PTVS20VZ1USK

Transient voltage suppressor in DSN1608-2 for mobile applications

11 September 2020 **Product data sheet**

1. General description

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

2. Features and benefits

- Rated peak pulse current: I_{PPM} = 41 A (8/20 µs pulse)
- Rated peak pulse power: P_{PPM} = 2000 W (8/20 µs pulse)
- Dynamic resistance R_{dyn} = 0.2 Ω
- Reverse current: I_{RM} = 1 nA
- Very low package height: 0.29 mm

3. Applications

- Power supply protection
- Industrial application
- 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 °C		-	-	20	V
I_{PPM}	rated peak pulse current	t_p = 8/20 µs	[1] [2]	-	-	41	A
		t_p = 10/1000 µs	[3] [2]	-	-	6	A

[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).

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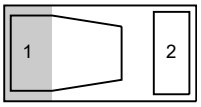
5. Pinning information

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
PTVS20VZ1USK	DSN1608-2	silicon, leadless very small package; 2 terminals; 0.6 mm pitch; 1.6 mm x 0.8 mm x 0.29 mm body	SOD964

7. Marking

Table 4. Marking codes

Type number	Marking code
PTVS20VZ1USK	Z9

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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	t_p = 8/20 µs	[1] [2]	-	2000	W
		t_p = 10/1000 µs	[3] [2]	-	220	W
I_{PPM}	rated peak pulse current	t_p = 8/20 µs	[1] [2]	-	41	A
		t_p = 10/1000 µs	[3] [2]	-	6	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.

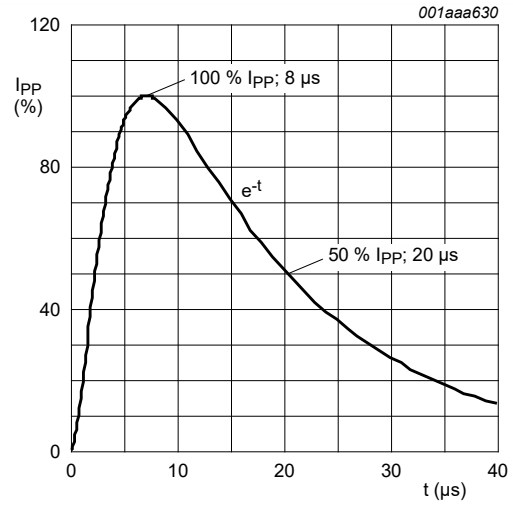

Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

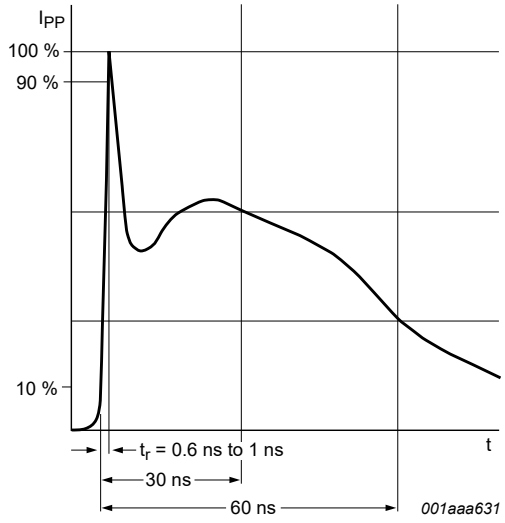

Fig. 2. ESD pulse waveform according to IEC 61000-4-2

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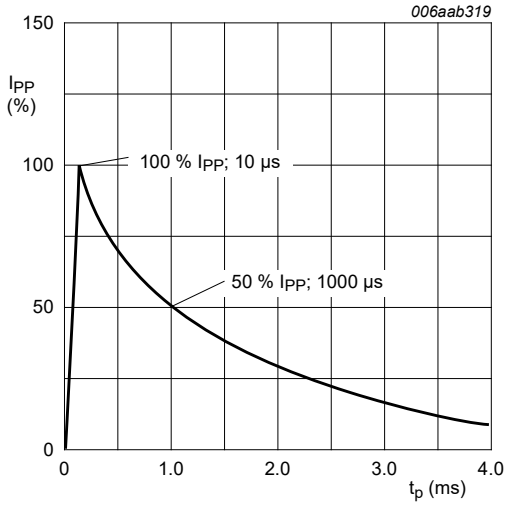

Fig. 3. 10/1000 µs pulse waveform according to IEC 61643-321

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	20	V
V_{BR}	breakdown voltage	I_R = 10 mA; T_{amb} = 25 °C	[1]	22.2	23.8	25.4	V
I_{RM}	reverse leakage current	V_{RWM} = 20 V; T_{amb} = 25 °C	[1]	-	1	100	nA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	260	-	pF
V_{CL}	clamping voltage	I_{PPM} = 41 A; t_p = 8/20 µs; T_{amb} = 25 °C	[2] [1]	-	40.3	48.3	V
		I_{PPM} = 6 A; t_p = 10/1000 µs; T_{amb} = 25 °C	[3] [1]	-	30.75	36.9	V
R_{dyn}	dynamic resistance	I_R = 10 A; T_{amb} = 25 °C	[4] [1]	-	0.2	-	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.

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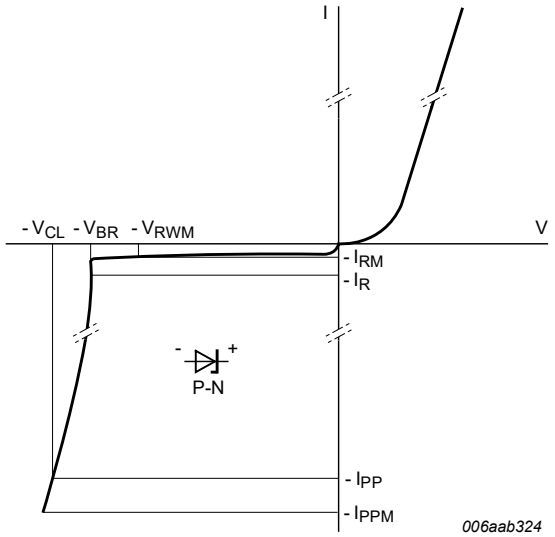


Fig. 4. V-I characteristics for a unidirectional TVS protection diode

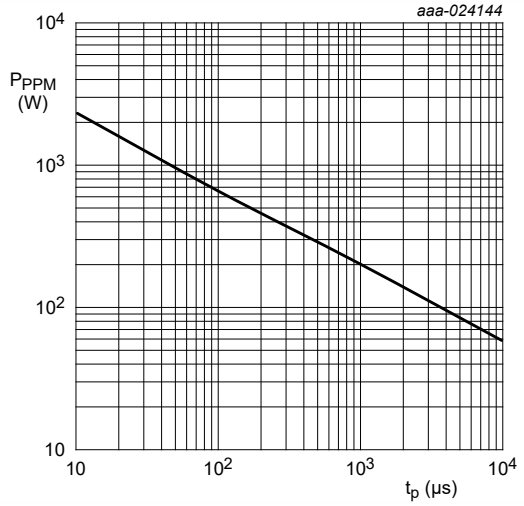


Fig. 5. Rated peak pulse power as a function of square pulse duration; typical values

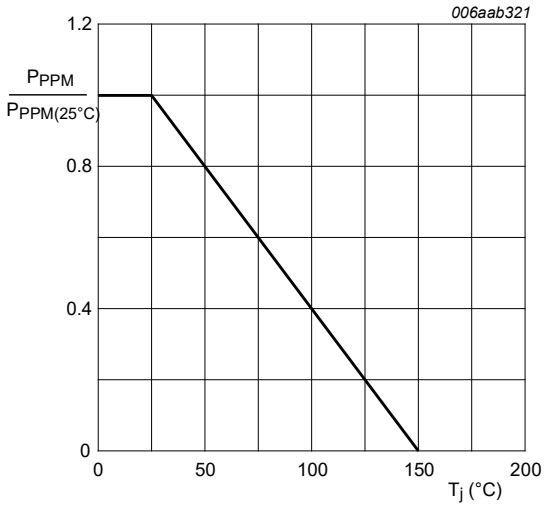
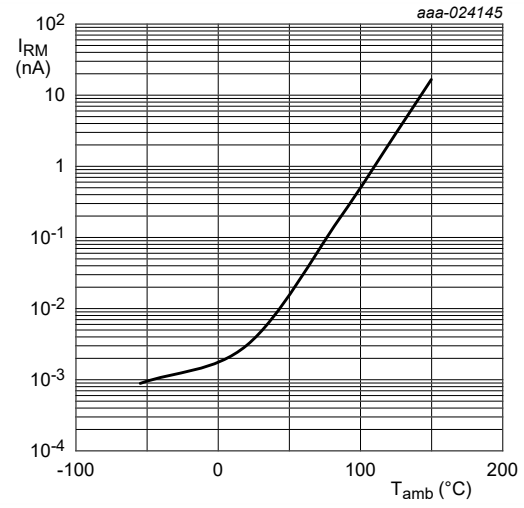


Fig. 6. Relative variation of rated peak pulse power as a function of junction temperature; typical values



V_{RWM} = 20 V

Fig. 7. Relative variation of reverse leakage current as a function of ambient temperature; typical values

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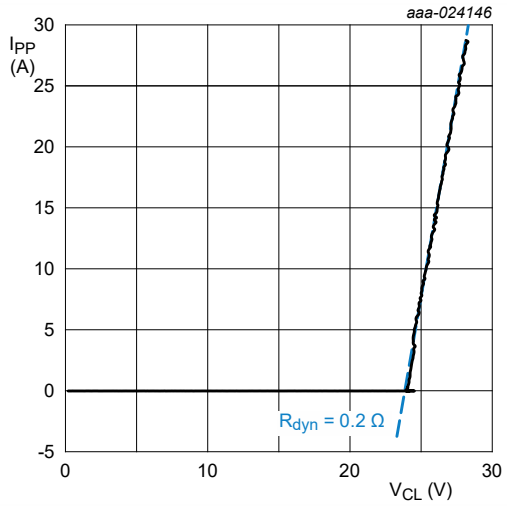
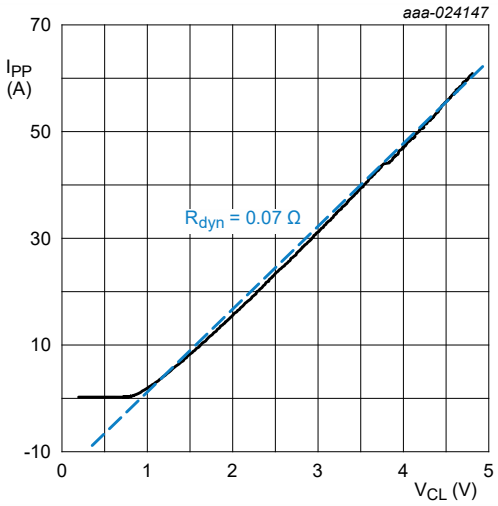


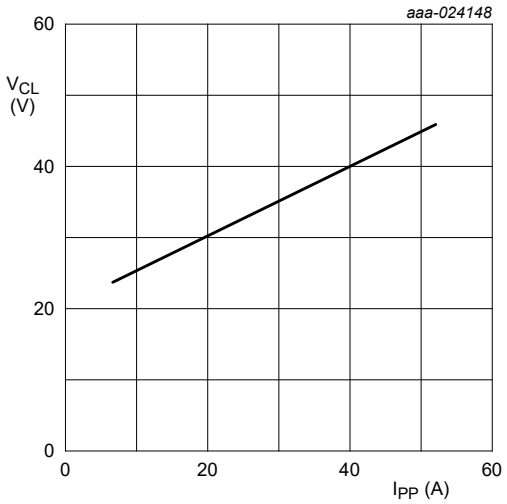
t_p = 100 ns; Transmission Line Pulse (TLP)

Fig. 8. Positive clamping voltage (TLP); typical values



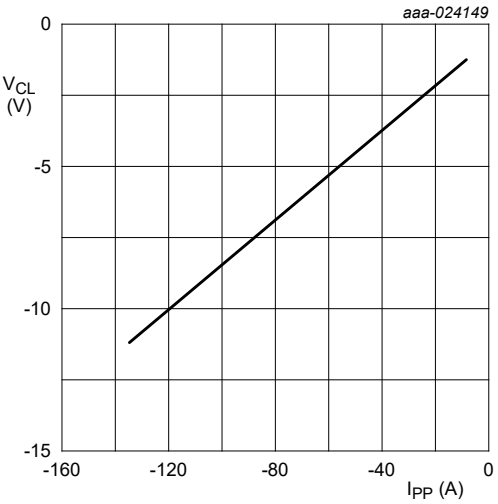
t_p = 100 ns; Transmission Line Pulse (TLP)

Fig. 9. Negative clamping voltage (TLP); typical values



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

Fig. 10. Positive clamping voltage (8/20 µs pulse); typical values



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

Fig. 11. Negative clamping voltage (8/20 µs pulse); typical values

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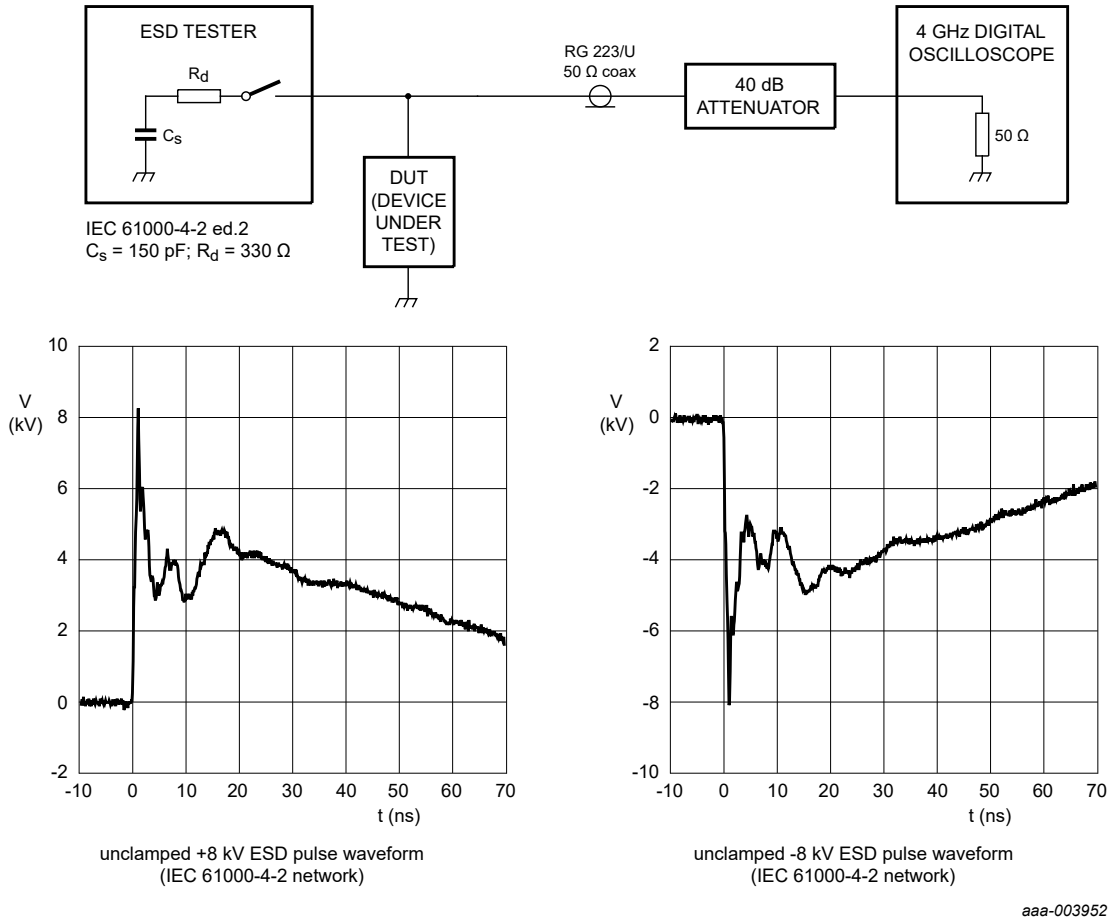

Fig. 12. ESD clamping test setup and waveforms

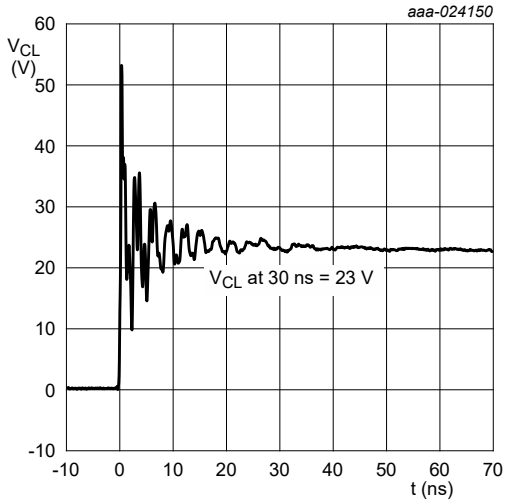

Fig. 13. Clamped +8 kV pulse waveform (IEC 61000-4-2 network)

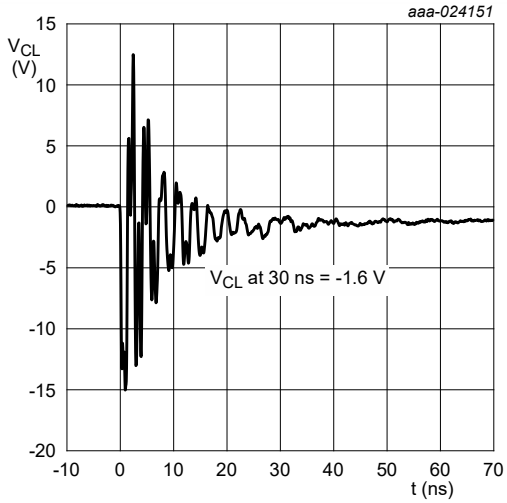

Fig. 14. Clamped -8 kV pulse waveform (IEC 61000-4-2 network)

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10. Application information

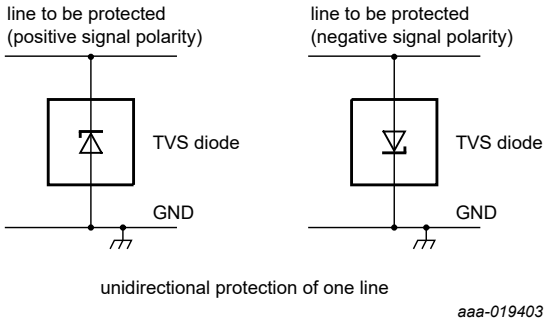

Fig. 15. Application diagram

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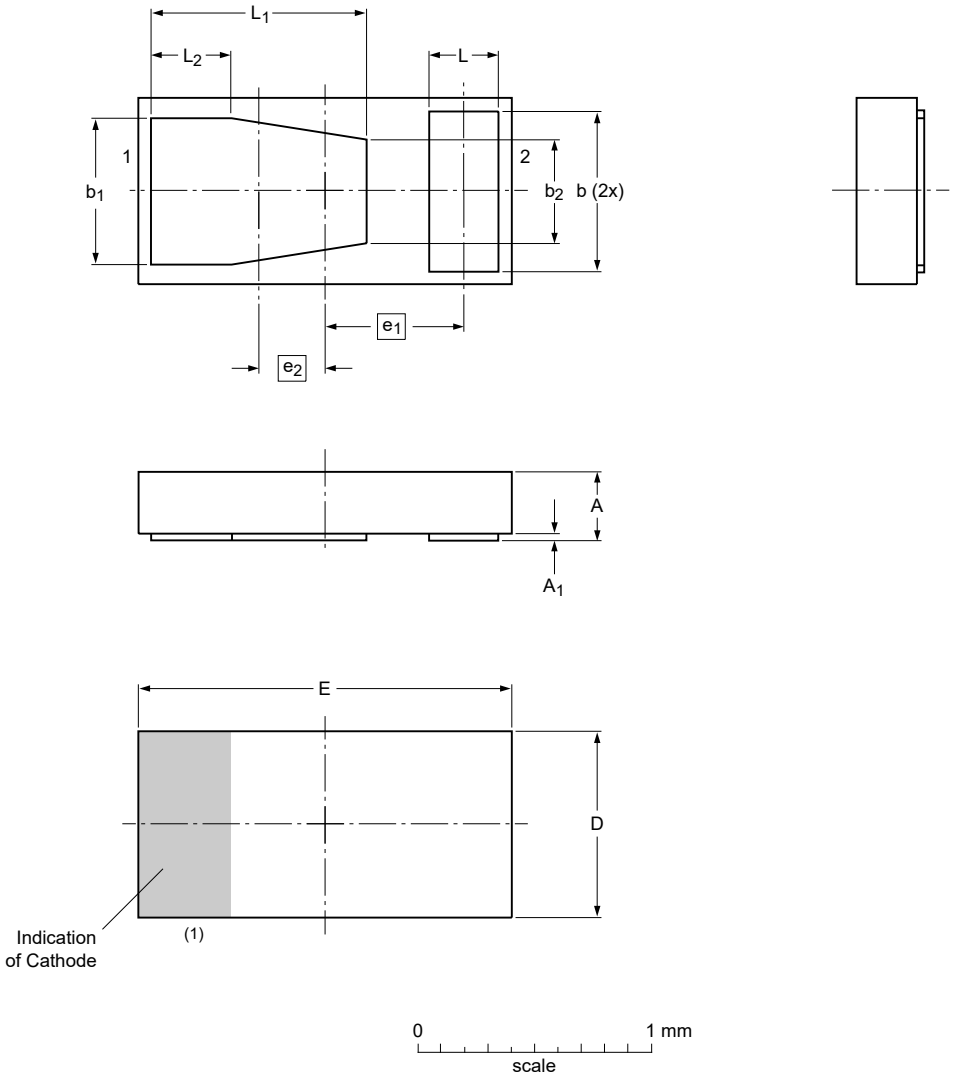
11. Package outline

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	0.6	0.285	0.31	0.94	0.36
	nom												
	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. 16. Package outline DSN1608-2 (SOD964)

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12. Soldering

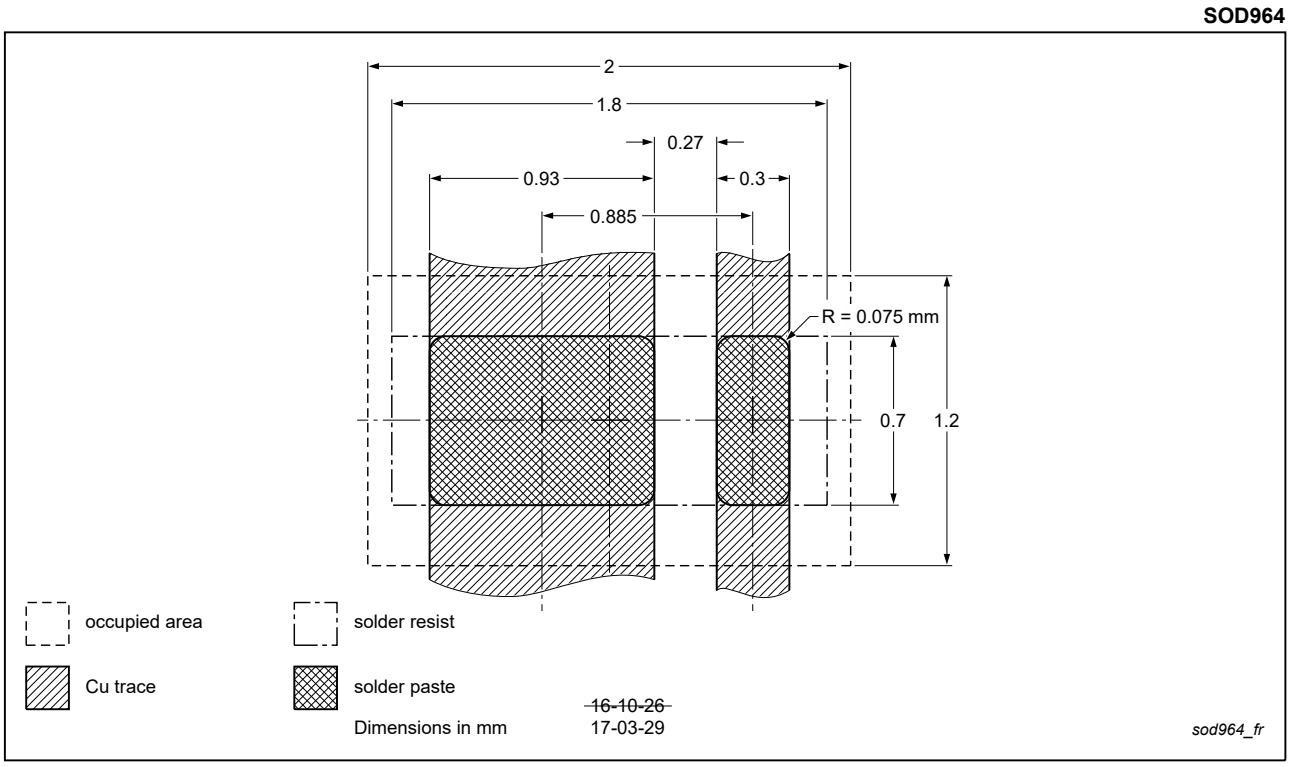

Fig. 17. Reflow soldering footprint for DSN1608-2 (SOD964)

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13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS20VZ1USK v.2	20200911	Product data sheet	-	PTVS20VZ1USK 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. • Chapter "Soldering": Figure for reflow soldering footprint updated.			
PTVS20VZ1USK v.1	20160822	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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Date of release: 11 September 2020