

PTVSxS1UTR series

High-temperature 400 W Transient Voltage Suppressor

1 December 2025 Product data sheet

1. General description

400 W unidirectional Transient Voltage Suppressor (TVS) in a SOD123W small and flat lead low-profile Surface-Mounted Device (SMD) plastic package, designed for transient overvoltage protection in high-temperature applications.

2. Features and benefits

- Rated peak pulse power: P_{PPM} = 400 W (350 W for 3V3)
- 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
- High temperature stability $T_j \leq 185$ °C
- Small plastic package suitable for surface-mounted design

3. Applications

- Power supply protection
- Industrial application
- Power management
- High-temperature applications

4. Quick reference data

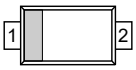
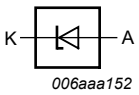
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
P_{PPM}	rated peak pulse power		[1] [2]	-	-	400	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).
[2] For PTVS3V3S1UTR: P_{PPM} = 350W.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 CFP3 (SOD123W)	 006aaa152
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number[1]	Package		
	Name	Description	Version
PTVSxS1UTR series	CFP3	plastic, surface mounted package; 2 terminals; 2.6 mm x 1.7 mm x 1 mm body	SOD123W

[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
PTVS3V3S1UTR	C2	PTVS20VS1UTR	CL
PTVS5V0S1UTR	C3	PTVS22VS1UTR	CM
PTVS6V0S1UTR	C4	PTVS24VS1UTR	CN
PTVS6V5S1UTR	C5	PTVS26VS1UTR	CP
PTVS7V0S1UTR	C6	PTVS28VS1UTR	CR
PTVS7V5S1UTR	C7	PTVS30VS1UTR	CS
PTVS8V0S1UTR	C8	PTVS33VS1UTR	CT
PTVS8V5S1UTR	C9	PTVS36VS1UTR	CU
PTVS9V0S1UTR	CA	PTVS40VS1UTR	CV
PTVS10VS1UTR	CB	PTVS43VS1UTR	CW
PTVS11VS1UTR	CC	PTVS45VS1UTR	CX
PTVS12VS1UTR	CD	PTVS48VS1UTR	CY
PTVS13VS1UTR	CE	PTVS51VS1UTR	CZ
PTVS14VS1UTR	CF	PTVS54VS1UTR	D1
PTVS15VS1UTR	CG	PTVS58VS1UTR	D2
PTVS16VS1UTR	CH	PTVS60VS1UTR	D3
PTVS17VS1UTR	CJ	PTVS64VS1UTR	D4
PTVS18VS1UTR	CK	-	-

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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] [2]	-	400	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		-	50	A
T_j	junction temperature			-	185	°C
T_{amb}	ambient temperature			-55	185	°C
T_{stg}	storage temperature			-65	185	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[3]	-	30	kV
		MIL-STD-883; human body model (HBM)		-	> 8	kV

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).
[2] For PTVS3V3S1UTR: P_{PPM} = 350W.
[3] 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]	-	-	220	K/W
			[2]	-	-	130	K/W
			[3]	-	-	70	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	18	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.

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10. Characteristics

Table 7. Characteristics per type; PTVS3V3S1UTR to PTVS7V0S1UTR

T_j = 25°C unless otherwise specified.

Type number PTVSxS1UTR	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)			Clamping voltage V_{CL} (V)		Temperature coefficient S_Z (mV/K)
		I_R = 10 mA			at V_{RWM}		at V_{RWM} T_j = 150 °C			I_Z = 5 mA
	Max	Min	Typ	Max	Typ	Max	Typ	Max	I_{PPM} (A)	Typ
3V3	3.3	5.20	5.60	6.00	5	600	17	8.0	43.8	-1.0
5V0	5.0	6.40	6.70	7.00	5	400	17	9.2	43.5	2.5
6V0	6.0	6.67	7.02	7.37	5	400	17	10.3	38.8	3.2
6V5	6.5	7.22	7.60	7.98	5	250	17	11.2	35.7	3.6
7V0	7.0	7.78	8.20	8.60	3	100	9	12.0	33.3	4.3

Table 8. Characteristics per type; PTVS7V5S1UTR to PTVS64VS1UTR

T_j = 25°C unless otherwise specified.

Type number PTVSxS1UTR	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)			Clamping voltage V_{CL} (V)		Temperature coefficient S_Z (mV/K)
		I_R = 1 mA			at V_{RWM}		at V_{RWM} T_j = 150 °C			I_Z = 5 mA
	Max	Min	Typ	Max	Typ	Max	Typ	Max	I_{PPM} (A)	Typ
7V5	7.5	8.33	8.77	9.21	0.2	50	2.0	12.9	31.0	5.0
8V0	8.0	8.89	9.36	9.83	0.03	25	2.0	13.6	29.4	5.5
8V5	8.5	9.44	9.92	10.40	0.01	10	0.5	14.4	27.8	6.5
9V0	9.0	10.00	10.55	11.10	0.005	5	0.5	15.4	26.0	7.1
10V	10	11.10	11.70	12.30	0.005	2.5	0.5	17.0	23.5	8.1
11V	11	12.20	12.85	13.50	0.005	2.5	0.5	18.2	22.0	9.2
12V	12	13.30	14.00	14.70	0.005	2.5	0.5	19.9	20.1	10.3
13V	13	14.40	15.15	15.90	0.001	0.1	0.5	21.5	18.6	11.4
14V	14	15.60	16.40	17.20	0.001	0.1	0.5	23.2	17.2	13.2
15V	15	16.70	17.60	18.50	0.001	0.1	0.5	24.4	16.4	14.1
16V	16	17.80	18.75	19.70	0.001	0.1	0.5	26.0	15.4	15.9
17V	17	18.90	19.90	20.90	0.001	0.1	0.5	27.6	14.5	16.4
18V	18	20.00	21.00	22.10	0.001	0.1	0.5	29.2	13.7	18.5
20V	20	22.20	23.35	24.50	0.001	0.1	0.5	32.4	12.3	20.0
22V	22	24.40	25.60	26.90	0.001	0.1	0.5	35.5	11.3	23.8
24V	24	26.70	28.10	29.50	0.001	0.1	0.5	38.9	10.3	24.9
26V	26	28.90	30.40	31.90	0.001	0.1	0.5	42.1	9.5	29.1
28V	28	31.10	32.80	34.40	0.001	0.1	0.5	45.4	8.8	30.6
30V	30	33.30	35.10	36.80	0.001	0.1	0.5	48.4	8.3	34.4
33V	33	36.70	38.70	40.60	0.001	0.1	0.5	53.3	7.5	37.5
36V	36	40.00	42.10	44.20	0.001	0.1	0.5	58.1	6.9	42.3
40V	40	44.40	46.80	49.10	0.001	0.1	0.5	64.5	6.2	48.1
43V	43	47.80	50.30	52.80	0.001	0.1	0.5	69.4	5.8	51.6

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Type number PTVSxS1UTR	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (µA)			Clamping voltage V_{CL} (V)		Temperature coefficient S_Z (mV/K)
		I_R = 1 mA			at V_{RWM}		at V_{RWM} T_j = 150 °C			I_Z = 5 mA
	Max	Min	Typ	Max	Typ	Max	Typ	Max	I_{PPM} (A)	Typ
45V	45	50.00	52.65	55.30	0.001	0.1	0.5	72.7	5.5	55.2
48V	48	53.30	56.10	58.90	0.001	0.1	0.5	77.4	5.2	58.2
51V	51	56.70	59.70	62.70	0.001	0.1	0.5	82.4	4.9	62.5
54V	54	60.00	63.15	66.30	0.001	0.1	0.5	87.1	4.6	66.1
58V	58	64.40	67.80	71.20	0.001	0.1	0.5	93.6	4.3	71.4
60V	60	66.70	70.20	73.70	0.001	0.1	0.5	96.8	4.1	74.1
64V	64	71.10	74.85	78.60	0.001	0.1	0.5	103.0	3.9	80.0

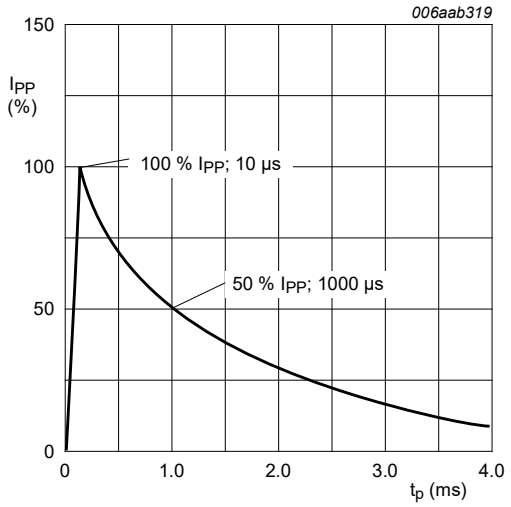


Fig. 1. 10/1000 µs pulse waveform according to IEC 61643-321

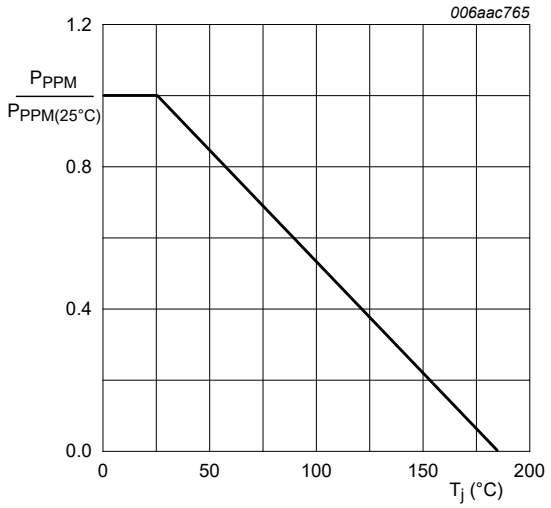
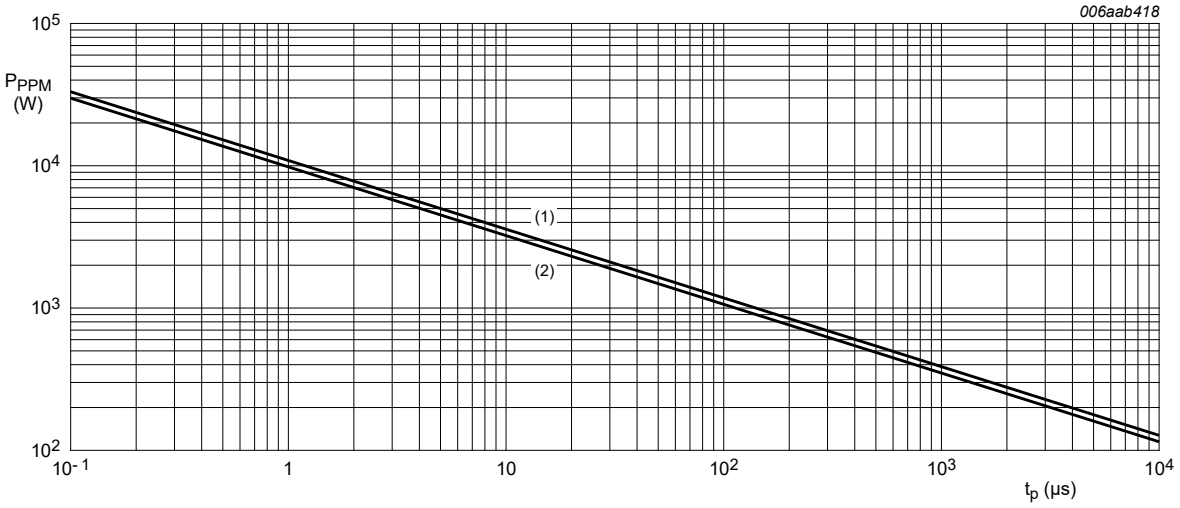


Fig. 2. Relative variation of rated peak pulse power as a function of junction temperature; typical values



T_{amb} = 25 °C

(1) PTVS5V0S1UTR to PTVS64VS1UTR

(2) PTVS3V3S1UTR

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

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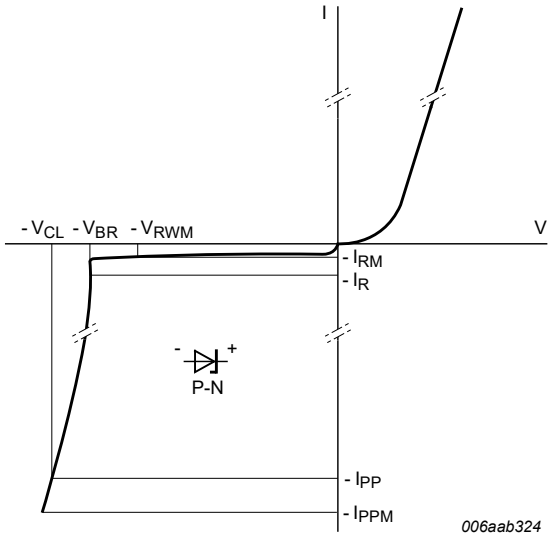


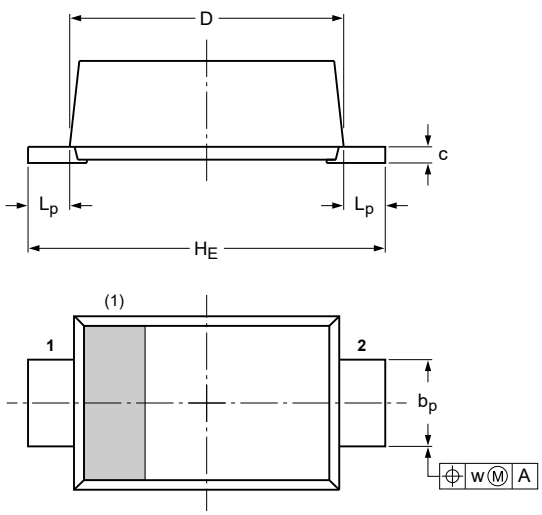
Fig. 4. V-I characteristics for a unidirectional TVS protection diode

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11. Package outline

Plastic surface-mounted package; 2 leads **SOD123W**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	H_E	L_p	w
mm	1.1 0.9	1.05 0.75	0.22 0.10	2.8 2.4	1.9 1.5	3.7 3.3	0.6 0.3	0.13

Note

1. The marking bar indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD123W						~~07-06-28~~ 08-11-06

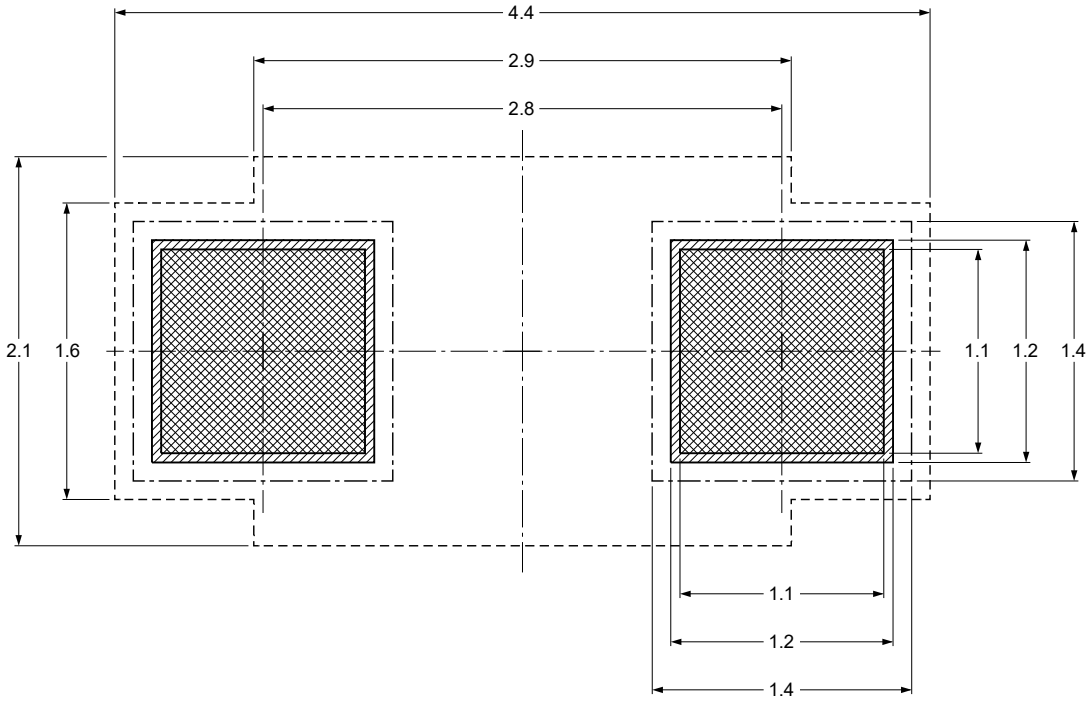
Fig. 5. Package outline CFP3 (SOD123W)

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12. Soldering

Footprint information for reflow soldering of CFP3 package **SOD123W**



recommended stencil thickness: 0.1 mm

occupied area

solder resist

solder land

solder paste

Dimensions in mm

Issue date ~~17-06-09~~ 20-02-28

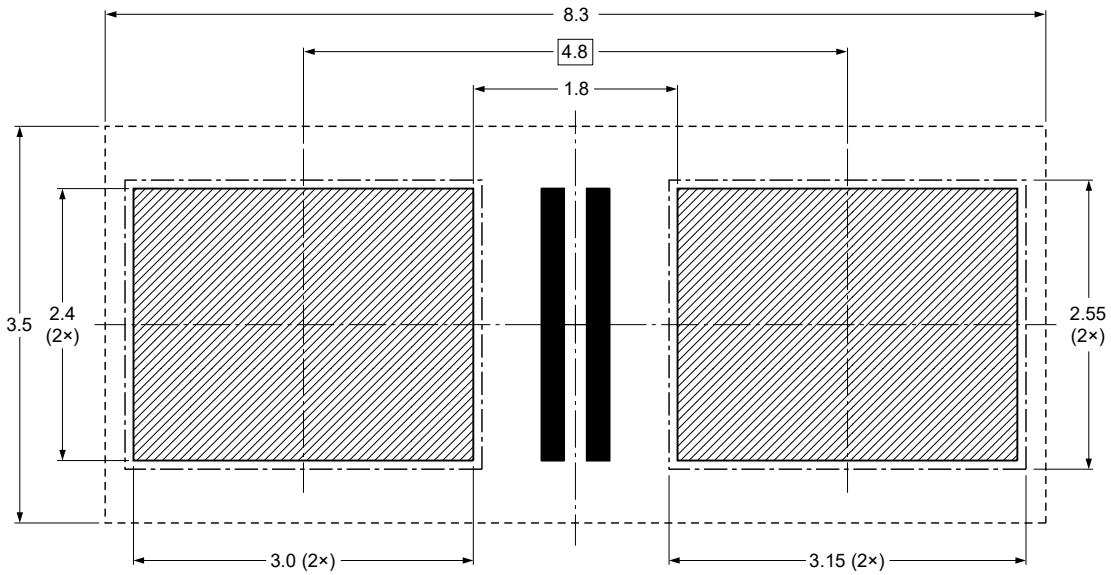
sod123w_fr

Fig. 6. Reflow soldering footprint for CFP3 (SOD123W)

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Wave soldering footprint information **SOD123W**



occupied area

solder resist

solder lands

dummy track (solder resist and Cu free)

Dimensions in mm

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

sod123w_fw

Fig. 7. Wave soldering footprint for CFP3 (SOD123W)

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13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVSxS1UTR_SER v.2	20251201	Product data sheet	-	PTVSxS1UTR_SER v.1
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 • All products changed to standard qualification			
PTVSxS1UTR_SER v.1	20111011	Product data sheet	-	-

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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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