



PTVSxP1UTP series

High-temperature 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 in high-temperature applications.

2. Features and benefits

- Rated peak pulse power: $P_{PPM} = 600 \text{ W}$
- Reverse standoff voltage range: $V_{RWM} = 3.3 \text{ V to } 64 \text{ V}$
- Reverse current: $I_{RM} = 0.001 \mu\text{A}$
- Very low package height: 1 mm
- High temperature stability $T_j \leq 185 \text{ }^\circ\text{C}$
- 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
- High-temperature applications

[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

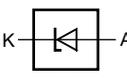
Table 1. Quick reference data

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

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode ^[1]	 CFP5 (SOD128)	 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
PTVSxP1UTP 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
PTVS3V3P1UTP	C5	PTVS20VP1UTP	CP
PTVS5V0P1UTP	C6	PTVS22VP1UTP	CR
PTVS6V0P1UTP	C7	PTVS24VP1UTP	CS
PTVS6V5P1UTP	C8	PTVS26VP1UTP	CT
PTVS7V0P1UTP	C9	PTVS28VP1UTP	CU
PTVS7V5P1UTP	CA	PTVS30VP1UTP	CV
PTVS8V0P1UTP	CB	PTVS33VP1UTP	CW
PTVS8V5P1UTP	CC	PTVS36VP1UTP	CX
PTVS9V0P1UTP	CD	PTVS40VP1UTP	CY
PTVS10VP1UTP	CE	PTVS43VP1UTP	CZ
PTVS11VP1UTP	CF	PTVS45VP1UTP	D1
PTVS12VP1UTP	CG	PTVS48VP1UTP	D2
PTVS13VP1UTP	CH	PTVS51VP1UTP	D3
PTVS14VP1UTP	CJ	PTVS54VP1UTP	D4
PTVS15VP1UTP	CK	PTVS58VP1UTP	D5
PTVS16VP1UTP	CL	PTVS60VP1UTP	D6
PTVS17VP1UTP	CM	PTVS64VP1UTP	D7
PTVS18VP1UTP	CN	-	-

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			-	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	[2]	-	30	kV
		MIL-STD-883; human body model (HBM)		-	> 8	kV

[1] In accordance with IEC 61643-321 (10/1000 μ s 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 cm².

[3] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

[4] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics per type; PTVS3V3P1UTP to PTVS7V0P1UTP

$T_j = 25^\circ\text{C}$ unless otherwise specified.

Type number PTVSxP1UTP	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)
		$I_R = 10 \text{ mA}$			at V_{RWM}		at V_{RWM} $T_j = 150^\circ\text{C}$	Max	I_{PPM} (A)	$I_Z = 5 \text{ mA}$
		Min	Typ	Max	Typ	Max	Typ			Typ
3V3	3.3	5.20	5.60	6.00	5	600	17	8.0	75.0	-1.0
5V0	5.0	6.40	6.70	7.00	5	400	17	9.2	65.2	2.5
6V0	6.0	6.67	7.02	7.37	5	400	17	10.3	58.3	3.2
6V5	6.5	7.22	7.60	7.98	5	250	17	11.2	53.6	3.6
7V0	7.0	7.78	8.20	8.60	3	100	9	12.0	50.0	4.3

Table 8. Characteristics per type; PTVS7V5P1UTP to PTVS64VP1UTP

$T_j = 25^\circ\text{C}$ unless otherwise specified.

Type number PTVSxP1UTP	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)
		$I_R = 1 \text{ mA}$			at V_{RWM}		at V_{RWM} $T_j = 150^\circ\text{C}$	Max	I_{PPM} (A)	$I_Z = 5 \text{ mA}$
		Min	Typ	Max	Typ	Max	Typ			Typ
7V5	7.5	8.33	8.77	9.21	0.2	50	2.0	12.9	46.5	5.0
8V0	8.0	8.89	9.36	9.83	0.03	25	2.0	13.6	44.1	5.5
8V5	8.5	9.44	9.92	10.40	0.01	10	0.5	14.4	41.7	6.5
9V0	9.0	10.00	10.55	11.10	0.005	5	0.5	15.4	39.0	7.1
10V	10	11.10	11.70	12.30	0.005	2.5	0.5	17.0	35.3	8.1
11V	11	12.20	12.85	13.50	0.005	2.5	0.5	18.2	33.0	9.2
12V	12	13.30	14.00	14.70	0.005	2.5	0.5	19.9	30.2	10.3
13V	13	14.40	15.15	15.90	0.001	0.1	0.5	21.5	27.9	11.4
14V	14	15.60	16.40	17.20	0.001	0.1	0.5	23.2	25.9	13.2
15V	15	16.70	17.60	18.50	0.001	0.1	0.5	24.4	24.6	14.1
16V	16	17.80	18.75	19.70	0.001	0.1	0.5	26.0	23.1	15.9
17V	17	18.90	19.90	20.90	0.001	0.1	0.5	27.6	21.7	16.4
18V	18	20.00	21.00	22.10	0.001	0.1	0.5	29.2	20.5	18.5
20V	20	22.20	23.35	24.50	0.001	0.1	0.5	32.4	18.5	20.0
22V	22	24.40	25.60	26.90	0.001	0.1	0.5	35.5	16.9	23.8
24V	24	26.70	28.10	29.50	0.001	0.1	0.5	38.9	15.4	24.9
26V	26	28.90	30.40	31.90	0.001	0.1	0.5	42.1	14.3	29.1
28V	28	31.10	32.80	34.40	0.001	0.1	0.5	45.4	13.2	30.6
30V	30	33.30	35.10	36.80	0.001	0.1	0.5	48.4	12.4	34.4
33V	33	36.70	38.70	40.60	0.001	0.1	0.5	53.3	11.3	37.5
36V	36	40.00	42.10	44.20	0.001	0.1	0.5	58.1	10.3	42.3
40V	40	44.40	46.80	49.10	0.001	0.1	0.5	64.5	9.3	48.1
43V	43	47.80	50.30	52.80	0.001	0.1	0.5	69.4	8.6	51.6

High-temperature 600 W Transient Voltage Suppressor

Type number PTVSxP1UTP	Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V)			Reverse leakage current I_{RM} (μ A)			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	Max	I_{PPM} (A)	$I_Z = 5$ mA
		Min	Typ	Max	Typ	Max	Typ			
45V	45	50.00	52.65	55.30	0.001	0.1	0.5	72.7	8.3	55.2
48V	48	53.30	56.10	58.90	0.001	0.1	0.5	77.4	7.8	58.2
51V	51	56.70	59.70	62.70	0.001	0.1	0.5	82.4	7.3	62.5
54V	54	60.00	63.15	66.30	0.001	0.1	0.5	87.1	6.9	66.1
58V	58	64.40	67.80	71.20	0.001	0.1	0.5	93.6	6.4	71.4
60V	60	66.70	70.20	73.70	0.001	0.1	0.5	96.8	6.2	74.1
64V	64	71.10	74.85	78.60	0.001	0.1	0.5	103.0	5.8	80.0

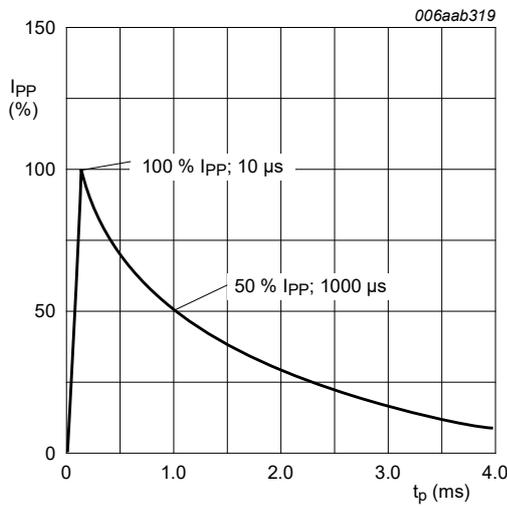


Fig. 1. 10/1000 μ s pulse waveform according to IEC 61643-321

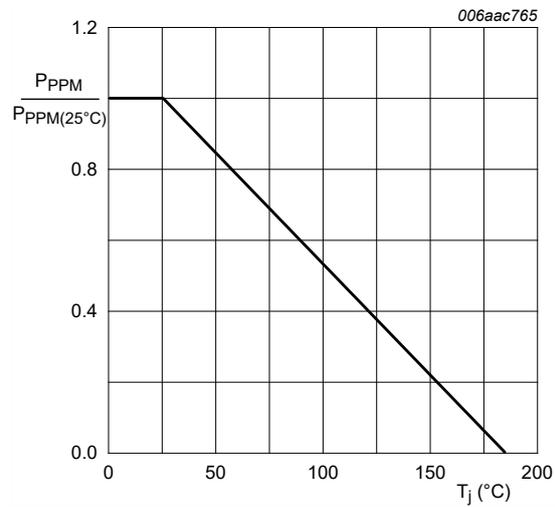
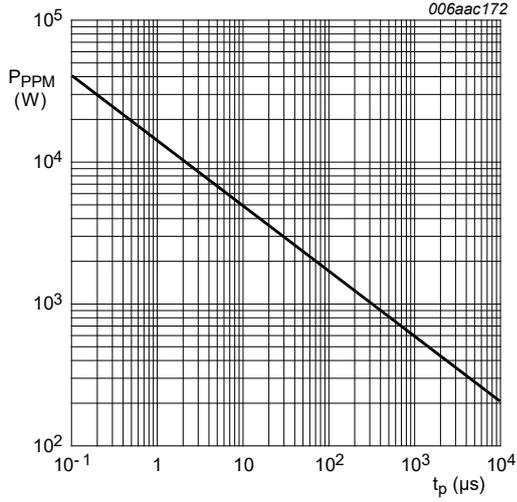
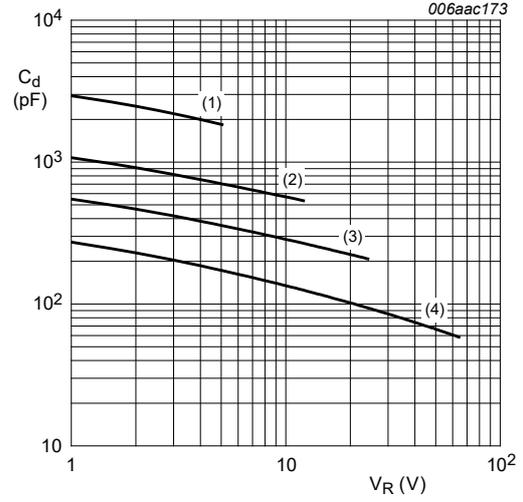


Fig. 2. Relative variation of rated peak pulse power as a function of junction temperature; typical values



$T_{amb} = 25\text{ °C}$

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



$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

- (1) PTVS5V0P1UTP
- (2) PTVS12VP1UTP
- (3) PTVS24VP1UTP
- (4) PTVS64VP1UTP

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

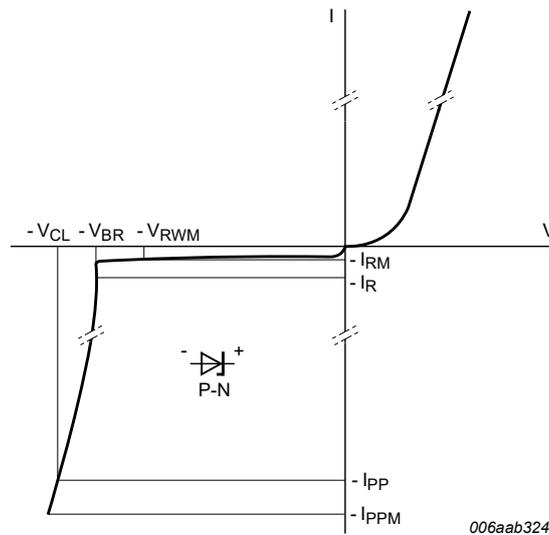


Fig. 5. V-I characteristics for a unidirectional TVS protection diode

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

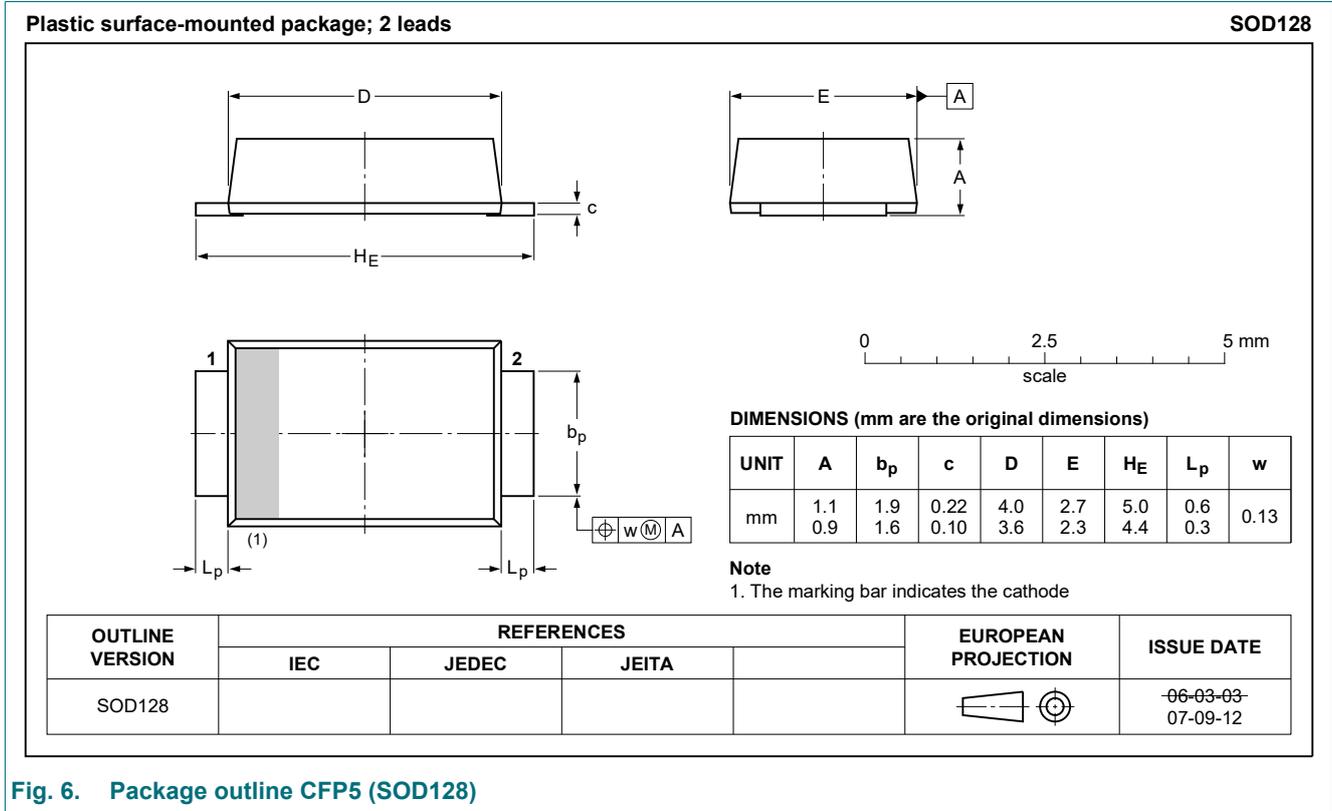


Fig. 6. Package outline CFP5 (SOD128)

13. Soldering

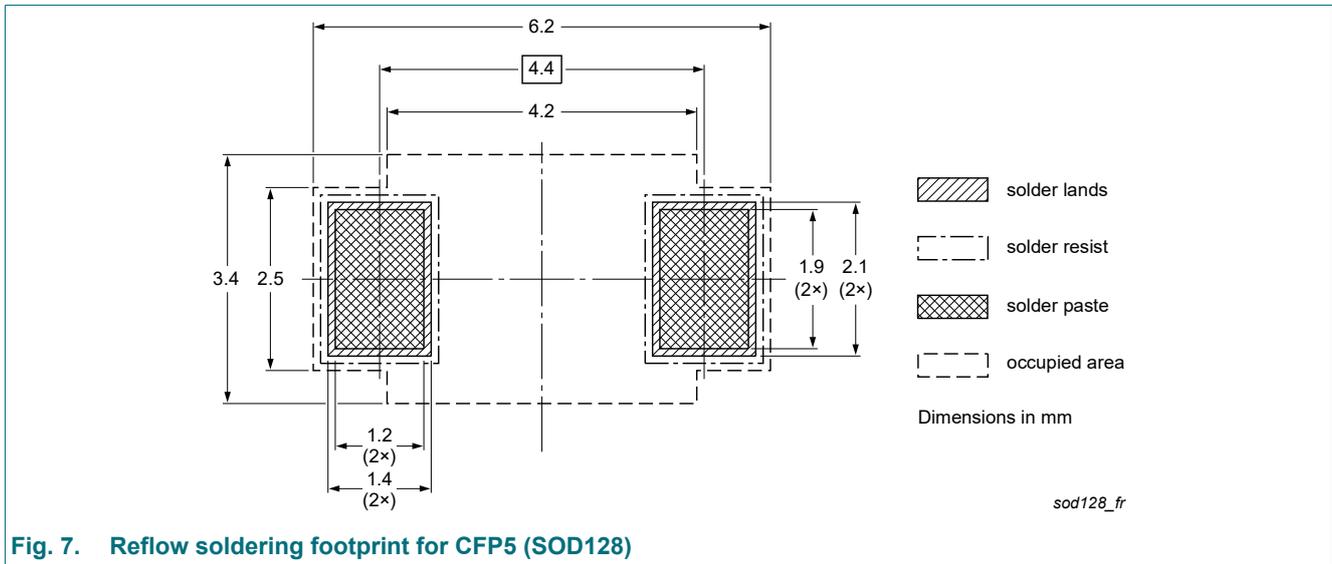


Fig. 7. Reflow soldering footprint for CFP5 (SOD128)

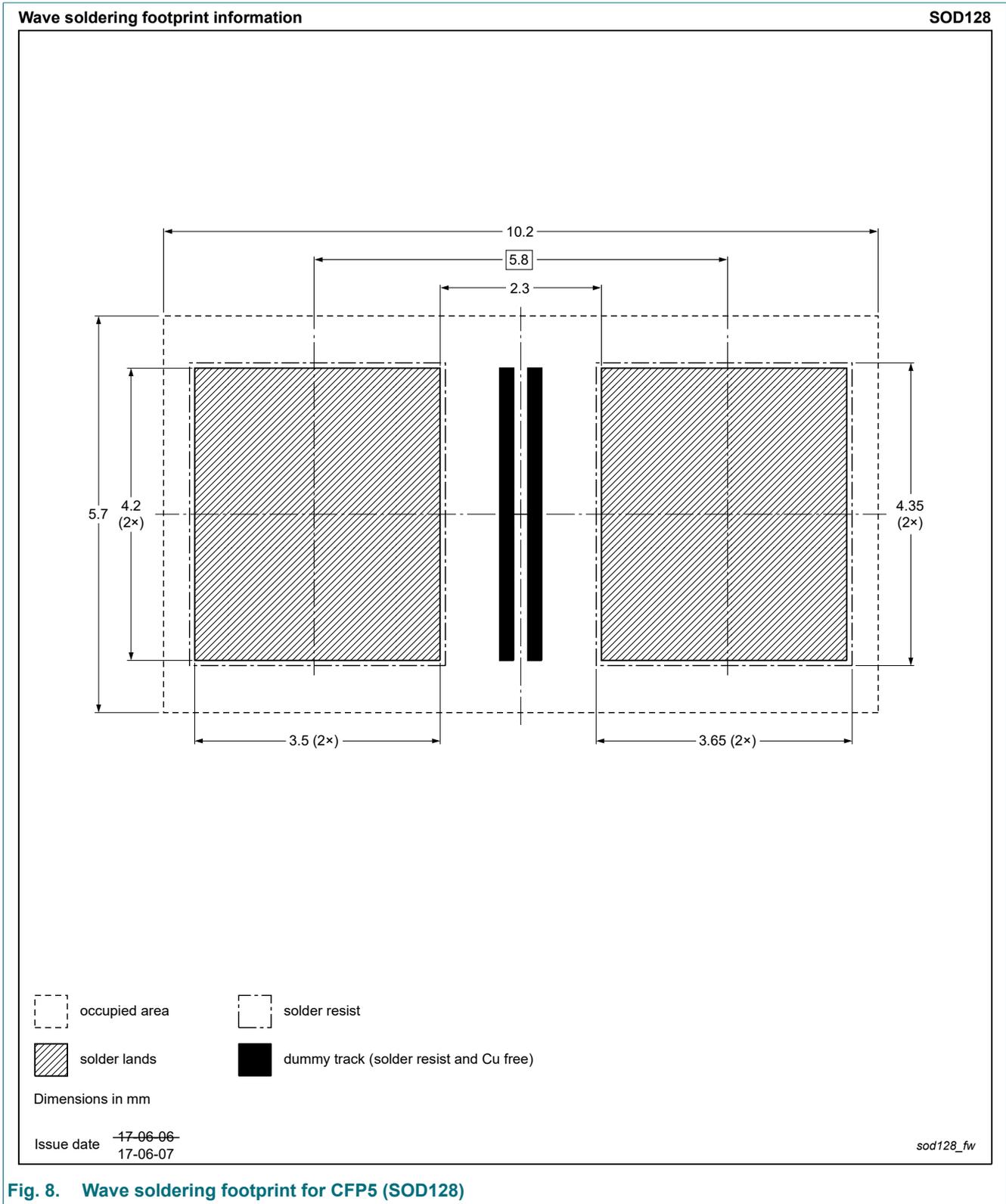


Fig. 8. Wave soldering footprint for CFP5 (SOD128)

14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVSxP1UTP_SER v.2	20251201	Product data sheet	-	PTVSxP1UTP_SER v.1
Modifications:	<ul style="list-style-type: none"> • 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 • 33 products changed to standard qualification: <ul style="list-style-type: none"> PTVS3V3P1UTP PTVS6V0P1UTP PTVS6V5P1UTP PTVS7V0P1UTP PTVS7V5P1UTP PTVS8V0P1UTP PTVS8V5P1UTP PTVS9V0P1UTP PTVS10VP1UTP PTVS11VP1UTP PTVS12VP1UTP PTVS13VP1UTP PTVS14VP1UTP PTVS15VP1UTP PTVS16VP1UTP PTVS17VP1UTP PTVS20VP1UTP PTVS22VP1UTP PTVS24VP1UTP PTVS26VP1UTP PTVS28VP1UTP PTVS30VP1UTP PTVS33VP1UTP PTVS36VP1UTP PTVS40VP1UTP PTVS43VP1UTP PTVS45VP1UTP PTVS48VP1UTP PTVS51VP1UTP PTVS54VP1UTP PTVS58VP1UTP PTVS60VP1UTP PTVS64VP1UTP 			
PTVSxP1UTP_SER v.1	20111011	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.
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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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