



# PTVS5V0Z1USKP

Transient voltage suppressor in DSN1608-2 for mobile applications

9 June 2017

Product data sheet

## 1. General description

Unidirectional Transient Voltage Suppressor (TVS) in an ultra small leadless DSN1608-2 (SOD964) package, designed for transient overvoltage protection.

## 2. Features and benefits

- Average measured peak pulse current:  $I_{PPM} = 112.5 \text{ A}$  (8/20  $\mu\text{s}$  pulse)
- Rated peak pulse current:  $I_{PPM} = 100 \text{ A}$  (8/20  $\mu\text{s}$  pulse)
- Rated peak pulse power:  $P_{PPM} = 260 \text{ W}$  (10/1000  $\mu\text{s}$  pulse)
- Dynamic resistance  $R_{dyn} = 0.08 \Omega$
- 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	$t_p = 10/1000 \mu\text{s}$	[1] [2]	-	-	23	A
		$t_p = 8/20 \mu\text{s}$	[3] [2]	-	-	100	A
$V_{RWM}$	reverse standoff voltage	$T_j = 25 \text{ }^\circ\text{C}$		-	-	5	V

[1] In accordance with IEC 61643-321.

[2] Measured from pin 1 to pin 2.

[3] In accordance with IEC 61000-4-5.

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	<p>Transparent top view DSN1608-2 (SOD964)</p>	<p>1  2 sym035</p>
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PTVS5V0Z1USKP	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
PTVS5V0Z1USKP	ZP

## 8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
P <sub>PPM</sub>	rated peak pulse power	t <sub>p</sub> = 8/20 μs	[1] [2]	-	2000	W
		t <sub>p</sub> = 10/1000 μs	[3] [2]	-	260	W
I <sub>PPM</sub>	rated peak pulse current	t <sub>p</sub> = 8/20 μs	[1] [2]	-	100	A
		t <sub>p</sub> = 10/1000 μs	[3] [2]	-	23	A
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-40	125	°C
T <sub>stg</sub>	storage temperature			-65	150	°C
<b>ESD maximum ratings</b>						
V <sub>ESD</sub>	electrostatic discharge voltage	IEC 61000-4-2; contact discharge	[4]	-	30	kV
		IEC 61000-4-2; air discharge	[4]	-	30	kV

[1] In accordance with IEC 61000-4-5.

[2] Measured from pin 1 to pin 2.

[3] In accordance with IEC 61643-321.

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

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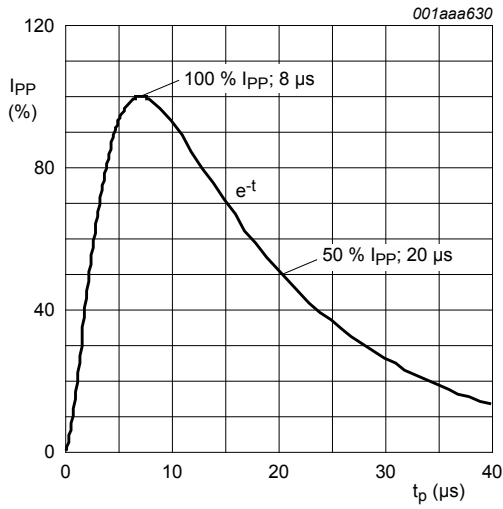


Fig. 1. 8/20  $\mu$ s pulse waveform according to IEC 61000-4-5

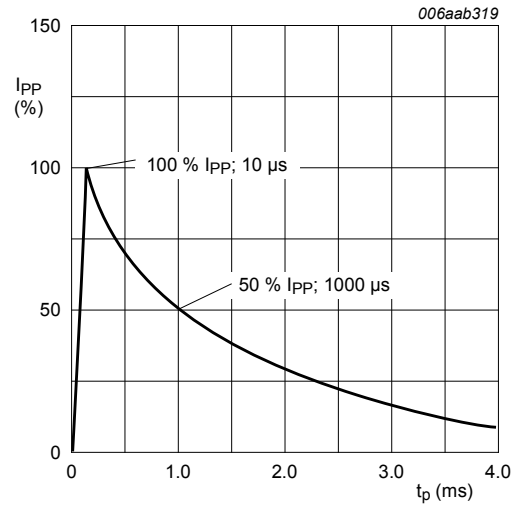


Fig. 2. 10/1000  $\mu$ s pulse waveform according to IEC 61643-321

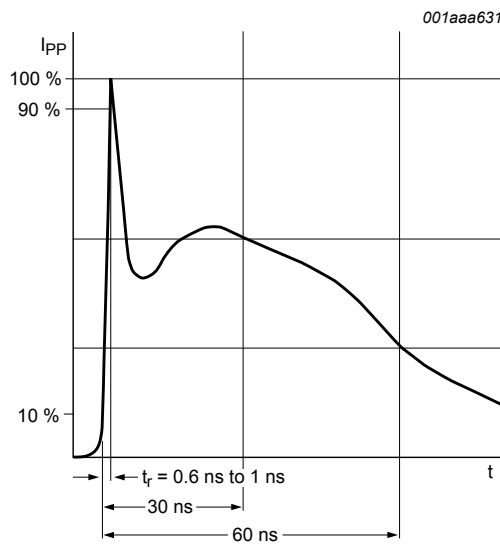


Fig. 3. ESD pulse waveform according to IEC 61000-4-2

### 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_j = 25\text{ }^\circ\text{C}$		-	-	5	V
$V_{BR}$	breakdown voltage	$I_R = 10\text{ mA}; T_j = 25\text{ }^\circ\text{C}$		6.4	7.1	7.8	V
$I_{RM}$	reverse leakage current	$V_R = 5\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	15	200	nA
$V_{CL}$	clamping voltage	$I_{PPM} = 100\text{ A}; t_p = 8/20\text{ }\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$	[1] [2]	-	17.2	20.4	V
		$I_{PPM} = 23\text{ A}; t_p = 10/1000\text{ }\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$	[3] [2]	-	9.5	11.4	V
$R_{dyn}$	dynamic resistance	$I_R = 10\text{ A}; T_j = 25\text{ }^\circ\text{C}$	[4]	-	0.08	-	$\Omega$

- [1] In accordance with IEC 61000-4-5.
- [2] Measured from pin 1 to 2.
- [3] In accordance with IEC 61643-321.
- [4] Non-repetitive current pulse, Transmission Line Pulse (TLP)  $t_p = 100\text{ ns}$ ; square pulse; ANSI / ESD STM5.5.1-2008.

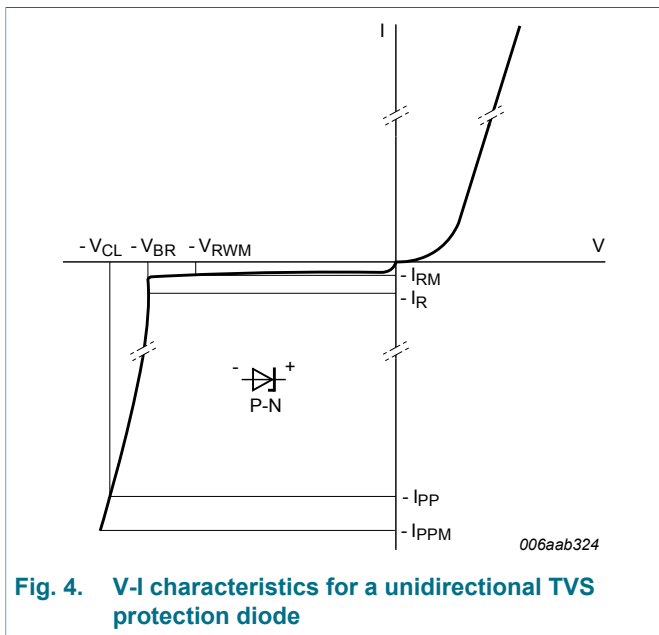


Fig. 4. V-I characteristics for a unidirectional TVS protection diode

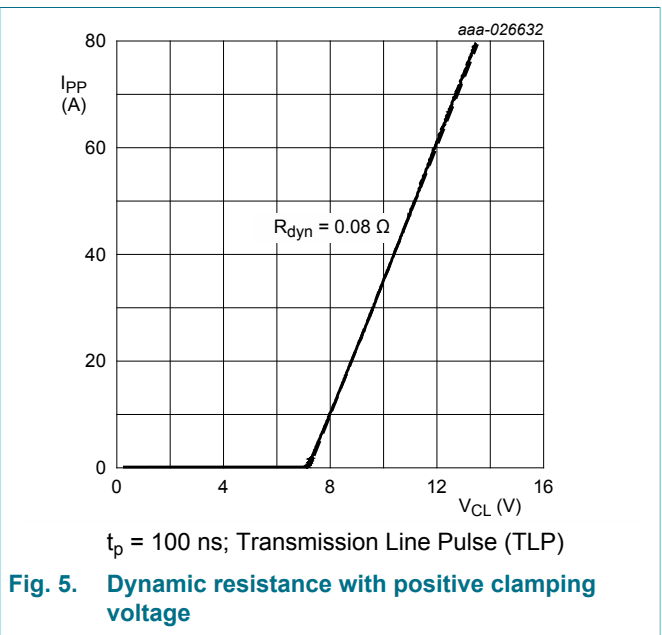
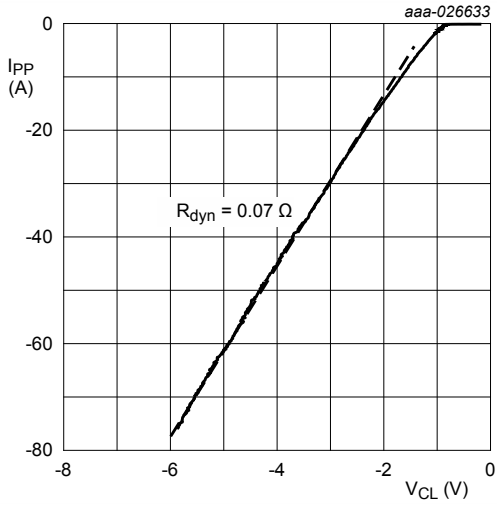


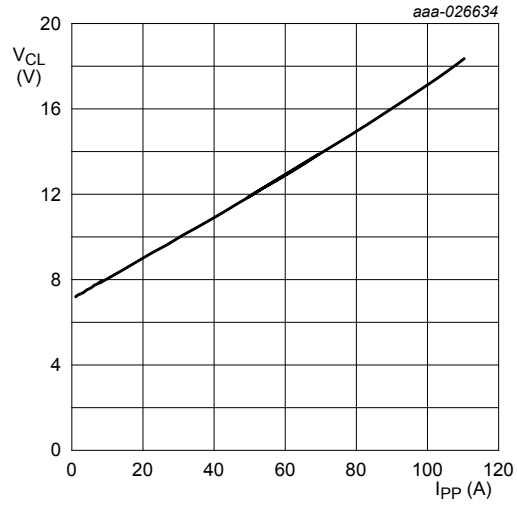
Fig. 5. Dynamic resistance with positive clamping voltage

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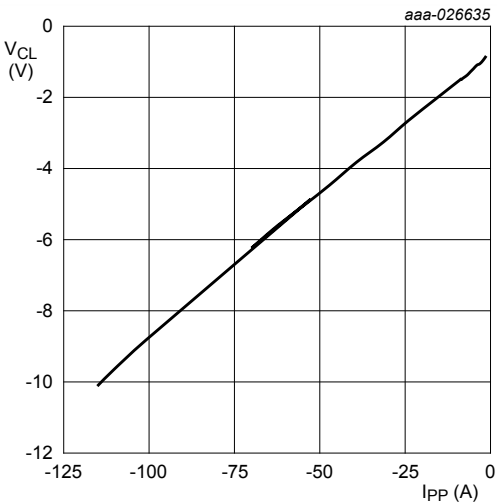
$t_p = 100 \text{ ns}$ ; Transmission Line Pulse (TLP)

**Fig. 6. Dynamic resistance with negative clamping voltage**



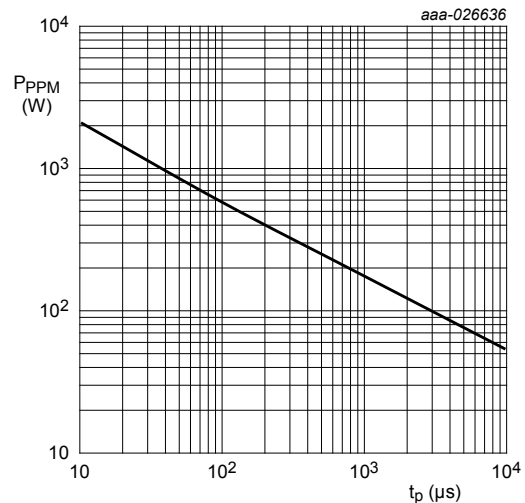
$t_p = 8/20 \text{ }\mu\text{s}$ ; according to IEC 61000-4-5

**Fig. 7. Positive clamping voltage (8/20  $\mu\text{s}$  pulse); typical values**



$t_p = 8/20 \text{ }\mu\text{s}$ ; according to IEC 61000-4-5

**Fig. 8. Negative clamping voltage (8/20  $\mu\text{s}$  pulse); typical values**



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

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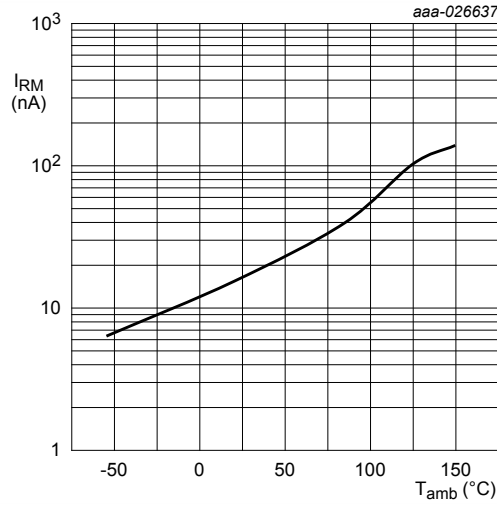


Fig. 10. Relative variation of reverse leakage current as a function of ambient temperature; typical values

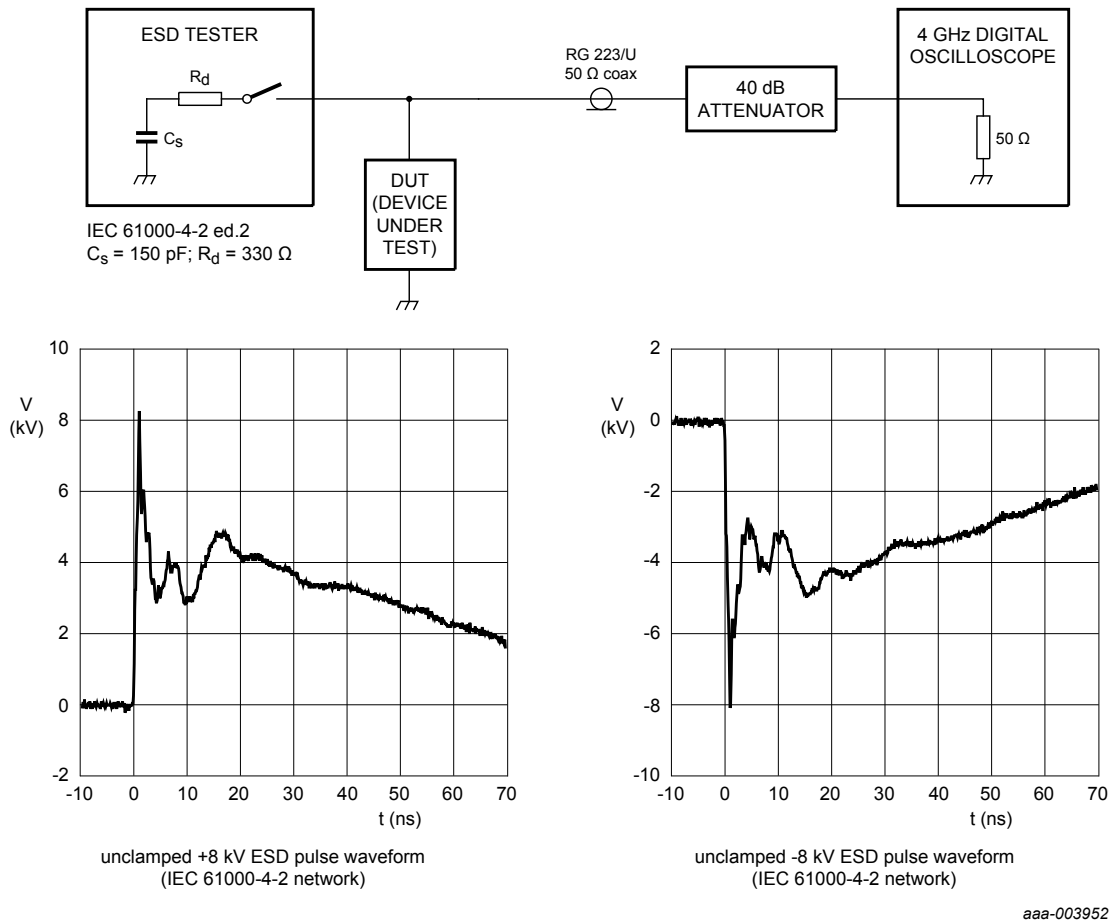


Fig. 11. ESD clamping test setup and waveforms

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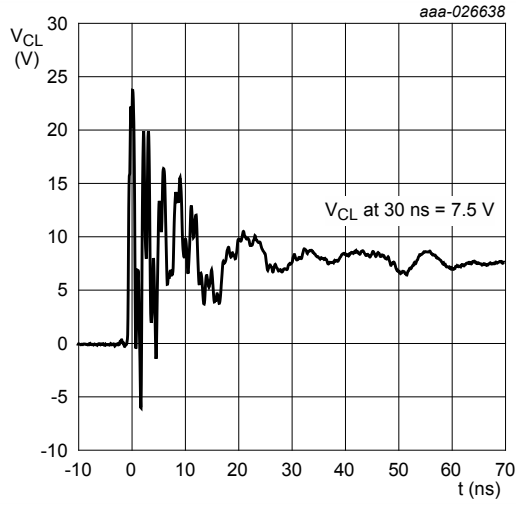


Fig. 12. Clamped +8 kV pulse waveform (IEC61000-4-2 network)

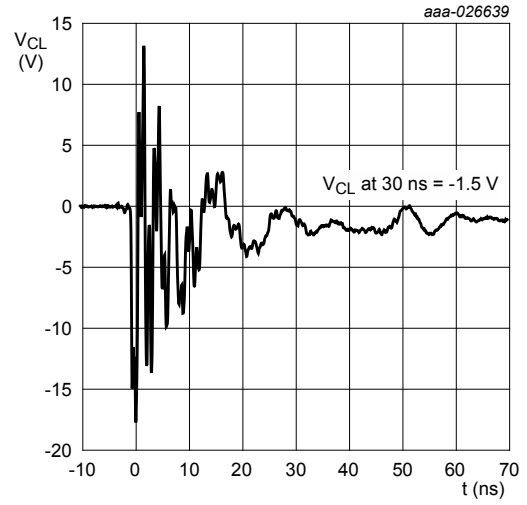
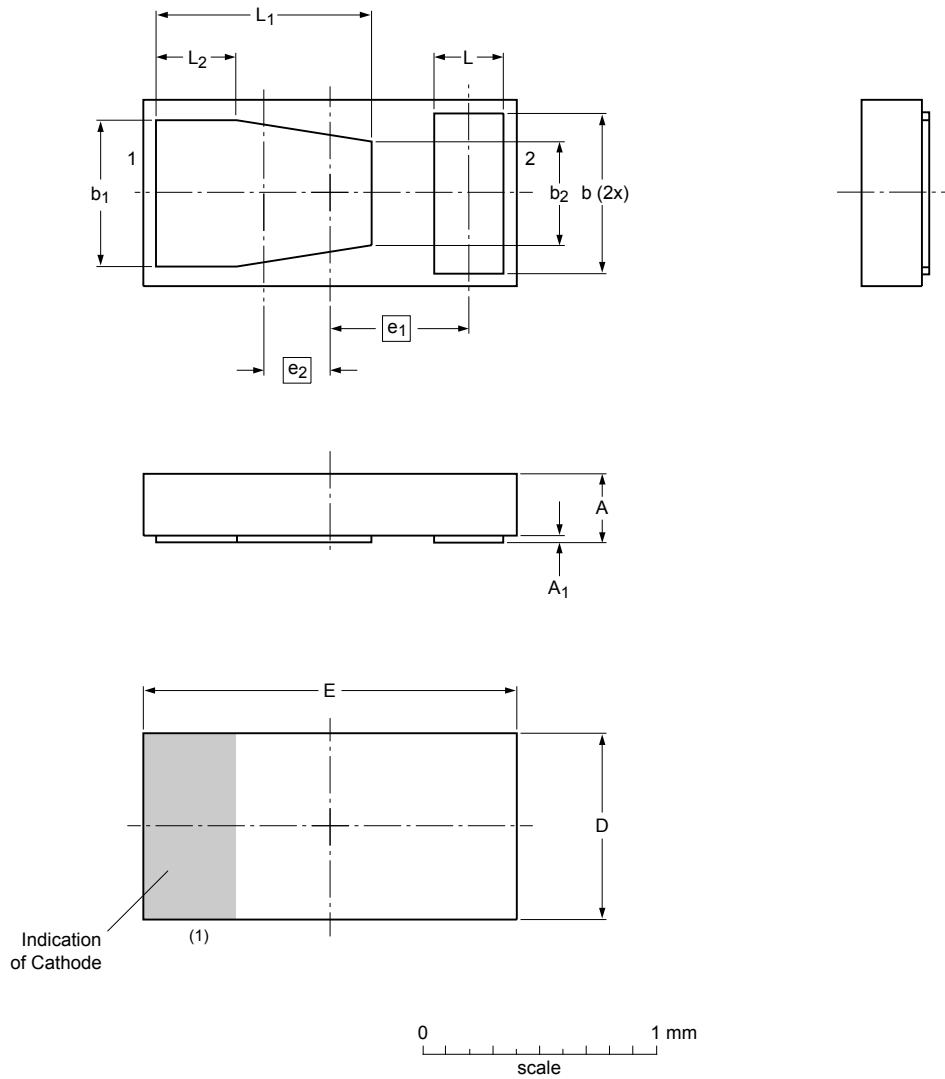


Fig. 13. Clamped -8 kV pulse waveform (IEC61000-4-2 network)

### 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 <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	D	E	e <sub>1</sub>	e <sub>2</sub>	L	L <sub>1</sub>	L <sub>2</sub>
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

SOD964

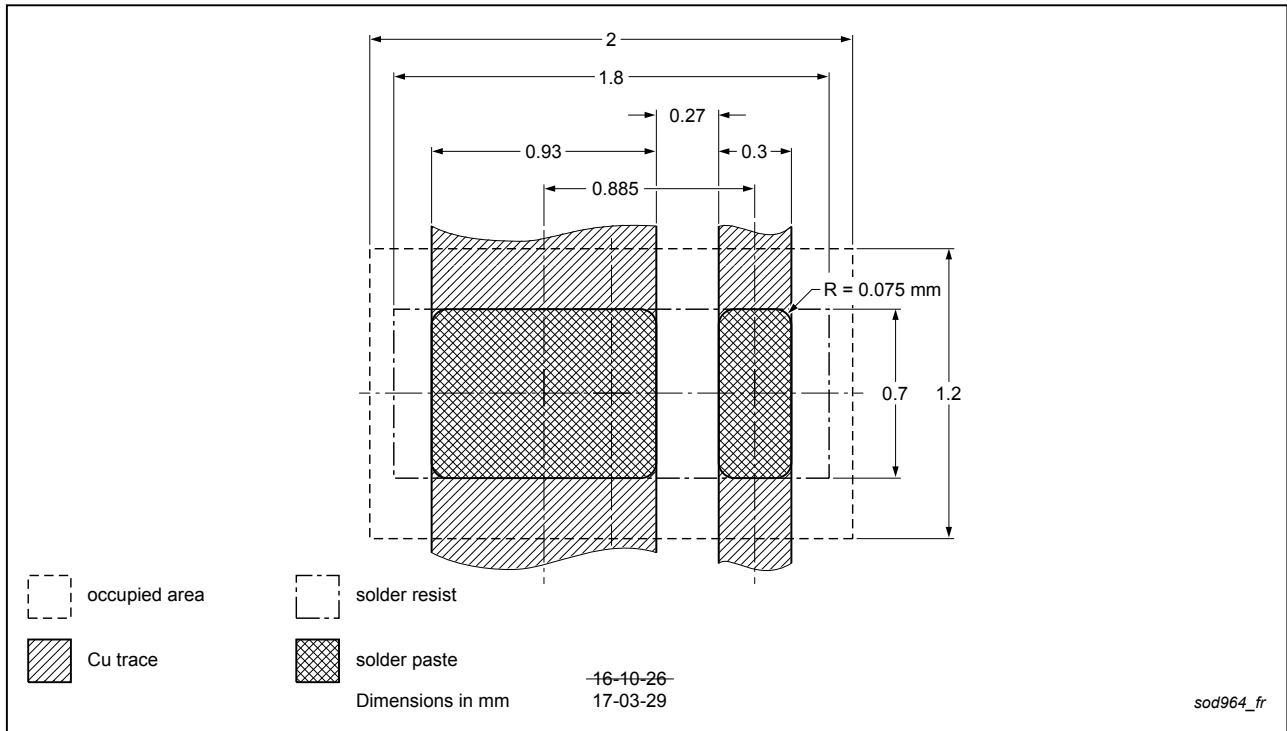


Fig. 15. Reflow soldering footprint for DSN1608-2 (SOD964)

## 12. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS5V0Z1USKP v.1	20170609	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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