



PESD33VL1BLS-Q

Extremely low clamping bidirectional ESD protection diode

5 July 2024

Product data sheet

1. General description

ESD protection device in a leadless ultra small DFN1006BD-2 (SOD882BD) Surface-Mounted Device (SMD) plastic package with side-wettable flanks, designed to protect one single line from the damage caused by ElectroStatic Discharge (ESD) and other transients.

2. Features and benefits

- Reverse stand-off voltage: $V_{RWM} = 33\text{ V}$
- Low clamping voltage: typical $V_{CL} = 36\text{ V}$ at $I_{pp} = 1\text{ A}$
- ESD protection up to 27 kV (IEC 61000-4-2)
- ESD protection up to 27 kV (ISO 10605; $C = 330\text{ pF}$, $R = 330\text{ }\Omega$)
- Low capacitance: $C_d = 11.5\text{ pF}$
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Automotive low speed data lines
- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Portable electronics

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	33	V
I_{PPM}	rated peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$	[1]	-	-	3.2	A
V_{CL}	clamping voltage	$I_{PP} = 16\text{ A}$; $t_p = 100\text{ ns}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[2]	-	45	-	V

[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); square pulse; ANSI / ESD STM5.5.1-2008

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 Transparent top view DFN1006BD-2 (SOD882BD)	 006aab041
2	K2	cathode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD33VL1BLS-Q	DFN1006BD-2	Leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.47 mm body	SOD882BD

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD33VL1BLS-Q	QF

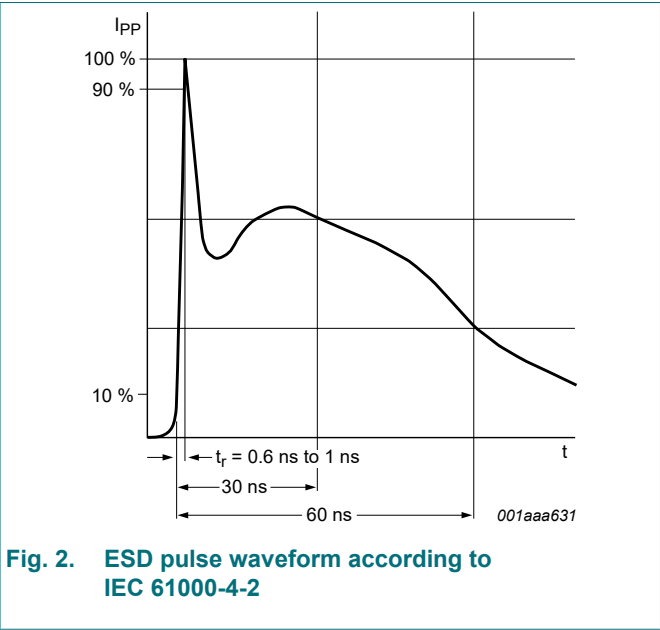
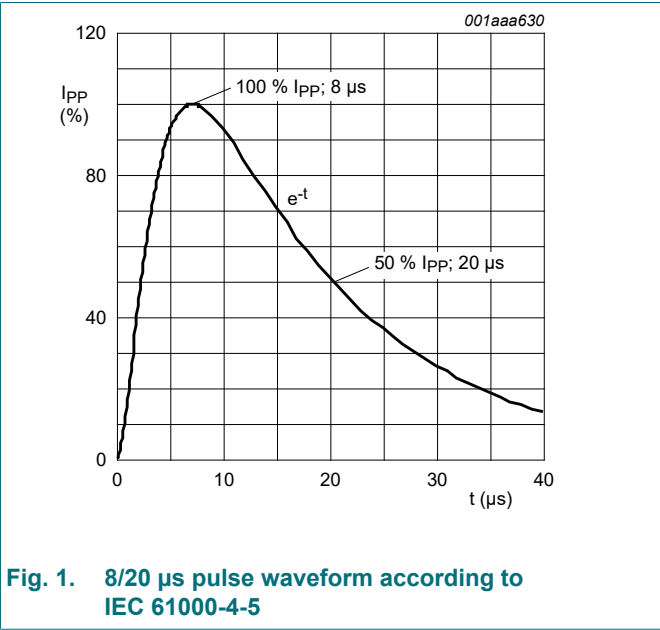
8. Limiting values

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]	-	3.2	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]	-	27	kV
		ISO 10605; contact discharge; C = 330 pF, R = 330 Ω	[2]	-	27	kV
		ISO 10605; contact discharge; C = 150 pF, R = 330 Ω	[2]	-	27	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.

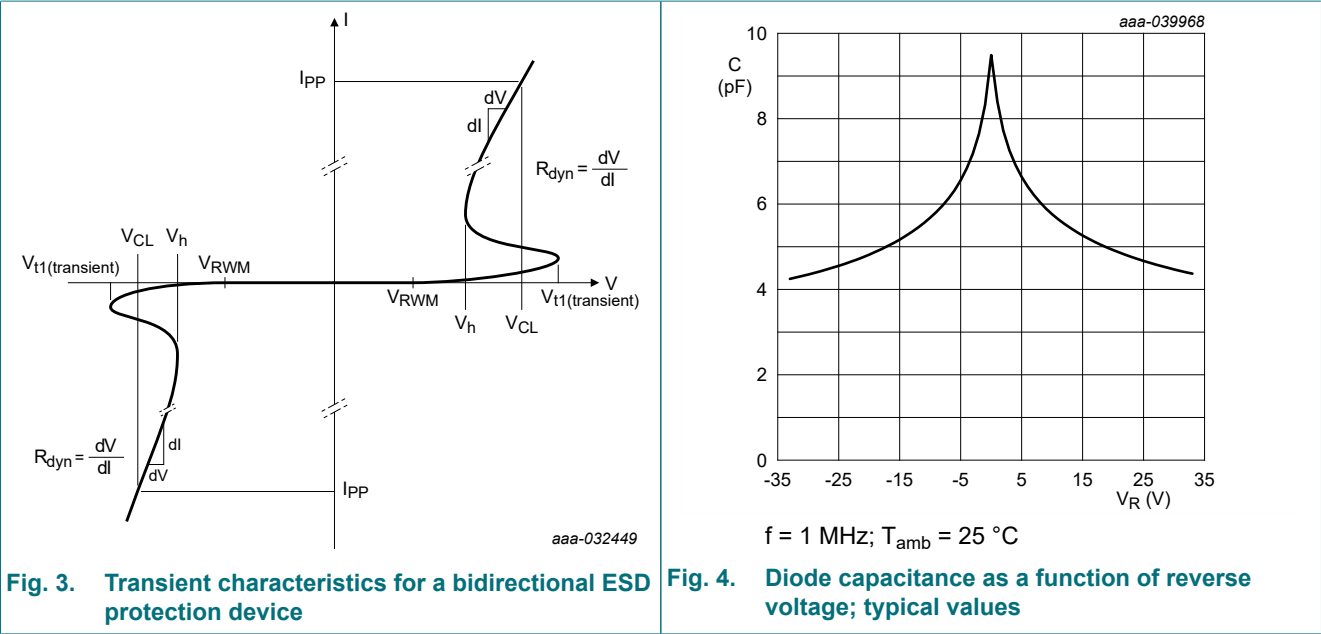


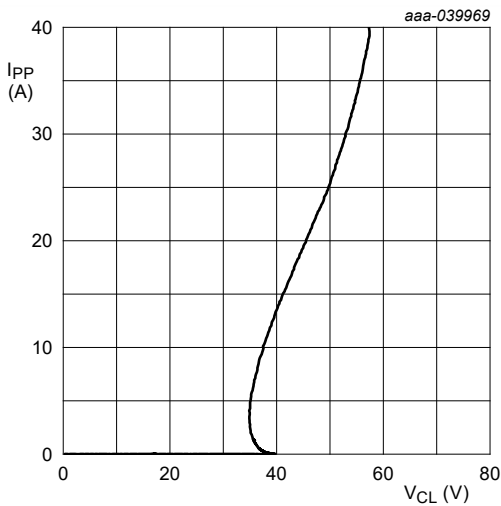
9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{RWM}	reverse standoff voltage	T _{amb} = 25 °C		-	-	33	V
V _{BR}	breakdown voltage	I _R = 10 mA; T _{amb} = 25 °C		34	-	44	V
I _{RM}	reverse leakage current	V _{RWM} = 33 V; T _{amb} = 25 °C		-	1	50	nA
C _d	diode capacitance	f = 1 MHz; V _R = 0 V; T _{amb} = 25 °C		-	9.5	11.5	pF
V _{CL}	clamping voltage	I _{PP} = 1 A; t _p = 8/20 μs; T _{amb} = 25 °C	[1]	-	36	-	V
		I _{PP} = 16 A; t _p = 100 ns; T _{amb} = 25 °C	[2]	-	45	-	V
R _{dyn}	dynamic resistance	I _R = 10 A; t _p = 100 ns; T _{amb} = 25 °C	[2]	-	0.7	-	Ω

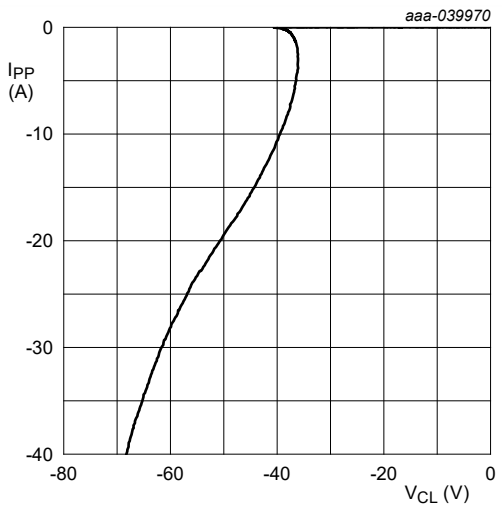
- [1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5.
- [2] Non-repetitive current pulse, Transmission Line Pulse (TLP); square pulse; ANSI / ESD STM5.5.1-2008





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

Fig. 5. Positive clamping voltage (TLP); typical values



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

Fig. 6. Negative clamping voltage (TLP); 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.

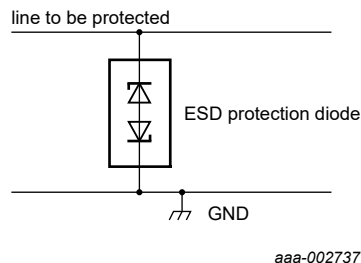


Fig. 7. Application diagram

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:

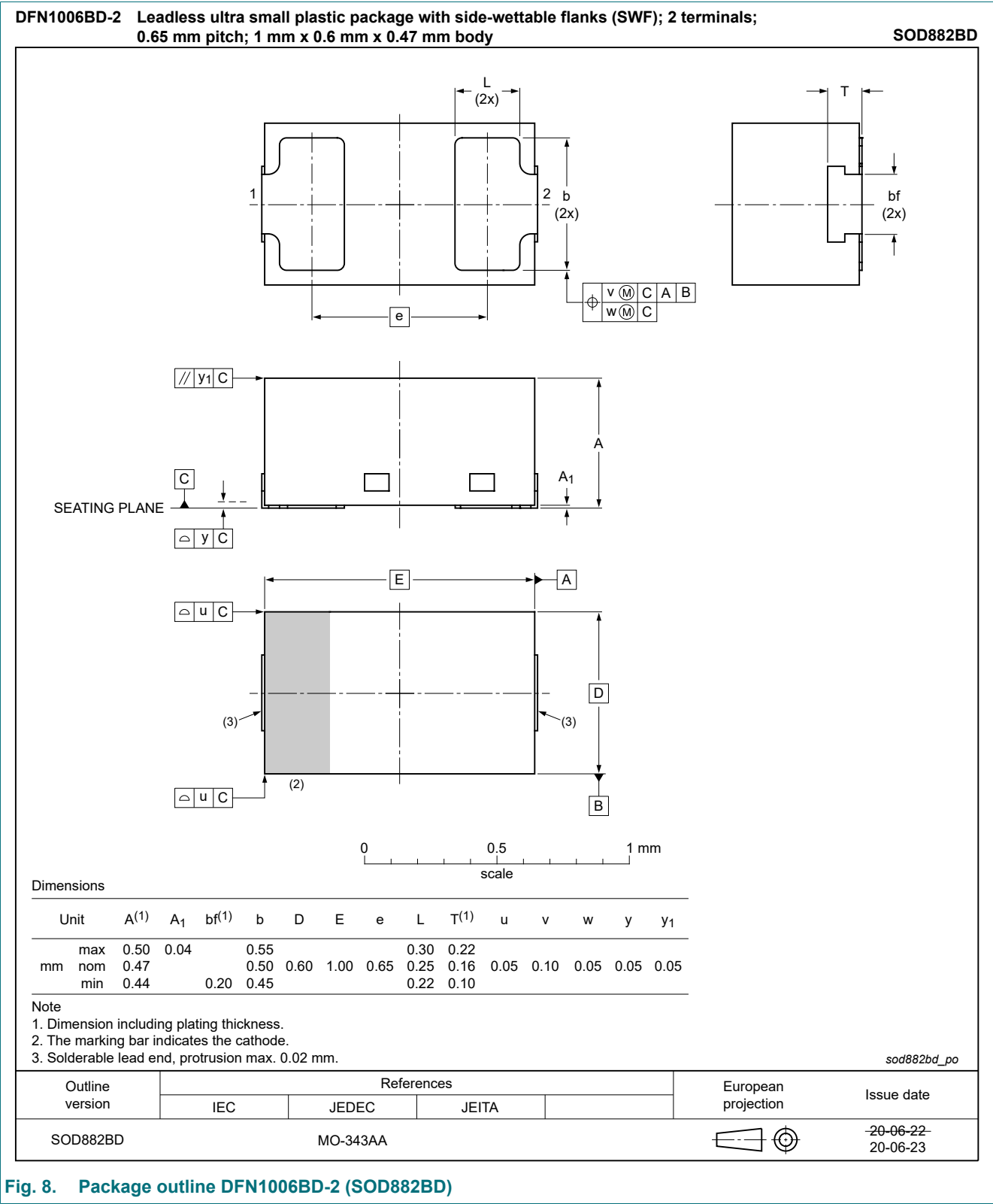
1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit 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



13. Soldering

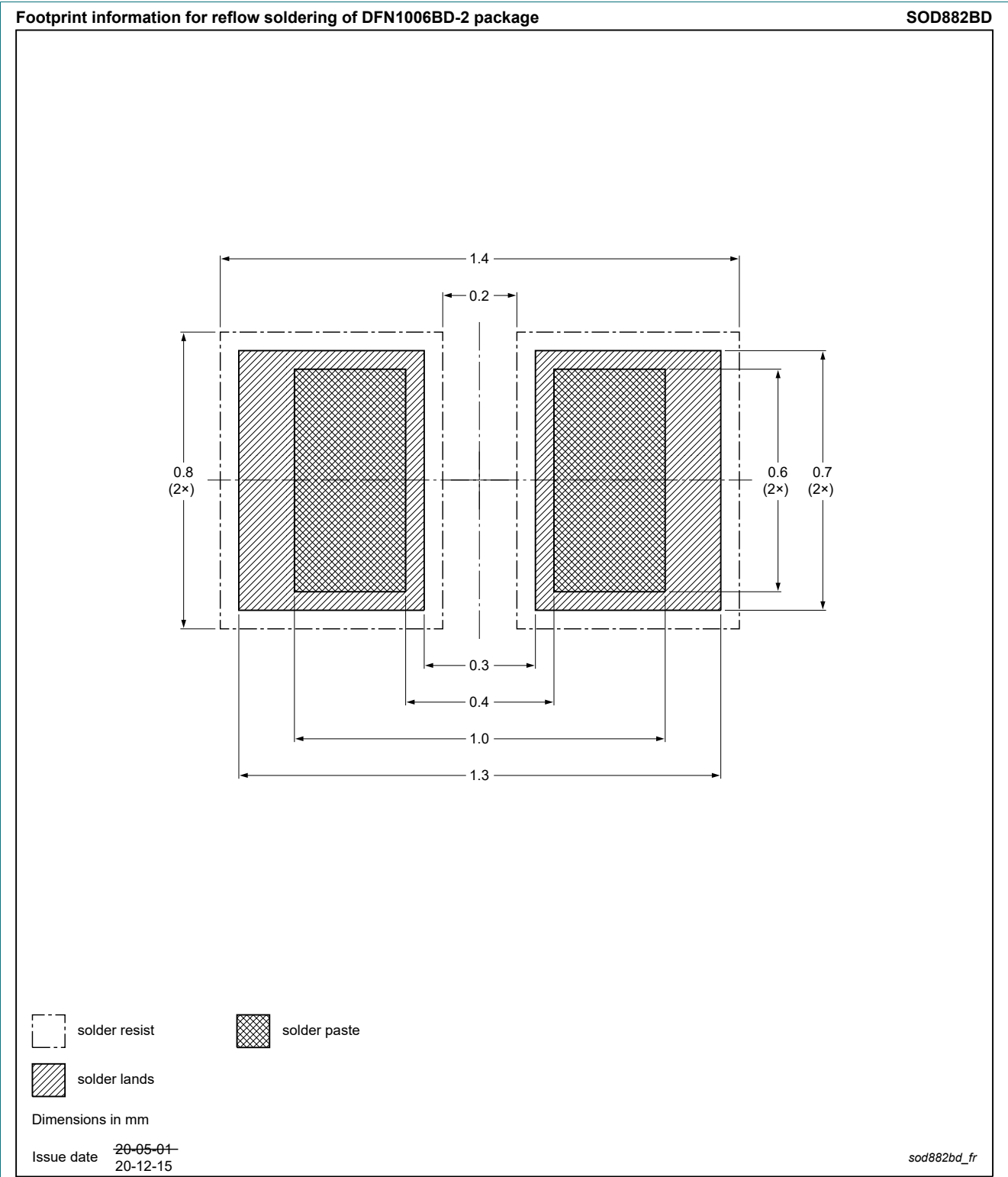


Fig. 9. Reflow soldering footprint for DFN1006BD-2 (SOD882BD)

14. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD33VL1BLS-Q v.1	20240705	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".
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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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