



# PESD24VF1BSF

Ultra low capacitance bidirectional ESD protection diode

11 December 2015

Product data sheet

## 1. General description

Ultra low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode in a DSN0603-2 (SOD962-2) 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

- Bidirectional ESD protection of one line
- Ultra low diode capacitance  $C_d = 0.25$  pF
- High reverse standoff voltage  $V_{RWM} = 24$  V
- ESD protection up to  $\pm 10$  kV according to IEC 61000-4-2

## 3. Applications

- NFC antenna protection
- Protection of high-speed and standard data lines with high signal levels

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$C_d$	diode capacitance	$f = 1$ MHz; $V_R = 0$ V	-	0.25	0.4	pF
$V_{RWM}$	reverse standoff voltage		-	-	24	V

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	<p>Transparent top view DSN0603-2 (SOD962-2)</p>	<p>sym045</p>
2	K2	cathode (diode 2)		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD24VF1BSF	DSN0603-2	Leadless ultra small package; 2 terminals; body 0.6 x 0.3 x 0.3 mm	SOD962-2

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PESD24VF1BSF	H

## 8. Limiting values

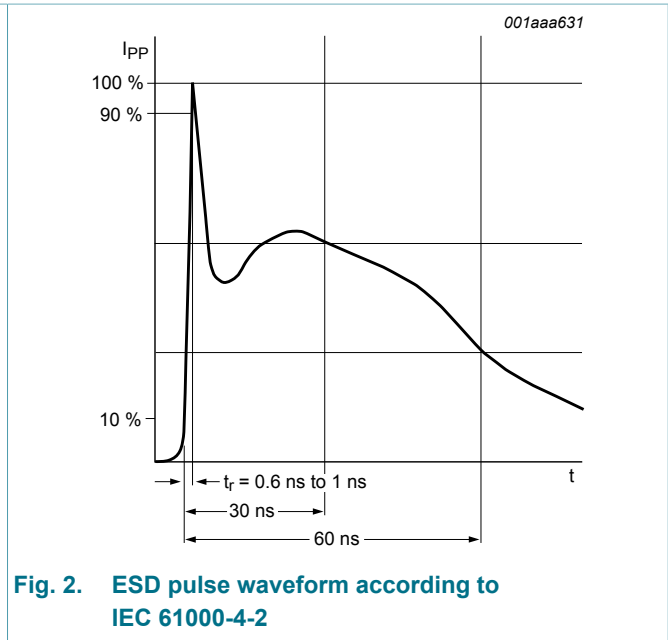
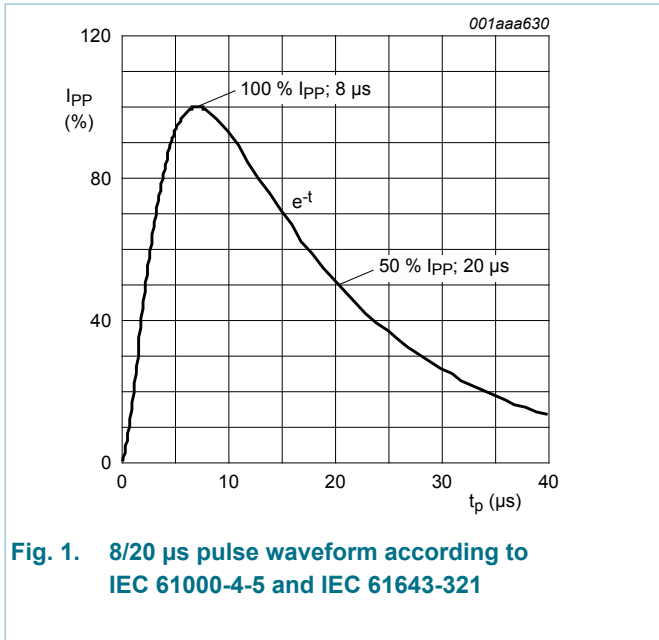
Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
$I_{PPM}$	peak pulse current	$t_p = 8/20 \mu s$	[1]	-	1	A
$T_j$	junction temperature			-45	125	°C
$T_{amb}$	ambient temperature			-45	125	°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]	-	15	kV
		MIL-STD-883; human body model; HBM		-	10	kV

[1] According to IEC 61000-4-5 and IEC 61643-321.

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



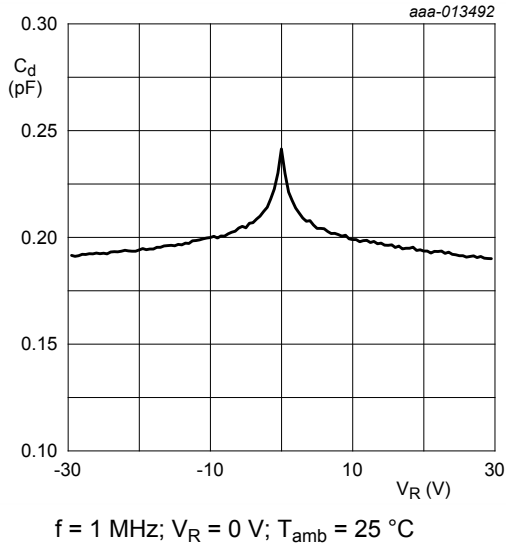
## 9. Characteristics

Table 6. Characteristics

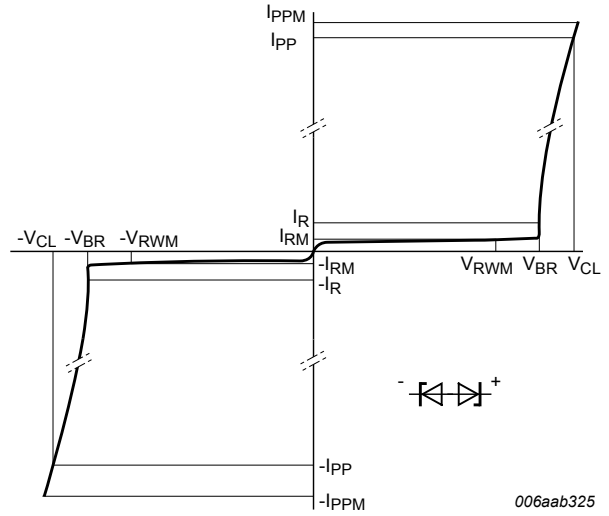
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage		-	-	24	V
$I_{RM}$	reverse leakage current	$V_R = 24\text{ V}$	-	1	30	nA
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}$	-	0.25	0.4	pF
$V_{BR}$	breakdown voltage	$I_R = 1\text{ mA}$	24.5	28	-	V
$V_{CL}$	clamping voltage	$I_{PPM} = 1\text{ A}$	[1]	-	17	V
$R_{dyn}$	dynamic resistance	$I_R = 5\text{ A}$	[2]	0.7	-	$\Omega$

[1] According to IEC 61000-4-5 and IEC 61643-321.

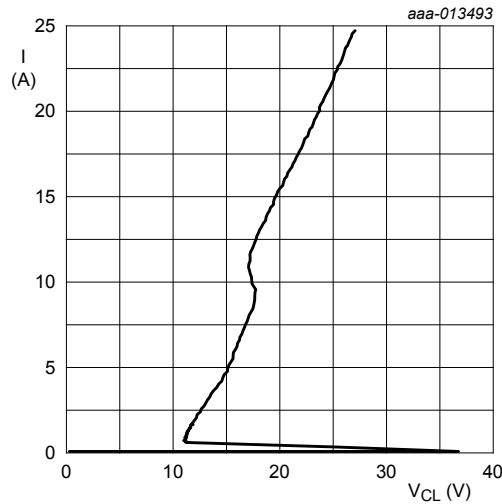
[2] Non-repetitive current pulse, Transmission Line Pulse (TLP)  $t_p = 100\text{ ns}$ ; square pulse; ANSI / ESD STM5.5.1-2008.



**Fig. 3. Diode capacitance as a function of reverse voltage; typical values**



**Fig. 4. V-I characteristics for a bidirectional ESD protection diode**



**Fig. 5. Dynamic resistance**

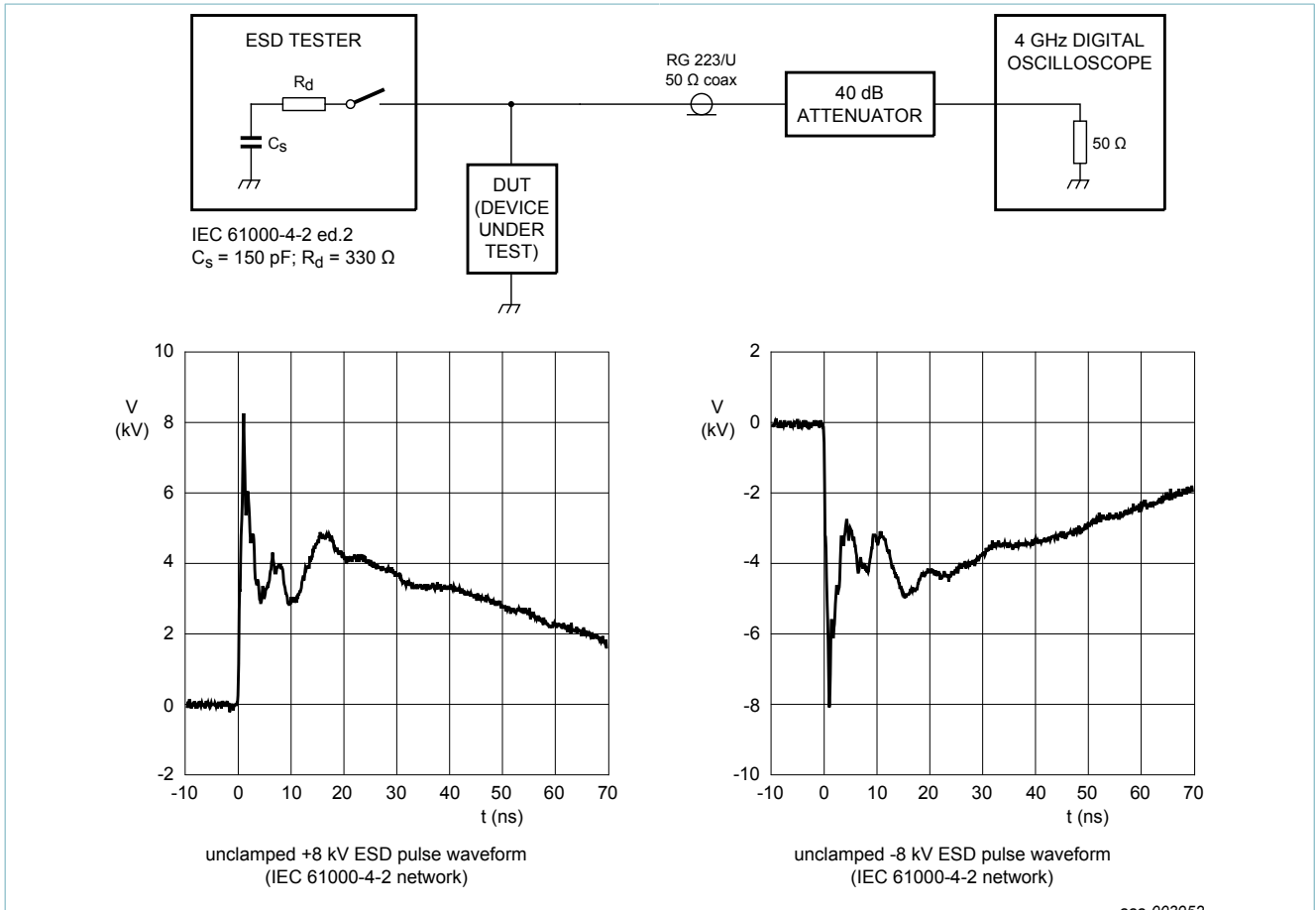


Fig. 6. ESD clamping test setup and waveforms

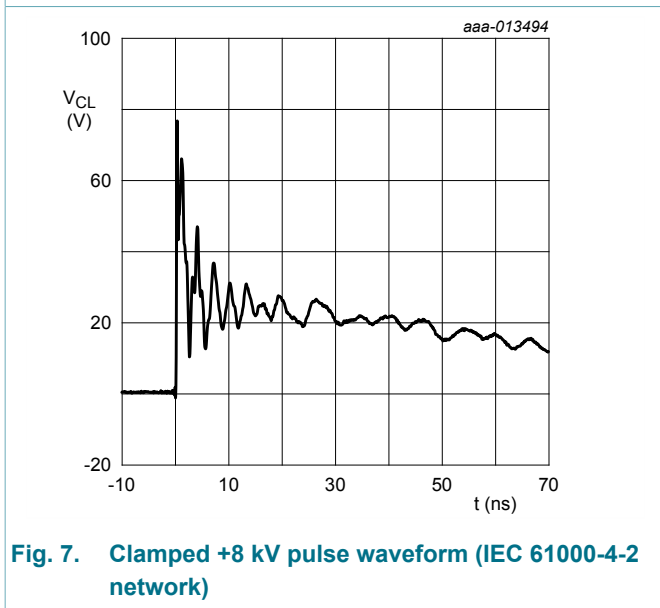


Fig. 7. Clamped +8 kV pulse waveform (IEC 61000-4-2 network)

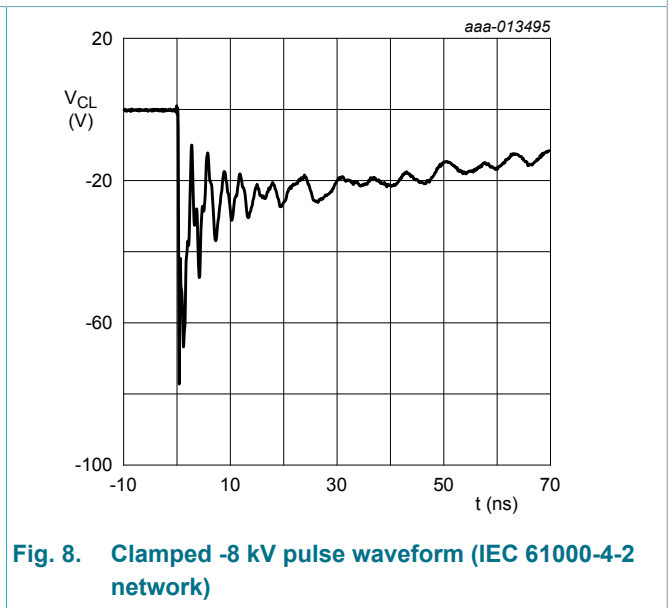
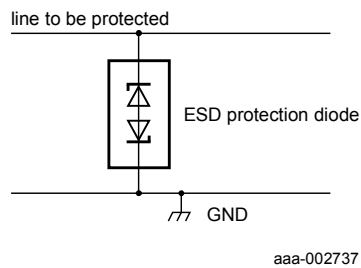


Fig. 8. Clamped -8 kV pulse waveform (IEC 61000-4-2 network)

## 10. Application information

The device is designed for the protection of one bidirectional data line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are both positive and 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

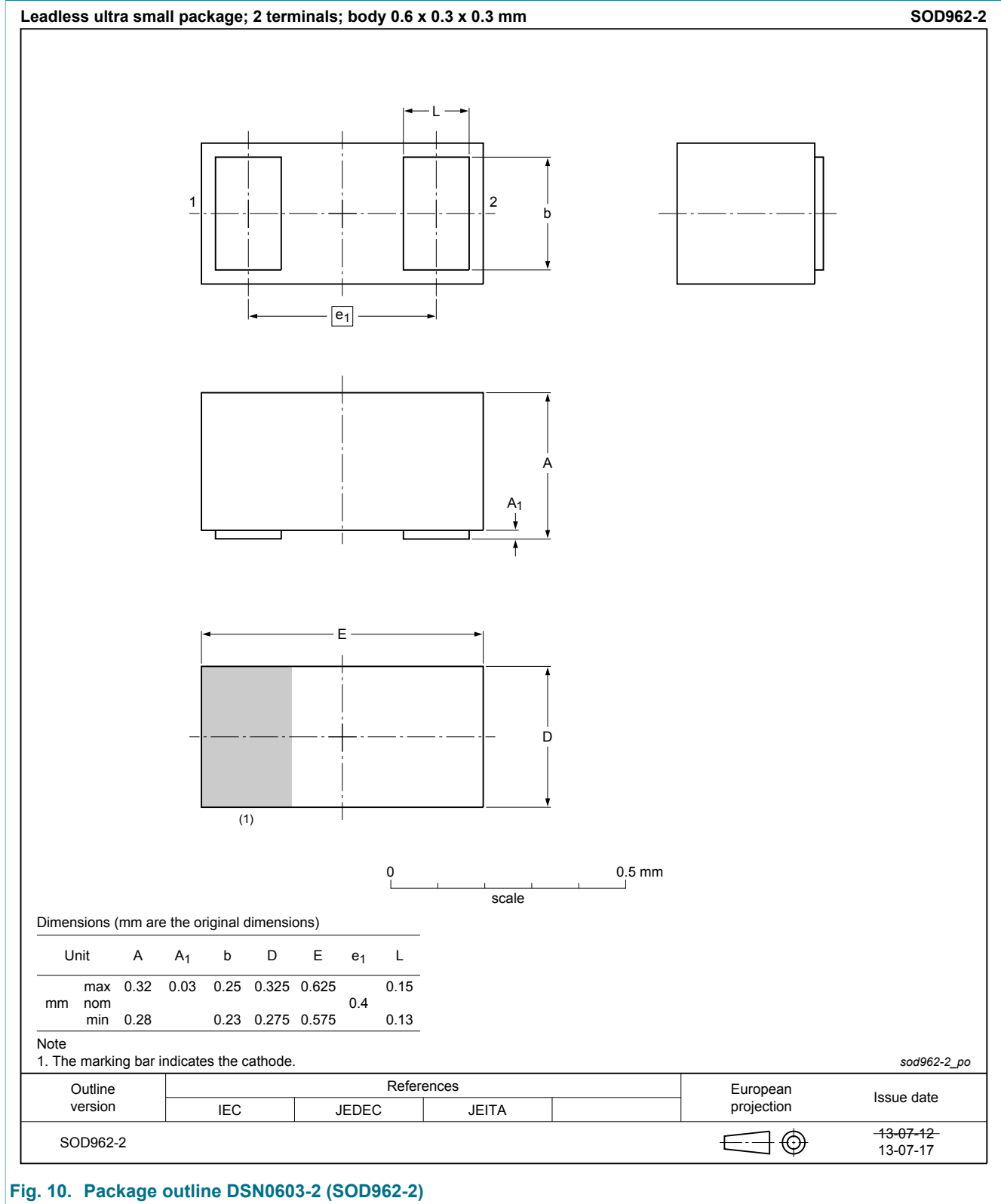
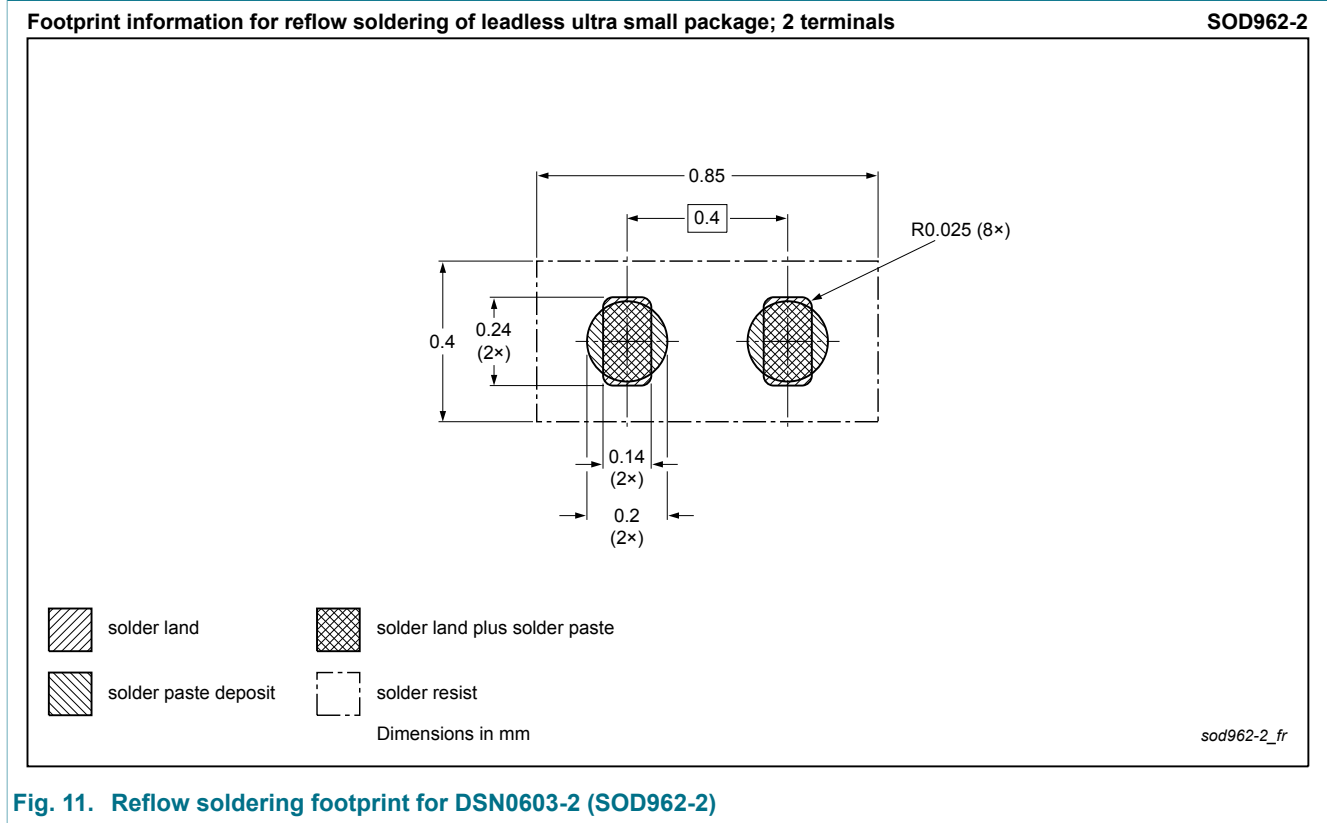


Fig. 10. Package outline DSN0603-2 (SOD962-2)

## 12. Soldering





## 13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD24VF1BSF v.1	20151211	Product data sheet	-	-

## 14. Legal information

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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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