



# PESD5V0F1USF

Extremely low capacitance unidirectional ESD protection diode

4 March 2019

Product data sheet

## 1. General description

Extremely low capacitance unidirectional ElectroStatic Discharge (ESD) protection diode in a DSN0603-2 (SOD962) leadless ultra small Surface-Mounted Device (SMD) package designed to protect one signal line from the damage caused by ESD and other transients.

## 2. Features and benefits

- Unidirectional ESD protection of one line
- Extremely low diode capacitance  $C_d = 0.6$  pF
- ESD protection up to  $\pm 10$  kV according to IEC 61000-4-2
- Ultra low leakage current  $I_{RM} = 1$  nA
- Ultra small SMD package

## 3. Applications

- Cellular handsets and accessories
- Portable electronics
- Communication systems
- Computers and peripherals

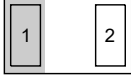
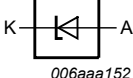
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25$ °C	-	-	5	V
$C_d$	diode capacitance	$f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C	-	0.6	0.75	pF

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode <sup>[1]</sup>	 <p>Transparent top view</p> <p><b>DSN0603-2 (SOD962)</b></p>	 <p>006aaa152</p>
2	A	anode		

[1] The marking bar indicates the cathode.

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0F1USF	DSN0603-2	silicon, leadless ultra small package; 2 terminals; 0.4 mm pitch; 0.6 x 0.3 x 0.3 mm body	SOD962

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PESD5V0F1USF	4

## 8. Limiting values

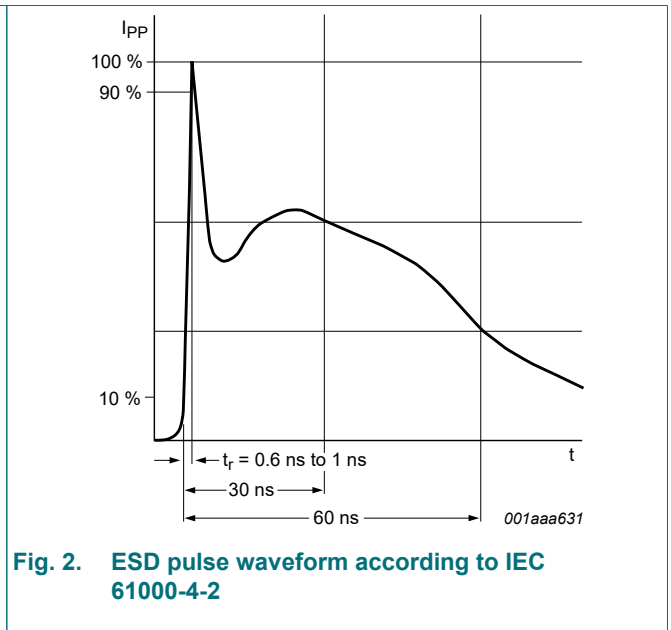
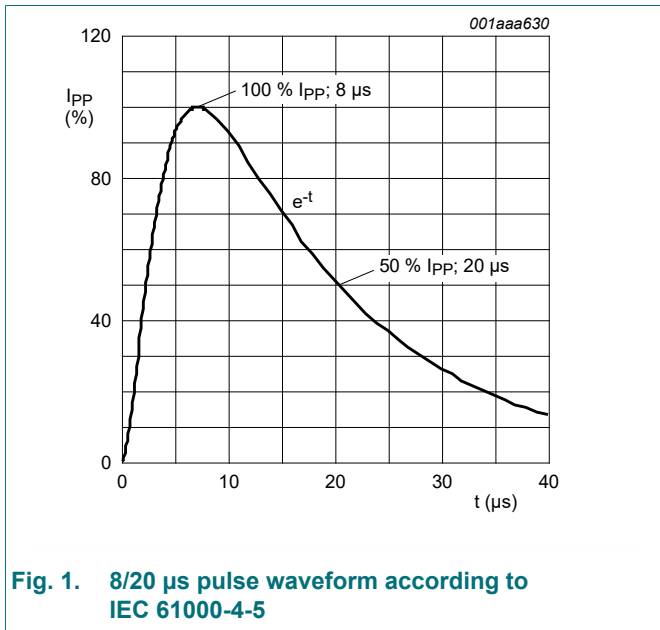
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions		Min	Max	Unit
$I_{PPM}$	rated peak pulse current	$t_p = 8/20 \mu s$	[1]	-	3	A
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-65	150	°C
<b>ESD maximum ratings</b>						
$V_{ESD}$	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[2]	-	10	kV
		IEC 61000-4-2 (air discharge)	[2]	-	10	kV
		machine model		-	400	V
		MIL-STD-883 (human body model)		-	10	kV

[1] Non-repetitive current pulse 8/20  $\mu s$  exponentially decaying waveform according to IEC 61000-4-5 and IEC61643-321.

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



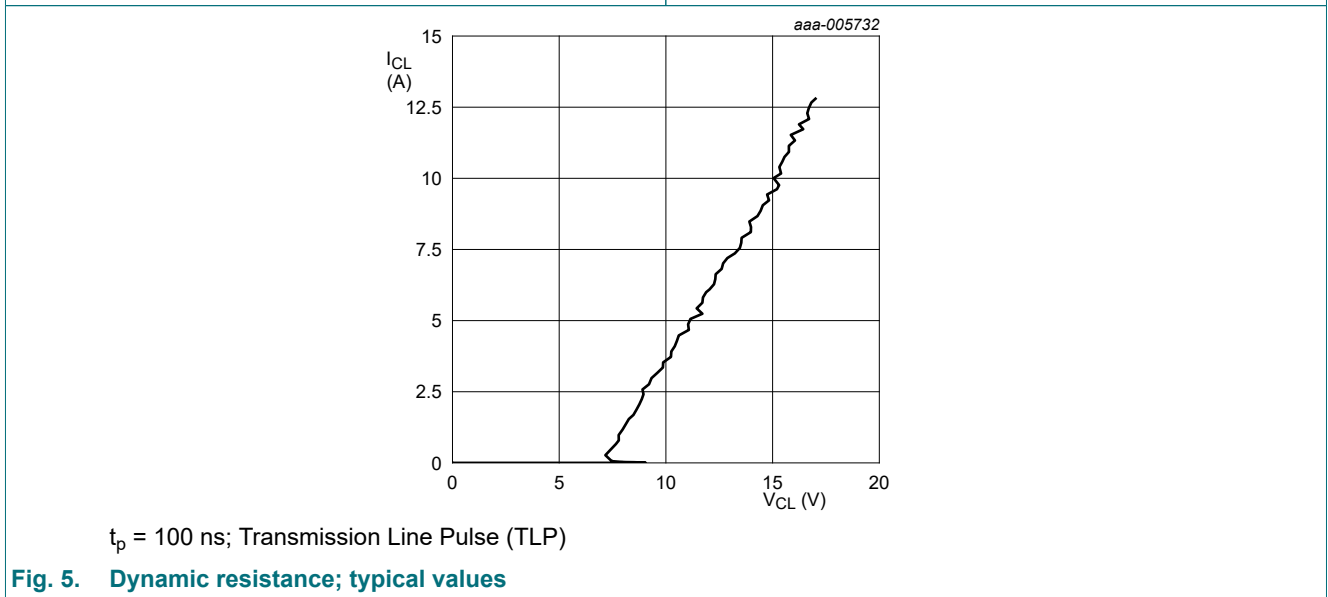
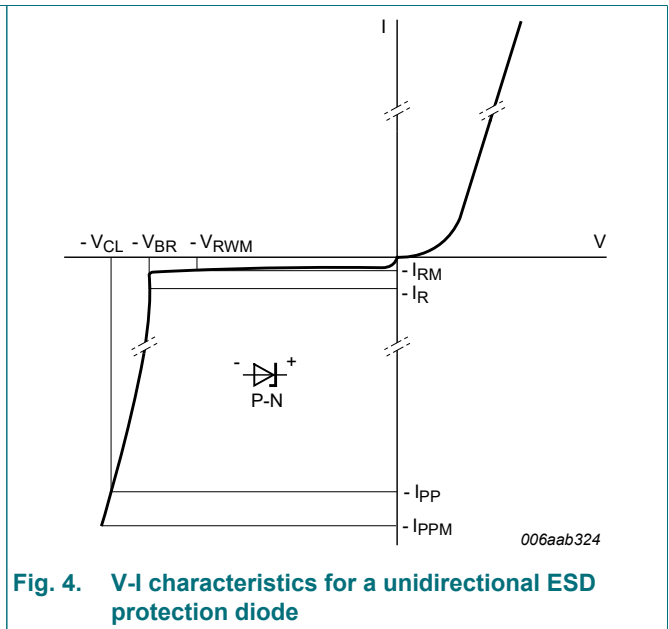
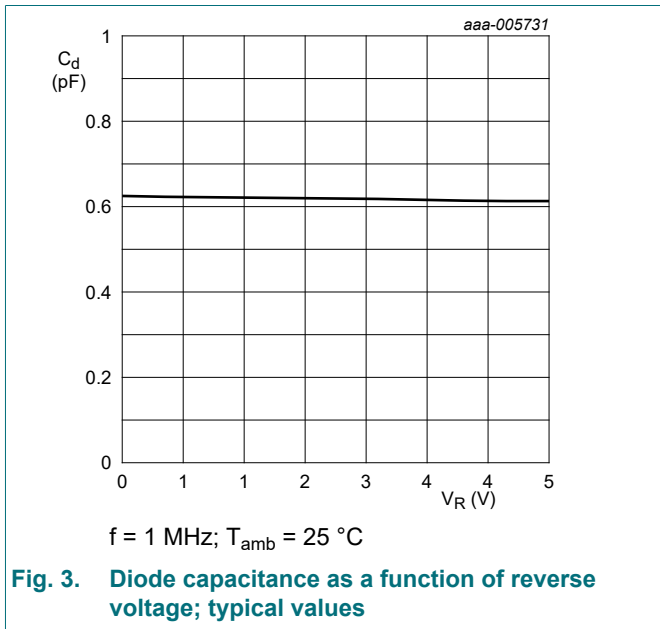
### 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	5	V
$V_{BR}$	breakdown voltage	$I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	6	8	10	V
$I_{RM}$	reverse leakage current	$V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1	100	nA
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	0.6	0.75	pF
$V_{CL}$	clamping voltage	$I_{PPM} = 3\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	10	12	V
$R_{dyn}$	dynamic resistance	$I_R = 10\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	[2]	0.7	-	$\Omega$

[1] Non-repetitive current pulse 8/20  $\mu\text{s}$  exponential decay waveform according to IEC 61000-4-5 and IEC61643-321.

[2] Non-repetitive current pulse, Transmission Line Pulse (TLP)  $t_p = 100\text{ ns}$ ; square pulse; ANSI/ESD STM5.5.1-2008.



Extremely low capacitance unidirectional ESD protection diode

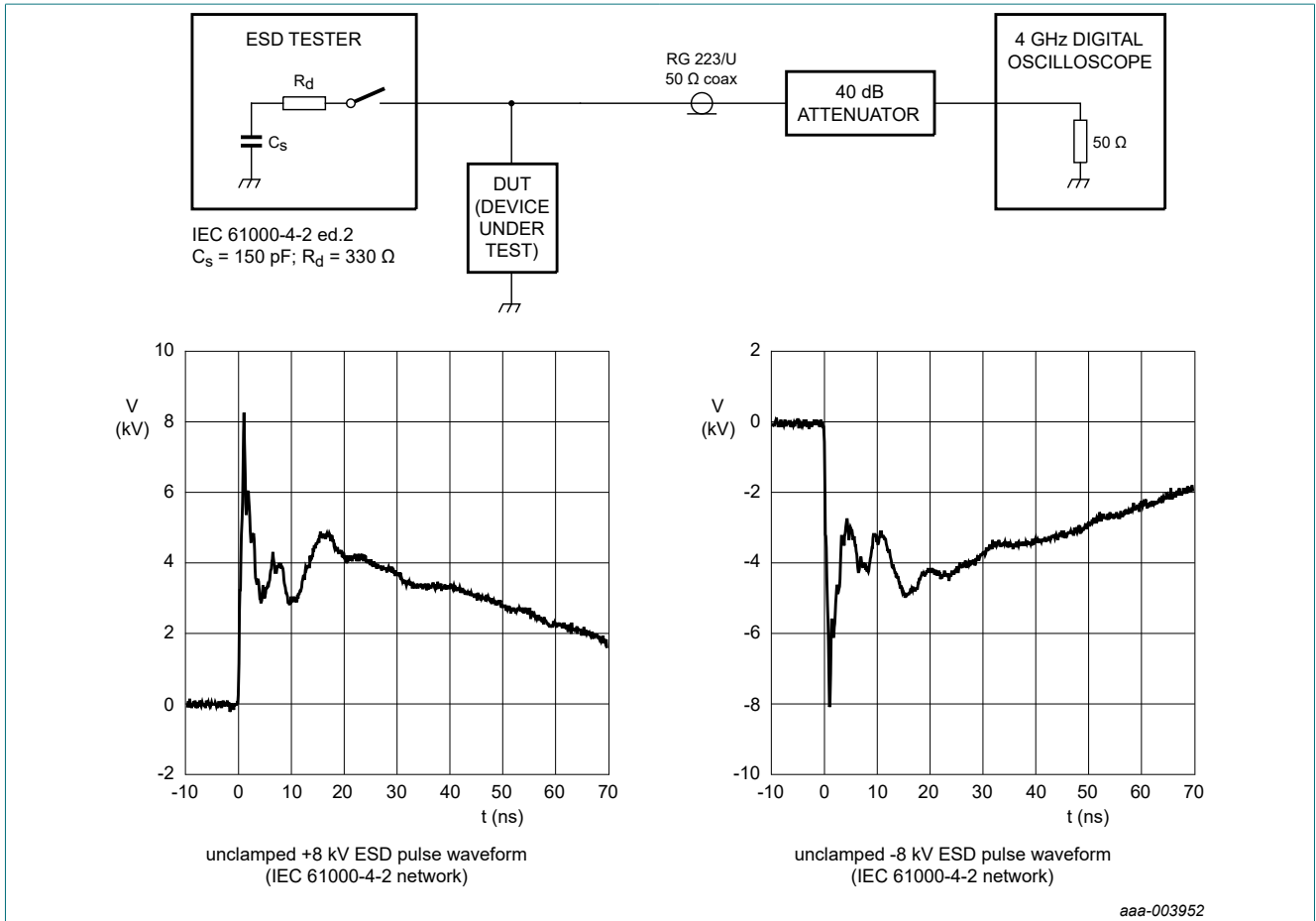


Fig. 6. ESD clamping test setup and waveforms

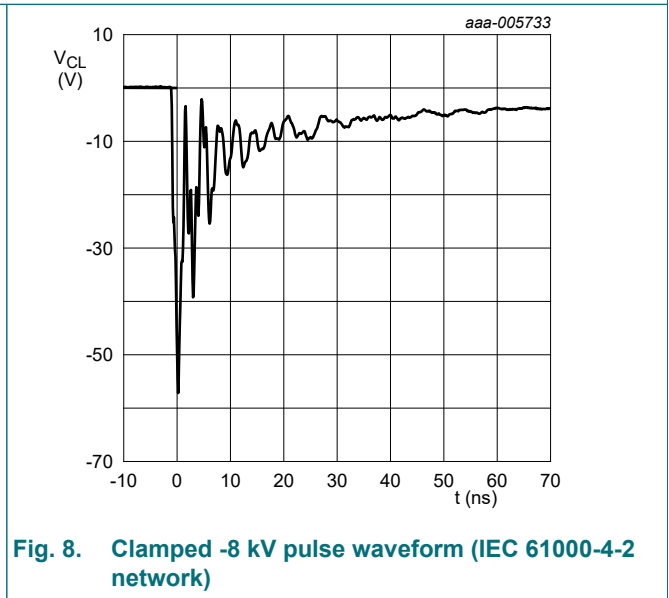
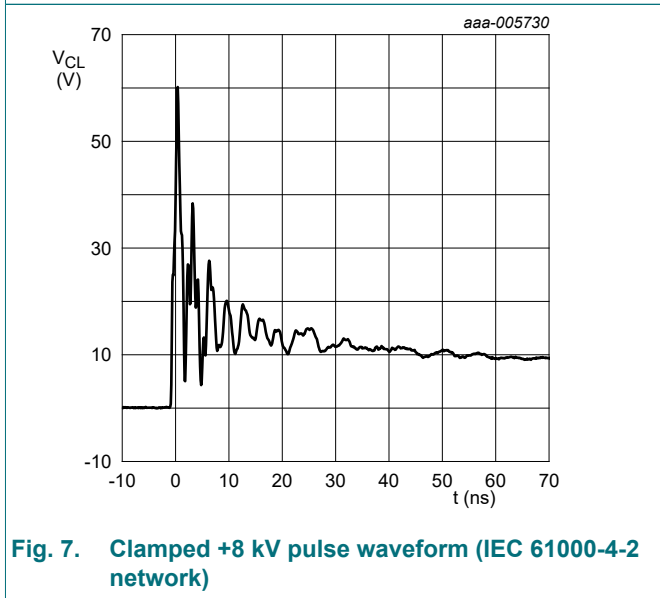


Fig. 7. Clamped +8 kV pulse waveform (IEC 61000-4-2 network)

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

## 10. Application information

The device is designed for the protection of one unidirectional data line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are either positive or negative with respect to ground.

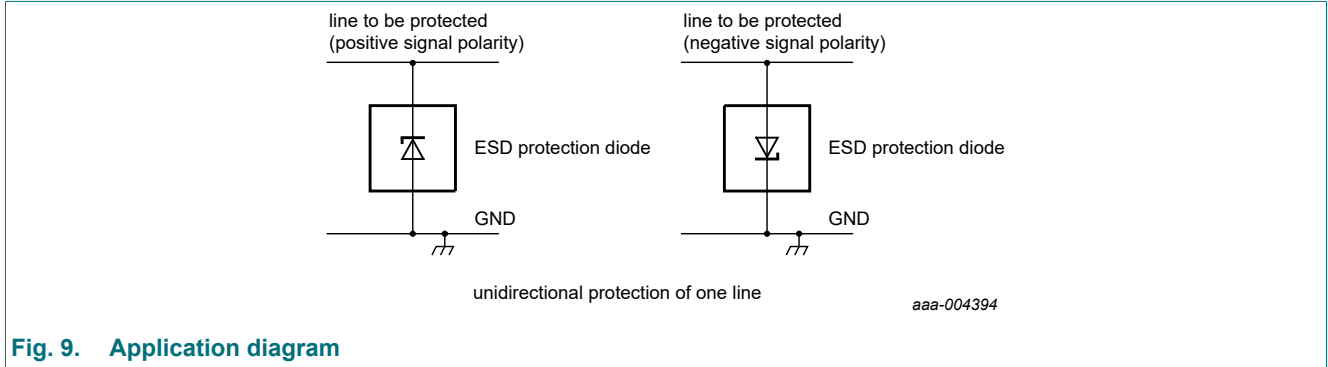


Fig. 9. Application diagram

### Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

## 11. Package outline

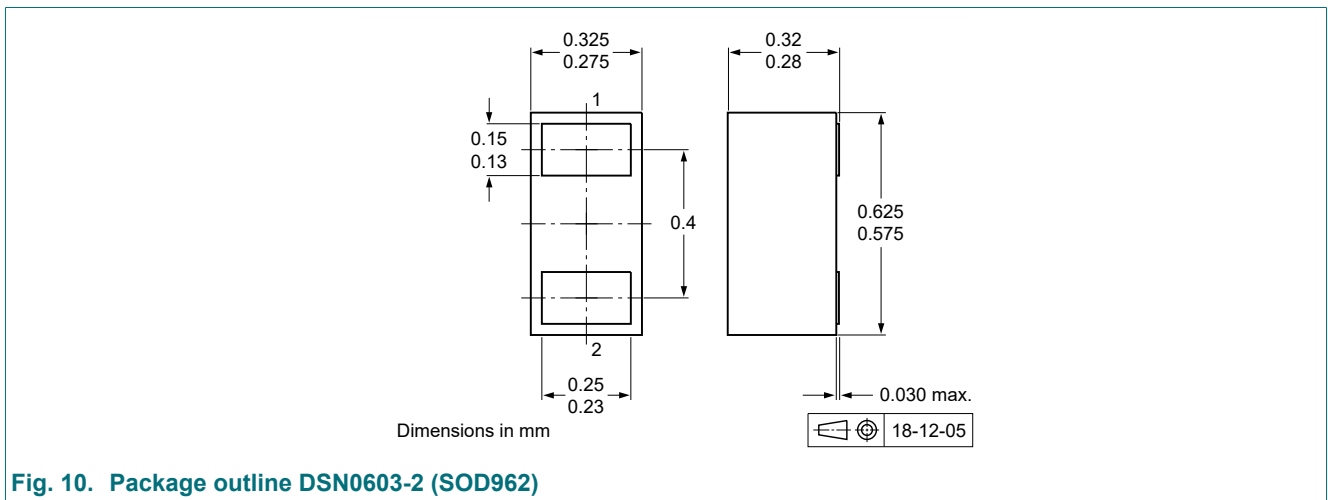
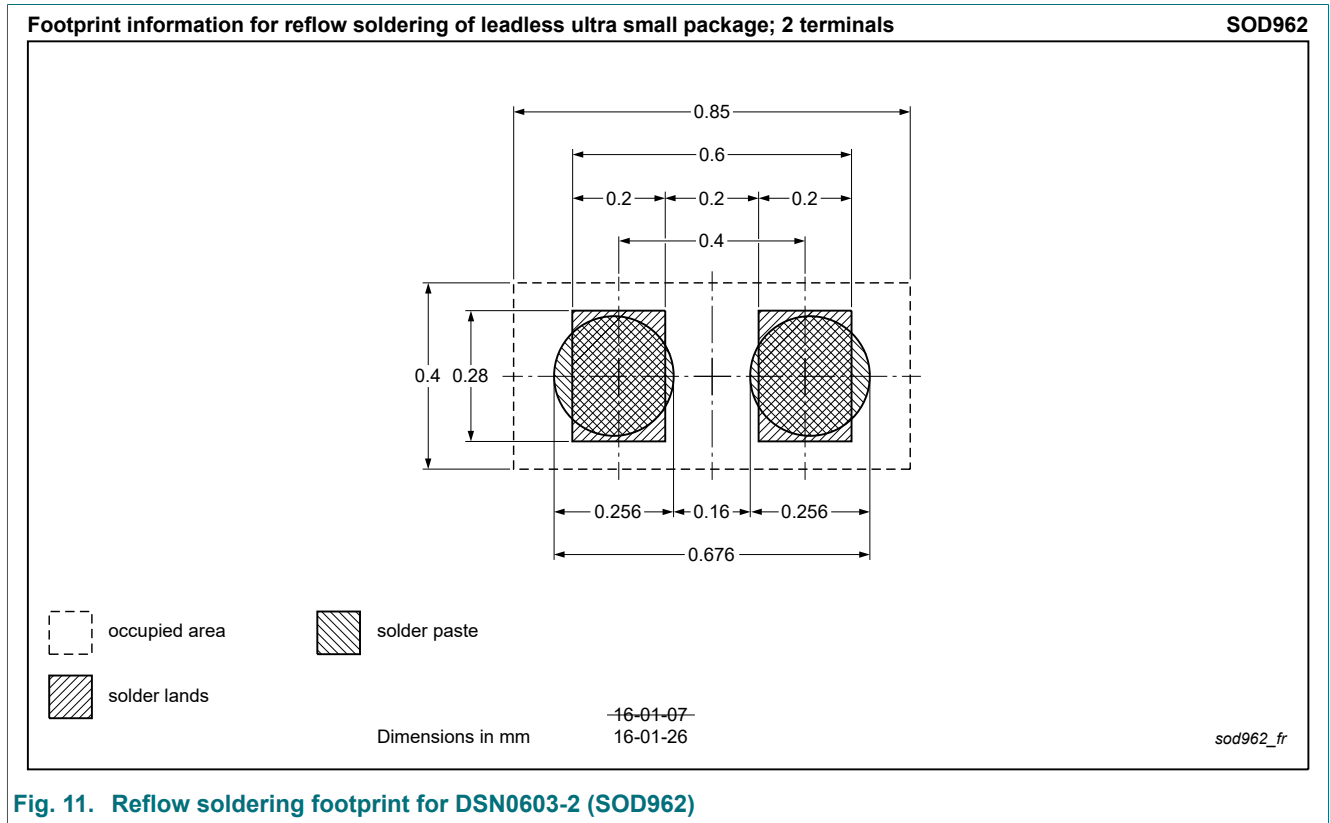


Fig. 10. Package outline DSN0603-2 (SOD962)

## 12. Soldering



## 13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0F1USF v.2	20190304	Product data sheet	-	PESD5V0F1USF v.1
Modifications:	<ul style="list-style-type: none"><li>• Package outline drawing: updated.</li><li>• Table "Characteristics": clamping voltage <math>V_{CL}</math> updated</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul>			
PESD5V0F1USF v.1	20121211	Product data sheet	-	-



## 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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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## Contents

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1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	3
9. Characteristics.....	4
10. Application information.....	6
11. Package outline.....	6
12. Soldering.....	7
13. Revision history.....	8
14. Legal information.....	9

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