



# PTVS5V0Z1USKN

Transient voltage suppressor in DSN1608-2 for mobile applications

22 October 2015

Product data sheet

## 1. General description

Unidirectional Transient Voltage Suppressor (TVS) in an ultra small leadless DSN1608-2 (SOD963) package, designed for transient overvoltage protection.

## 2. Features and benefits

- Rated peak pulse current:  $I_{PPM} = 80 \text{ A}$  (8/20  $\mu\text{s}$  pulse)
- Rated peak pulse power:  $P_{PPM} = 1200 \text{ W}$  (8/20  $\mu\text{s}$  pulse)
- Dynamic resistance  $R_{dyn} = 0.06 \Omega$
- Reverse current:  $I_{RM} = 0.025 \mu\text{A}$
- Very low package height: 0.25 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
$I_{PPM}$	peak pulse current	$t_p = 8/20 \mu\text{s}$	[1][2]	-	-	80	A
		$t_p = 10/1000 \mu\text{s}$	[3][2]	-	-	20	A
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	5	V

[1] In accordance with IEC 61000-4-5 and IEC 61643-321 (8/20  $\mu\text{s}$  current waveform).

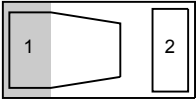

[2] Measured from pin 1 to pin 2.

[3] In accordance with IEC 61643-321 (10/1000  $\mu\text{s}$  current waveform).

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## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>Transparent top view DSN1608-2 (SOD963)</p>	 <p>sym035</p>
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PTVS5V0Z1USKN	DSN1608-2	leadless ultra small package; 2 terminals; body 1.6 x 0.8 x 0.25 mm	SOD963

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PTVS5V0Z1USKN	Z2

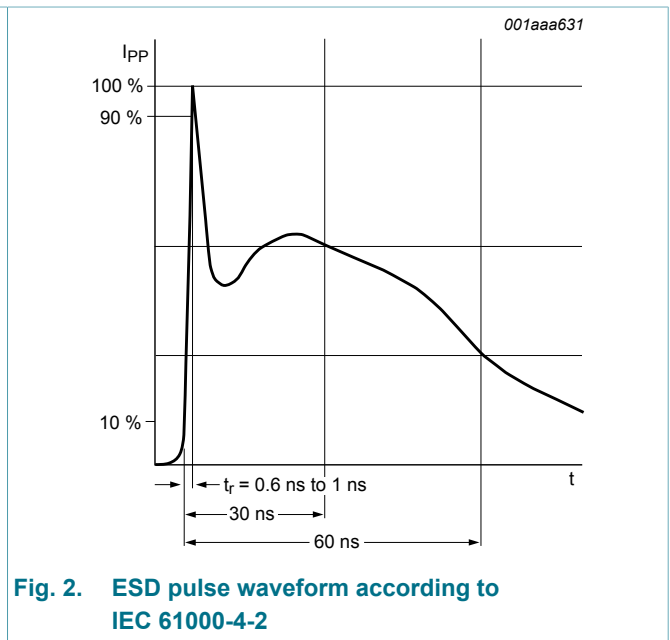
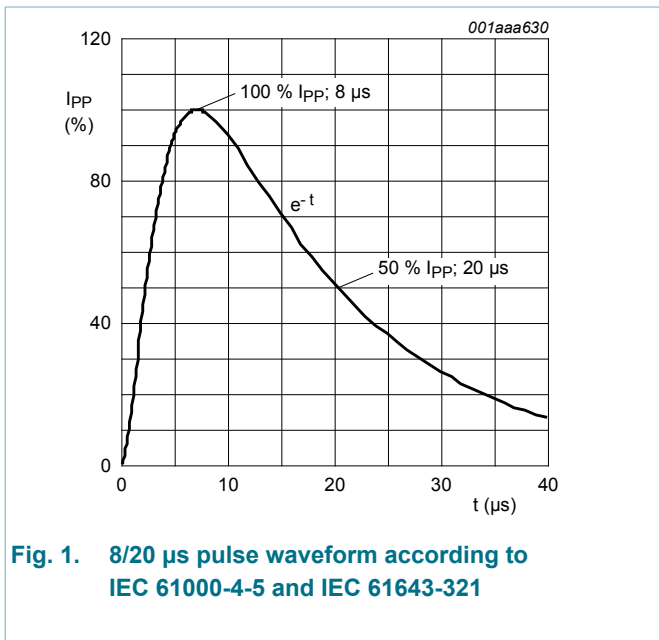
## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
P <sub>PPM</sub>	peak pulse power	t <sub>p</sub> = 8/20 μs	[1][2]	-	1200	W
		t <sub>p</sub> = 10/1000 μs	[3][2]	-	200	W
I <sub>PPM</sub>	peak pulse current	t <sub>p</sub> = 8/20 μs	[1][2]	-	80	A
		t <sub>p</sub> = 10/1000 μs	[3][2]	-	20	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][2]	-	30	kV
		IEC 61000-4-2; air discharge	[4][2]	-	30	kV

- [1] In accordance with IEC 61000-4-5 and IEC 61643-321 (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.



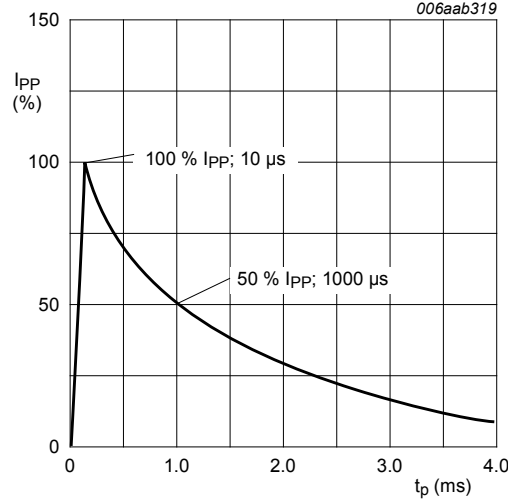


Fig. 3. 10/1000  $\mu$ s pulse waveform according to IEC 61643-321

## 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	5	V
$I_{RM}$	reverse leakage current	$V_R = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	0.025	1	$\mu$ A
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1200	-	pF
$V_{BR}$	breakdown voltage	$I_R = 10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	7	7.8	V
$V_{CL}$	clamping voltage	$I_{PPM} = 80\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}; t_p = 8/20\text{ }\mu\text{s}$	[2][1]	-	18	V
		$I_{PPM} = 20\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}; t_p = 10/1000\text{ }\mu\text{s}$	[3][1]	-	12	V
$R_{dyn}$	dynamic resistance	$I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[4][1]	0.06	-	$\Omega$

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

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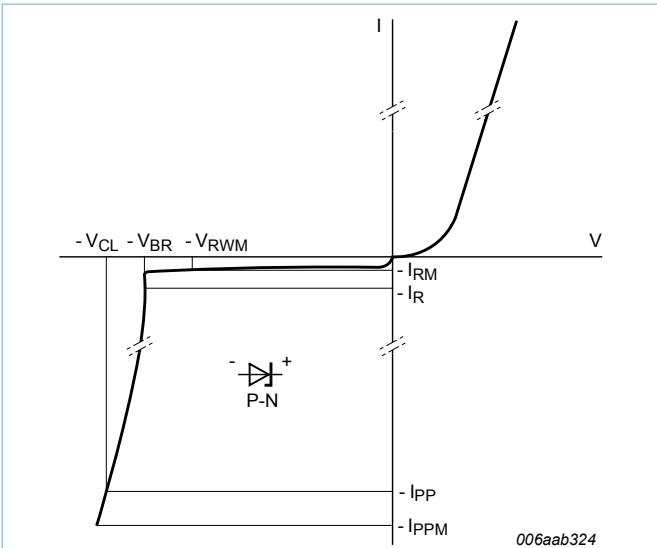


Fig. 4. V-I characteristics for a unidirectional TVS protection diode

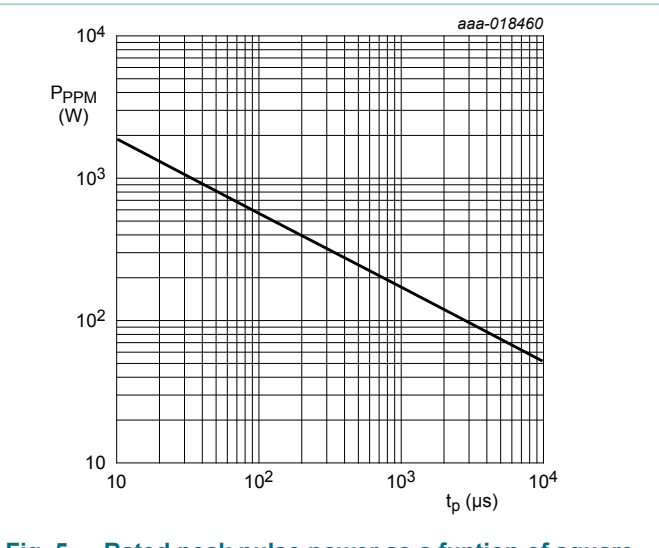


Fig. 5. Rated peak pulse power as a function of square pulse duration; typical values

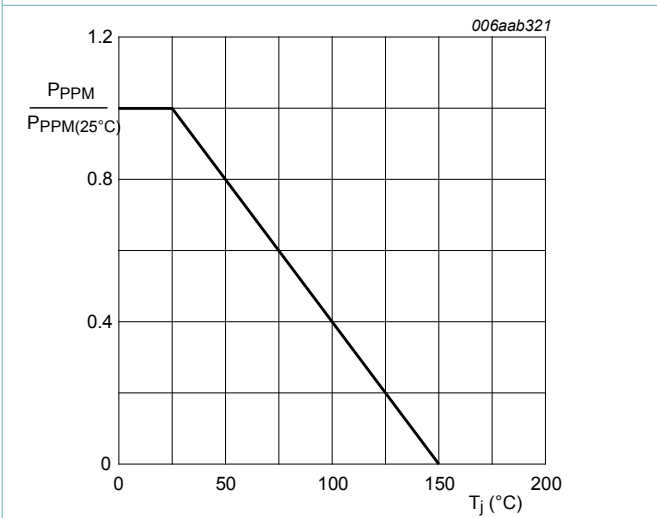


Fig. 6. Relative variation of rated peak pulse power as a function of junction temperature; typical values

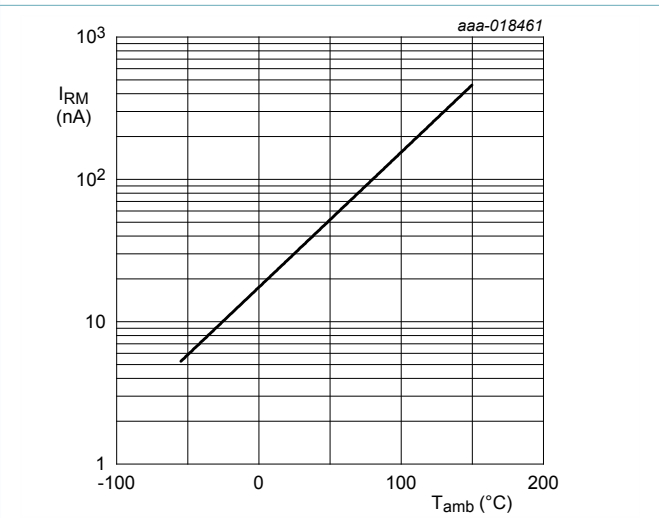
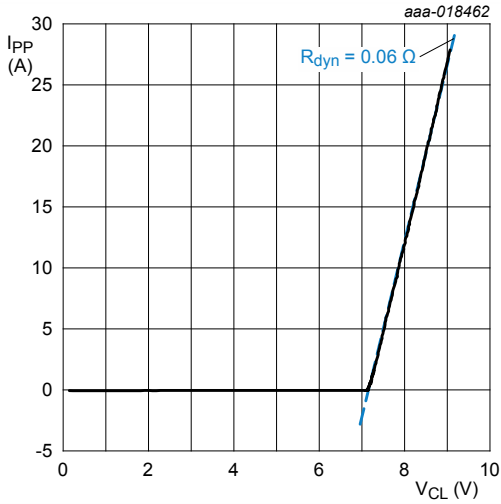


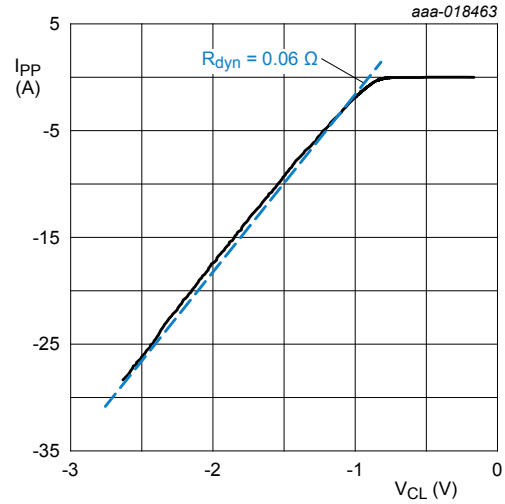
Fig. 7. Relative variation of reverse leakage current as a function of junction temperature; typical values

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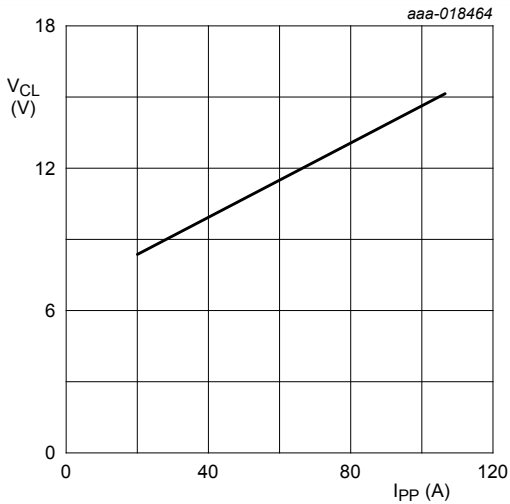
$t_p = 100 \text{ ns}$ ; Transmission Line Pulse (TLP)

**Fig. 8. Dynamic resistance with positive clamping voltage; typical values**



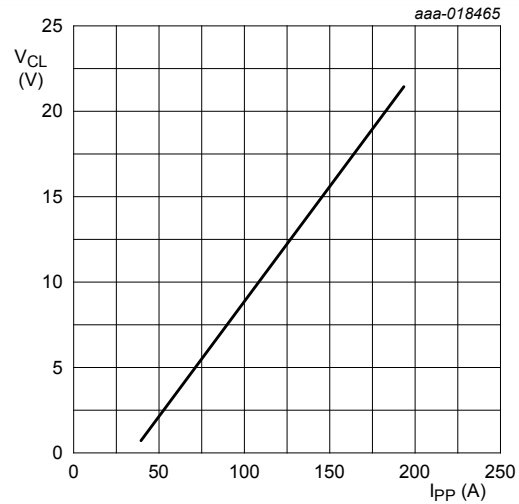
$t_p = 100 \text{ ns}$ ; Transmission Line Pulse (TLP)

**Fig. 9. Dynamic resistance with negative clamping voltage; typical values**



$t_p = 8/20 \text{ }\mu\text{s}$ ; according to IEC 61000-4-5 and IEC 61643-321

**Fig. 10. Dynamic resistance with positive clamping voltage; typical values**



$t_p = 8/20 \text{ }\mu\text{s}$ ; according to IEC 61000-4-5 and IEC 61643-321

**Fig. 11. Dynamic resistance with negative clamping voltage; typical values**

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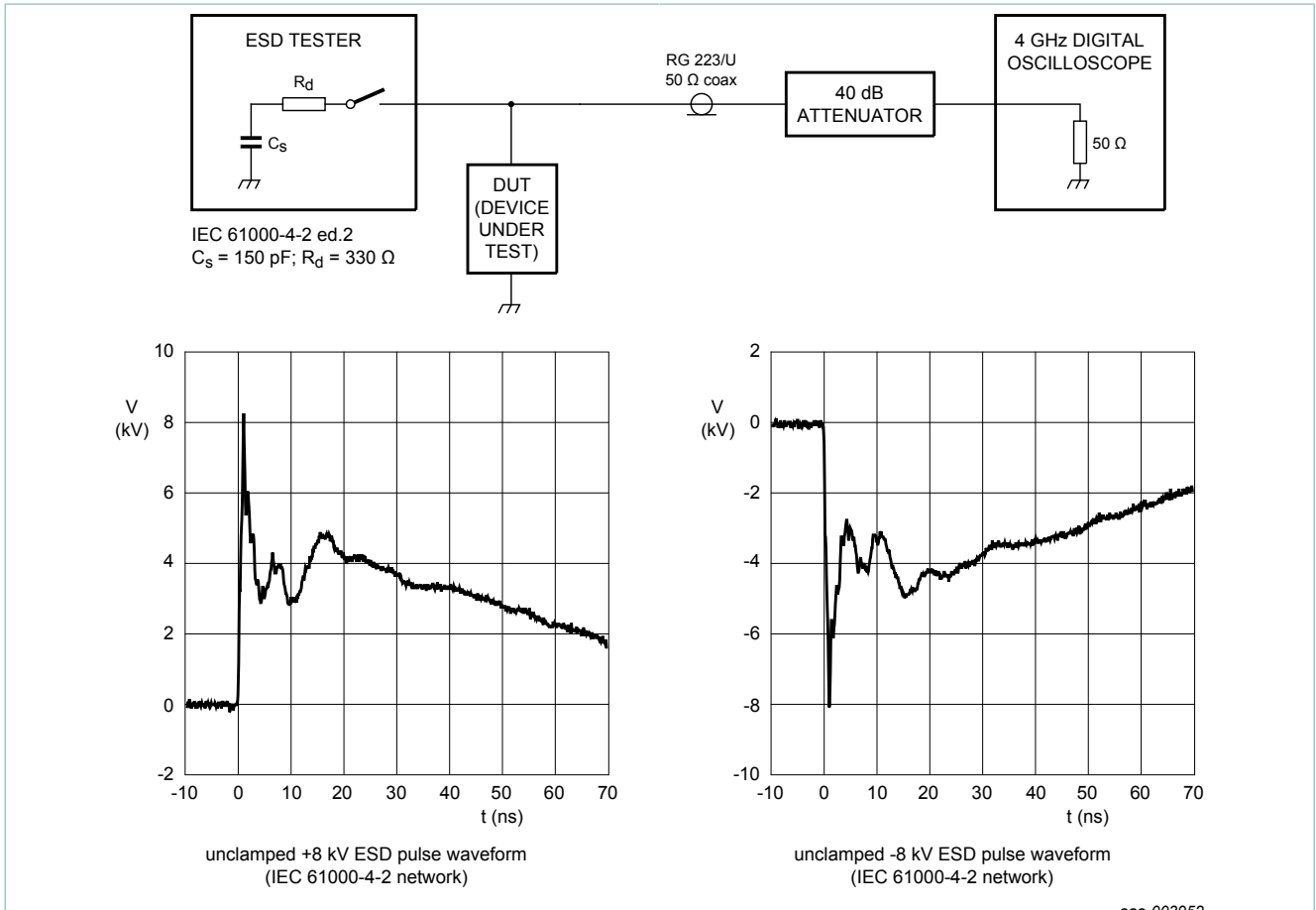
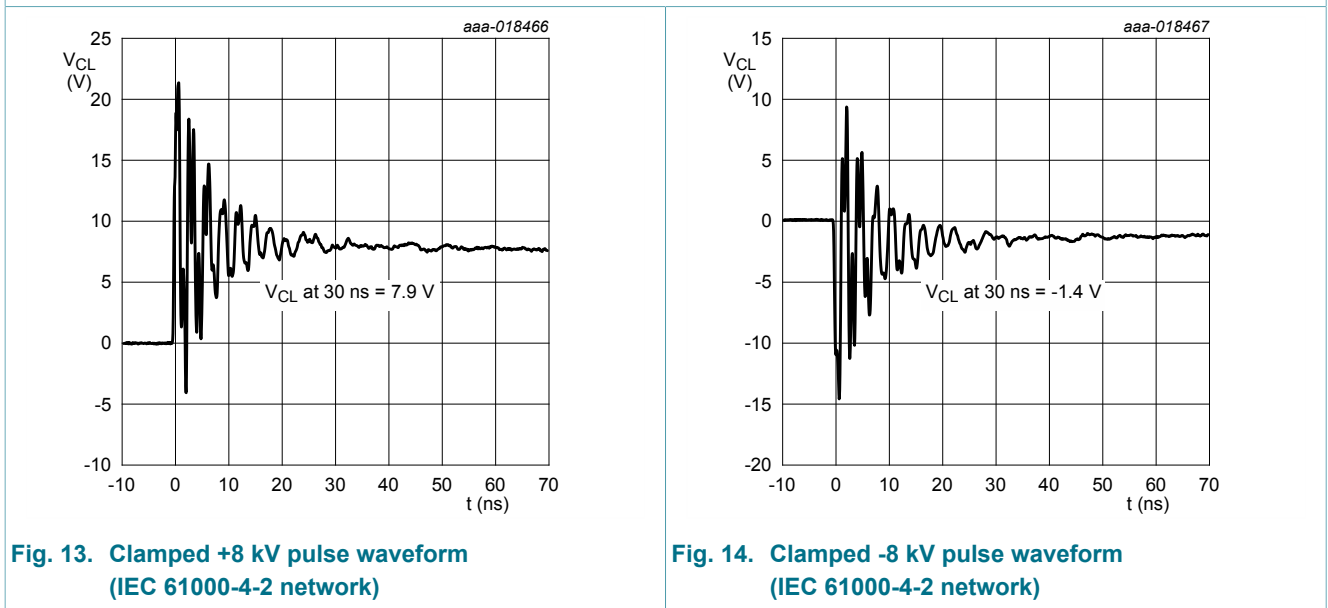


Fig. 12. ESD clamping test setup and waveforms



### 10. Application information

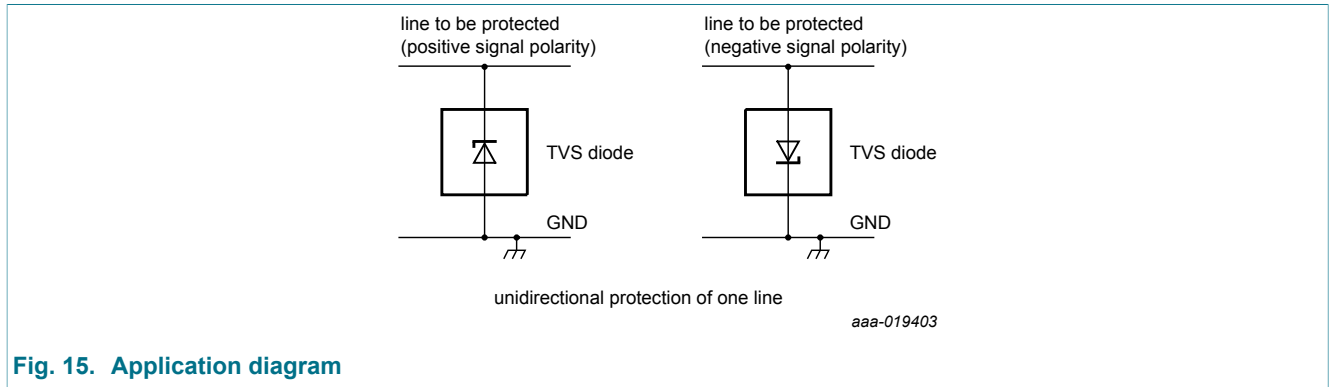


Fig. 15. Application diagram

### 11. Package outline

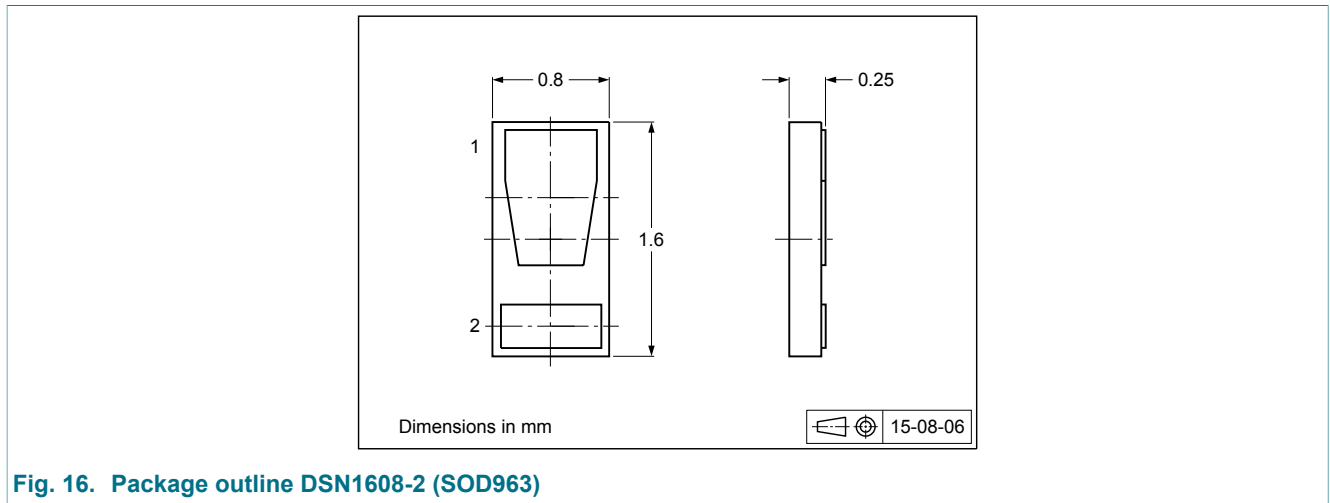


Fig. 16. Package outline DSN1608-2 (SOD963)



## 12. Soldering

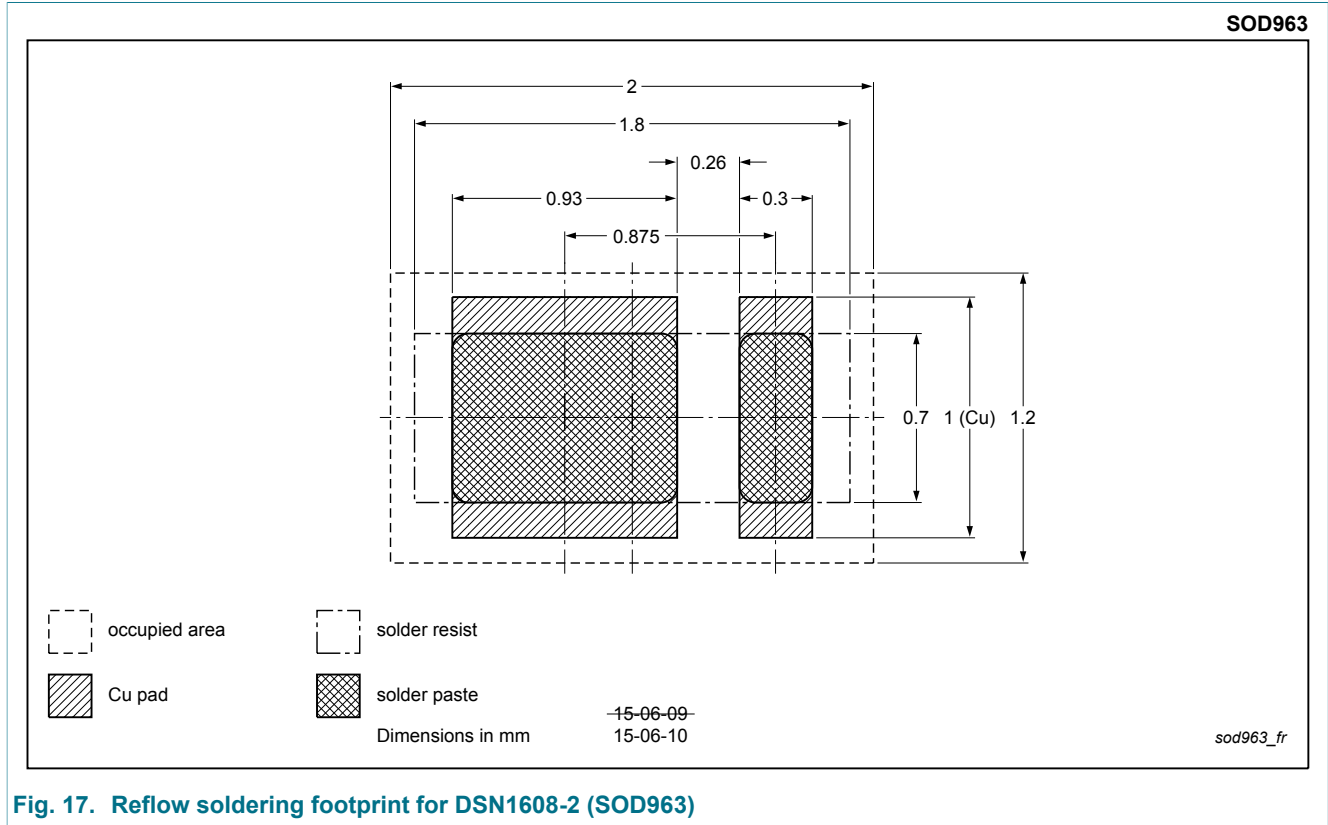


Fig. 17. Reflow soldering footprint for DSN1608-2 (SOD963)

## 13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PTVS5V0Z1USKN v.2	20151022	Product data sheet	-	PTVS5V0Z1USKN v.1
Modifications:	<ul style="list-style-type: none"><li>Section 9. Characteristics: diode capacitance <math>C_d</math> and clamping voltage <math>V_{CL}</math> updated</li></ul>			
PTVS5V0Z1USKN v.1	20150604	Preliminary data sheet	-	-

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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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