



PTVS24VZ1UPA

Transient Voltage Suppressor

24 February 2023

Product data sheet

1. General description

Transient voltage suppressor in a DFN2020-3 (SOT1061) 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: $V_{RWM} = 24\text{ V}$
- Average Surge current for 8/20 μs pulse: $I_{PPM} = 150\text{ A}$ (rated) / $I_{PP} = 200\text{ A}$ (average measured)
- Ultra low clamping voltage $V_{CL} = 28\text{ V}$ typ. at 150 A

3. Applications

- Portable electronics
- Power supply protection
- Power management

4. Quick reference data

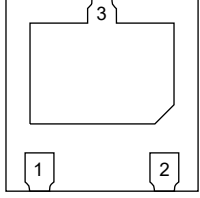

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	24	V
I_{PPM}	rated peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$	[1]	-	-	150	A
V_{CL}	clamping voltage	$I_{PPM} = 150\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	28	31	V

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>Transparent top view DFN2020-3 (SOT1061-3)</p>	 <p>1, 2 3</p> <p>aaa-035944</p>
2	K	cathode		
3	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PTVS24VZ1UPA	DFN2020-3	plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body 2 x 2 x 0.55 mm	SOT1061-3

7. Marking

Table 4. Marking codes

Type number	Marking code
PTVS24VZ1UPA	F3

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]	-	150	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.

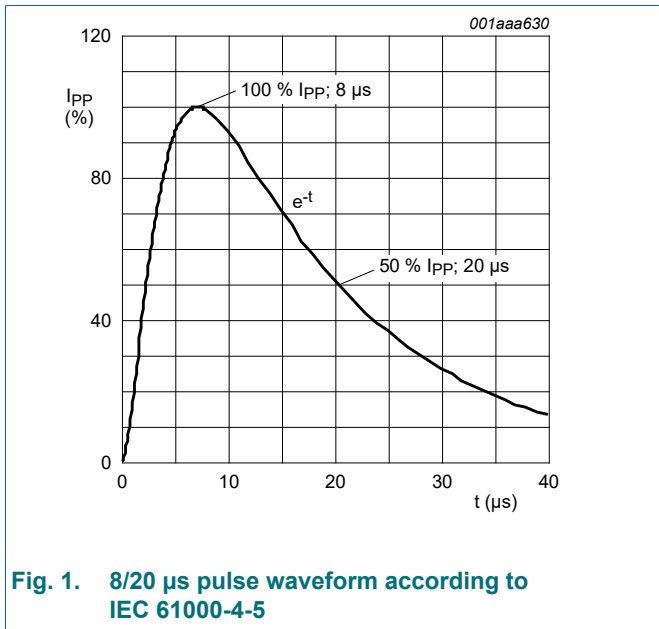


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5

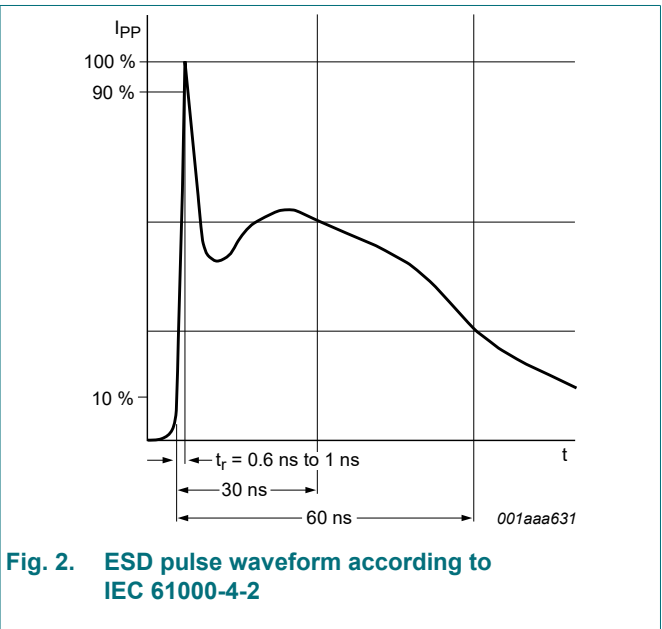


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	24	V
V_{BR}	breakdown voltage	$I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	25	-	29	V
I_{RM}	reverse leakage current	$V_R = 24\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	1	μA
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	620	-	pF
V_{CL}	clamping voltage	$I_{PPM} = 150\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_{amb} = 25\text{ }^{\circ}\text{C}$ [1]	-	28	31	V
		$I_{PPM} = -150\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_{amb} = 25\text{ }^{\circ}\text{C}$ [1]	-	10	-	V

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

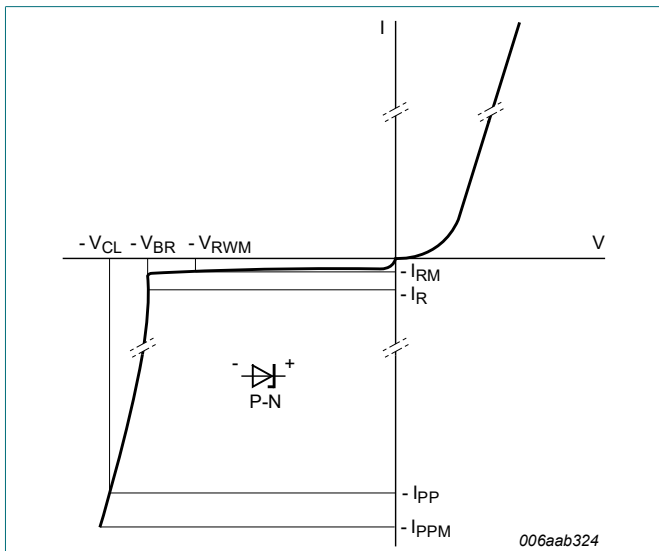


Fig. 3. V-I characteristics for a unidirectional TVS protection diode

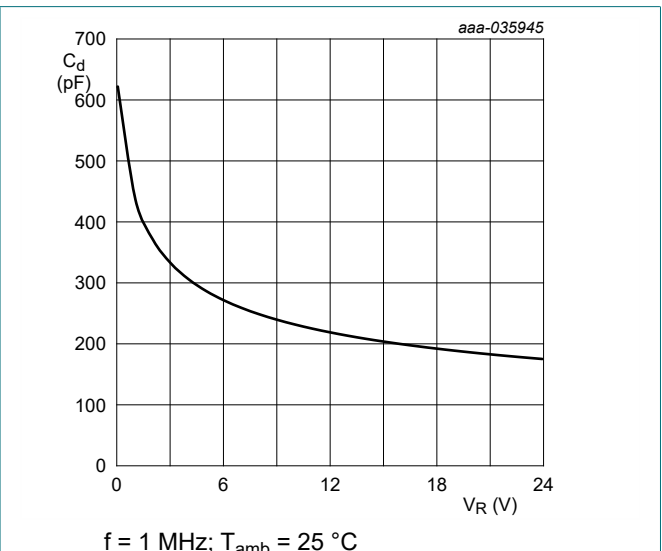


Fig. 4. Capacitance as a function of reverse voltage; typical values

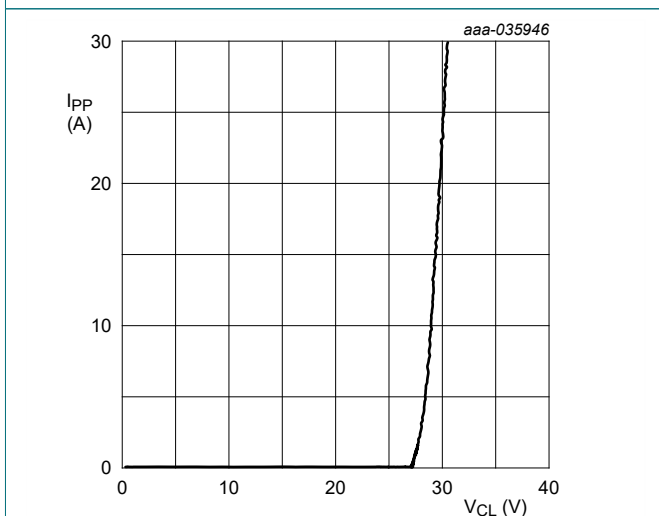


Fig. 5. Positive clamping voltage (TLP); typical values
Transmission Line Pulse (TLP);
 $t_p = 100\text{ ns}; t_r = 1\text{ ns}$

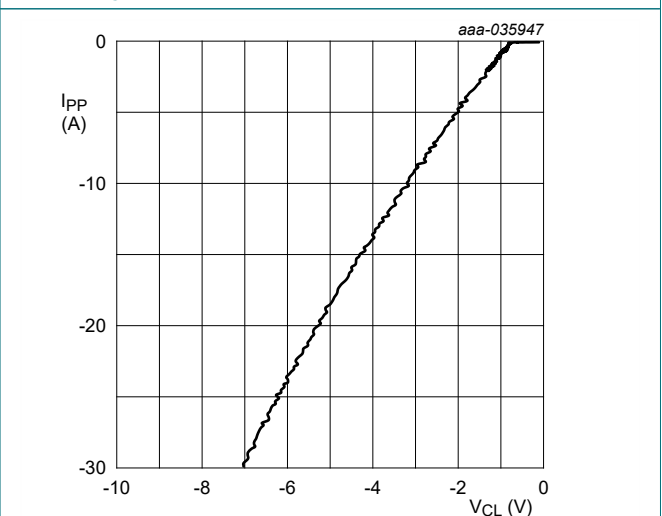
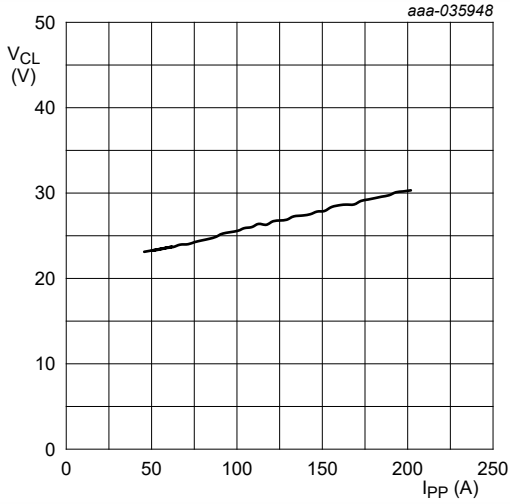
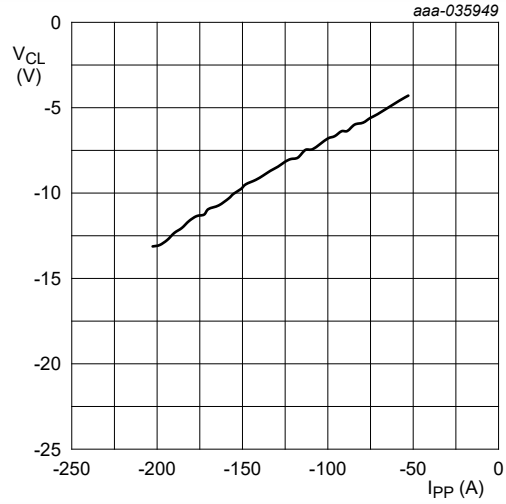


Fig. 6. Negative clamping voltage (TLP); typical values
Transmission Line Pulse (TLP);
 $t_p = 100\text{ ns}; t_r = 1\text{ ns}$



IEC 61000-4-5; $t_p = 8/20 \mu s$; positive pulse

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



IEC 61000-4-5; $t_p = 8/20 \mu s$; 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.

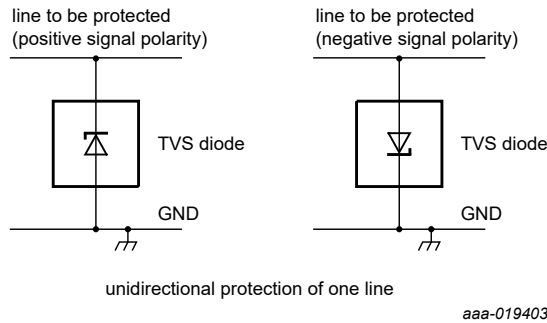
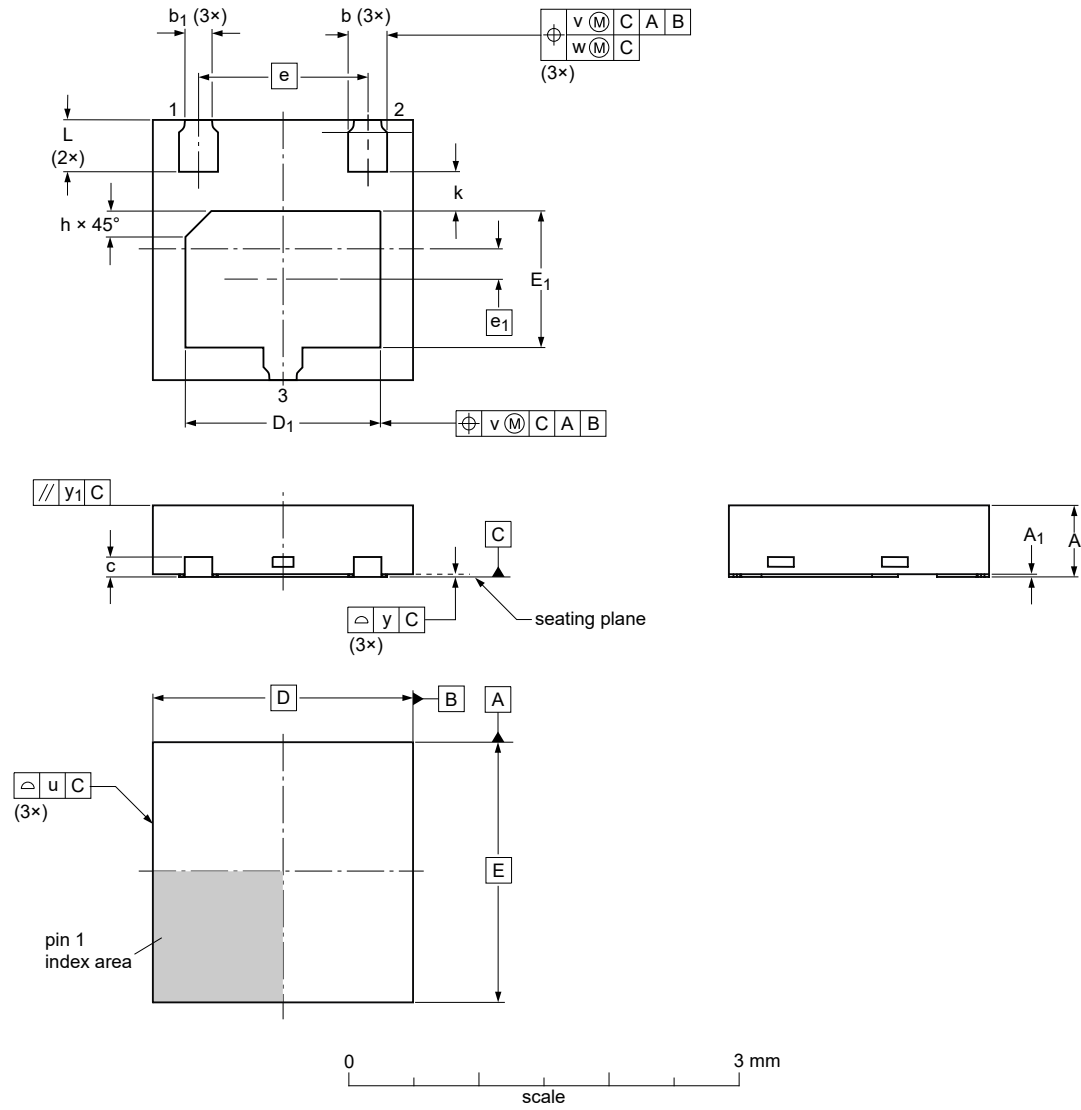


Fig. 9. Application diagram

11. Package outline

HUSON3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body 2 x 2 x 0.55 mm

SOT1061-3



Dimensions (mm are the original dimensions)

Unit	A	A ₁	b	b ₁	c	D	D ₁	E	E ₁	e	e ₁	h	k	L	u	v	w	y	y ₁
mm	max 0.60	0.05	0.35	0.21	0.152	2	1.6	2	1.15	1.3	0.225	0.2	0.3	0.45	0.1	0.1	0.05	0.08	0.1
	nom 0.55	0.02	0.30	REF	REF	BSC	1.5	BSC	1.05	BSC	BSC	REF	REF	0.40					
	min 0.50	0	0.25				1.4		0.95					0.35					

sot1061-3_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1061-3					22-12-19

Fig. 10. Package outline DFN2020-3 (SOT1061-3)

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS24VZ1UPA v.2	20230224	Product data sheet	-	PTVS24VZ1UPA v.1
Modifications:	<ul style="list-style-type: none">Fig. 7 and Fig. 8: change of descriptive titles			
PTVS24VZ1UPA v.1	20230120	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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