

PESD1LVDS

ESD protection for in-vehicle ultra high-speed interfaces

Rev. 3 — 5 July 2016

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 ≤ 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

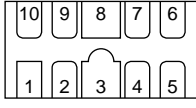
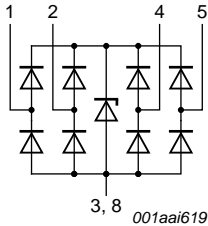
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage		-	-	5.5	V
C_{ch}	channel capacitance	$f = 1$ MHz; $V_{bias} = 2.5$ V	[1]	0.6	-	pF

[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 XSON10</p>	 <p>3, 8 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	+125	°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

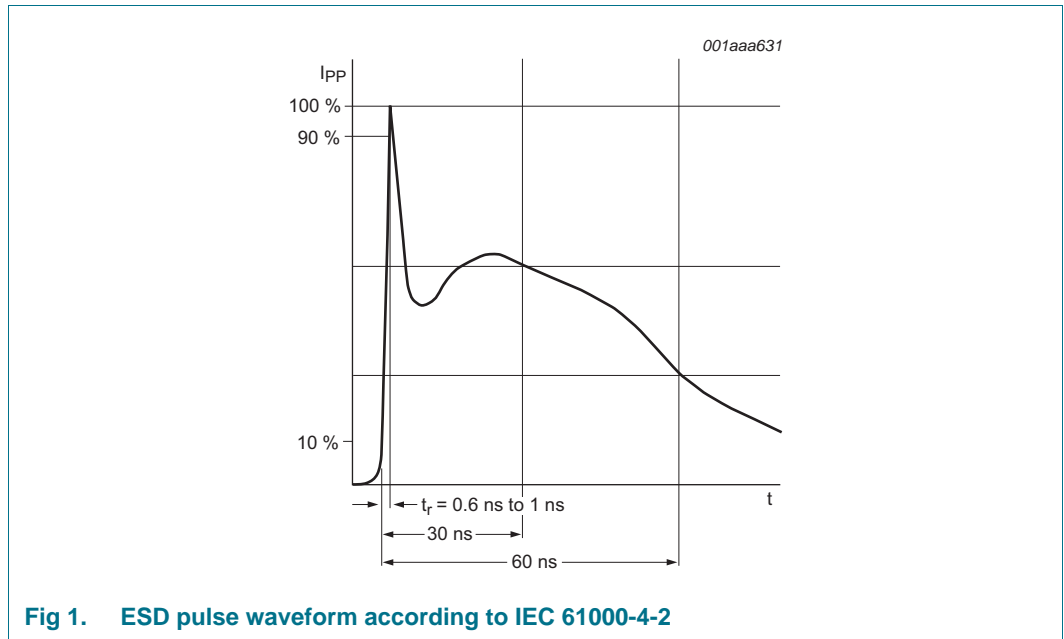


Fig 1. ESD pulse waveform according to IEC 61000-4-2

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	μA
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.

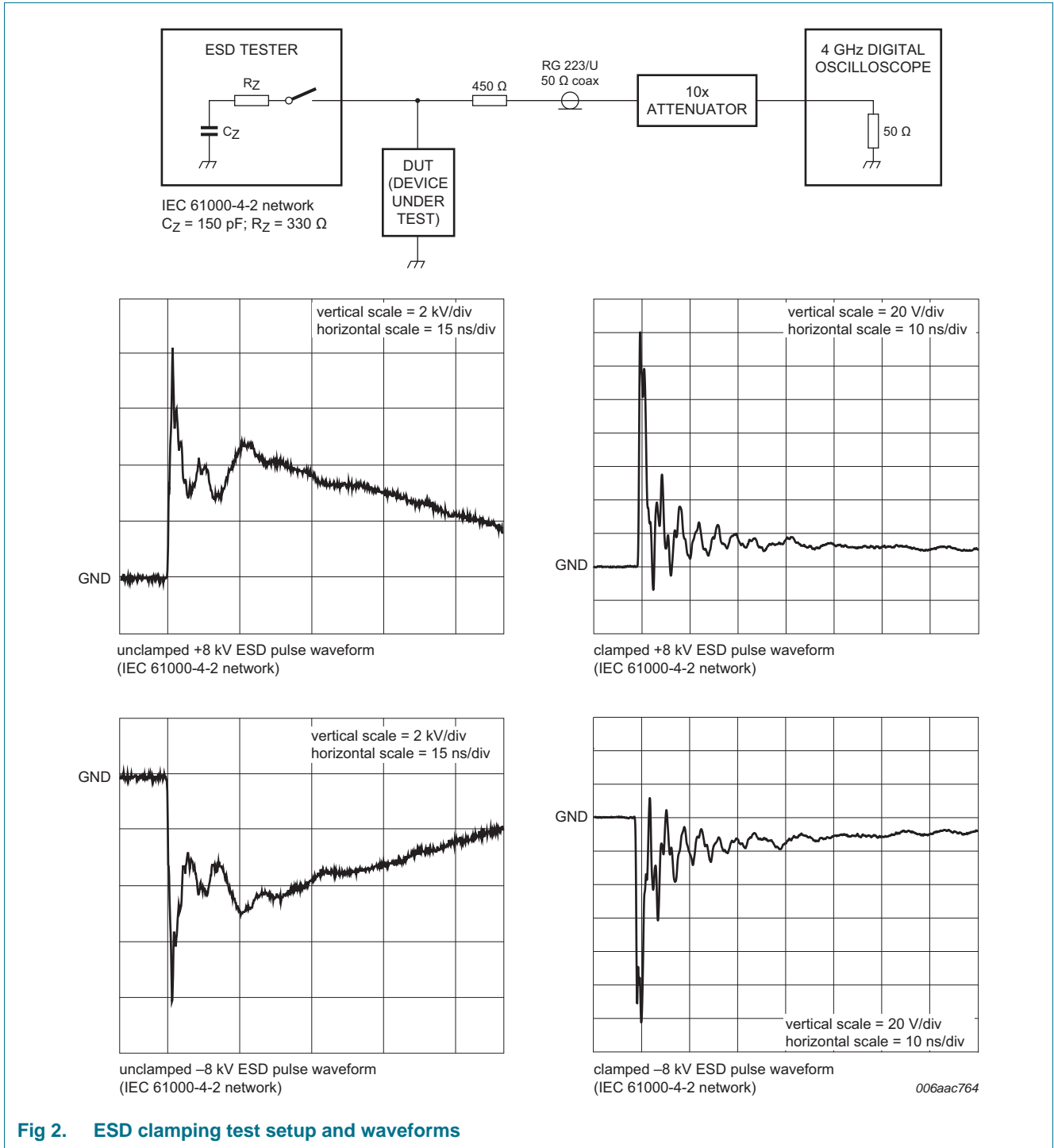


Fig 2. ESD clamping test setup and waveforms

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](#).

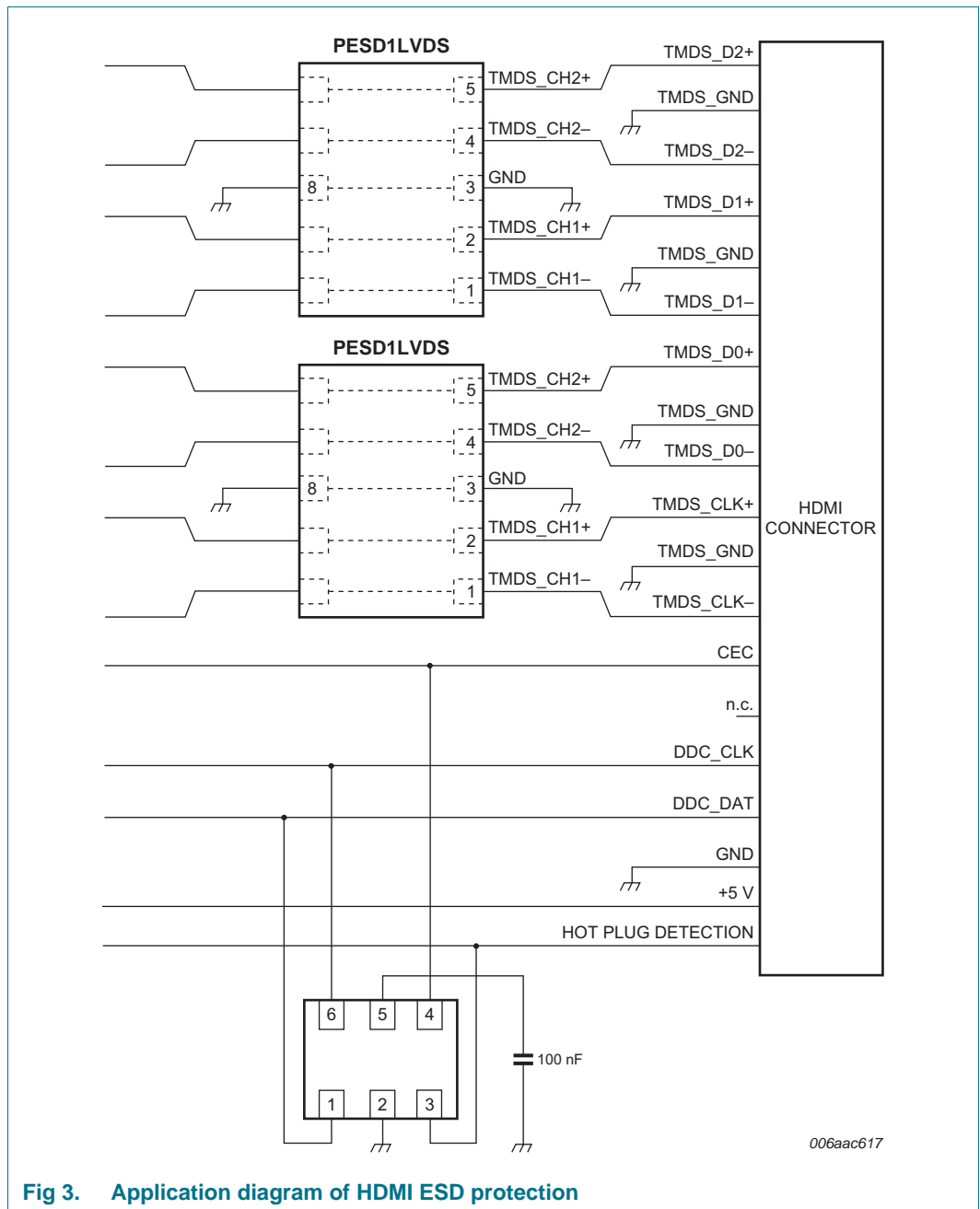


Fig 3. Application diagram of HDMI ESD protection

7. Test information

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

DFN2510-10: plastic, extremely thin small outline package; no leads;
10 terminals; body 1 x 2.5 x 0.5 mm

SOT1165-1

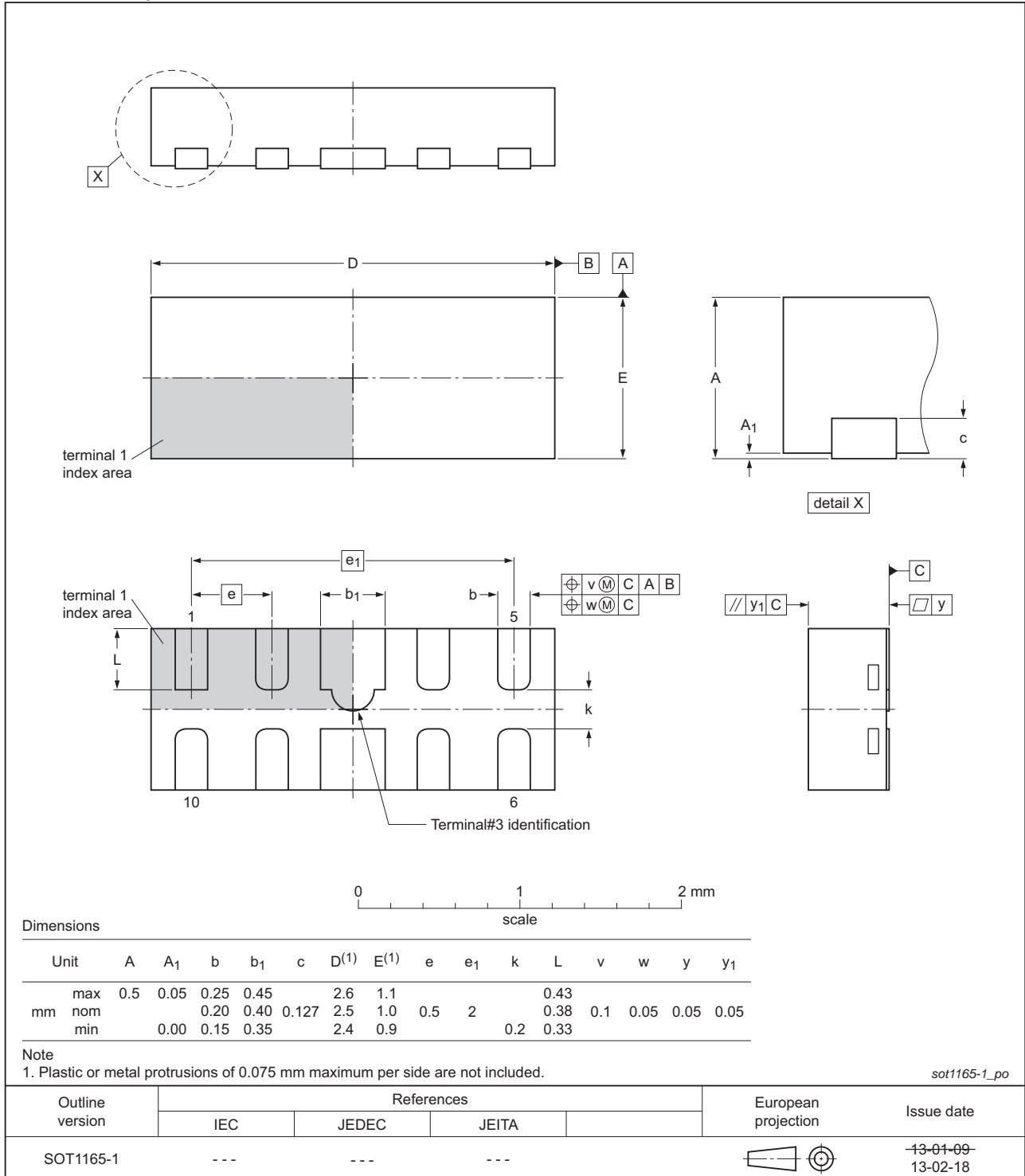
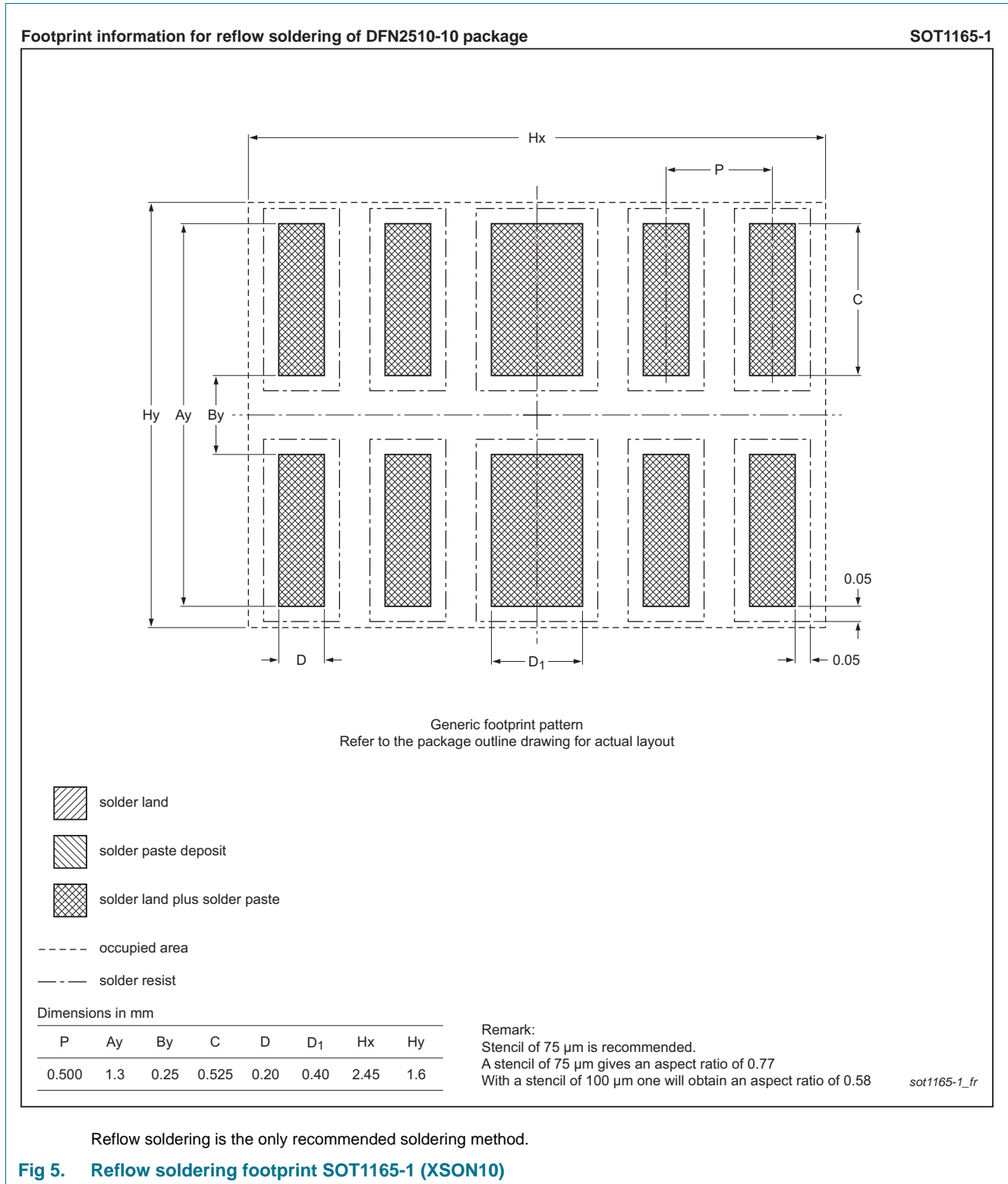


Fig 4. Package outline SOT1165-1 (XSON10)

9. Soldering



10. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PESD1LVDS v.3	20160705	Product data sheet	-	PESD1LVDS v.2
Modifications:	<ul style="list-style-type: none">Table 4 “Limiting values”: updated maximum ambient temperature T_{amb} from +85 °C to +125 °C			
PESD1LVDS v.2	20130123	Product data sheet	-	PESD1LVDS v.1
PESD1LVDS v.1	20111010	Product data sheet	-	-

11. Legal information

11.1 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".

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