



# PESD3V3S4UF; PESD5V0S4UF

Unidirectional quadruple ESD protection diode arrays

Rev. 01 — 17 January 2008

Product data sheet

## 1. Product profile

### 1.1 General description

Unidirectional quadruple ElectroStatic Discharge (ESD) protection diode arrays in a small SOT886 Surface-Mounted Device (SMD) plastic package designed to protect up to four signal lines from the damage caused by ESD and other transients.

### 1.2 Features

- ESD protection of up to four lines
- Max. peak pulse power:  $P_{PP} = 110 \text{ W}$
- Low clamping voltage:  $V_{CL} = 11 \text{ V}$
- Ultra low leakage current:  $I_{RM} = 4 \text{ nA}$
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge);  $I_{PP} = 10 \text{ A}$
- AEC-Q101 qualified

### 1.3 Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Communication systems
- Portable electronics

### 1.4 Quick reference data

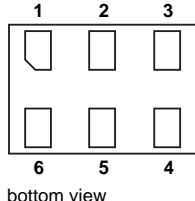
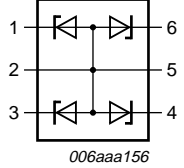
Table 1. Quick reference data

$T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_{RWM}$	reverse standoff voltage					
	PESD3V3S4UF		-	-	3.3	V
	PESD5V0S4UF		-	-	5.0	V
$C_d$	diode capacitance	$f = 1 \text{ MHz}; V_R = 0 \text{ V}$				
	PESD3V3S4UF		-	110	300	pF
	PESD5V0S4UF		-	85	220	pF

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode (diode 1)		
2	common anode		
3	cathode (diode 2)		
4	cathode (diode 3)		
5	common anode		
6	cathode (diode 4)		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD3V3S4UF	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
PESD5V0S4UF			

## 4. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PESD3V3S4UF	A3
PESD5V0S4UF	A4

[1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$P_{PP}$	peak pulse power	$t_p = 8/20 \mu s$	[1][2] -	110	W
$I_{PP}$	peak pulse current	$t_p = 8/20 \mu s$	[1][2] -	10	A

**Table 5. Limiting values ...continued**

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per device</b>					
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-55	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

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

[2] Measured from pin 1, 3, 4 or 6 to pin 2 or 5.

**Table 6. ESD maximum ratings**

$T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

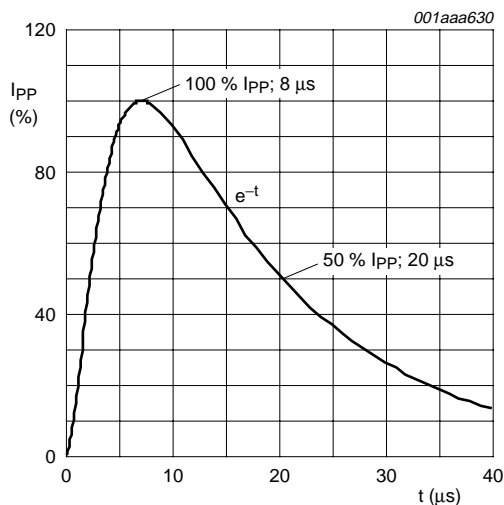
Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$V_{ESD}$	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[1][2]	-	30 kV
		MIL-STD-883 (human body model)	-	10	kV

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

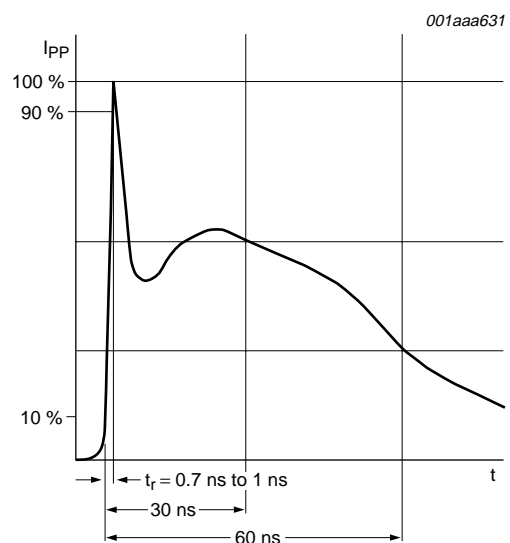
[2] Measured from pin 1, 3, 4 or 6 to pin 2 or 5.

**Table 7. ESD standards compliance**

Standard	Conditions
<b>Per diode</b>	
IEC 61000-4-2; level 4 (ESD)	> 15 kV (air); > 8 kV (contact)
MIL-STD-883; class 3 (human body model)	> 4 kV



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



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

## 6. Characteristics

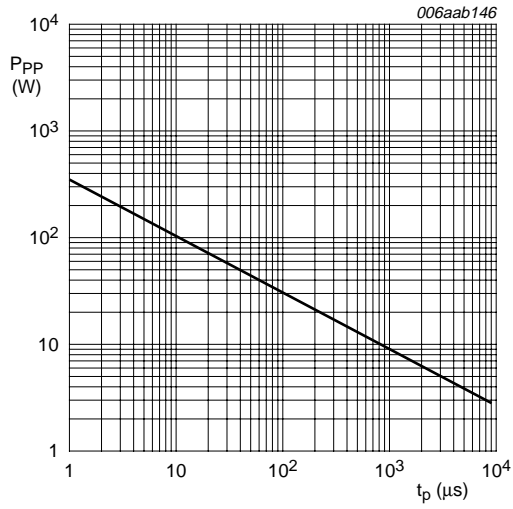
**Table 8. Characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_{RWM}$	reverse standoff voltage					
	PESD3V3S4UF		-	-	3.3	V
	PESD5V0S4UF		-	-	5.0	V
$I_R$	reverse current					
	PESD3V3S4UF	$V_R = 3.0\text{ V}$	-	100	1000	nA
	PESD5V0S4UF	$V_R = 4.3\text{ V}$	-	4	100	nA
$V_{BR}$	breakdown voltage	$I_R = 1\text{ mA}$				
	PESD3V3S4UF		5.32	5.6	5.88	V
	PESD5V0S4UF		6.46	6.8	7.14	V
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}$				
	PESD3V3S4UF		-	110	300	pF
	PESD5V0S4UF		-	85	220	pF
$V_{CL}$	clamping voltage					<a href="#">[1][2]</a>
	PESD3V3S4UF	$I_{PP} = 1\text{ A}$	-	-	8	V
		$I_{PP} = 10\text{ A}$	-	-	11	V
	PESD5V0S4UF	$I_{PP} = 1\text{ A}$	-	-	8	V
		$I_{PP} = 10\text{ A}$	-	-	12	V
$r_{dif}$	differential resistance	$I_R = 1\text{ mA}$				
	PESD3V3S4UF		-	-	400	$\Omega$
	PESD5V0S4UF		-	-	200	$\Omega$

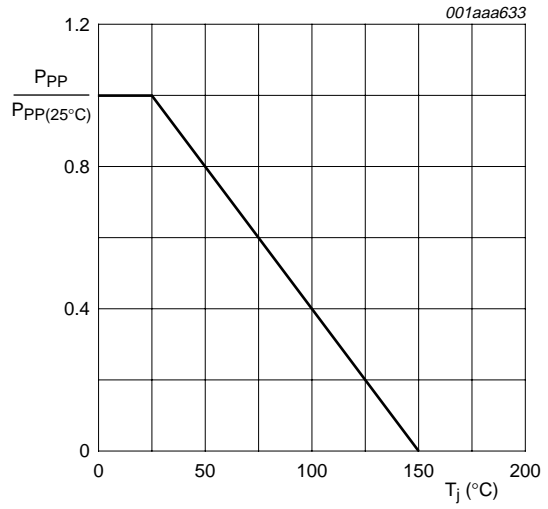
[1] Non-repetitive current pulse 8/20  $\mu\text{s}$  exponential decay waveform according to IEC 61000-4-5.

[2] Measured from pin 1, 3, 4 or 6 to pin 2 or 5.

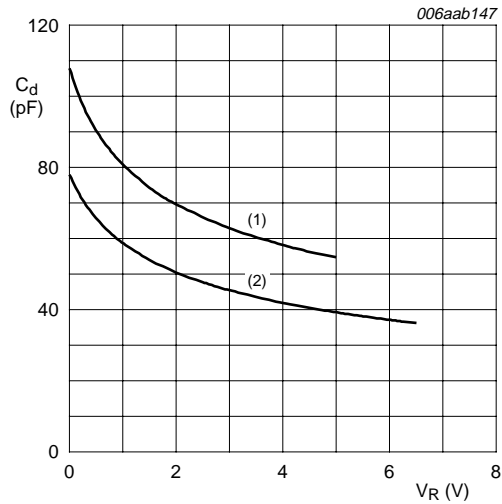


$T_{amb} = 25\text{ }^{\circ}\text{C}$

**Fig 3. Peak pulse power as a function of exponential pulse duration; typical values**



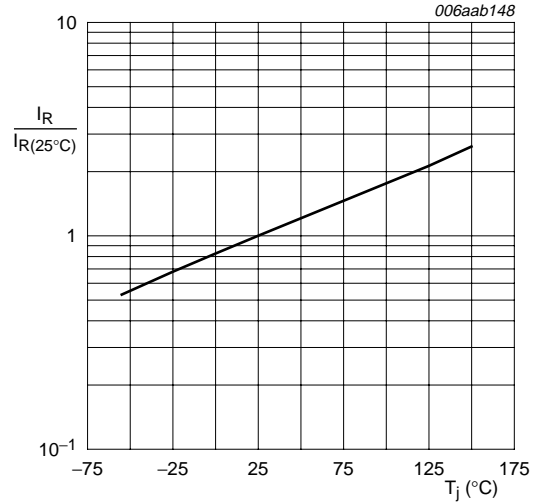
**Fig 4. Relative variation of peak pulse power as a function of junction temperature; typical values**



$f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$

- (1) PESD3V3S4UF
- (2) PESD5V0S4UF

**Fig 5. Diode capacitance as a function of reverse voltage; typical values**



**Fig 6. Relative variation of reverse current as a function of junction temperature; typical values**

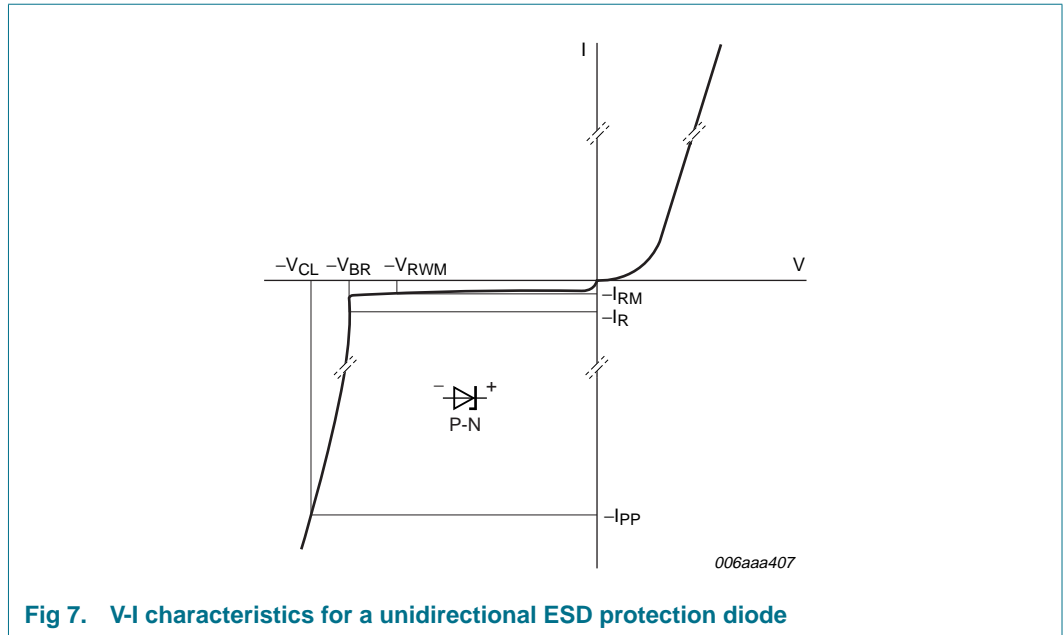
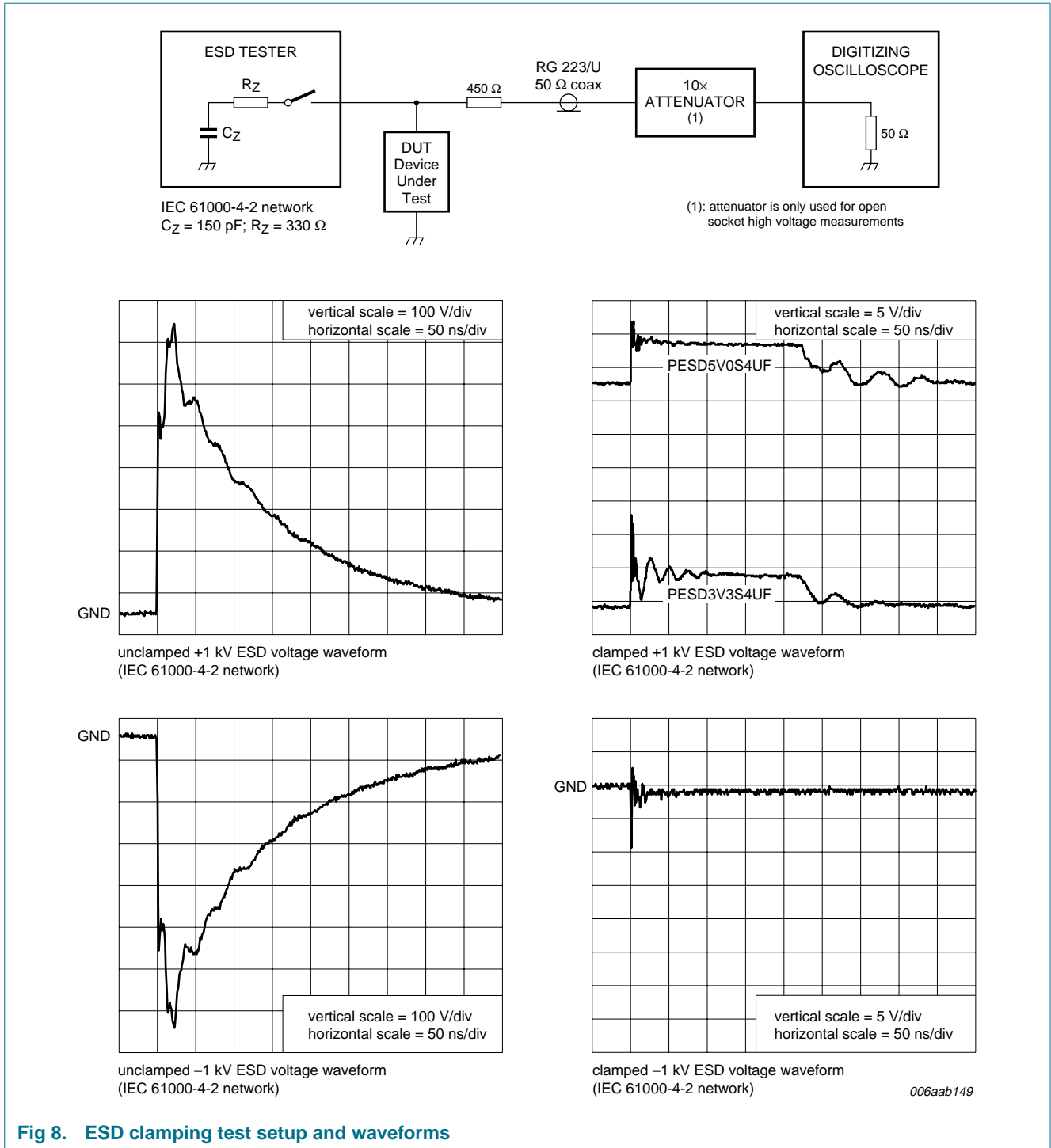


Fig 7. V-I characteristics for a unidirectional ESD protection diode



## 7. Application information

The PESDxS4UF is designed for the protection of up to four unidirectional data or signal lines from the damage caused by ESD and surge pulses. The PESDxS4UF may be used on lines where the signal polarities are either positive or negative with respect to ground. The PESDxS4UF provides a surge capability of 110 W per line for an 8/20  $\mu$ s waveform each.

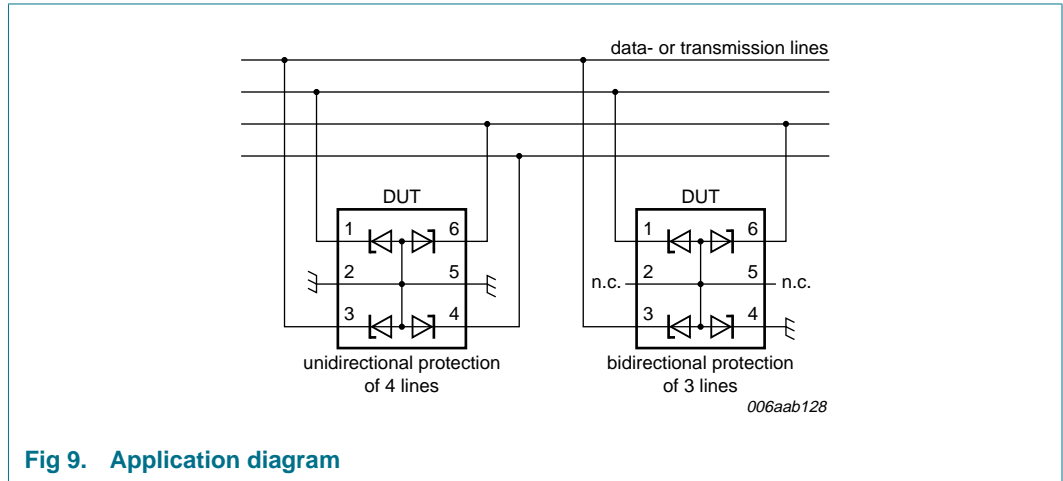


Fig 9. Application diagram

### 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 PESDxS4UF as close to the input terminal or connector as possible.
2. The path length between the device and the protected line should be minimized.
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. Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.



## 8. Package outline

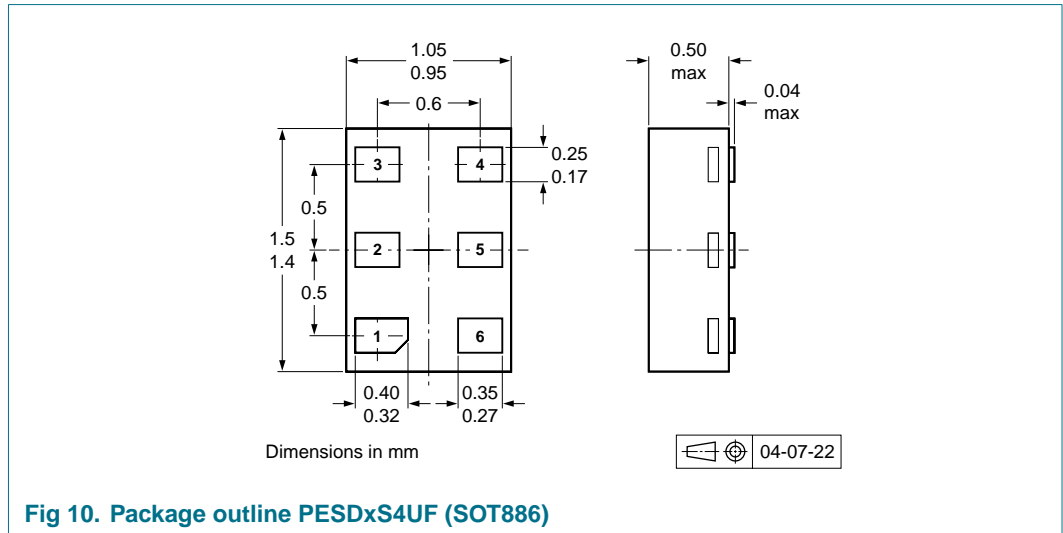


Fig 10. Package outline PESDxS4UF (SOT886)

## 9. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

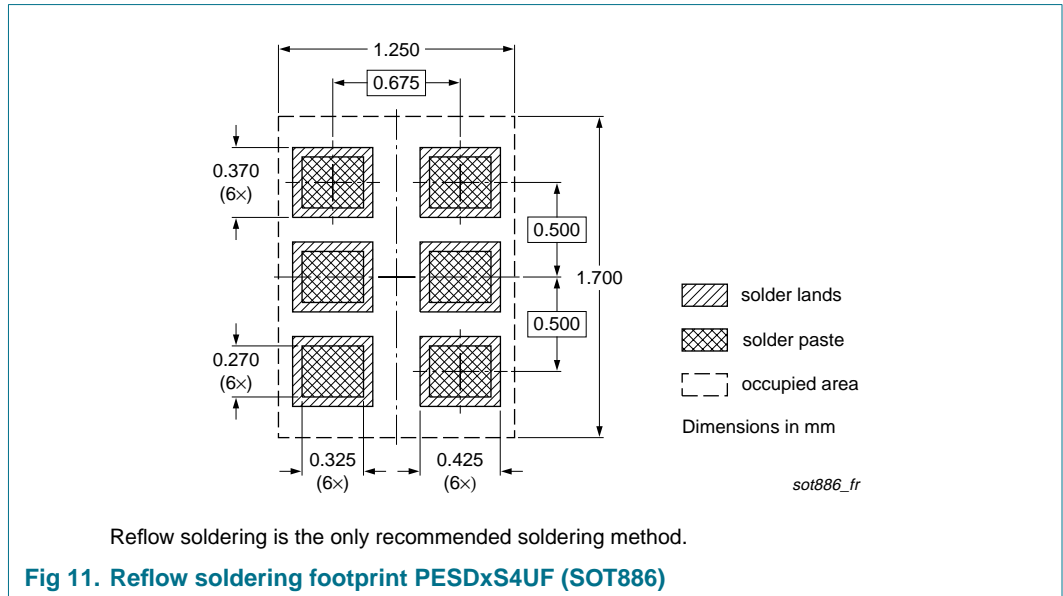
Type number	Package	Description	Packing quantity	
				5000
PESD3V3S4UF	SOT886	4 mm pitch, 8 mm tape and reel; T1	[2]	-115
		4 mm pitch, 8 mm tape and reel; T4	[3]	-132
PESD5V0S4UF	SOT886	4 mm pitch, 8 mm tape and reel; T1	[2]	-115
		4 mm pitch, 8 mm tape and reel; T4	[3]	-132

[1] For further information and the availability of packing methods, see [Section 13](#).

[2] T1: normal taping

[3] T4: 90° rotated reverse taping

## 10. Soldering



## 11. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
PESD3V3S4UF_PESD5V0S4UF_1	20080117	Product data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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