



# PTVS4V5D1BL

## Ultra compact Transient Voltage Supressor

4 November 2025

Product data sheet

### 1. General description

Transient voltage suppressor in a DFN1006-2 (SOD882) ultra small and leadless Surface-Mounted Device (SMD) package designed to protect one line against high surge currents and other transients.

### 2. Features and benefits

- Bidirectional ESD protection of one line
- Very high surge robustness;  $I_{PP} = 38.3$  A for 8/20  $\mu$ s pulse (average measured)
- Very low clamping voltage:  $V_{CL} = 10.3$  V typ. for 34 A, 8/20  $\mu$ s pulse
- ESD protection up to 30 kV
- Very low dynamical resistance  $R_{dyn} = 0.1$   $\Omega$  (TLP)

### 3. Applications

Surge protection for:

- supply and battery lines
- audio interfaces

in portable communication, consumer and computing devices.

### 4. Quick reference data

Table 1. Quick reference data

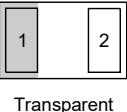
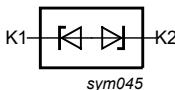
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{PPM}$	rated peak pulse current	$t_p = 8/20 \mu$ s	[1]	-	-	34	A
$V_{CL}$	clamping voltage	$I_{PPM} = 34$ A; $t_p = 8/20 \mu$ s; $T_{amb} = 25$ °C	[1]	-	10.3	13.2	V
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25$ °C		-	-	4.5	V

[1] In accordance with IEC 61000-4-5 (8/20  $\mu$ s current waveform).

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## 5. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 <b>DFN1006-2 (SOD882)</b>	
2	K2	cathode (diode 2)		

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
PTVS4V5D1BL	DFN1006-2	plastic, leadless ultra small package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.48 mm body	SOD882

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
PTVS4V5D1BL	J5

## 8. Limiting values

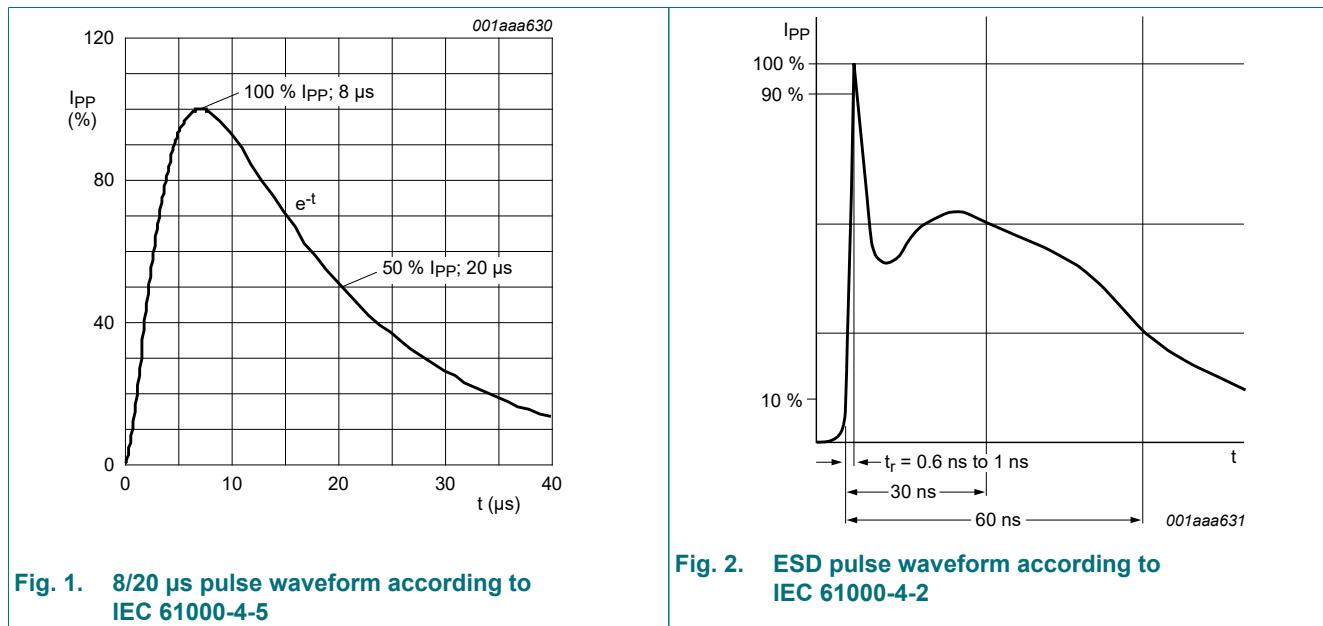
**Table 5. Limiting values**

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]	-	34	A
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-65	150	°C
<b>ESD maximum ratings</b>						
$V_{ESD}$	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[2]	-	30	kV
		IEC 61000-4-2; air discharge	[2]	-	30	kV

[1] In accordance with IEC 61000-4-5 (8/20  $\mu s$  current waveform).

[2] Device stressed with ten non-repetitive ESD pulses.



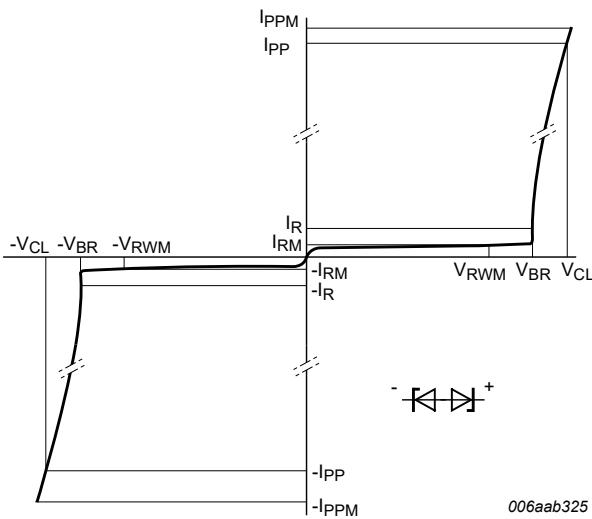
## 9. Characteristics

**Table 6. Characteristics**

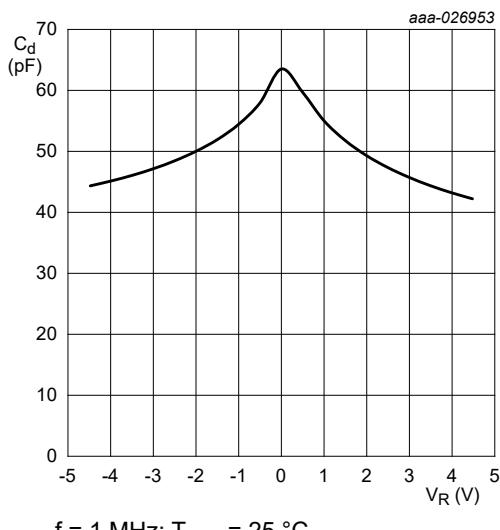
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25^\circ C$		-	-	4.5	V
$V_{BR}$	breakdown voltage	$I_R = 1 \text{ mA}; T_{amb} = 25^\circ C$		4.7	-	-	V
$I_{RM}$	reverse leakage current	$V_R = 4.5 \text{ V}; T_{amb} = 25^\circ C$		-	0.1	50	nA
$C_d$	diode capacitance	$f = 1 \text{ MHz}; V_R = 0 \text{ V}; T_{amb} = 25^\circ C$		-	65	78	pF
$V_{CL}$	clamping voltage	$I_{PP} = 1 \text{ A}; t_p = 8/20 \mu\text{s}; T_{amb} = 25^\circ C$	[1]	-	5.8	9.2	V
		$I_{PPM} = 34 \text{ A}; t_p = 8/20 \mu\text{s}; T_{amb} = 25^\circ C$	[1]	-	10.3	13.2	V
		$I_{PP} = 16 \text{ A}; t_p = \text{TLP}; T_{amb} = 25^\circ C$		-	7.5	-	V
$R_{dyn}$	dynamic resistance	$I_R = 10 \text{ A}; T_{amb} = 25^\circ C$	[2]	-	0.1	-	$\Omega$

[1] In accordance with IEC 61000-4-5 (8/20  $\mu\text{s}$  current waveform).

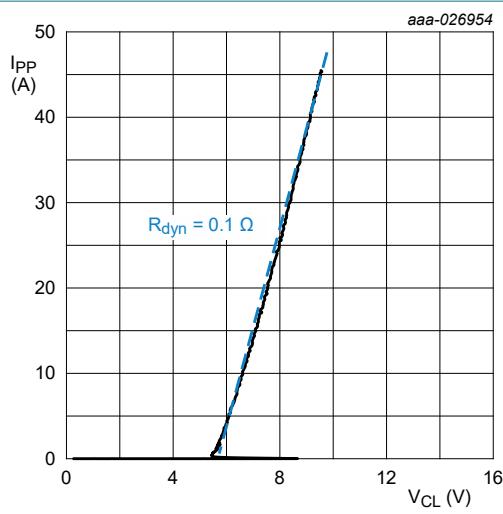
[2] Non-repetitive current pulse, Transmission Line Pulse (TLP); square pulse; ANSI/ESD STM5.5.1-2008



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

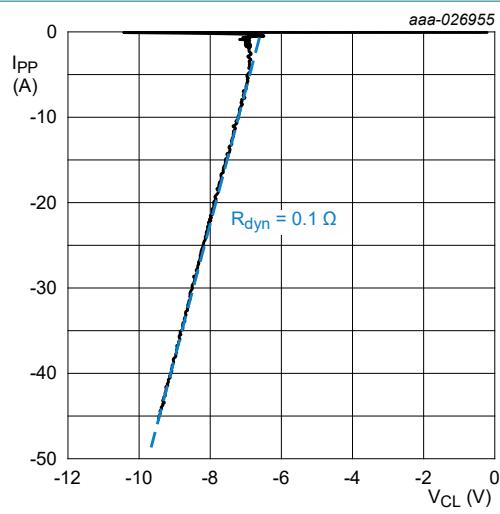


**Fig. 4. Diode capacitance as a function of reverse voltage; typical values**



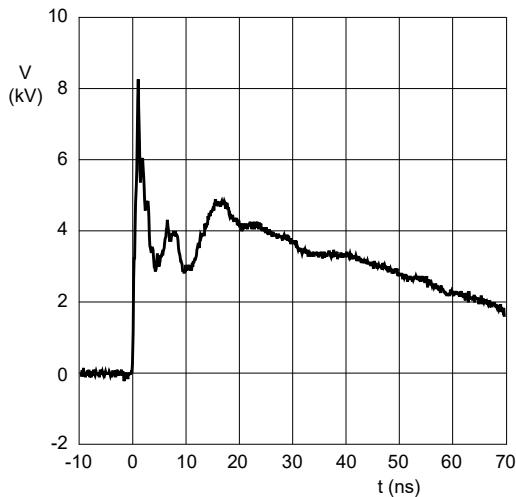
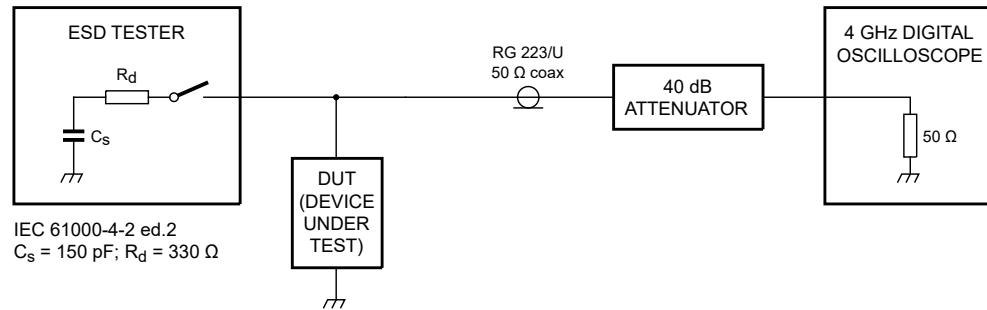
Transmission Line Pulse (TLP);  
 $tp = 100$  ns;  $tr = 1$  ns

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

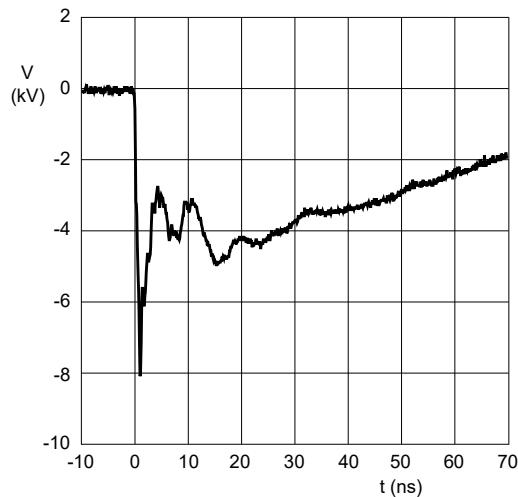


Transmission Line Pulse (TLP);  
 $tp = 100$  ns;  $tr = 1$  ns

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



unclamped +8 kV ESD pulse waveform  
(IEC 61000-4-2 network)



unclamped -8 kV ESD pulse waveform  
(IEC 61000-4-2 network)

aaa-003952

Fig. 7. ESD clamping test setup and waveforms

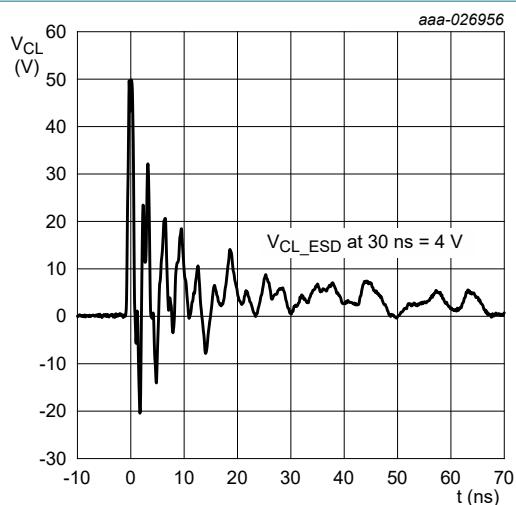


Fig. 8. Clamped +8 kV pulse waveform (IEC 61000-4-2 network)

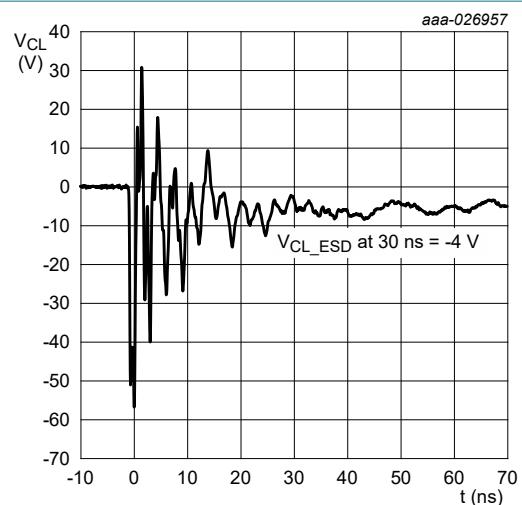


Fig. 9. Clamped -8 kV pulse waveform (IEC 61000-4-2 network)

## 10. Application information

The device is designed for the protection of one bidirectional 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.

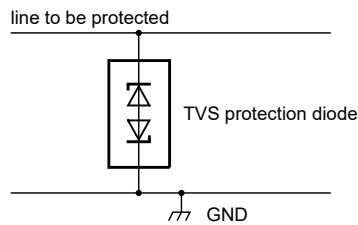


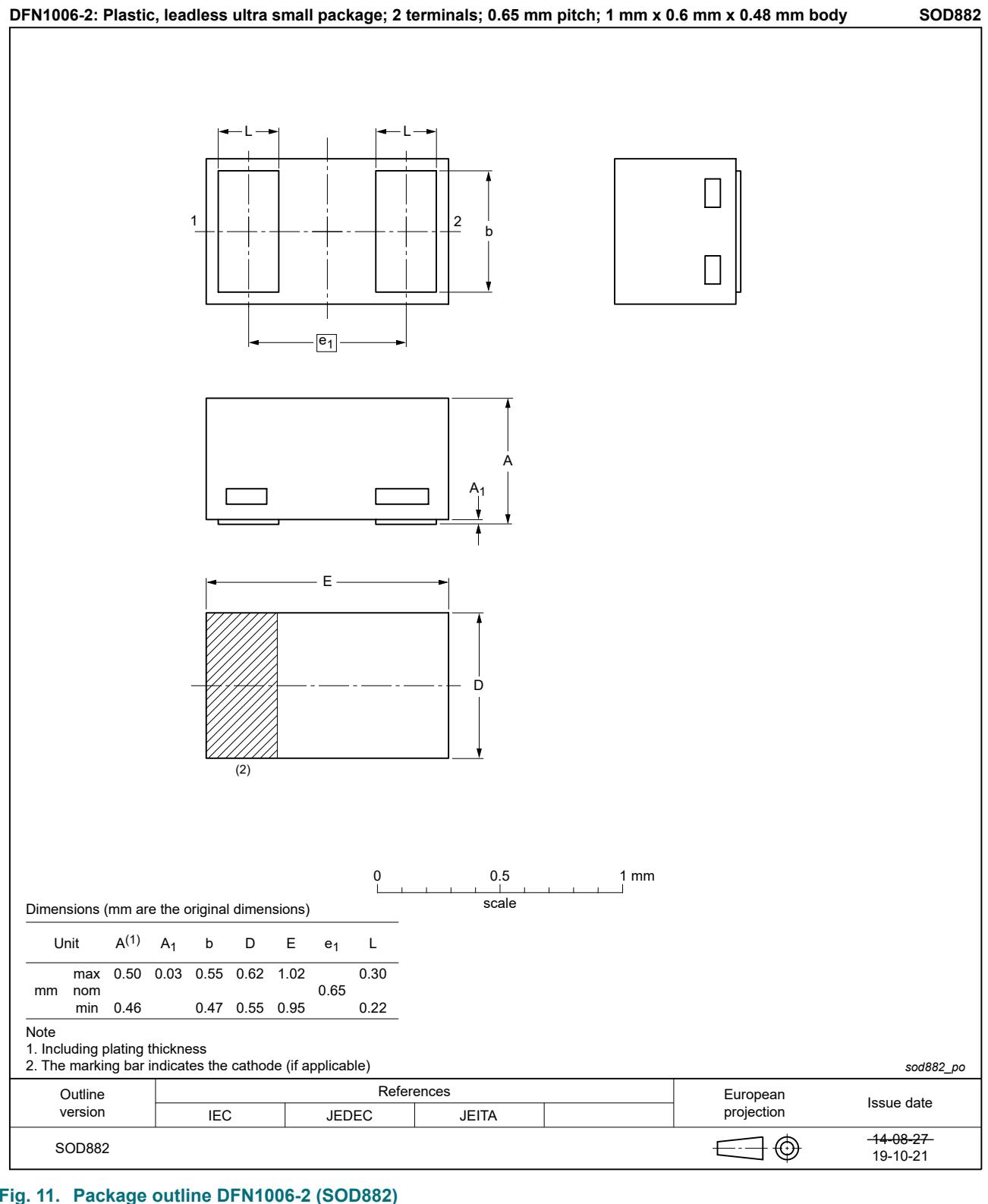
Fig. 10. Application diagram

### 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. Package outline



## 12. Soldering

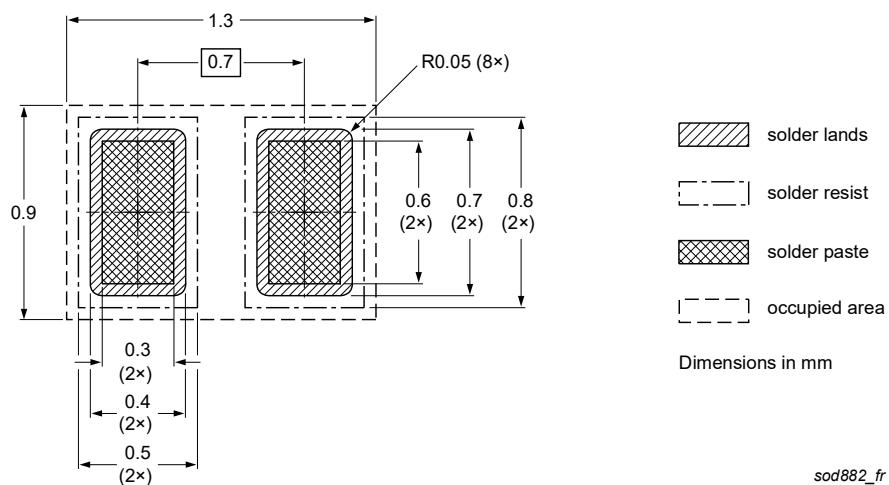


Fig. 12. Reflow soldering footprint for DFN1006-2 (SOD882)

## 13. Revision history

**Table 7. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS4V5D1BL v.2	20251104	Product data sheet	-	PTVS4V5D1BL v.1
Modifications:	<ul style="list-style-type: none"><li>Product changed to non-automotive qualification</li></ul>			
PTVS4V5D1BL v.1	20170719	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.
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.....	7
11. Package outline.....	8
12. Soldering.....	9
13. Revision history.....	10
14. Legal information.....	11

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Date of release: 4 November 2025