PESD5V0X2UAM-Q

Ultra low capacitance unidirectional double ESD protection diode

4 October 2022 **Product data sheet**

1. General description

Ultra low capacitance unidirectional double ElectroStatic Discharge (ESD) protection diode in a DFN1006-3 (SOT883) leadless ultra small Surface-Mounted Device (SMD) plastic package, designed to protect up to two signal lines from the damage caused by ESD and other transients.

2. Features and benefits

- Ultra low diode capacitance: C_d = 0.80 pF
- ESD protection up to 15 kV; IEC61000-4-2
- I_{PPM} = 2.5 A; IEC 61000-4-5 (surge)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed data lines
- Portable electronics
- Communication systems
- Computers and peripherals

4. Quick reference data

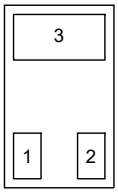
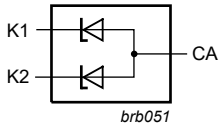
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	5	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C	[1]	-	0.8	0.95	pF

[1] Measured from pin 1 or 2 to 3.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 Transparent top view **DFN1006-3 (SOT883)**	
2	K2	cathode (diode 2)		
3	A	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0X2UAM-Q	DFN1006-3	plastic, leadless ultra small package; 3 terminals; 0.35 mm pitch; 1 mm x 0.6 mm x 0.48 mm body	SOT883

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD5V0X2UAM-Q	ZJ

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 µs	[1] [2]	-	2.5	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-55	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[3] [2]	-	15	kV
		IEC 61000-4-2; air discharge	[3] [2]	-	15	kV
		machine model	[2]	-	400	V
		MIL-STD-883; human body model (HBM)		-	10	kV

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

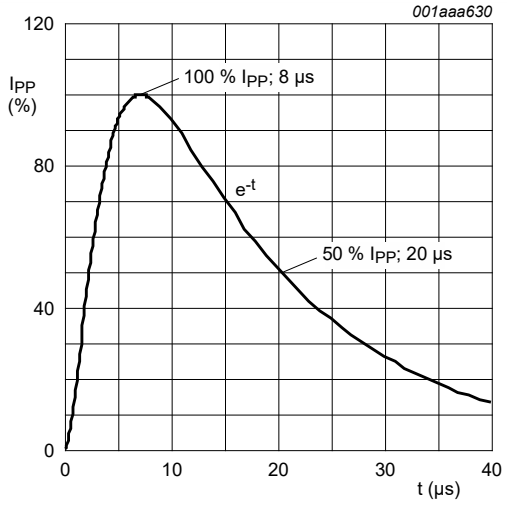


Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

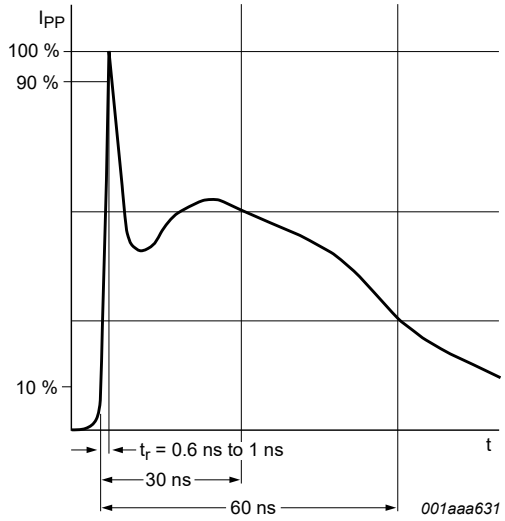


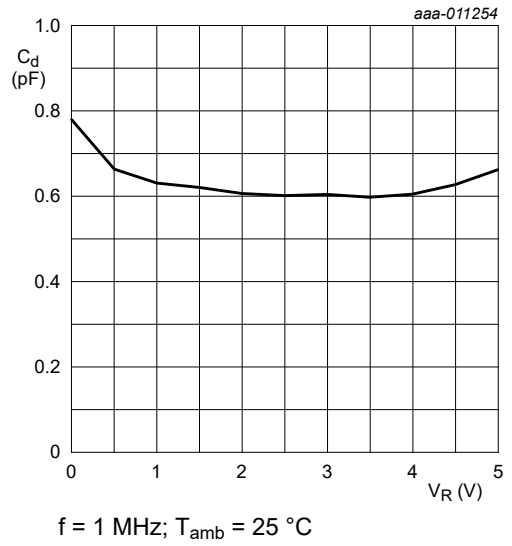
Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	5	V
V_{BR}	breakdown voltage	I_R = 10 mA; T_{amb} = 25 °C	[1]	7.5	8.8	10	V
I_{RM}	reverse leakage current	V_R = 5 V; T_{amb} = 25 °C	[1]	-	1	10	nA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C	[1]	-	0.8	0.95	pF
V_{CL}	clamping voltage	I_{PP} = 1 A; t_p = 8/20 µs; T_{amb} = 25 °C	[2] [1]	-	-	13	V
		I_{PPM} = 2.5 A; t_p = 8/20 µs; T_{amb} = 25 °C	[2] [1]	-	-	14	V
R_{dyn}	dynamic resistance	I_R = 10 A; t_p = 100 ns; T_{amb} = 25 °C	[3] [1]	-	0.65	-	Ω

[1] Measured from pin 1 or 2 to 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); square pulse; ANSI / ESD STM5.5.1-2008.



f = 1 MHz; T_{amb} = 25 °C

Fig. 3. Diode capacitance as a function of reverse voltage; typical values

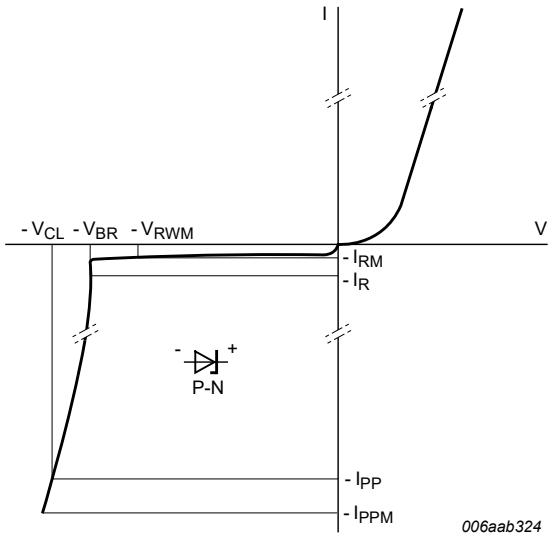
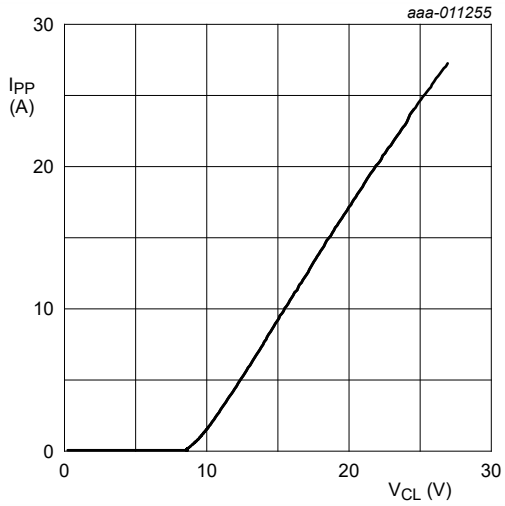


Fig. 4. V-I characteristics for a unidirectional ESD protection diode



Transmission Line Pulse (TLP);
t_p = 100 ns; t_r = 1 ns

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

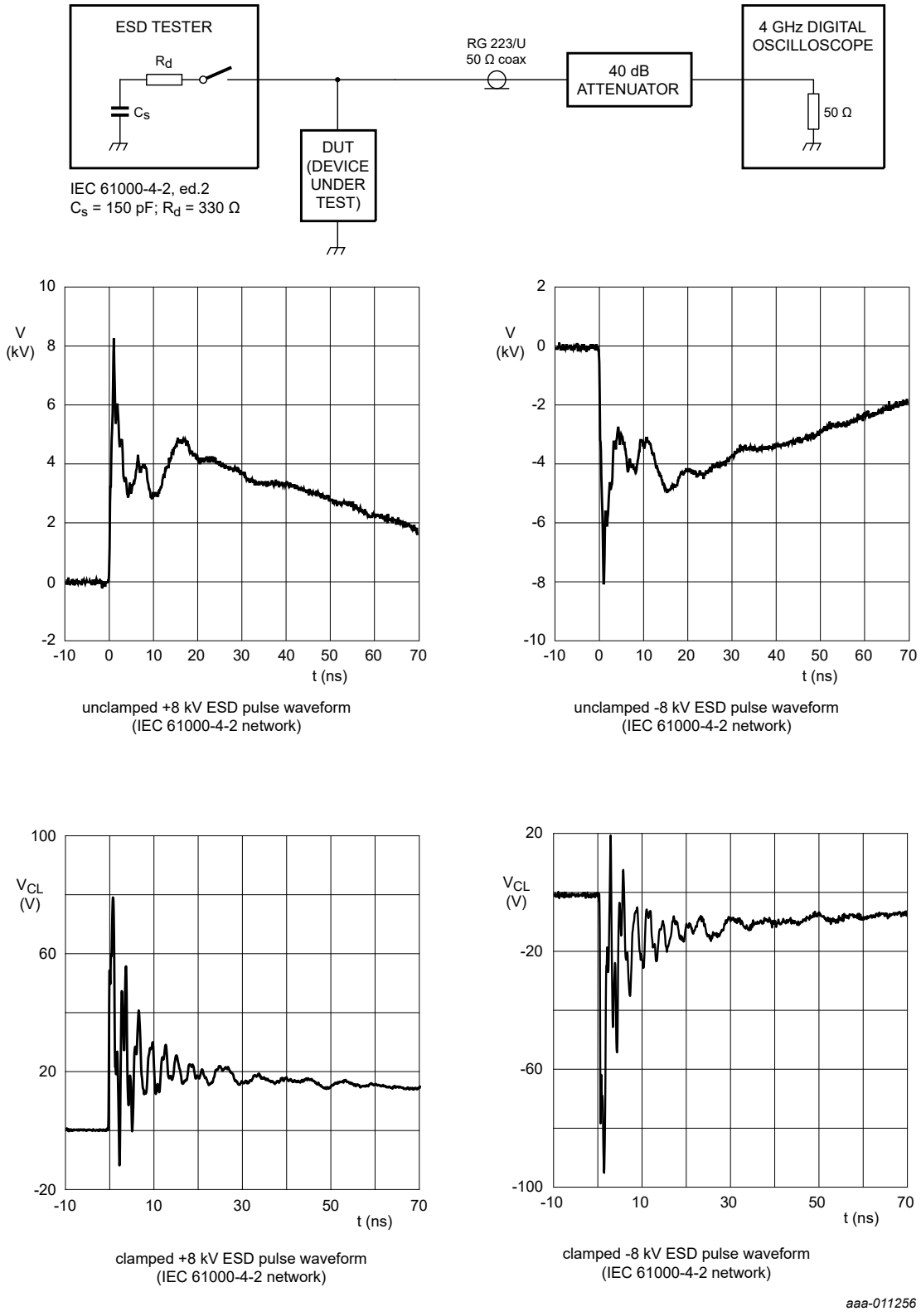


Fig. 6. ESD clamping test setup and waveforms

10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground.

The device may also be used for the protection of two unidirectional data or signal lines, which have positive signal polarities with respect to ground.

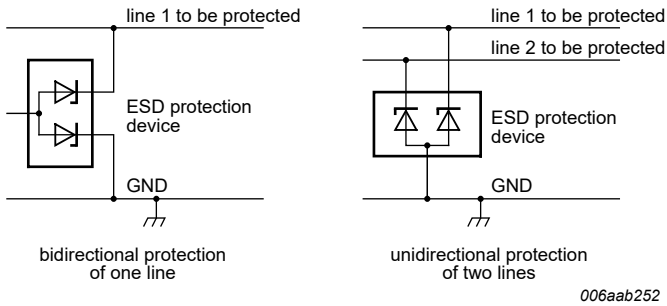


Fig. 7. Application diagram

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. The path length between the device and the protected line should be minimized.
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. Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

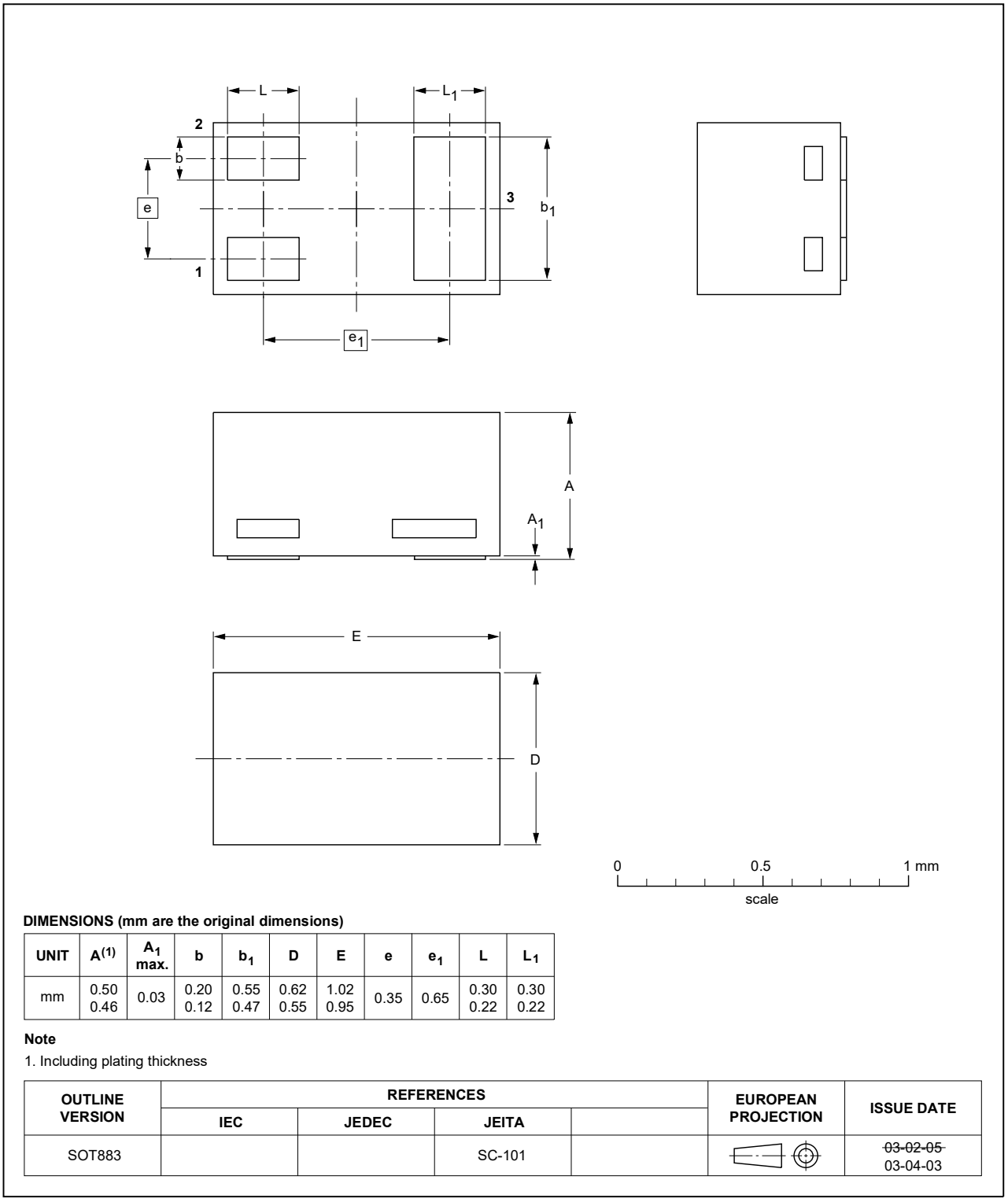
11. Test information

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

Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm **SOT883**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1)	A_1 max.	b	b_1	D	E	e	e_1	L	L_1
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

Note

1. Including plating thickness

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT883			SC-101			~~03-02-05~~ 03-04-03

Fig. 8. Package outline DFN1006-3 (SOT883)

13. Soldering

Footprint information for reflow soldering of DFN1006-3 (SOT883) package **SOT883**

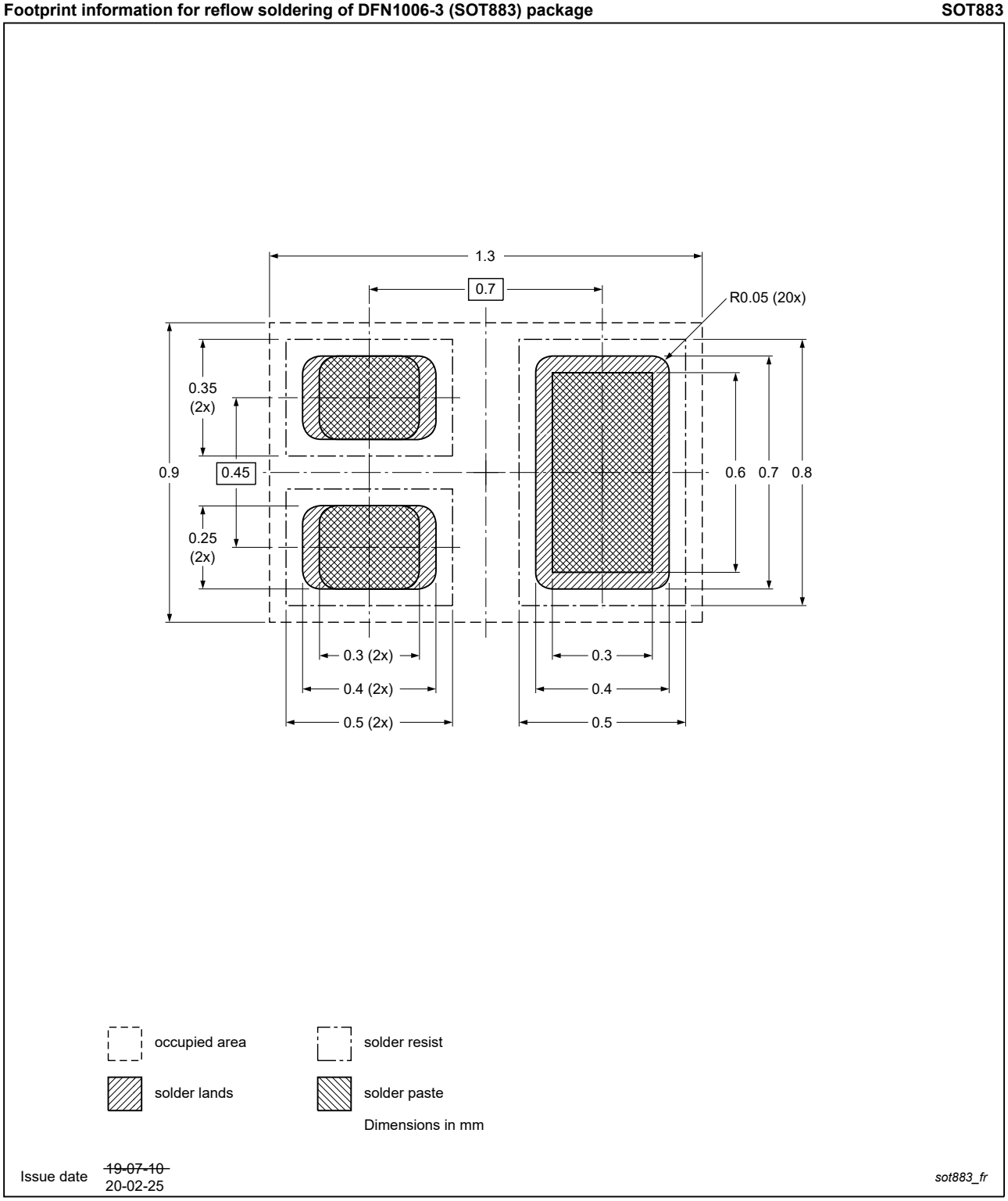


Fig. 9. Reflow soldering footprint for DFN1006-3 (SOT883)

14. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0X2UAM-Q v.1	20221004	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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