PTVS22VZ1USK

Transient voltage suppressor in DSN1608-2 for mobile applications

25 May 2017 **Product data sheet**

1. General description

Unidirectional Transient Voltage Suppressor (TVS) in a very small leadless DSN1608-2 (SOD964) package.

2. Features and benefits

- Average measured peak pulse current: I_{PPM} = 43.5 A (8/20 µs pulse)
- Rated peak pulse current: I_{PPM} = 37 A (8/20 µs pulse)
- Rated peak pulse power: P_{PPM} = 200 W (10/1000 µs pulse)
- Dynamic resistance R_{dyn} = 0.17 Ω
- Very low package height: 0.29 mm

3. Applications

- Power supply protection
- Power management
- Industrial application

4. Quick reference data

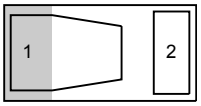
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{PPM}	rated peak pulse current	t_p = 8/20 µs	[1] [2]	-	-	37	A
		t_p = 10/1000 µs	[3] [2]	-	-	5.3	A
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	22	V

[1] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[2] Measured from pin 1 to pin 2.
[3] 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	 Transparent top view **DSN1608-2 (SOD964)**	 *sym035*
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PTVS22VZ1USK	DSN1608-2	leadless very small package; 2 terminals; body 1.6 x 0.8 x 0.29 mm	SOD964

7. Marking

Table 4. Marking codes

Type number	Marking code
PTVS22VZ1USK	Y2

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	t_p = 8/20 µs	[1] [2]	-	1900	W
		t_p = 10/1000 µs	[3] [2]	-	200	W
I_{PPM}	rated peak pulse current	t_p = 8/20 µs	[1] [2]	-	37	A
		t_p = 10/1000 µs	[3] [2]	-	5.3	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-40	125	°C
T_{stg}	storage temperature			-65	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[4] [2]	-	30	kV
		IEC 61000-4-2; air discharge	[4] [2]	-	30	kV

[1] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[2] Measured from pin 1 to pin 2.
[3] In accordance with IEC 61643-321 (10/1000 µs current waveform).

[4] Device stressed with ten non-repetitive ESD pulses.

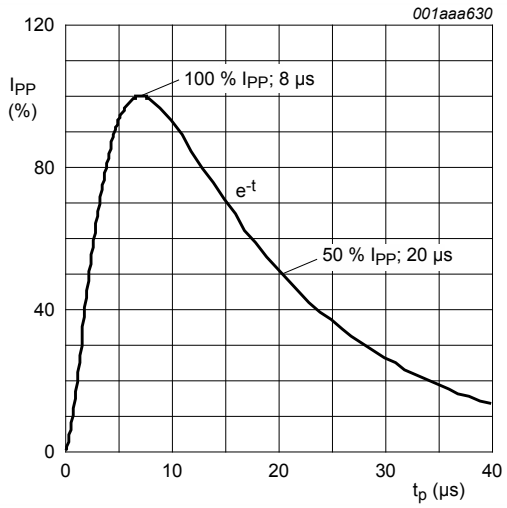


Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

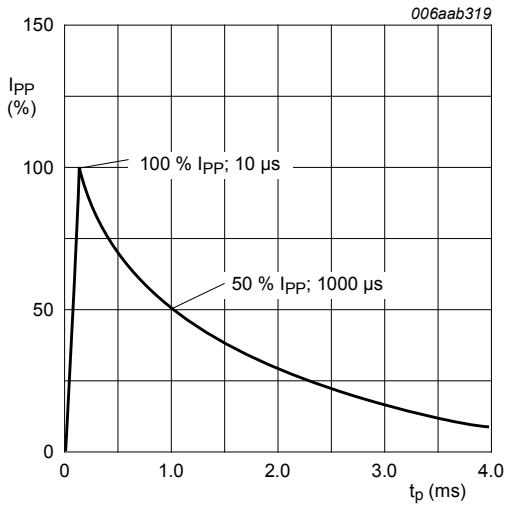


Fig. 2. 10/1000 µs pulse waveform according to IEC 61643-321

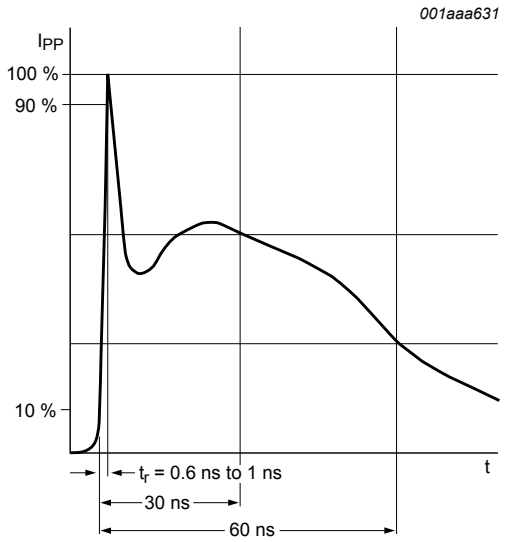


Fig. 3. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	22	V
V_{BR}	breakdown voltage	I_R = 10 mA; T_{amb} = 25 °C	[1]	24.4	25.7	26.9	V
I_{RM}	reverse leakage current	V_R = 22 V; T_{amb} = 25 °C	[1]	-	0.1	200	nA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	247	-	pF
V_{CL}	clamping voltage	I_{PPM} = 37 A; t_p = 8/20 µs; T_{amb} = 25 °C	[2] [1]	-	43.5	52	V
		I_{PPM} = 5.3 A; t_p = 10/1000 µs; T_{amb} = 25 °C	[3] [1]	-	33	39.5	V
R_{dyn}	dynamic resistance	I_R = 10 A; T_{amb} = 25 °C	[4]	-	0.17	-	Ω

[1] Measured from pin 1 to 2.
[2] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[3] In accordance with IEC 61643-321 (10/1000 µs current waveform).
[4] Non-repetitive current pulse, Transmission Line Pulse (TLP) t_p = 100 ns; square pulse; ANSI / ESD STM5.5.1-2008.

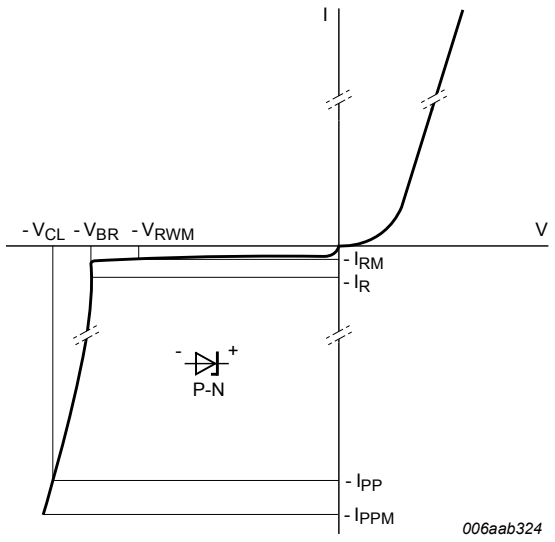
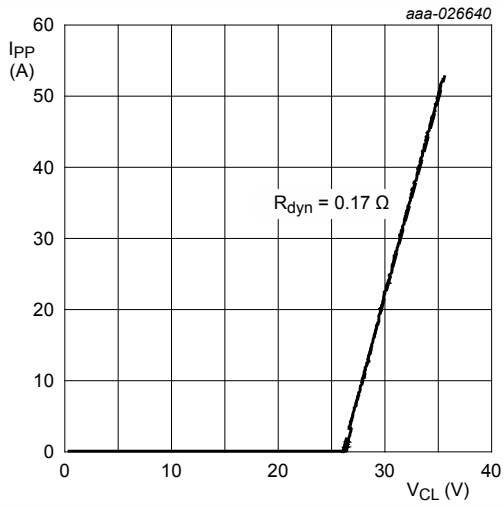
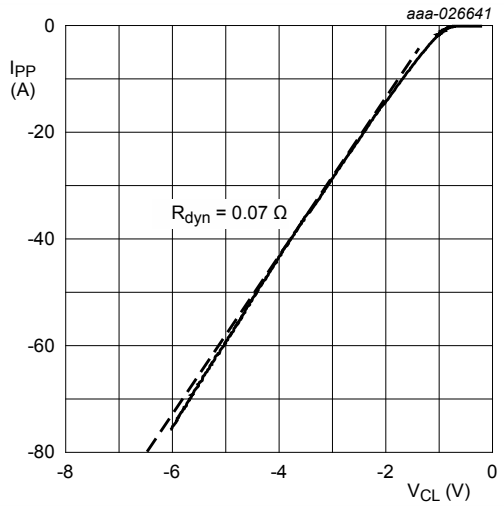


Fig. 4. V-I characteristics for a unidirectional TVS protection diode



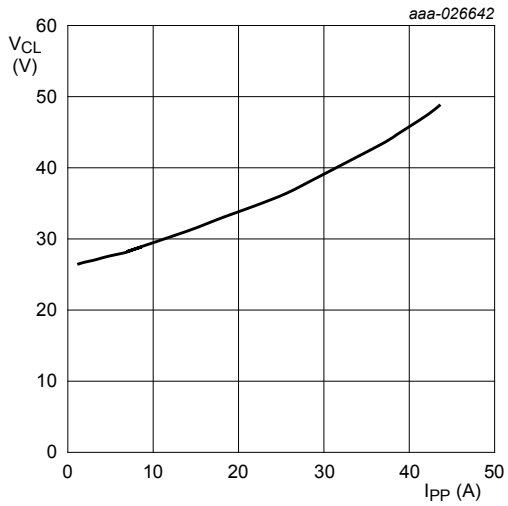
t_p = 100 ns; Transmission Line Pulse (TLP)

Fig. 5. Dynamic resistance with positive clamping voltage



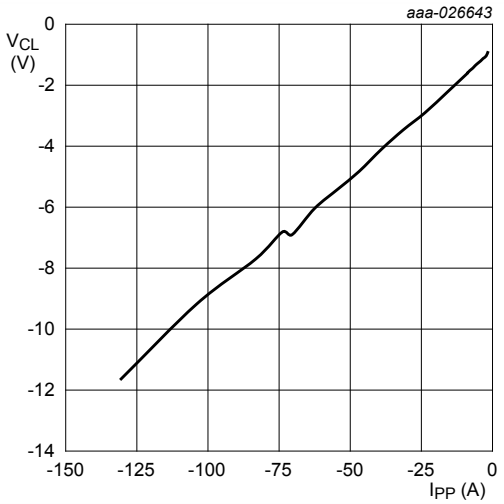
t_p = 100 ns; Transmission Line Pulse (TLP)

Fig. 6. Dynamic resistance with negative clamping voltage



t_p = 8/20 µs; according to IEC 61000-4-5

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



t_p = 8/20 µs; according to IEC 61000-4-5

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

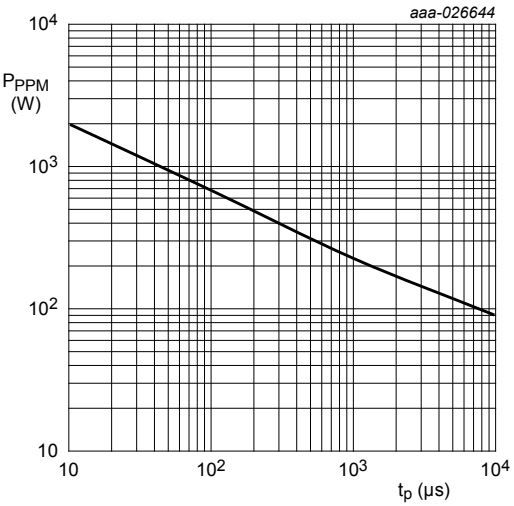


Fig. 9. Rated peak pulse power as a function of square pulse duration; typical values

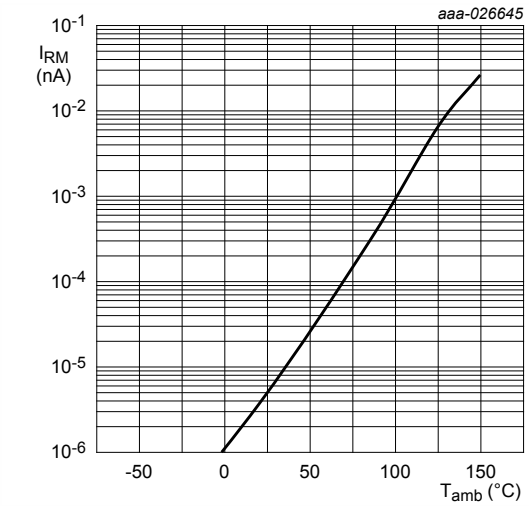


Fig. 10. Relative variation of reverse leakage current as a function of ambient temperature; typical values

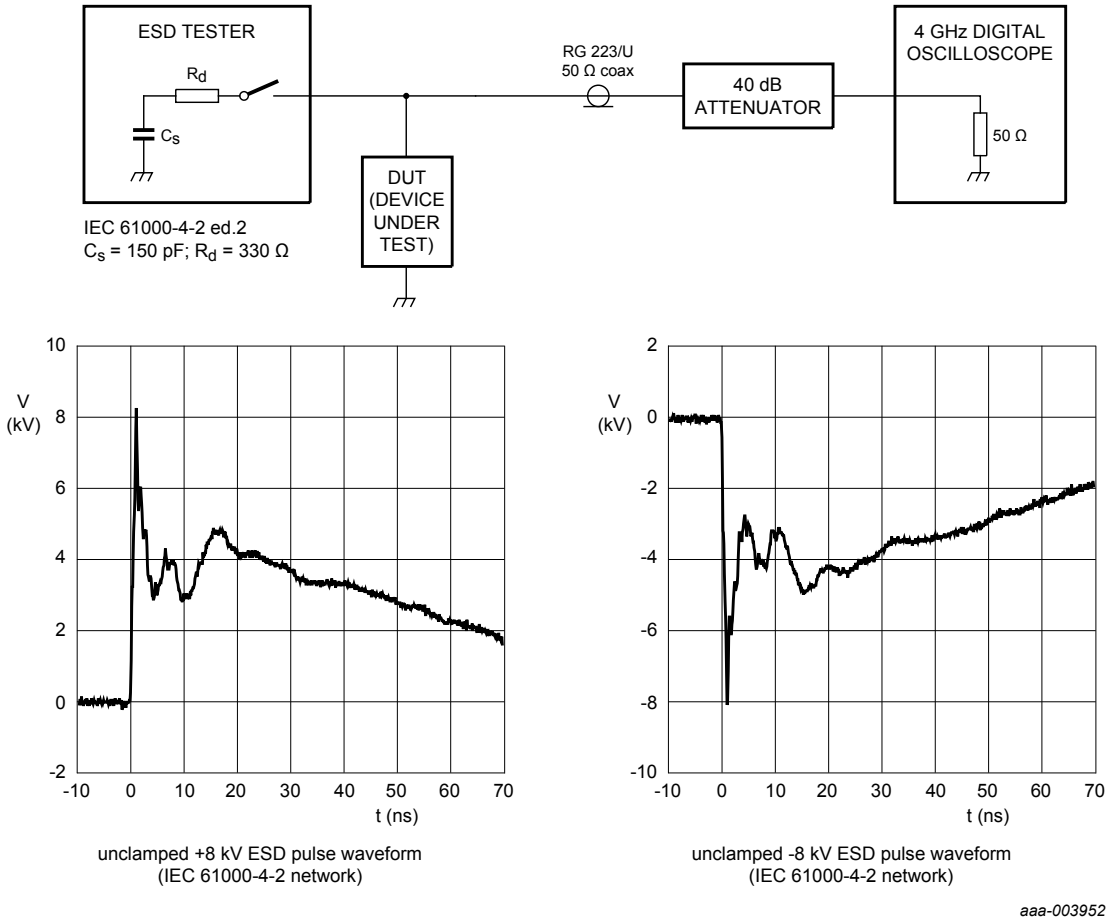


Fig. 11. ESD clamping test setup and waveforms

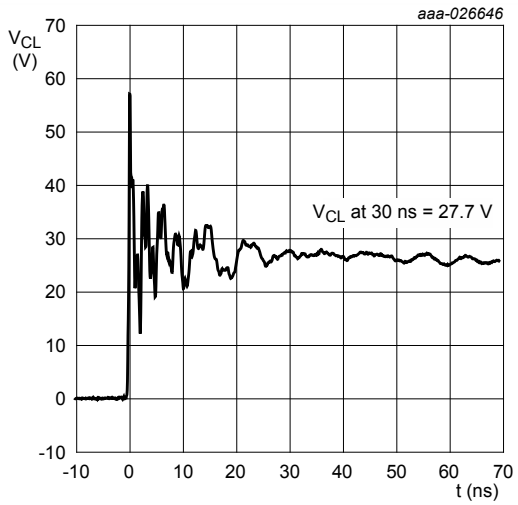


Fig. 12. Clamped +8 kV pulse waveform (IEC61000-4-2 network)

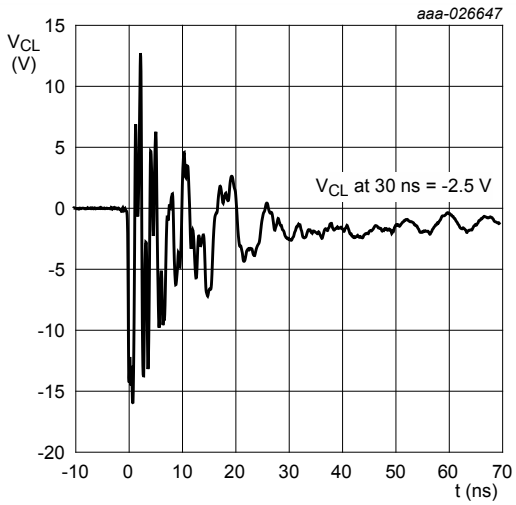
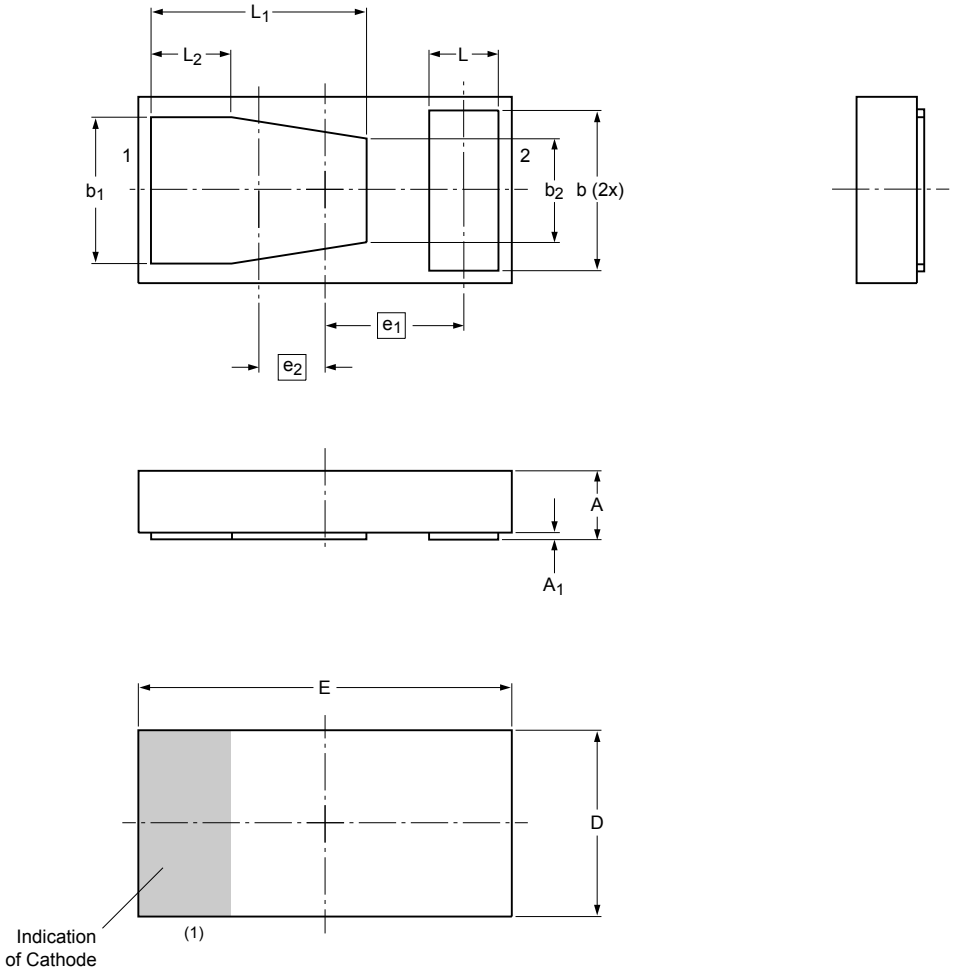


Fig. 13. Clamped -8 kV pulse waveform (IEC61000-4-2 network)

10. Package outline

DSN1608-2, leadless very small package; 2 terminals; body 1.6 x 0.8 x 0.29 mm **SOD964**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b	b_1	b_2	D	E	e_1	e_2	L	L_1	L_2
mm	max	0.31	0.03	0.71	0.645	0.46	0.85	1.65			0.31	0.94	0.36
	nom								0.6	0.285			
	min	0.27		0.69	0.625	0.44	0.75	1.55			0.29	0.92	0.34

Note
1. The marking bar indicates the cathode.

sod964_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD964						~~15-08-13~~ 16-01-03

Fig. 14. Package outline DSN1608-2 (SOD964)

11. Soldering

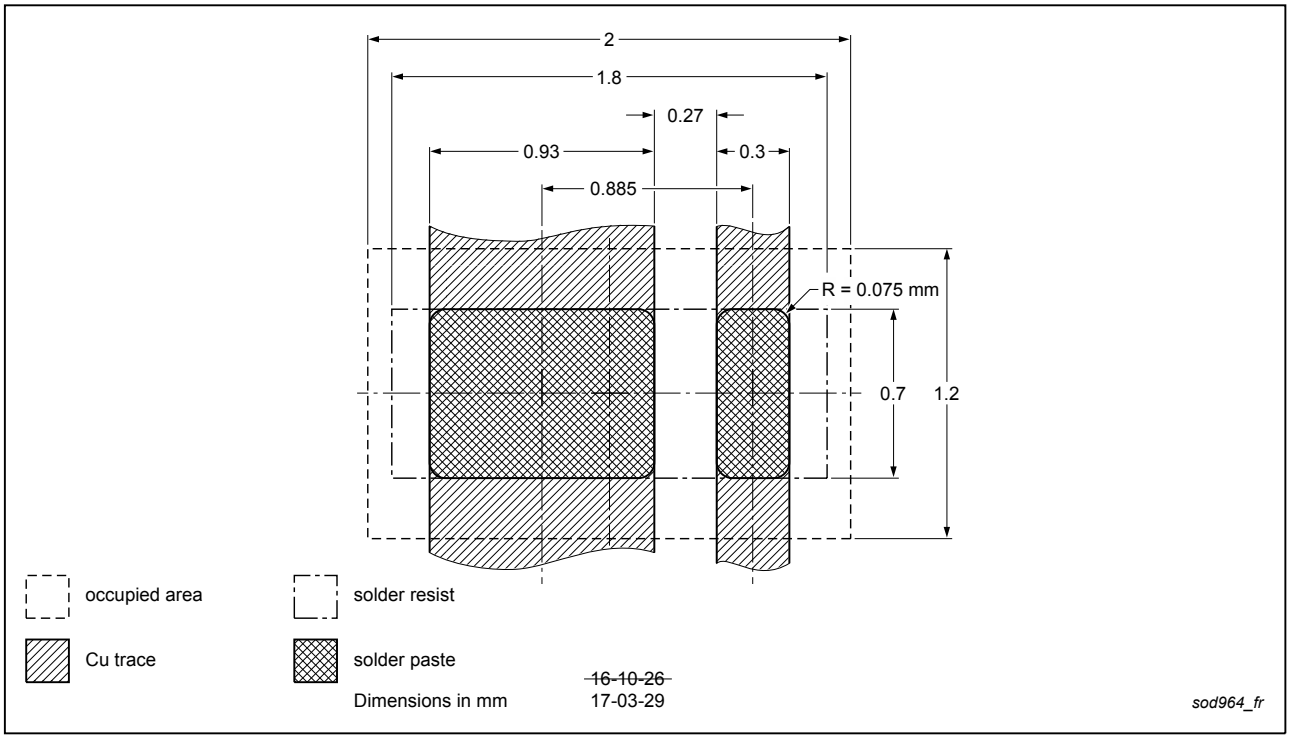


Fig. 15. Reflow soldering footprint for DSN1608-2 (SOD964)

12. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS22VZ1USK v.1	20170525	Product data sheet	-	-

13. 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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