PTVSxP1UP series

600 W Transient Voltage Suppressor

1 December 2025 Product data sheet

1. General description

600 W unidirectional Transient Voltage Suppressor (TVS) in a SOD128 small and flat lead Surface-Mounted Device (SMD) plastic package, designed for transient overvoltage protection.

2. Features and benefits

- Rated peak pulse power: P_{PPM} = 600 W
- Reverse standoff voltage range: V_{RWM} = 3.3 V to 64 V
- Reverse current: I_{RM} = 0.001 µA
- Very low package height: 1 mm
- Small plastic package suitable for surface-mounted design
- AEC-Q101 qualified [1]

[1] Part of the products (as listed in the revision history) have removed automotive qualification status.

3. Applications

- Power supply protection
- Automotive application [2]
- Industrial application
- Power management

[2] Part of the products (as listed in the revision history) have removed automotive qualification status, thus not applicable to automotive applications.

4. Quick reference data

Table 1. Quick reference data

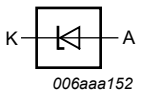
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
P_{PPM}	rated peak pulse power		[1]	-	-	600	W
V_{RWM}	reverse standoff voltage	T_j = 25 °C		3.3	-	64	V

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 CFP5 (SOD128)	
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number[1]	Package		
	Name	Description	Version
PTVSxP1UP series	CFP5	plastic, surface mounted package; 2 terminals; 4 mm pitch; 3.8 mm x 2.6 mm x 1 mm body	SOD128

[1] The series consists of 35 types with reverse standoff voltages from 3.3 V to 64 V.

7. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code
PTVS3V3P1UP	AJ	PTVS20VP1UP	B3
PTVS5V0P1UP	AK	PTVS22VP1UP	B4
PTVS6V0P1UP	AL	PTVS24VP1UP	B5
PTVS6V5P1UP	AM	PTVS26VP1UP	B6
PTVS7V0P1UP	AN	PTVS28VP1UP	B7
PTVS7V5P1UP	AP	PTVS30VP1UP	B8
PTVS8V0P1UP	AQ	PTVS33VP1UP	B9
PTVS8V5P1UP	AR	PTVS36VP1UP	BA
PTVS9V0P1UP	AS	PTVS40VP1UP	BB
PTVS10VP1UP	AT	PTVS43VP1UP	BC
PTVS11VP1UP	AU	PTVS45VP1UP	BD
PTVS12VP1UP	AV	PTVS48VP1UP	BE
PTVS13VP1UP	AW	PTVS51VP1UP	BF
PTVS14VP1UP	AX	PTVS54VP1UP	BG
PTVS15VP1UP	AY	PTVS58VP1UP	BH
PTVS16VP1UP	AZ	PTVS60VP1UP	BJ
PTVS17VP1UP	B1	PTVS64VP1UP	BK
PTVS18VP1UP	B2	-	-

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
P_{PPM}	rated peak pulse power		[1]	-	600	W
I_{PPM}	rated peak pulse current		[1]	-	see table 7 and 8	A
I_{FSM}	non-repetitive peak forward current	single half-sine wave; t_p = 8.3 ms		-	100	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]	-	30	kV
		MIL-STD-883; human body model (HBM)		-	> 4	kV

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).
[2] Device stressed with ten non-repetitive ESD pulses.

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	200	K/W
			[2]	-	-	120	K/W
			[3]	-	-	60	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	12	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[3] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.
[4] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics per type; PTVS3V3P1UP to PTVS7V0P1UP

T_j = 25°C unless otherwise specified.

Type number PTVSxP1UP	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)		Clamping voltage V_{CL} (V)	
		I_R = 10 mA			at V_{RWM} (V)			
	Max	Min	Typ	Max	Typ	Max	Max	I_{PPM} (A)
3V3	3.3	5.20	5.60	6.00	5	600	8.0	75.0
5V0	5.0	6.40	6.70	7.00	5	400	9.2	65.2
6V0	6.0	6.67	7.02	7.37	5	400	10.3	58.3
6V5	6.5	7.22	7.60	7.98	5	250	11.2	53.6
7V0	7.0	7.78	8.20	8.60	3	100	12.0	50.0

Table 8. Characteristics per type; PTVS7V5P1UP to PTVS64VP1UP

T_j = 25°C unless otherwise specified.

Type number PTVSxP1UP	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)		Clamping voltage V_{CL} (V)	
		I_R = 1 mA			at V_{RWM} (V)			
	Max	Min	Typ	Max	Typ	Max	Max	I_{PPM} (A)
7V5	7.5	8.33	8.77	9.21	0.2	50	12.9	46.5
8V0	8.0	8.89	9.36	9.83	0.03	25	13.6	44.1
8V5	8.5	9.44	9.92	10.40	0.01	10	14.4	41.7
9V0	9.0	10.00	10.55	11.10	0.005	5	15.4	39.0
10V	10	11.10	11.70	12.30	0.005	2.5	17.0	35.3
11V	11	12.20	12.85	13.50	0.005	2.5	18.2	33.0
12V	12	13.30	14.00	14.70	0.005	2.5	19.9	30.2
13V	13	14.40	15.15	15.90	0.001	0.1	21.5	27.9
14V	14	15.60	16.40	17.20	0.001	0.1	23.2	25.9
15V	15	16.70	17.60	18.50	0.001	0.1	24.4	24.6
16V	16	17.80	18.75	19.70	0.001	0.1	26.0	23.1
17V	17	18.90	19.90	20.90	0.001	0.1	27.6	21.7
18V	18	20.00	21.00	22.10	0.001	0.1	29.2	20.5
20V	20	22.20	23.35	24.50	0.001	0.1	32.4	18.5
22V	22	24.40	25.60	26.90	0.001	0.1	35.5	16.9
24V	24	26.70	28.10	29.50	0.001	0.1	38.9	15.4
26V	26	28.90	30.40	31.90	0.001	0.1	42.1	14.3
28V	28	31.10	32.80	34.40	0.001	0.1	45.4	13.2
30V	30	33.30	35.10	36.80	0.001	0.1	48.4	12.4
33V	33	36.70	38.70	40.60	0.001	0.1	53.3	11.3
36V	36	40.00	42.10	44.20	0.001	0.1	58.1	10.3
40V	40	44.40	46.80	49.10	0.001	0.1	64.5	9.3
43V	43	47.80	50.30	52.80	0.001	0.1	69.4	8.6
45V	45	50.00	52.65	55.30	0.001	0.1	72.7	8.3

Type number PTVSxP1UP	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)		Clamping voltage V_{CL} (V)	
		I_R = 1 mA			at V_{RWM} (V)			
	Max	Min	Typ	Max	Typ	Max	Max	I_{PPM} (A)
48V	48	53.30	56.10	58.90	0.001	0.1	77.4	7.8
51V	51	56.70	59.70	62.70	0.001	0.1	82.4	7.3
54V	54	60.00	63.15	66.30	0.001	0.1	87.1	6.9
58V	58	64.40	67.80	71.20	0.001	0.1	93.6	6.4
60V	60	66.70	70.20	73.70	0.001	0.1	96.8	6.2
64V	64	71.10	74.85	78.60	0.001	0.1	103.0	5.8

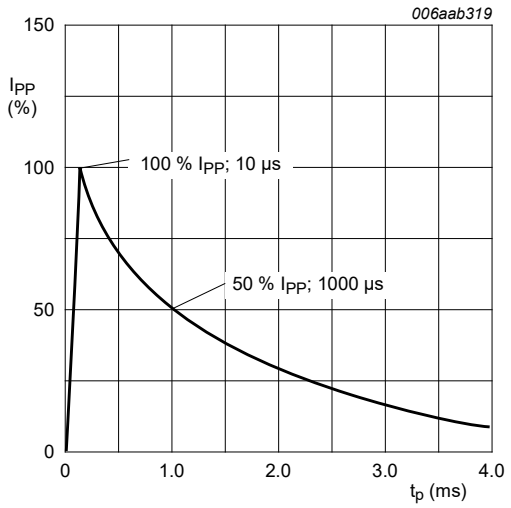


Fig. 1. 10/1000 µs pulse waveform according to IEC 61643-321

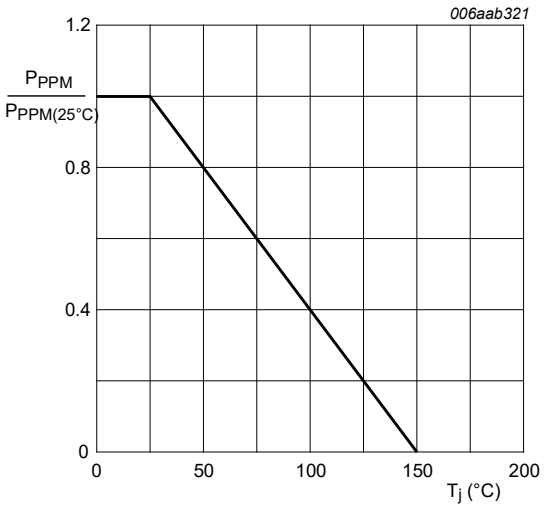
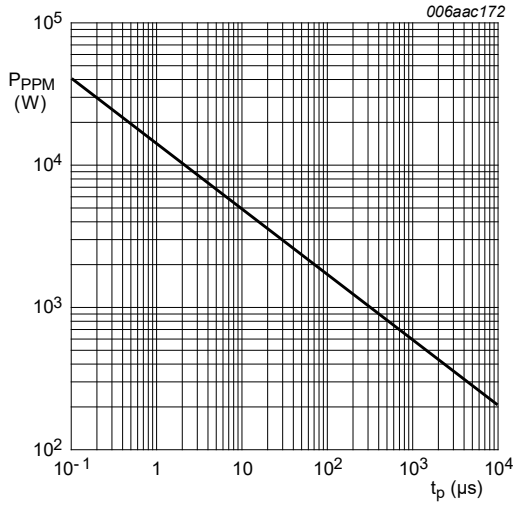
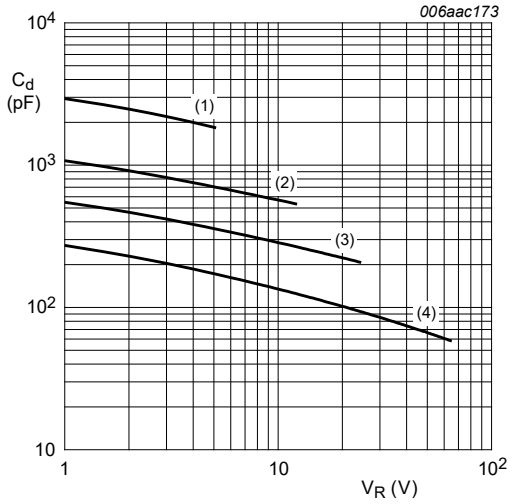


Fig. 2. Relative variation of rated peak pulse power as a function of junction temperature; typical values



T_{amb} = 25 °C

Fig. 3. Rated peak pulse power as a function of pulse duration; typical values



T_{amb} = 25 °C; f = 1 MHz

(1) PTVS5V0P1UP

(2) PTVS12VP1UP

(3) PTVS24VP1UP

(4) PTVS64VP1UP

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

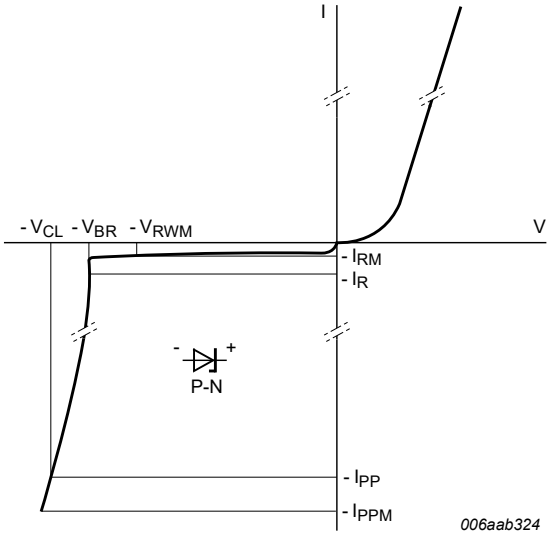


Fig. 5. V-I characteristics for a unidirectional TVS protection diode

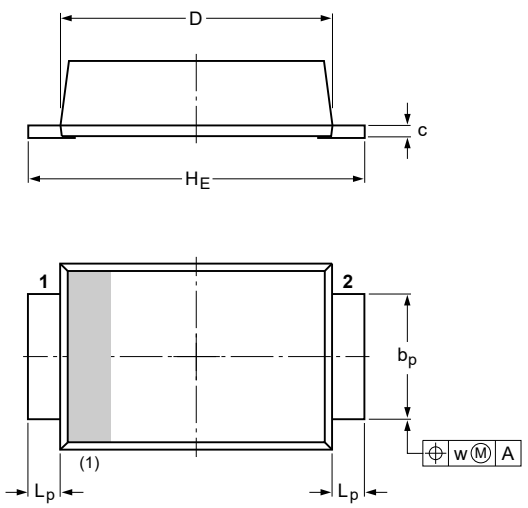
11. Test information

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

Plastic surface-mounted package; 2 leads **SOD128**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	H_E	L_p	w
mm	1.1 0.9	1.9 1.6	0.22 0.10	4.0 3.6	2.7 2.3	5.0 4.4	0.6 0.3	0.13

Note

1. The marking bar indicates the cathode

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD128						~~06-03-03~~ 07-09-12

Fig. 6. Package outline CFP5 (SOD128)

13. Soldering

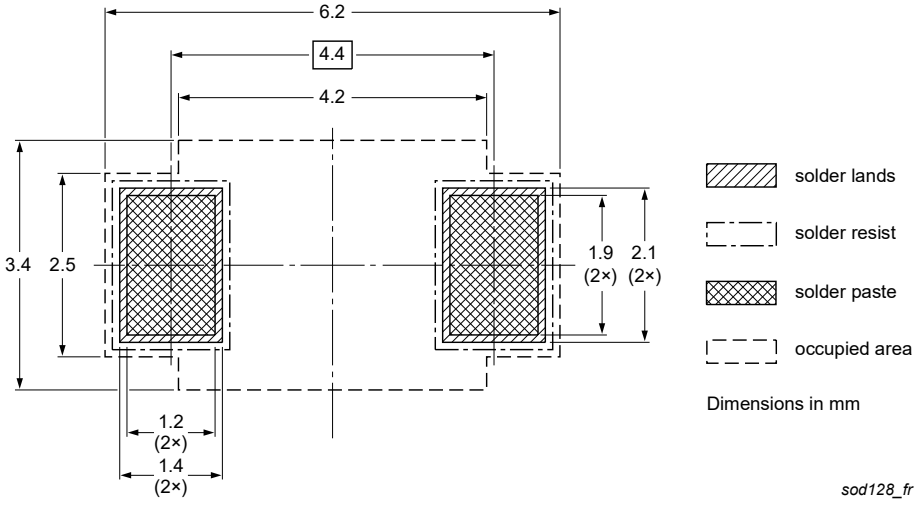
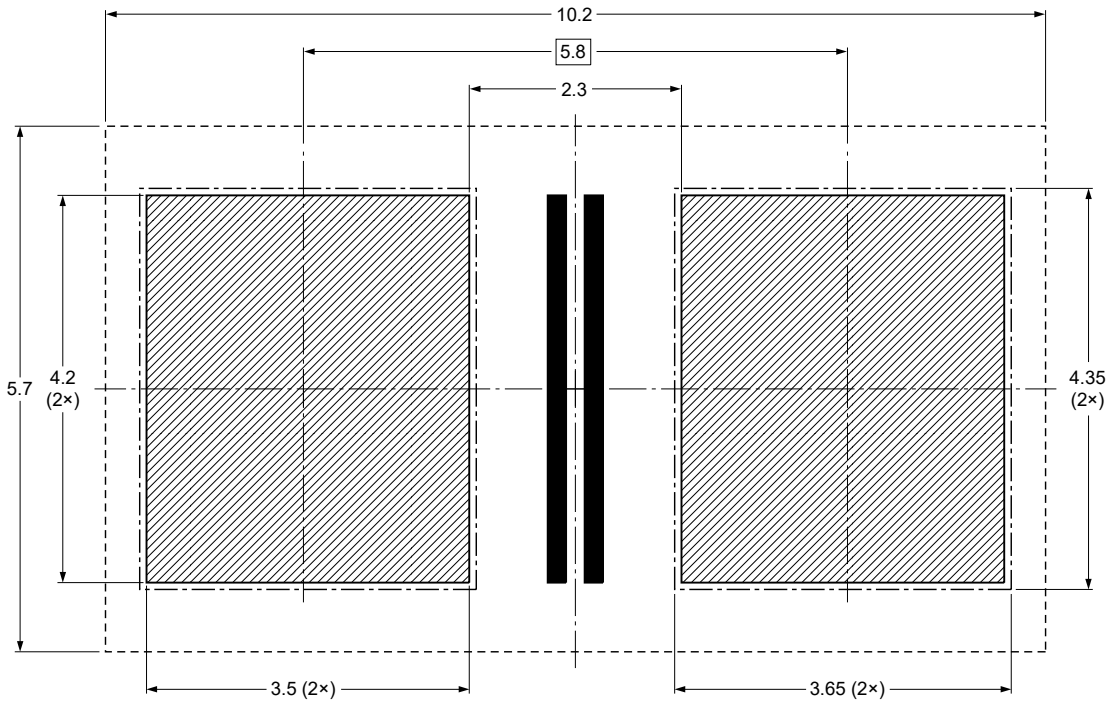


Fig. 7. Reflow soldering footprint for CFP5 (SOD128)

Wave soldering footprint information **SOD128**



occupied area

solder resist

solder lands

dummy track (solder resist and Cu free)

Dimensions in mm

Issue date ~~17-06-06~~ 17-06-07

sod128_fw

Fig. 8. Wave soldering footprint for CFP5 (SOD128)

14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVSxP1UP_SER v.3	20251201	Product data sheet	-	PTVSxP1UP_SER v.2
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia • Legal texts have been adapted to the new company name where appropriate • Section "Packing information" removed • 25 products changed to standard qualification: PTVS6V0P1UP PTVS6V5P1UP PTVS7V0P1UP PTVS7V5P1UP PTVS8V0P1UP PTVS8V5P1UP PTVS9V0P1UP PTVS10VP1UP PTVS11VP1UP PTVS12VP1UP PTVS14VP1UP PTVS15VP1UP PTVS16VP1UP PTVS17VP1UP PTVS18VP1UP PTVS20VP1UP PTVS22VP1UP PTVS28VP1UP PTVS30VP1UP PTVS43VP1UP PTVS45VP1UP PTVS48VP1UP PTVS54VP1UP PTVS58VP1UP PTVS60VP1UP			
PTVSxP1UP_SER v.2	20110106	Product data sheet	-	PTVSxP1UP_SER v.1
PTVSxP1UP_SER v.1	20100527	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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Date of release: 1 December 2025