PTVS20VD1UL

Ultra compact Transient Voltage Suppressor

16 August 2023 Product data sheet

1. General description

Transient voltage suppressor in a DFN1006-2 (SOD882P-1) 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

- Unidirectional protection of one line
- Reverse standoff voltage: V_{RWM} = 20 V
- Very high surge robustness: rated I_{PPM} = 30 A (8/20 µs)
- Ultra low clamping voltage V_{CL} = 28.5 V typ. at 30 A
- ESD protection up to 30 kV

3. Applications

Surge protection for:

- USB Type-C CC/SBU lines
- Power supply lines

in portable communication, consumer and computing devices

4. Quick reference data

Table 1. Quick reference data

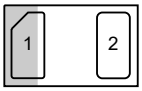
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	20	V
I_{PPM}	rated peak pulse current	t_p = 8/20 µs	[1]	-	-	30	A
V_{CL}	clamping voltage	I_{PPM} = 30 A; t_p = 8/20 µs; T_{amb} = 25 °C	[1]	-	28.5	-	V

[1] Device stressed with 8/20 µs exponential decay waveform according to IEC 61000-4-5.

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 Transparent top view **DFN1006-2 (SOD882P-1)**	 *sym035*
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PTVS20VD1UL	DFN1006-2	Leadless ultra small plastic package, 2 terminals, 0.65 mm pitch; 1.02 mm x 0.62 mm x 0.45 mm body	SOD882P-1

7. Marking

Table 4. Marking codes

Type number	Marking code
PTVS20VD1UL	9R

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]	-	30	A
T_j	junction temperature			-	125	°C
T_{amb}	ambient temperature			-40	125	°C
T_{stg}	storage temperature			-55	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[2]	-	30	kV
		IEC 61000-4-2; air discharge	[2]	-	30	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.

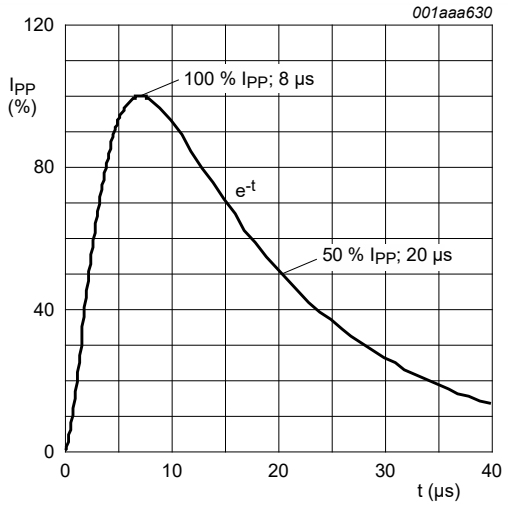


Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

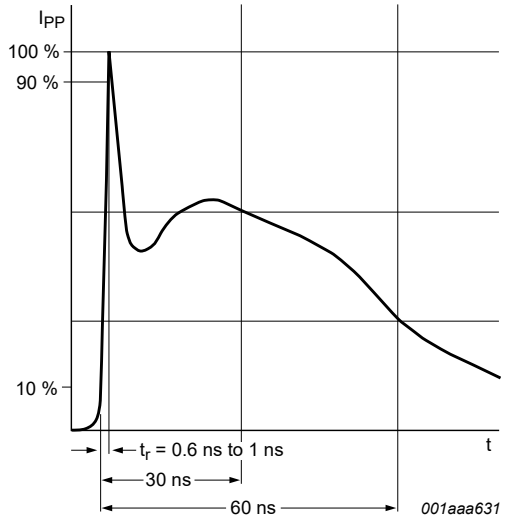


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	20	V
V_{BR}	breakdown voltage	I_R = 1 mA; T_{amb} = 25 °C		22	-	26	V
I_{RM}	reverse leakage current	V_R = 20 V; T_{amb} = 25 °C		-	-	0.5	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	73	-	pF
V_{CL}	clamping voltage	I_{PPM} = 30 A; t_p = 8/20 µs; T_{amb} = 25 °C	[1]	-	28.5	-	V

[1] Device stressed with 8/20 µs exponential decay waveform according to IEC 61000-4-5.

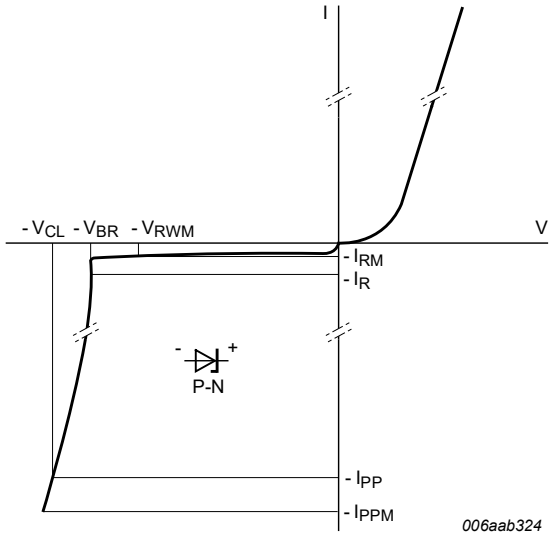
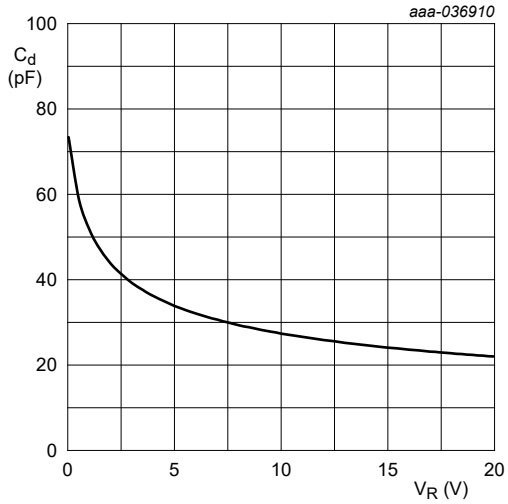
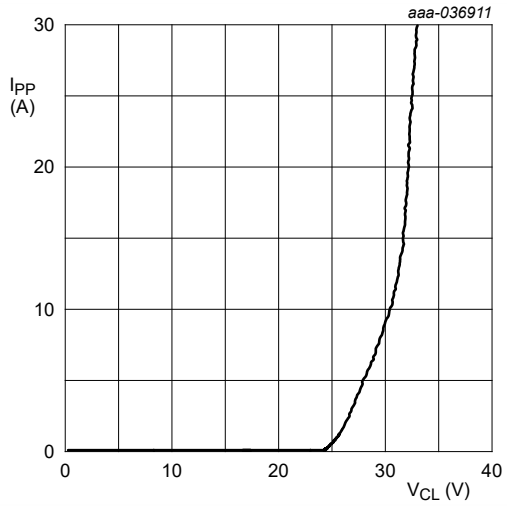


Fig. 3. V-I characteristics for a unidirectional TVS protection diode



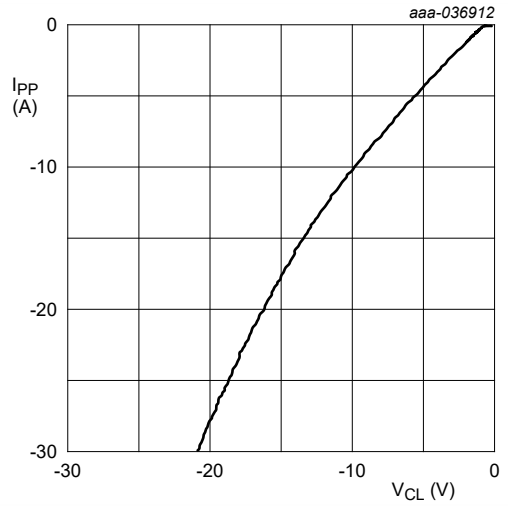
f = 1 MHz; T_{amb} = 25 °C

Fig. 4. Capacitance as a function of reverse voltage; typical values



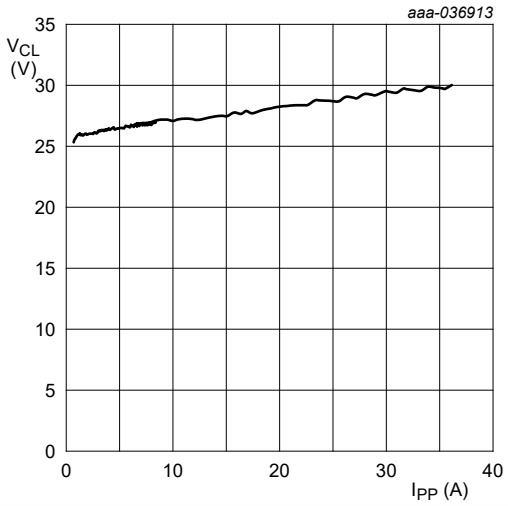
Transmission Line Pulse (TLP);
t_p = 100 ns; t_r = 1 ns

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



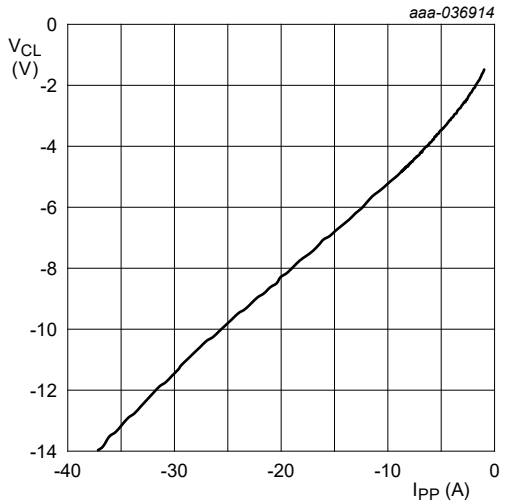
Transmission Line Pulse (TLP);
t_p = 100 ns; t_r = 1 ns

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



IEC 61000-4-5; t_p = 8/20 µs; positive pulse

Fig. 7. Positive clamping voltage (8/20 µs pulse); typical values



IEC 61000-4-5; t_p = 8/20 µs; negative pulse

Fig. 8. Negative clamping voltage (8/20 µs pulse); typical values

10. Application information

The device is designed for the protection of one unidirectional data 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.

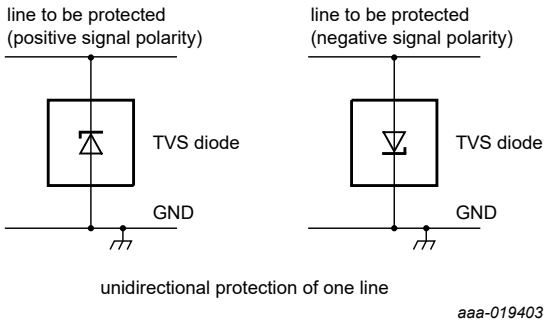
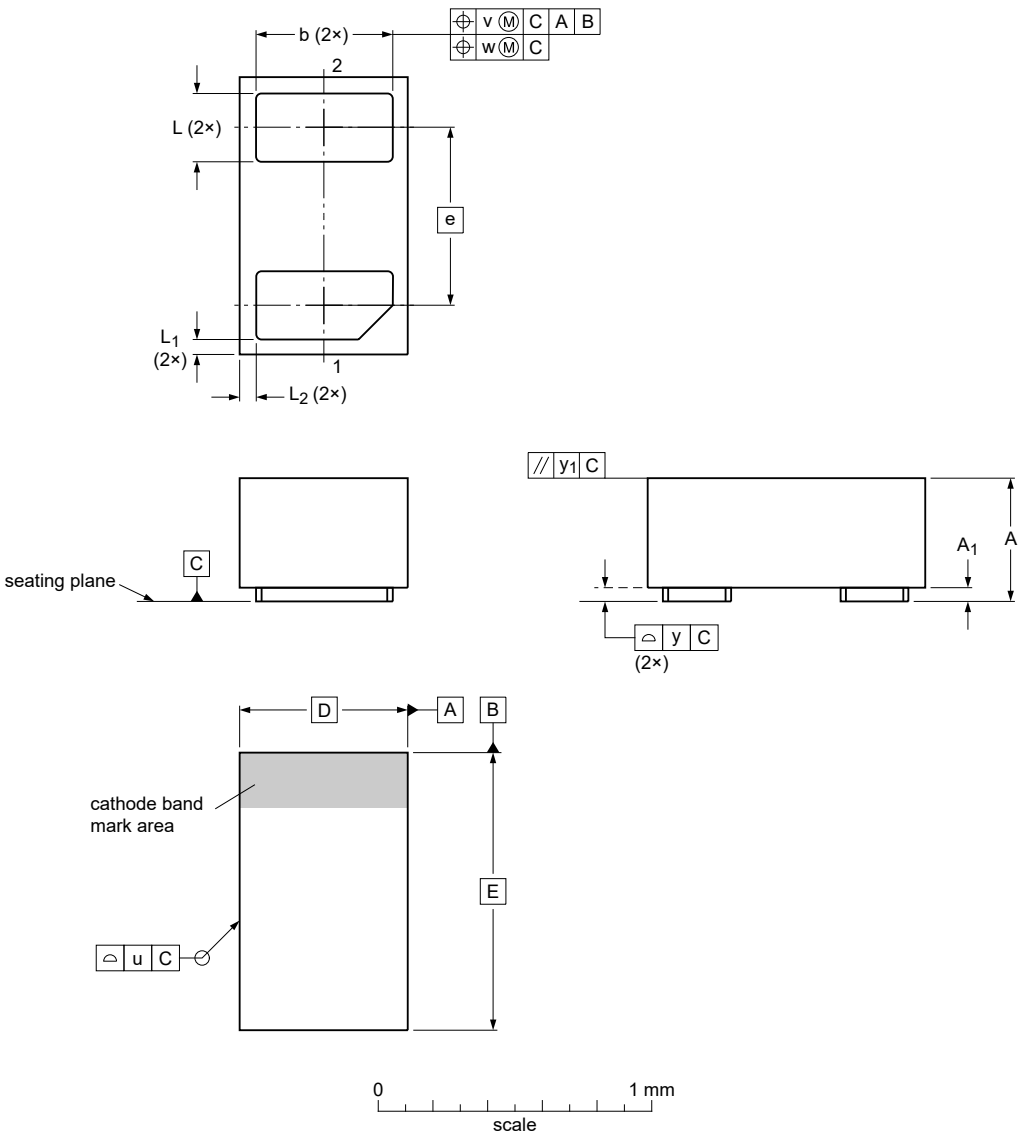


Fig. 9. Application diagram

11. Package outline

DFN1006-2: Leadless ultra small plastic package, 2 terminals, 0.65 mm pitch; 1.02 mm x 0.62 mm x 0.45 mm body **SOD882P-1**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b	D	E	e	L	L_1	L_2	u	v	w	y	y_1
mm	max	0.50	0.05	0.55	0.62 BSC.	1.02 BSC.	0.65 BSC.	0.30	0.10	0.10	0.03	0.1	0.05	0.05	0.05
	nom	0.45	-	0.50				0.25	0.06	0.06					
	min	0.40	-	0.45				0.20	0.02	0.02					

sod882p-1_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD882P-1						2023-06-19

Fig. 10. Package outline DFN1006-2 (SOD882P-1)

12. Soldering

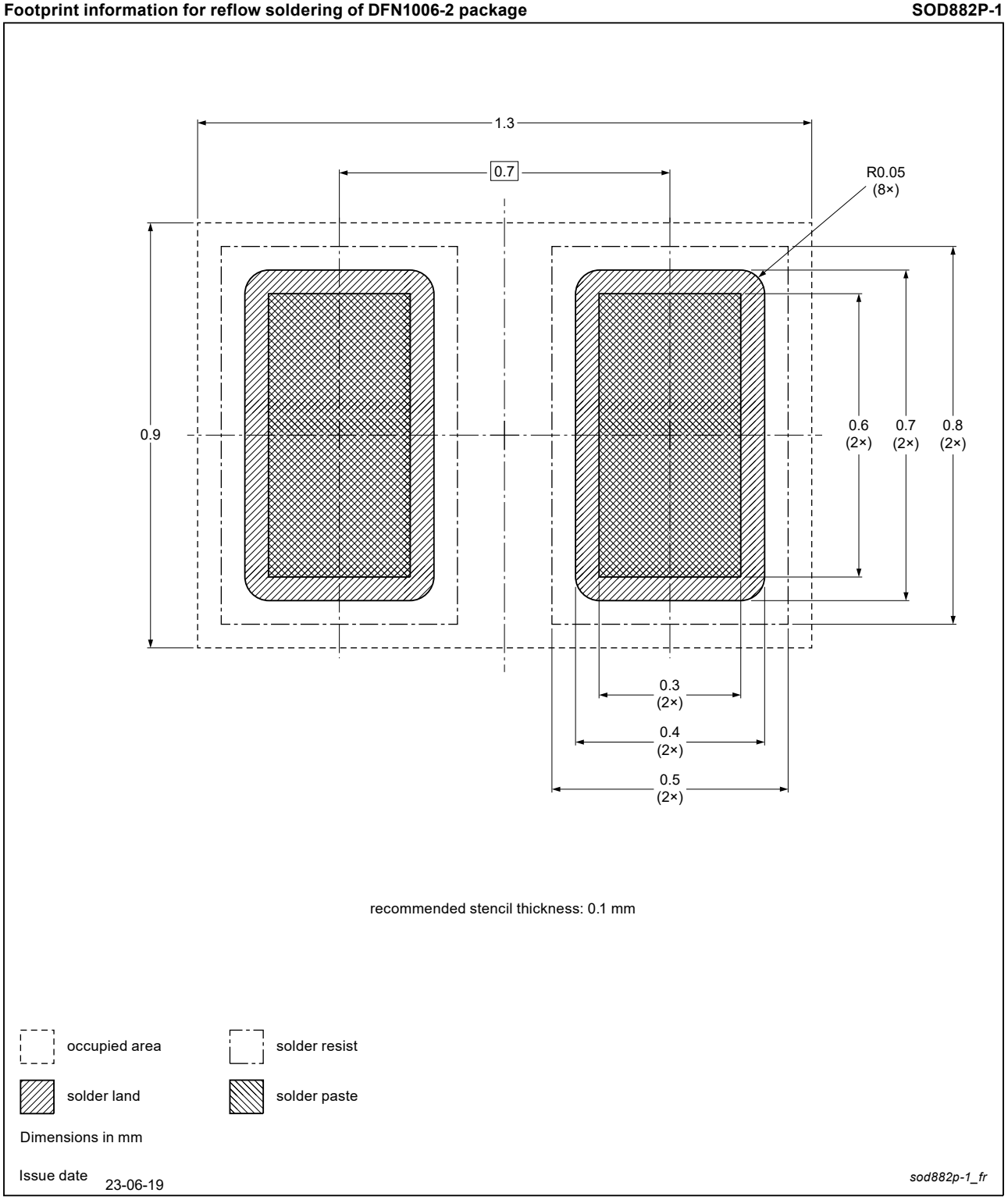


Fig. 11. Reflow soldering footprint for DFN1006-2 (SOD882P-1)

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS20VD1UL v.1	20230816	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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Date of release: 16 August 2023