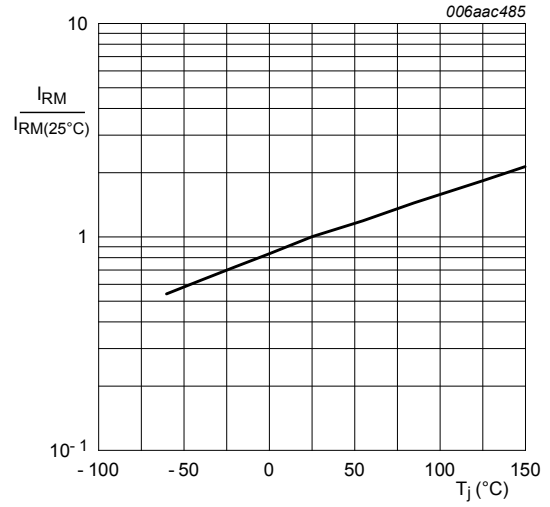


Fig. 7. Relative variation of reverse leakage current as a function of junction temperature; typical values

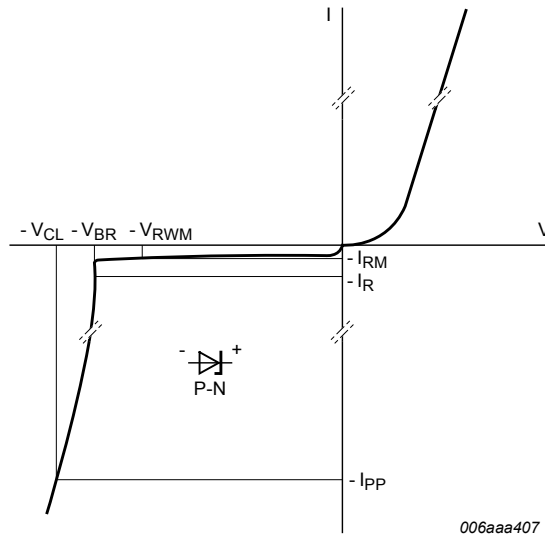


Fig. 8. V-I characteristics for unidirectional ESD protection diode

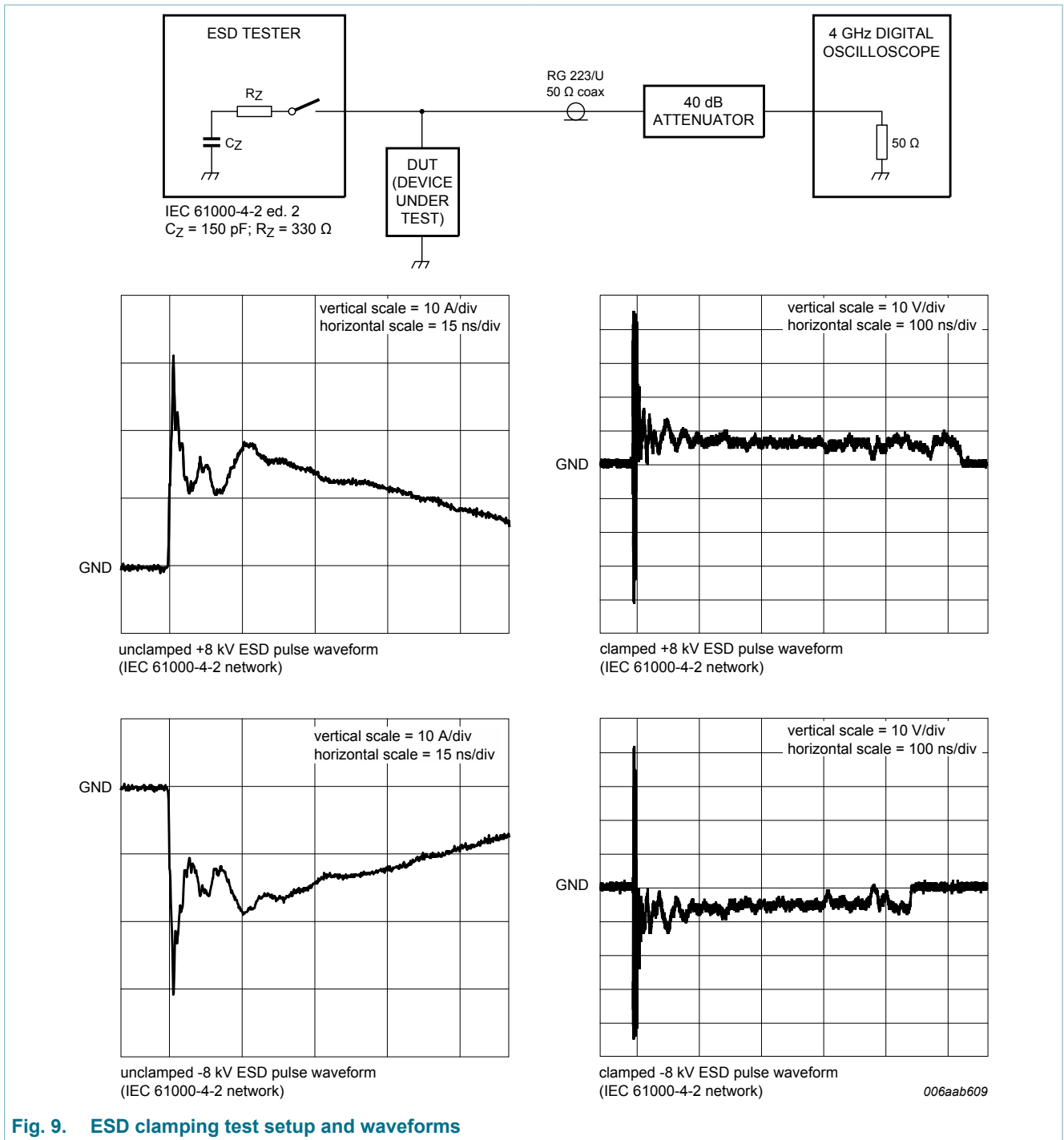


Fig. 9. ESD clamping test setup and waveforms

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.

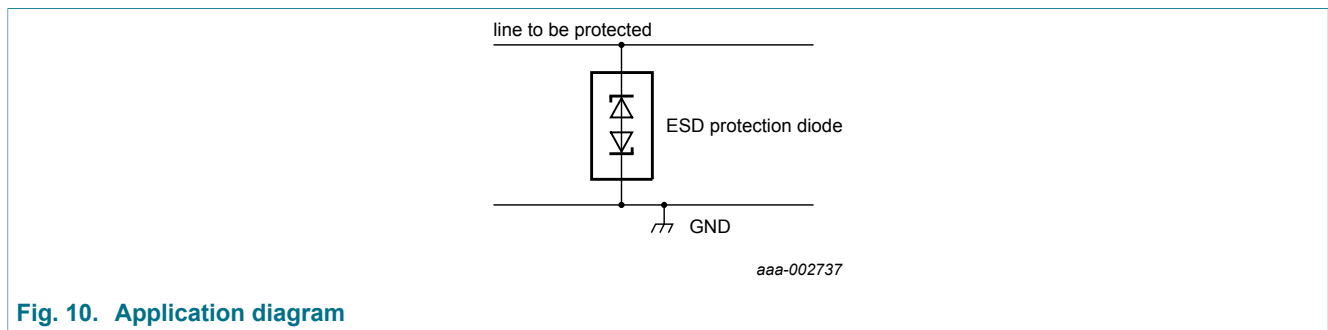


Fig. 10. Application diagram

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

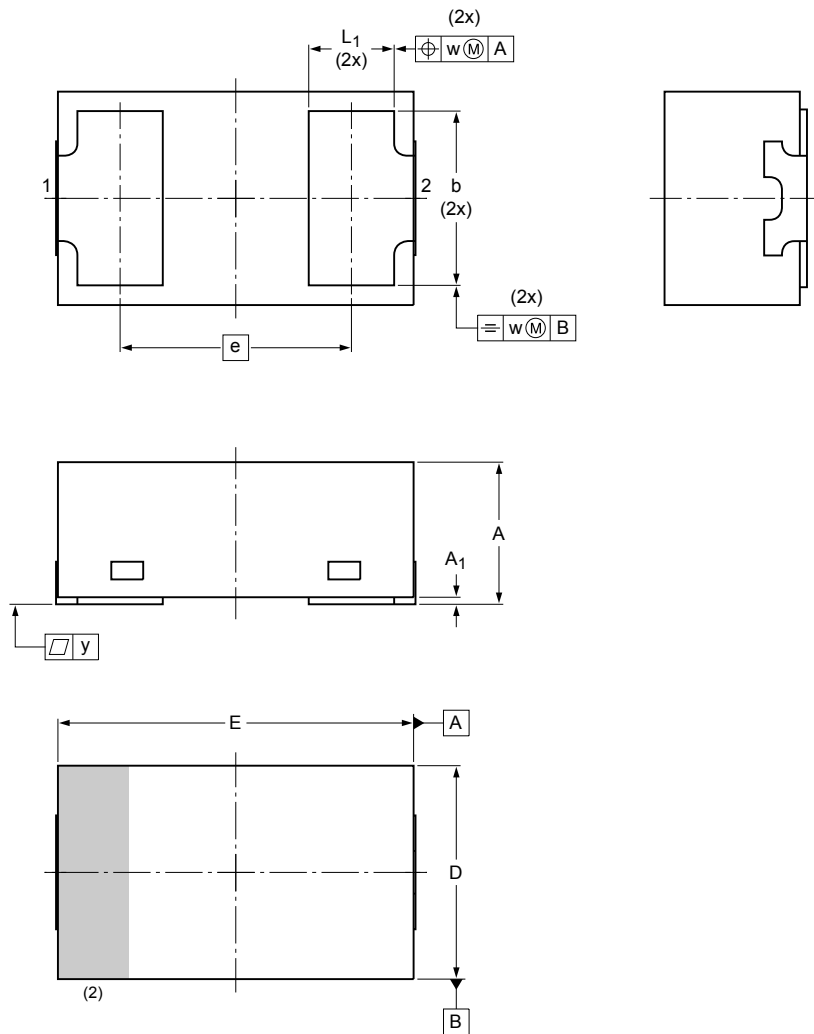
Quality information

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

DFN1006D-2: Leadless ultra small plastic package; 2 terminals; body 1 x 0.6 x 0.4 mm

SOD882D



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | L ₁ | w | y |
|--------|------------------|----------------|------|------|------|------|----------------|-----|------|
| max | 0.4 | 0.04 | 0.55 | 0.65 | 1.05 | | 0.30 | 0.1 | 0.03 |
| mm nom | | | 0.50 | 0.60 | 1.00 | 0.65 | 0.25 | | |
| min | | | 0.45 | 0.55 | 0.95 | 0.22 | | | |

Note

1. Dimension including plating thickness.
2. The marking bar indicates the cathode (if applicable).

sod882d_po

| Outline version | References | | | European projection | Issue date |
|-----------------|------------|-------|-------|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | |
| SOD882D | | | | | -10-09-27- 12-05-01 |

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

13. Soldering

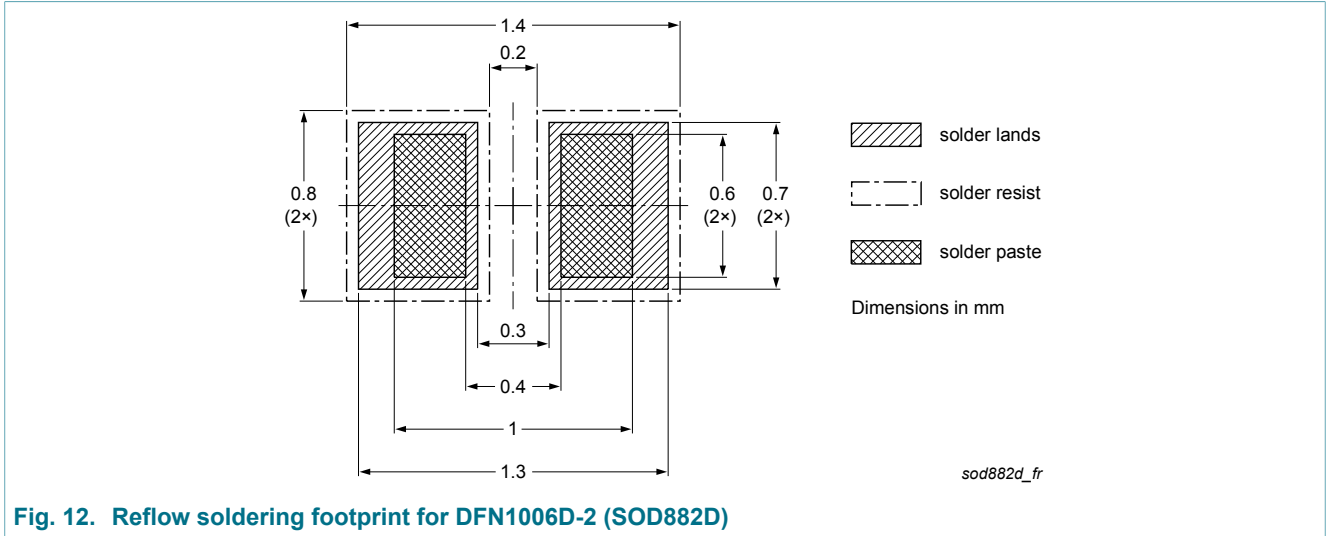


Fig. 12. Reflow soldering footprint for DFN1006D-2 (SOD882D)

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|---|--------------------|---------------|------------------|
| PESD5V0S1ULD v.2 | 20170308 | Product data sheet | - | PESD5V0S1ULD v.1 |
| Modifications: | <ul style="list-style-type: none">• Revise V_{RWM} to 5.5 V• Figure 9 updated | | | |
| PESD5V0S1ULD v.1 | 20101019 | 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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