



PESD5V0X1ULD-Q

Ultra low capacitance unidirectional ESD protection diode

23 August 2022

Product data sheet

1. General description

Ultra 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.

The combination of extremely low capacitance and ultra low clamping voltage makes the device ideal for high-speed data line protection applications.

2. Features and benefits

- ESD protection of one line
- Ultra low diode capacitance $C_d = 0.95$ pF
- Ultra low clamping voltage: $V_{CL} = 8$ V
- Ultra low leakage current: $I_{RM} = 1$ nA
- ESD protection up to 8 kV
- IEC 61000-4-2; level 4 (ESD)
- Ultra small SMD plastic package
- Solderable tin-plated side pads
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- 10/100/1000 Mbit/s Ethernet
- Communication systems
- Portable electronics
- SIM card protection
- USB, High-Definition Multimedia Interface (HDMI), FireWire
- High-speed data lines

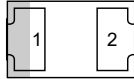
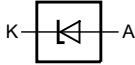
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25$ °C	-	-	5.5	V
C_d	diode capacitance	$f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C	-	0.95	1.1	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 pin 1.

6. Ordering information

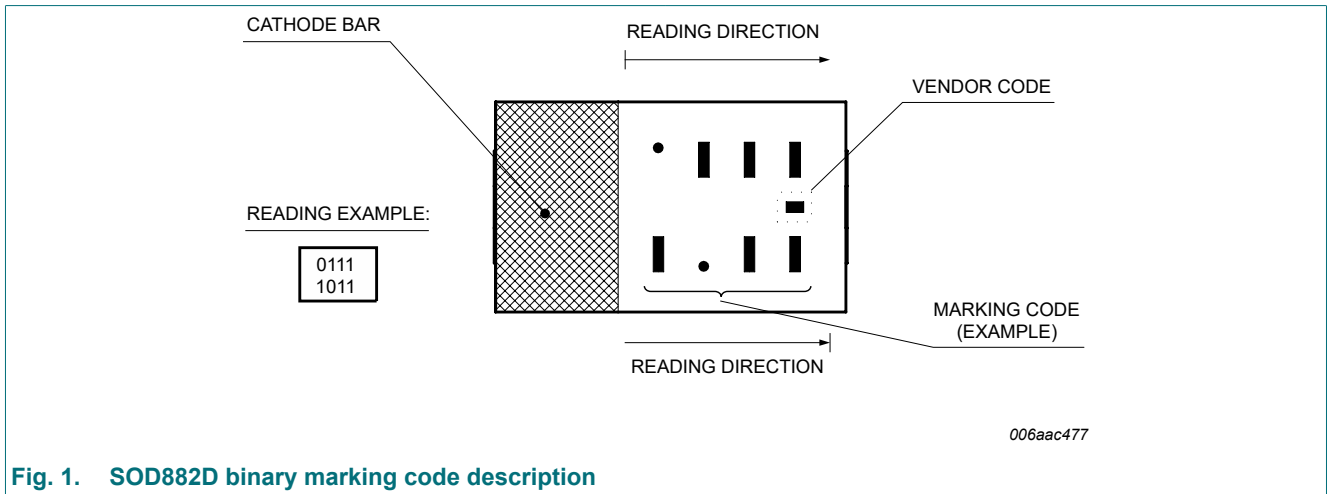
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0X1ULD-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
PESD5V0X1ULD-Q	1111 0000



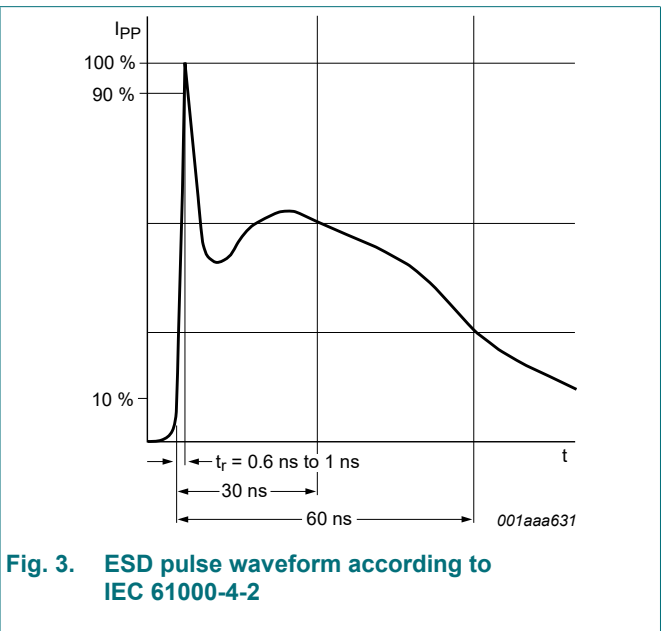
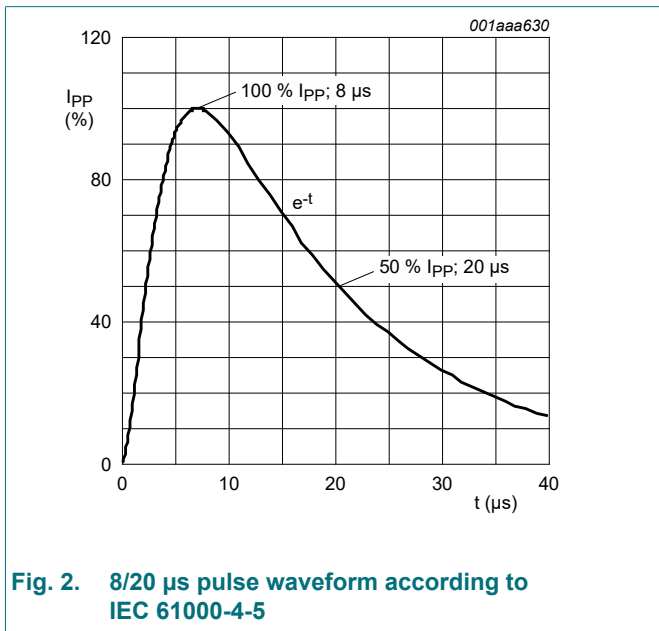
8. Limiting values

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] [2]	-	1.5	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]	-	8	kV
		IEC 61000-4-2 (air discharge) machine model; $T_{amb} = 25 \text{ °C}$		-	15	kV
				-	400	V
		MIL-STD-883 (human body model); $T_{amb} = 25 \text{ °C}$	[2]	-	10	kV

- [1] Non-repetitive current pulse 8/20 μs exponentially decay waveform according to IEC 61000-4-5.
- [2] Measured from pin 1 to 2.
- [3] Device stressed with ten non-repetitive ESD pulses.



9. Characteristics

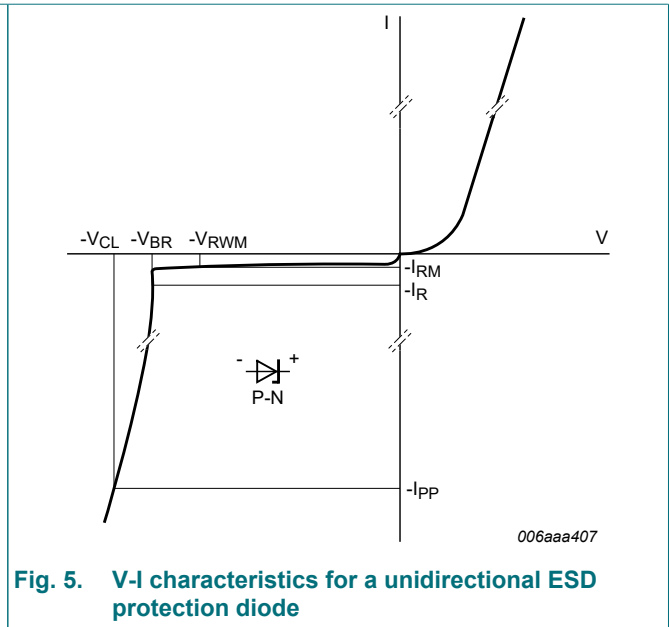
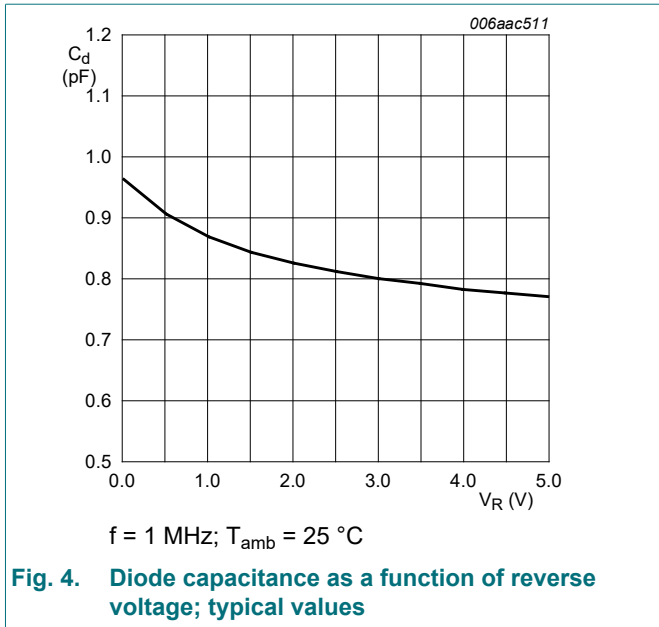
Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	5.5	V
V_{BR}	breakdown voltage	$I_R = 10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	5.8	7.5	10	V
I_{RM}	reverse leakage current	$V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1	100	nA
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	0.95	1.1	pF
V_{CL}	clamping voltage	$I_{PPM} = 1.5\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1] [2]	8	-	V
R_{dyn}	dynamic resistance	$I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[3]	0.25	-	Ω

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

[2] Measured from pin 1 to 2.

[3] Non-repetitive current pulse, Transmission Line Pulse (TLP) $t_p = 100\text{ ns}$; square pulse; ANSI / ESD STM5.5.1-2008.



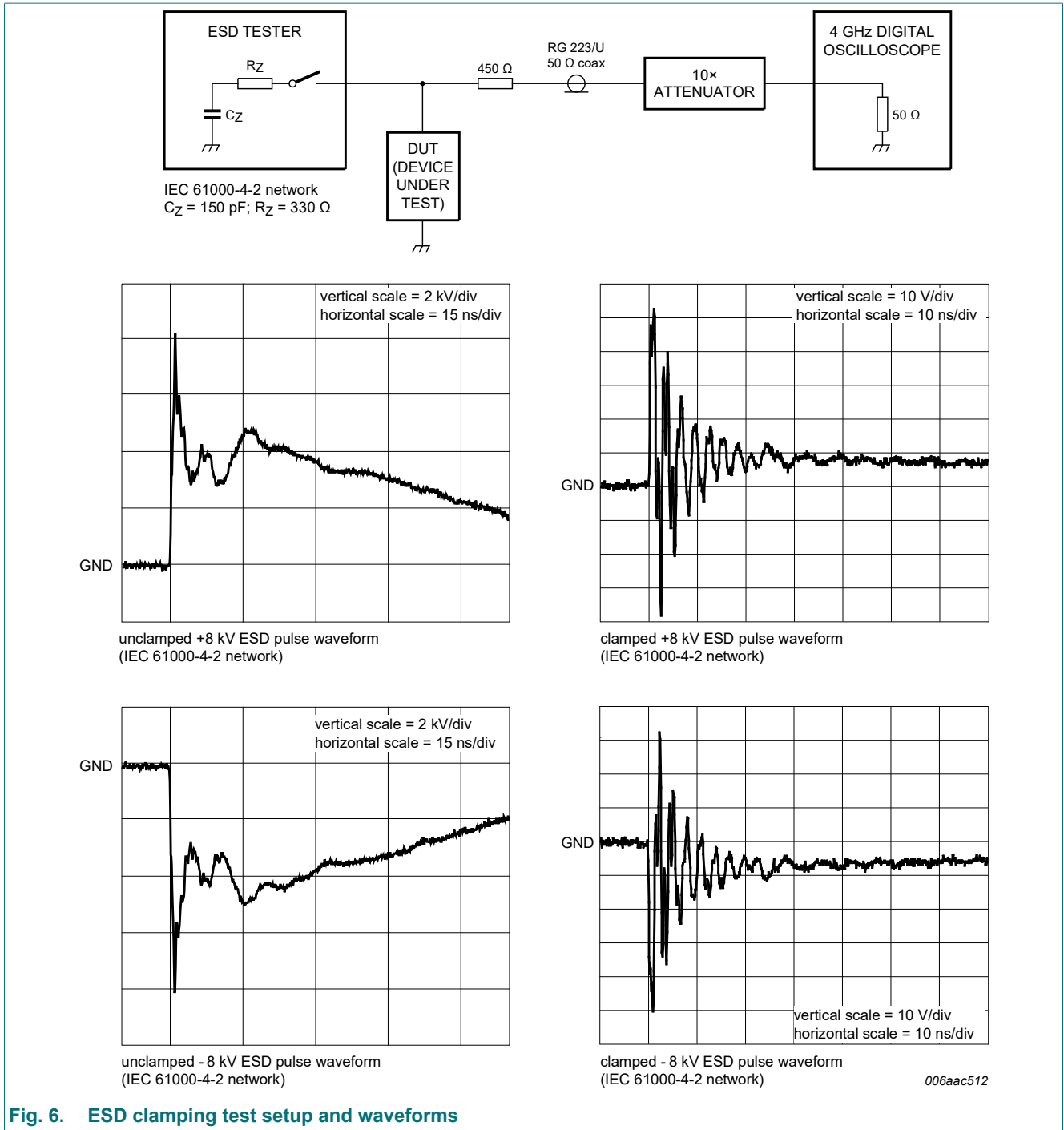


Fig. 6. ESD clamping test setup and waveforms

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.

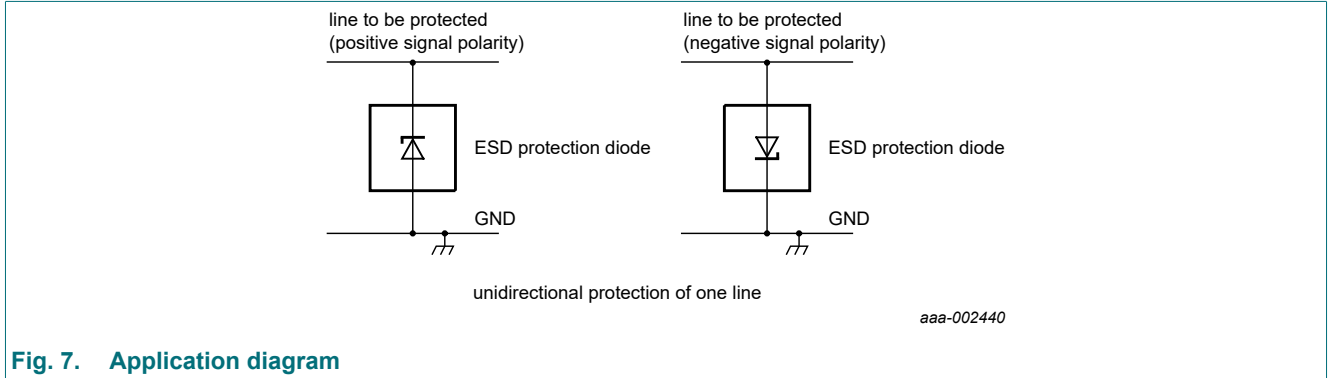


Fig. 7. Application diagram

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

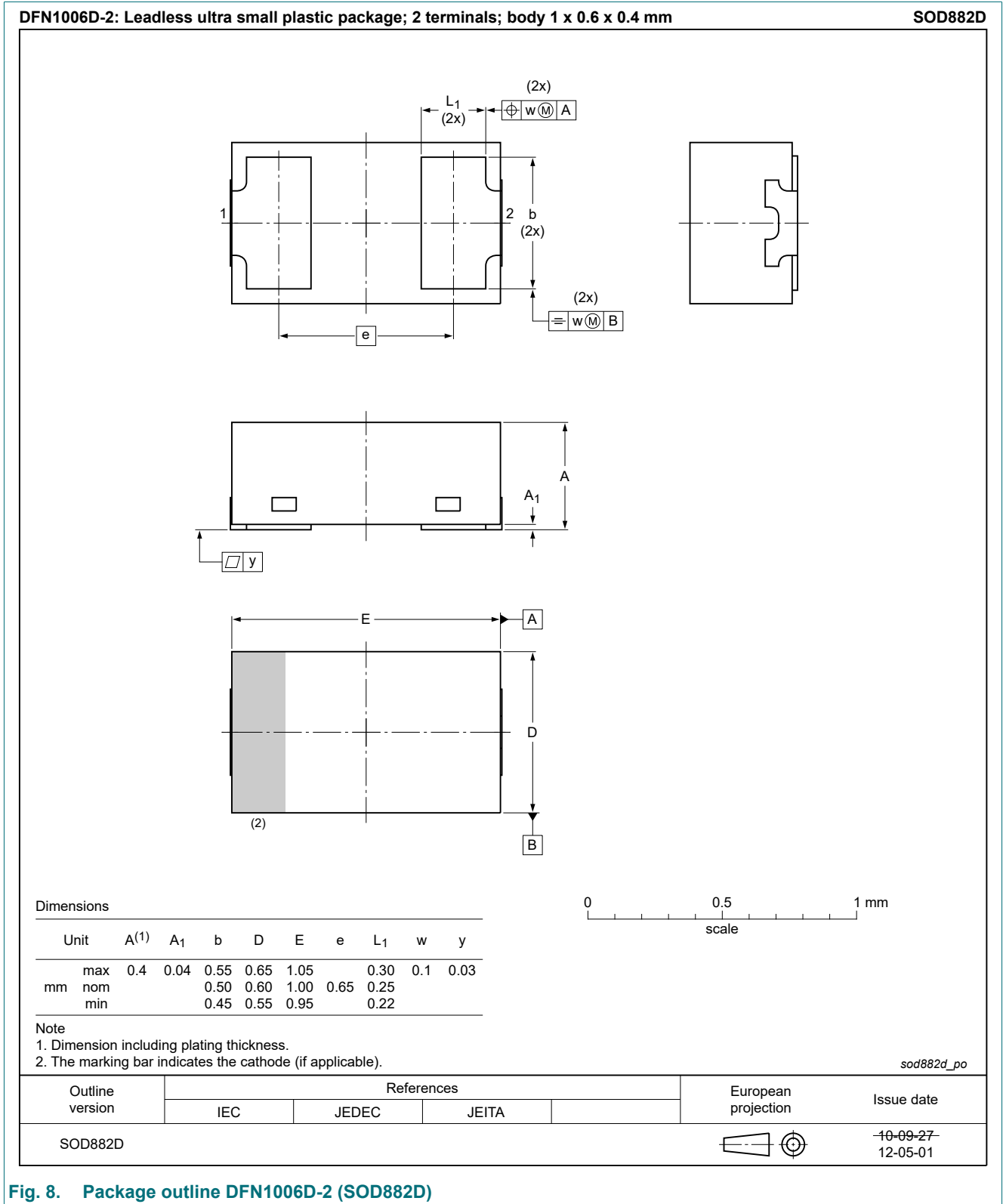


Fig. 8. Package outline DFN1006D-2 (SOD882D)

13. Soldering

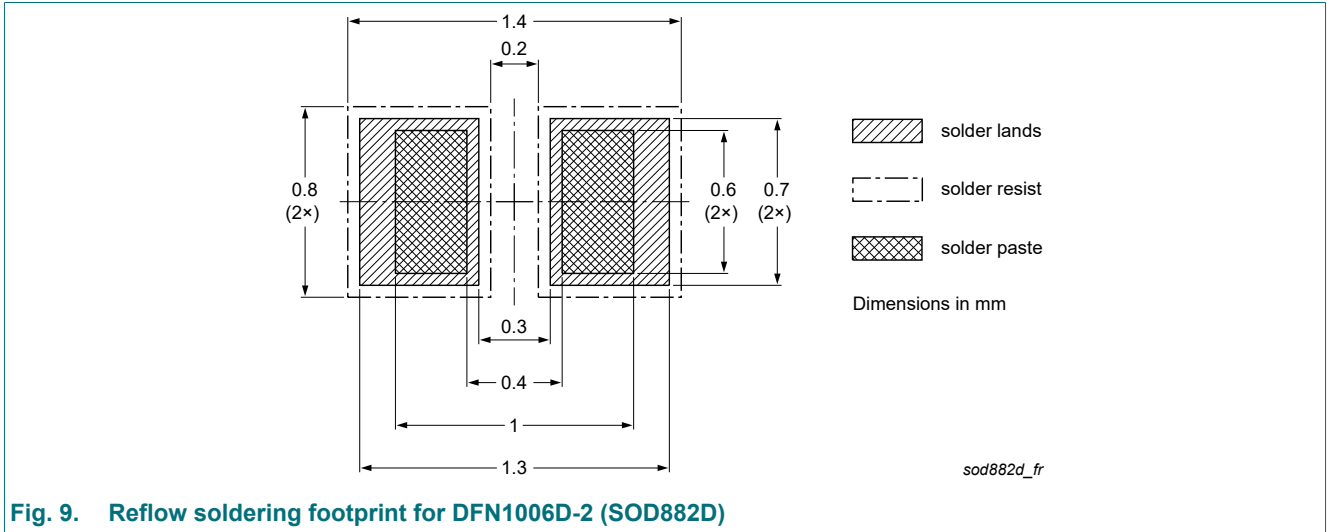


Fig. 9. Reflow soldering footprint for DFN1006D-2 (SOD882D)

14. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0X1ULD-Q v.1	20220823	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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