

# PESD1LVDS

ESD protection for in-vehicle ultra high-speed interfaces

Rev. 1 — 10 October 2011

Product data sheet

## 1. Product profile

### 1.1 General description

The device is designed to protect in-vehicle ultra high-speed interfaces in automotive applications, such as Low-Voltage Differential Signaling (LVDS), High-Definition Multimedia Interface (HDMI) and DisplayPort interfaces against ElectroStatic Discharge (ESD).

The device is housed in an ultra small SOT1165-1 (XSON10) Surface-Mounted Design (SMD) plastic package.

### 1.2 Features and benefits

- System ESD protection for LVDS, HDMI and DisplayPort interfaces
- Line capacitance of only 0.6 pF with  $\leq 0.05$  pF matching capacitance between signal pairs
- Ultra small XSON10 package with design-friendly 'pass-thru' signal routing
- AEC-Q101 qualified

### 1.3 Applications

The devices are designed for high-speed receiver and transmitter port protection:

- Automotive A/V monitors, displays and cameras

### 1.4 Quick reference data

Table 1. Quick reference data

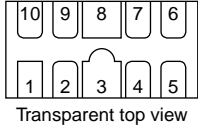
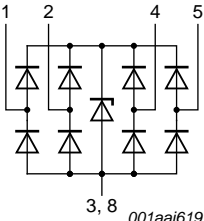
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage		-	-	5.5	V
$C_{ch}$	channel capacitance	$f = 1$ MHz; $V_{bias} = 2.5$ V	[1] -	0.6	-	pF

[1] This parameter is guaranteed by design.



## 2. Pinning information

**Table 2. Pinning**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	CH1-	negative channel 1 ESD protection	 <p>Transparent top view</p> <p><b>XSON10</b></p>	 <p>001aai619</p>
2	CH1+	positive channel 1 ESD protection		
3	GND	ground		
4	CH2-	negative channel 2 ESD protection		
5	CH2+	positive channel 2 ESD protection		
6	n.c.	not connected		
7	n.c.	not connected		
8	GND	ground		
9	n.c.	not connected		
10	n.c.	not connected		

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
PESD1LVDS	XSON10	plastic extremely thin small outline package; no leads; 10 terminals; body 1 × 2.5 × 0.5 mm	SOT1165-1

## 4. Limiting values

**Table 4. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
$T_{stg}$	storage temperature		-55	+125	°C
$T_{amb}$	ambient temperature		-40	+85	°C

**Table 5. ESD maximum ratings**

$T_{amb} = 25$  °C unless otherwise specified.

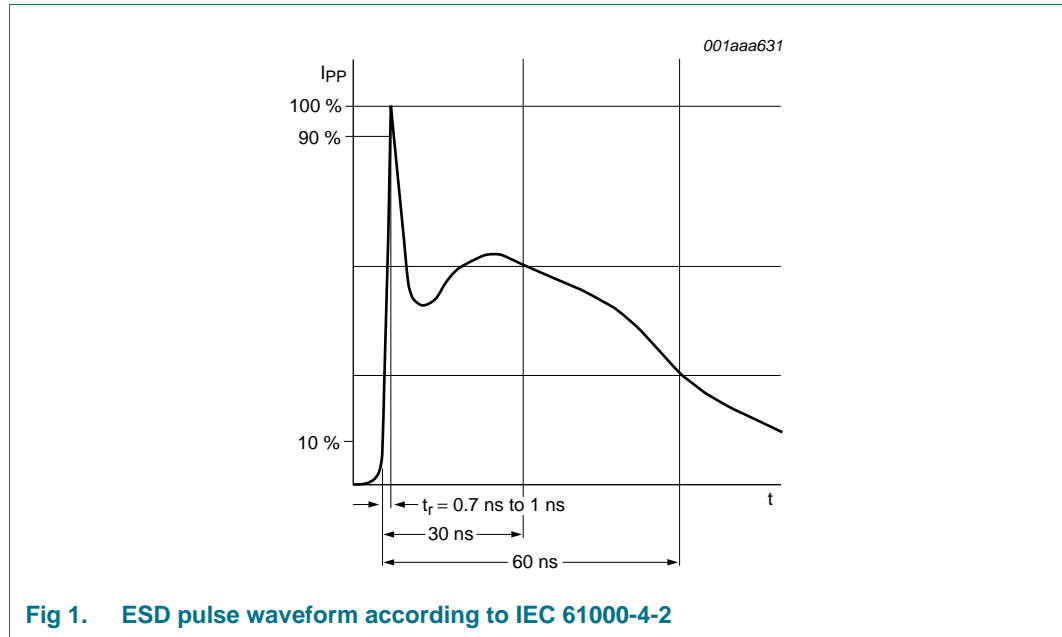
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{ESD}$	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[1][2] -	±8	kV

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

[2] All pins to ground.

**Table 6. ESD standards compliance**

Standard	Conditions
IEC 61000-4-2; level 4 (ESD)	> 8 kV (contact)
MIL-STD-883; class 3B (human body model)	> 8 kV



**Fig 1. ESD pulse waveform according to IEC 61000-4-2**

## 5. Characteristics

**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RWM}$	reverse standoff voltage		-	-	5.5	V
$I_{RM}$	reverse leakage current	per channel; $V = 3.0\text{ V}$	-	-	1	$\mu\text{A}$
$V_{BR}$	breakdown voltage	$I = 1\text{ mA}$	6	-	9	V
$V_F$	forward voltage		-	0.7	-	V
$C_{(I/O-GND)}$	input/output to ground capacitance	$f = 1\text{ MHz};$ $V_{bias} = 2.5\text{ V}$	[1]	-	0.6	pF
$\Delta C_{(I/O-GND)}$	input/output to ground capacitance variation	$f = 1\text{ MHz};$ $V_{bias} = 2.5\text{ V}$	[1]	-	0.05	pF
$C_{ch(mutual)}$	mutual channel capacitance	$f = 1\text{ MHz};$ $V_{bias} = 2.5\text{ V}$	[1][2]	-	0.07	pF

[1] This parameter is guaranteed by design.

[2] Between signal pin and pin n.c.

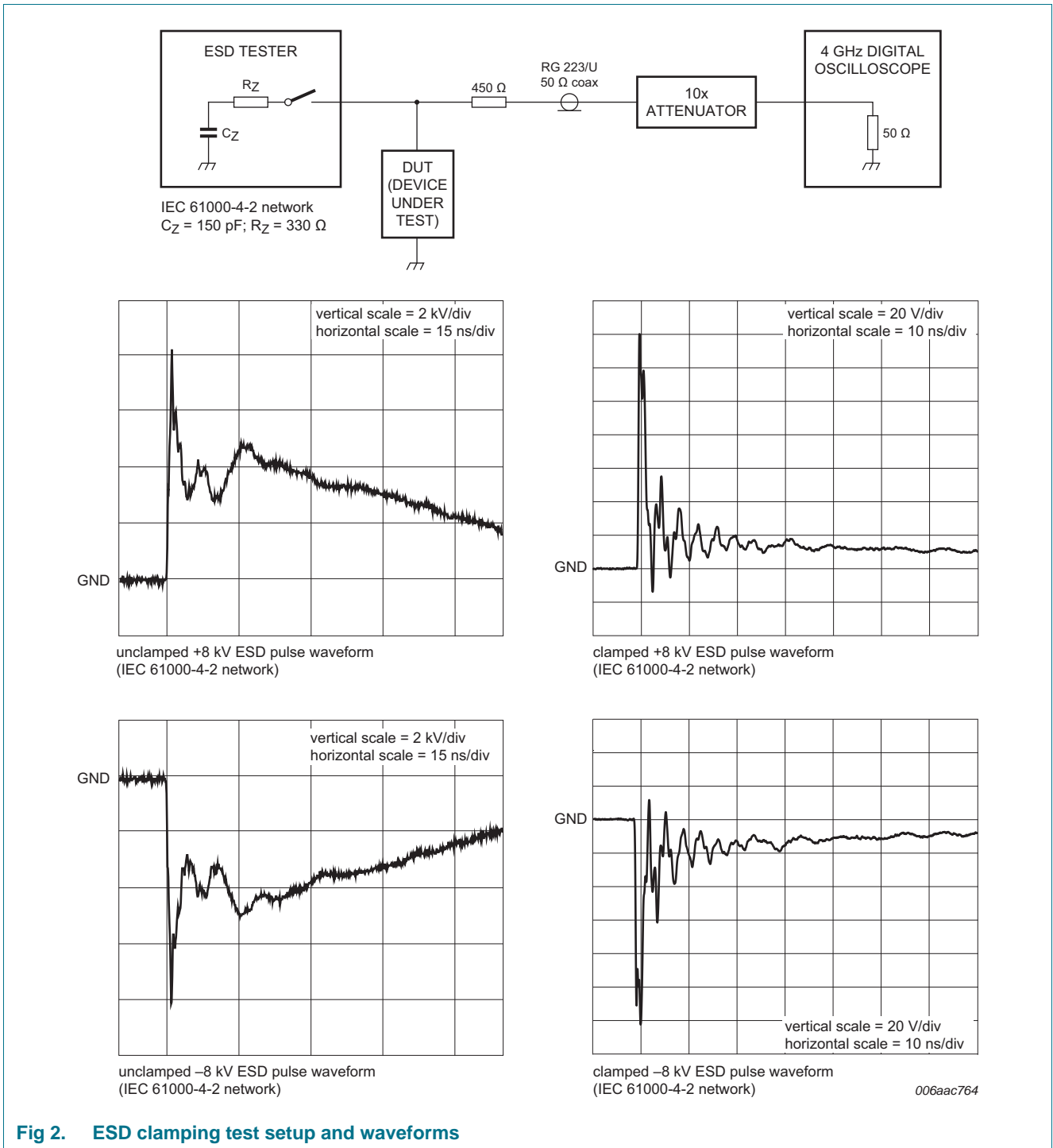


Fig 2. ESD clamping test setup and waveforms

## 6. Application information

The devices are designed to provide high-level ESD protection for high-speed serial data buses such as LVDS, HDMI and DisplayPort data lines.

When designing the Printed-Circuit Board (PCB), careful consideration should be given to impedance matching, and signal coupling.

Basic application diagrams for the ESD protection of an HDMI interface are shown in [Figure 3](#).

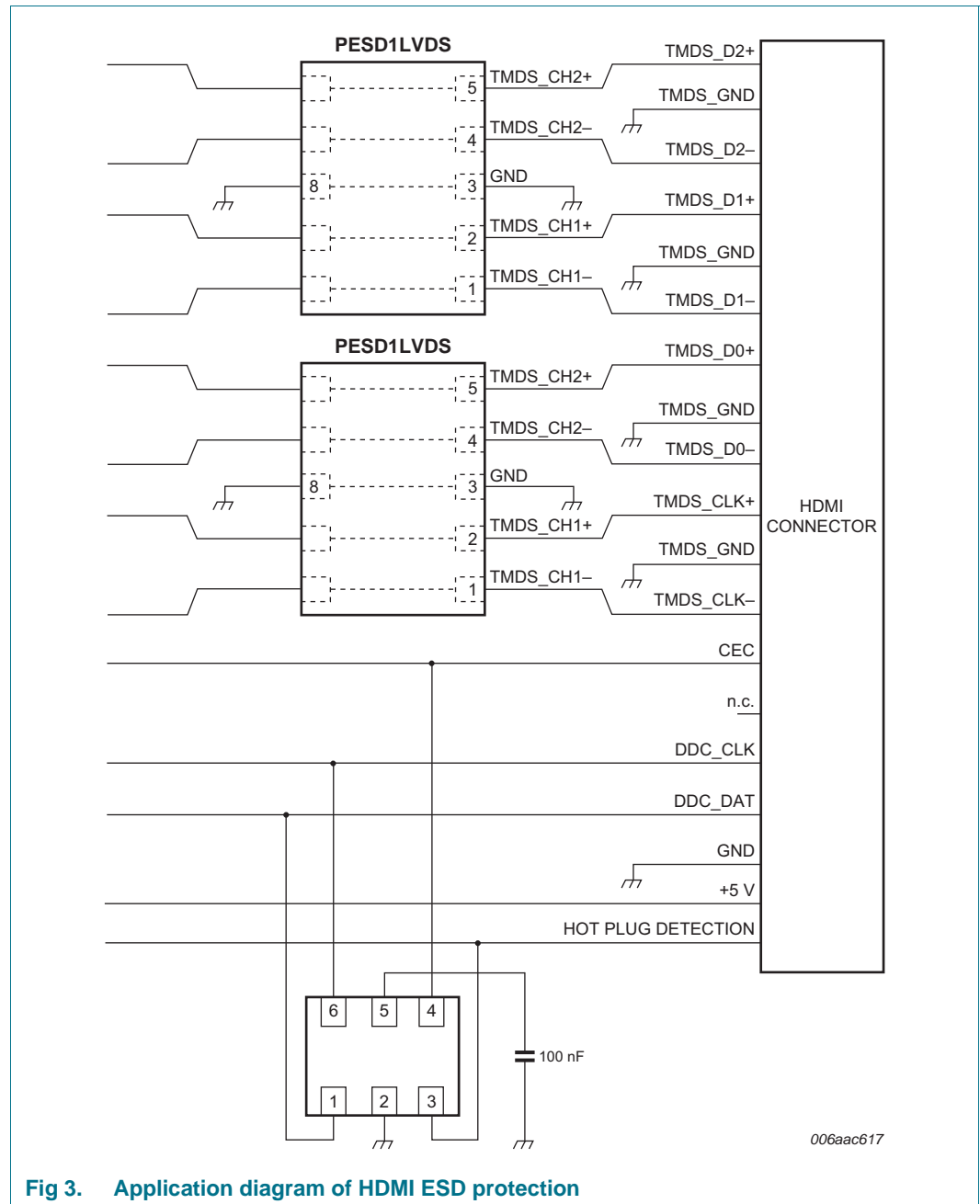


Fig 3. Application diagram of HDMI ESD protection

## 7. Test information

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### 7.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 8. Package outline

**XSON10:** plastic, extremely thin small outline package; no leads;  
**10 terminals;** body 1 x 2.5 x 0.5 mm

SOT1165-1

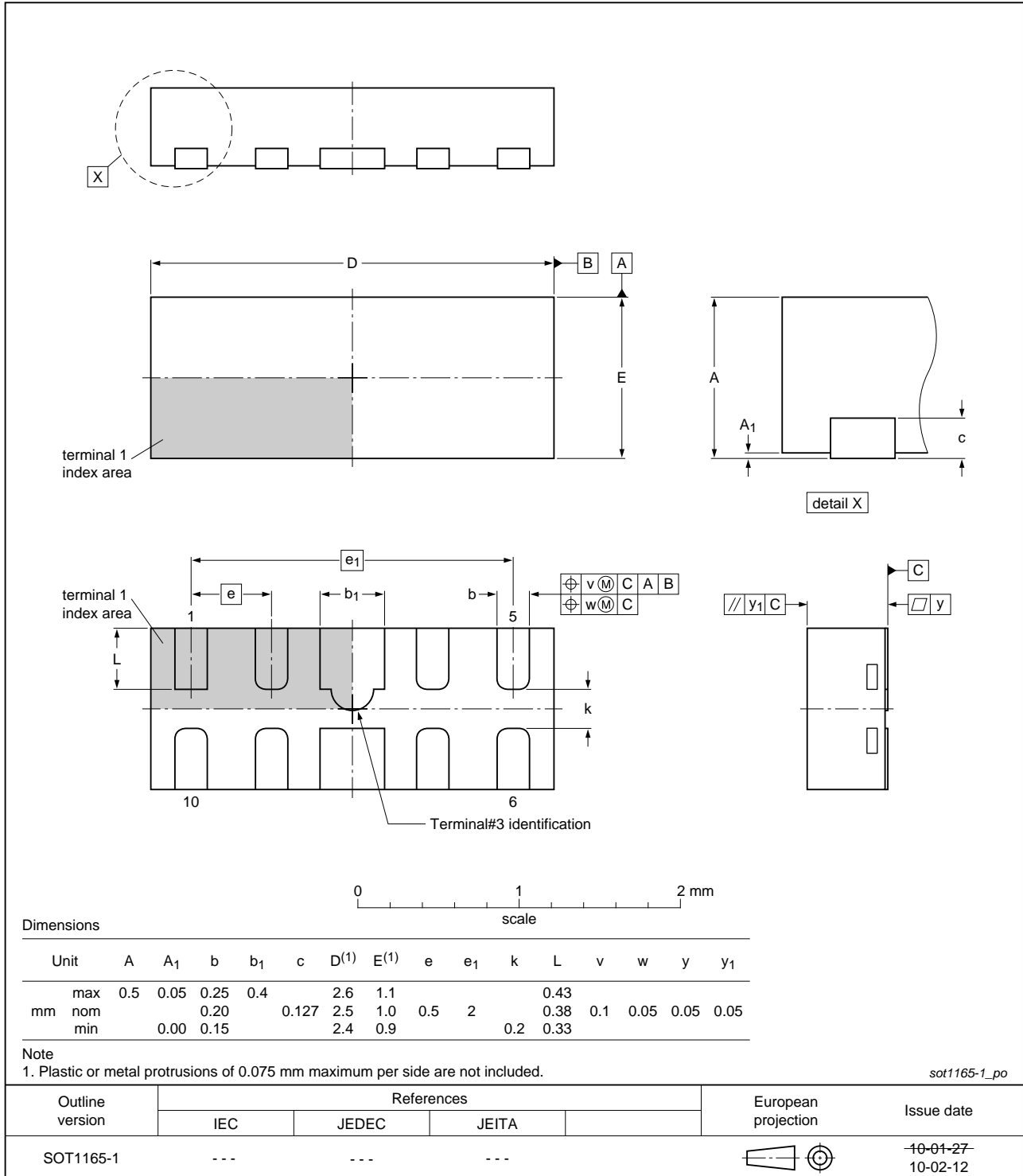
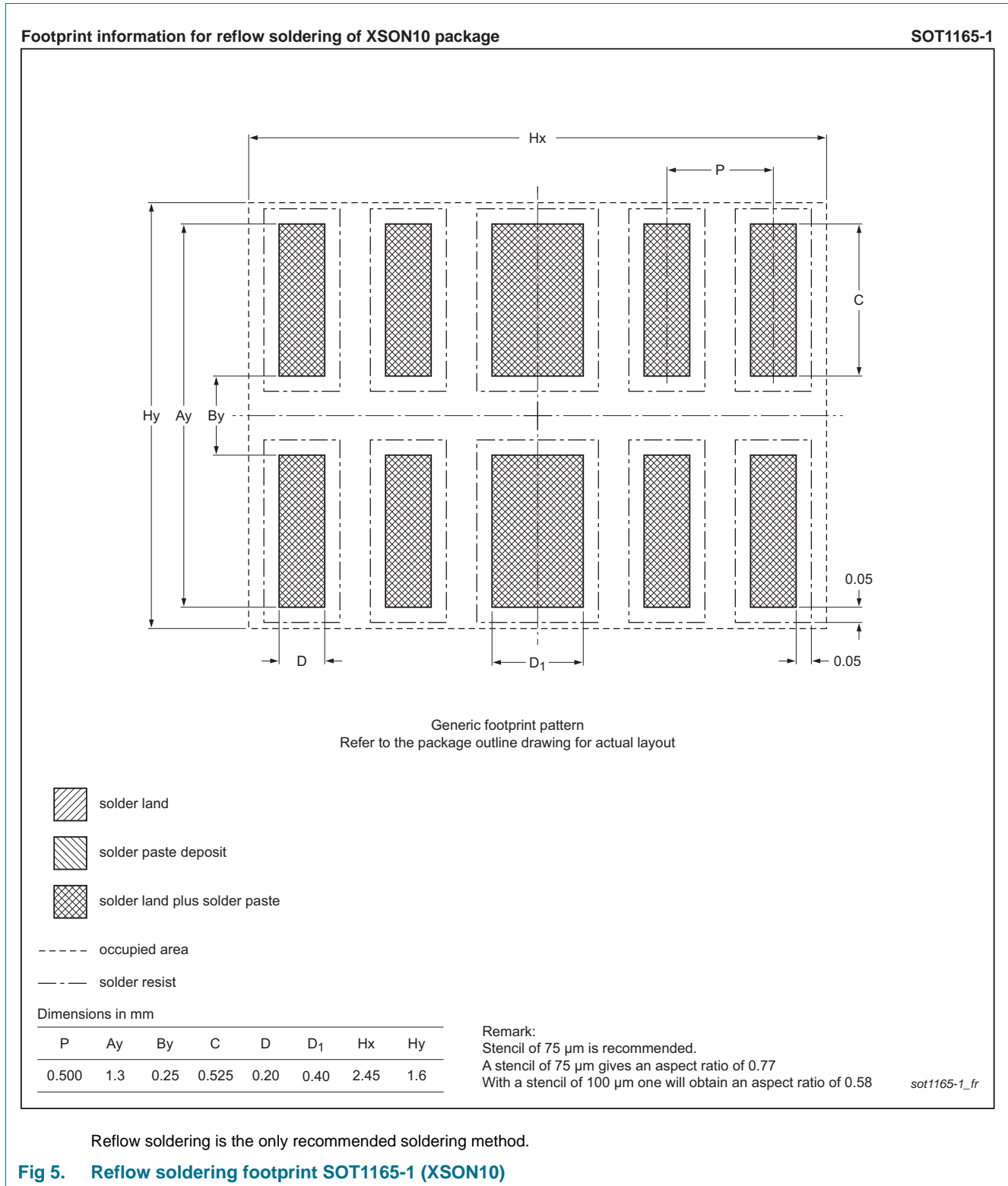


Fig 4. Package outline SOT1165-1 (XSON10)

## 9. Soldering





## 10. Revision history

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**Table 8.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PESD1LVDS v.1	20111010	Product data sheet	-	-

## 11. Legal information

### 11.1 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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Date of release: 10 October 2011

Document identifier: PESD1LVDS