

DATA SHEET

PTN3310/PTN3311

High-speed serial logic translators

Product data
Supersedes data of 2002 Oct 24

2004 Feb 24

High-speed serial logic translators

PTN3310/PTN3311

FEATURES

- Meets LVDS EIA-644 and PECL standards
- 2 pin-for-pin replacement input/output choices:
 - LVDS in, PECL out (PTN3310)
 - PECL in, LVDS out (PTN3311)
- Single +3.3 V supply voltage operation
- Available in 8-pin SO or TSSOP package
- Maximum throughput data rate of 800 Mbps typical

APPLICATIONS

- High-speed networking and telecom applications
 - ATM
 - SONET/SDH
 - Switches
 - Routers
 - Add-drop multiplexers

GENERAL DESCRIPTION

The High-Speed Serial Logic Translator provides a point solution that addresses the various interface logic requirements of Optical Transceiver Modules. The product offers a compact translation between LVDS and PECL high speed serial data lines. This provides the end users a simple way to mix or match Optical Transceiver ICs from various vendors to maximize desired performance and reduces the need to redesign interfaces to accommodate new Optical Transceiver ICs.

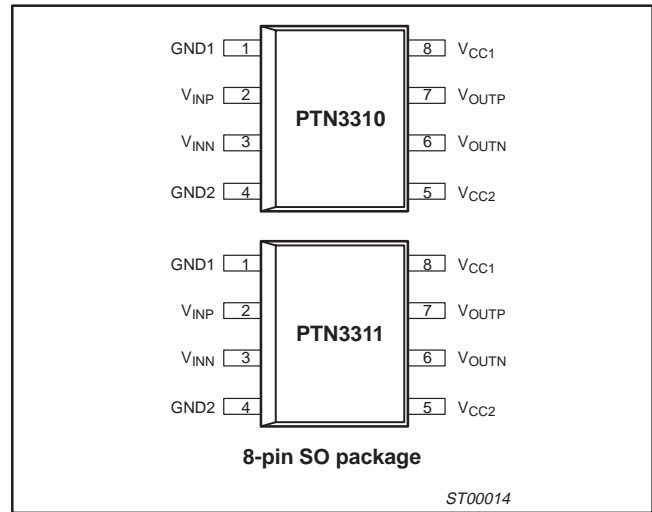
The High-Speed Serial Logic Translator comes in two translation choices to allow mixing LVDS and PECL input/outputs. The product is offered in a small, convenient, 8-pin package.

Figure 1 shows the High-Speed Serial Logic Translator Device in a typical high speed optical module application. Figure 2 shows the circuit block diagrams.

ORDERING INFORMATION

Type number	Package		
	Name	Description	Version
PTN3310D	SO8	Plastic small-outline package; 8 leads; body width 3.9 mm	SOT96-1
PTN3311D	SO8	Plastic small-outline package; 8 leads; body width 3.9 mm	SOT96-1
PTN3310DP	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm	SOT505-1
PTN3311DP	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm	SOT505-1

PIN CONFIGURATIONS



PIN DESCRIPTIONS

8-pin SO and TSSOP package

Pin #	Symbol	Name and function
1, 4	GND1, GND2	Ground
2, 3	V _{INP} , V _{INN}	Differential inputs
5, 8	V _{CC1} , V _{CC2}	Supply voltage
6, 7	V _{OUTN} , V _{OUTP}	Differential outputs

High-speed serial logic translators

PTN3310/PTN3311

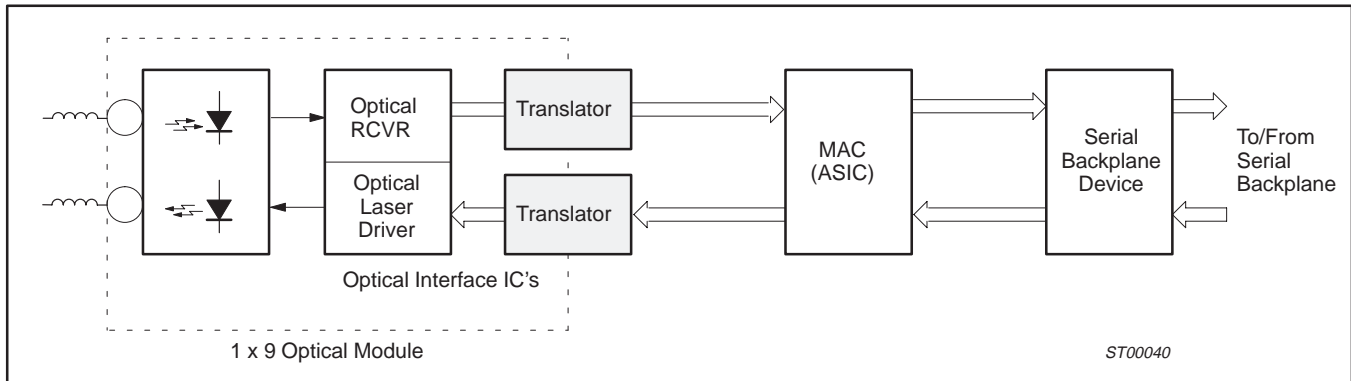


Figure 1. High-Speed Serial Logic Translators in Optical Module Application

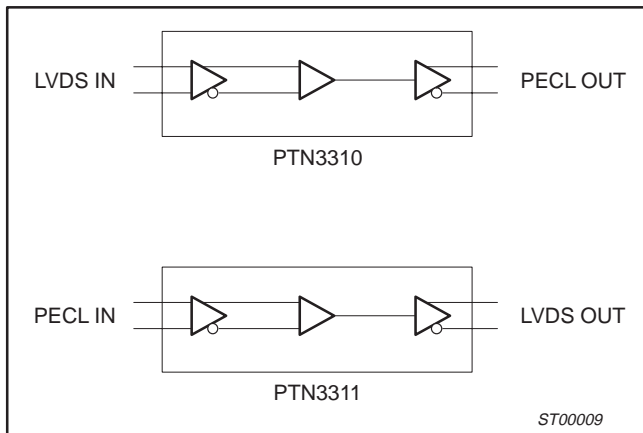


Figure 2. High-Speed Serial Logic Translator Block Diagrams

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Limits	Unit
V _{CC}	Supply voltage	-0.3 to +4.0	V
V _I	LVDS receiver input voltage	-0.3 to +5.5	V
V _O	LVDS driver output voltage	-0.3 to +5.5	V
t _{SC}	LVDS output short circuit duration	continuous	
T _j	Maximum junction temperature	+150	°C
T _{stg}	Storage temperature range	-65 to +150	°C
ESD _{HBM}	Electrostatic discharge (Human Body Model, 1.5 kΩ, 100 pF)	>2	kV
ESD _{MM}	Electrostatic discharge (Machine Model, 0 kΩ, 200 pF)	>200	V

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply voltage	3.0	3.6	V
T _{amb}	Operating ambient temperature range in free air	-40	+85	°C
V _{CCN}	Power supply noise voltage	-	100	mV _{PP}

High-speed serial logic translators

PTN3310/PTN3311

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
General						
V_{CC}	Supply voltage		3.0	3.3	3.6	V
I_{CC}	Power supply current	PTN3311	–	12	20	mA
I_{EE}	Power supply current	PTN3310	–	13	20	mA
PECL inputs (PTN3311)						
V_{IH}	Input HIGH voltage ¹		2.135	–	2.420	V
V_{IL}	Input LOW voltage ¹		1.490	–	1.825	V
I_I	Input current	$V_{IN} = V_{CC}$ or GND	–	–	±10	µA
LVDS inputs (PTN3310)						
V_{ID}	Minimum differential input signal amplitude		100	–	–	mV
I_{IN}	Input current ²	$V_{IN} = 0$ V	–	–	20	µA
		$V_{IN} = V_{CC}$	–	–	20	µA
PECL outputs (PTN3310)						
V_{OH}	Output HIGH voltage ¹		2.275	2.345	2.420	V
V_{OL}	Output LOW voltage ¹		1.490	1.595	1.680	V
C_L	Output load capacitance		–	5	–	pF
LVDS outputs (PTN3311); $R_L = 100 \Omega$						
V_{OD}	Output differential voltage		250	350	450	mV
ΔV_{OD}	Steady-state difference in output differential voltage between complementary output states		–	–	50	mV
V_{OS}	Offset voltage		1.125	1.250	1.375	V
ΔV_{OS}	Steady-state difference in offset voltage between complementary output states		–	–	50	mV
I_{OS}	Output short-circuit current	outputs mutually shorted	–	–	12	mA
		output shorted to GND	–	–	24	mA
C_L	Output load capacitance		–	5	–	pF

NOTES:

1. These values are for $V_{CC} = 3.3$ V; PECL level specifications are referenced to V_{CC} and will track 1:1 with variation of V_{CC} .
2. Power supply either on or off.

High-speed serial logic translators

PTN3310/PTN3311

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
General						
f _{MAX}	Maximum throughput data rate		655	800	–	Mbps
t _{SKEW}	Clock output skew, part-to-part		–	100	–	ps
	Clock output pulse skew		–	50	–	ps
t _{PLH} /t _{PHL}	Propagation delay input (differential) to output		–	1	3	ns
	Propagation delay input (single-ended) to output		–	1	3	ns
PECL outputs (PTN3310)						
t _r /t _f	Output rise and fall times at 20% and 80% intersects		–	200	300	ps
LVDS outputs (PTN3311); R_L = 100 Ω; C_L = 5 pF						
t _{TLH}	Transition time LOW to HIGH	R _L = 100 Ω; C _L = 5 pF	–	500	650	ps
t _{THL}	Transition time HIGH to LOW	R _L = 100 Ω; C _L = 5 pF	–	500	650	ps
V _{OSS}	Peak-to-peak switching offset voltage	Measured between two matched 49.9 Ω load resistors; 5 pF load capacitance	–	–	150	mV

LVDS REFERENCE MEASUREMENT CONFIGURATION

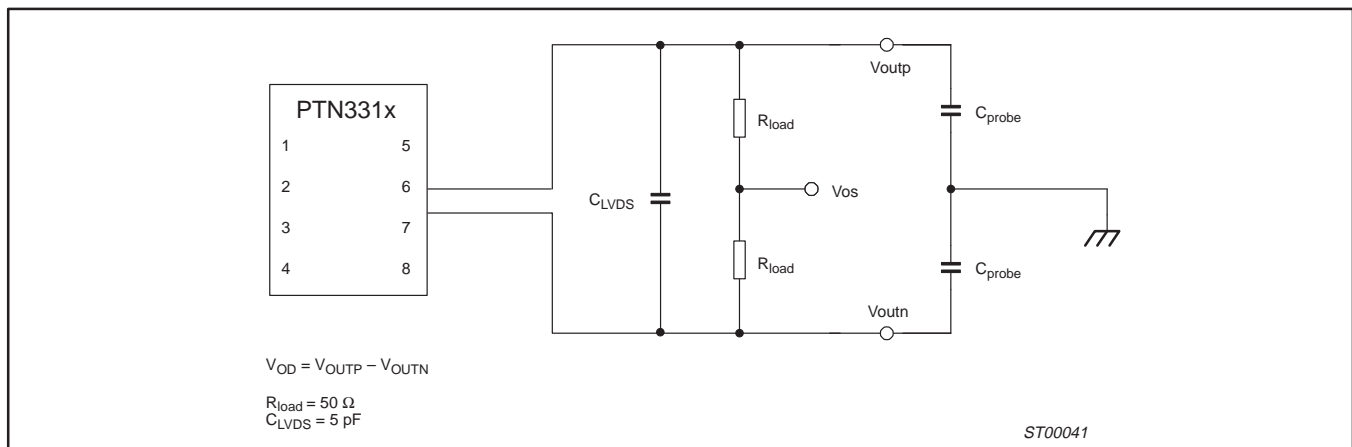


Figure 3.

The above diagram shows the test set-up used when evaluating LVDS outputs. According to the TIA-EIA-644 Standard, the maximum lumped capacitance test load should be 5 pF. However, by using probes or cables to observe the signal, additional capacitance is added, which has an effect on the rise and fall times. C_{probe} represents any capacitance caused by the use of probes or cables. Assuming balanced loading and balanced output drivers, the total effective capacitance seen by the part is:

$$C_{Eff} = C_{LVDS} + 1/2 C_{probe}$$

To correctly account for the effects of C_{probe}, the following formula should be used:

$$\Delta t = \frac{5 \text{ pF}}{C_{Eff}} \Delta t_{\text{measured}}$$

Where Δt is the 20%–80% rise/fall time.

To avoid the use of additional calculation of the measured results, a different approach could be taken; however, the value of C_{probe} has to be known in advance. In that case, the value of C_{LVDS} can be chosen such that the sum of the capacitances equals 5 pF, i.e.:

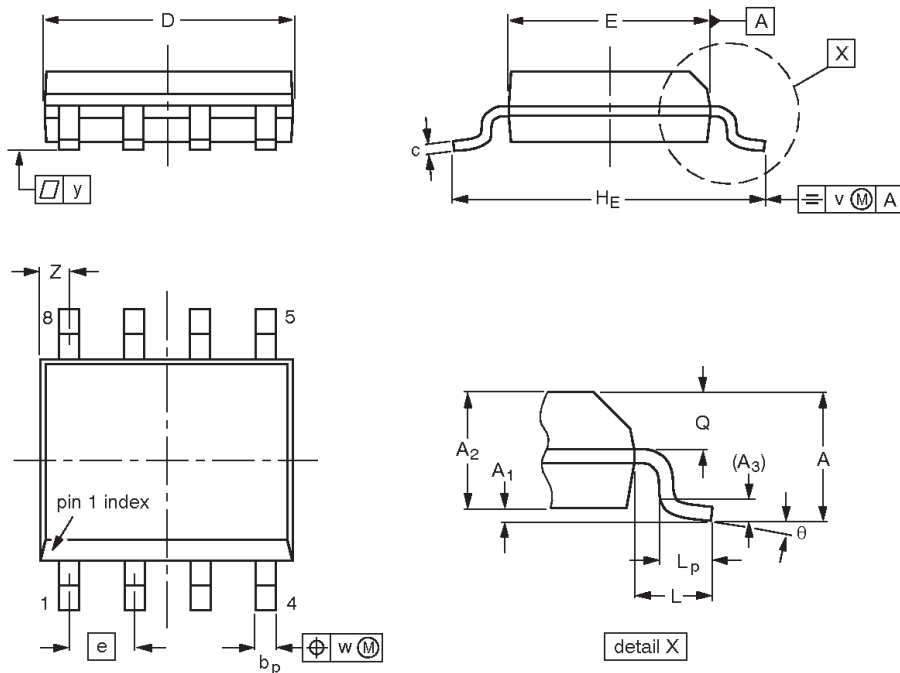
$$C_{LVDS} + 1/2 C_{probe} = 5 \text{ pF}$$

High-speed serial logic translators

PTN3310/PTN3311

SO8: plastic small outline package; 8 leads; body width 3.9 mm

SOT96-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽²⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	5.0 4.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.20 0.19	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Notes

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.
2. Plastic or metal protrusions of 0.25 mm (0.01 inch) maximum per side are not included.

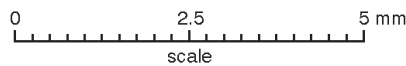
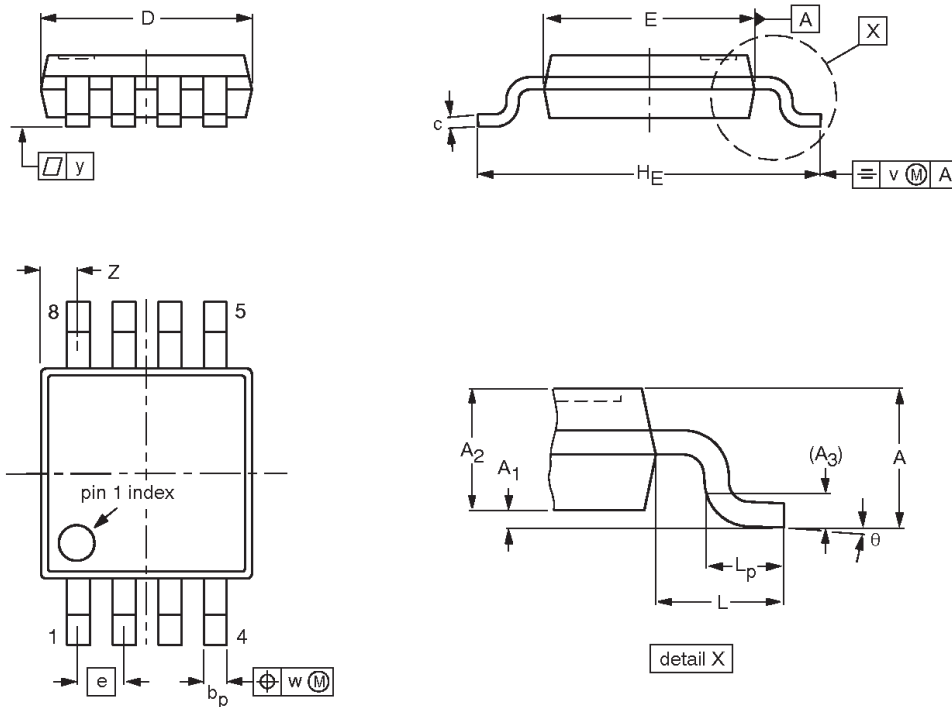
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT96-1	076E03	MS-012				99-12-27 03-02-18

High-speed serial logic translators

PTN3310/PTN3311

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm

SOT505-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽²⁾	e	H _E	L	L _p	v	w	y	Z ⁽¹⁾	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.45 0.25	0.28 0.15	3.1 2.9	3.1 2.9	0.65	5.1 4.7	0.94	0.7 0.4	0.1	0.1	0.1	0.70 0.35	6° 0°

Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT505-1						99-04-09 03-02-18

High-speed serial logic translators

PTN3310/PTN3311

REVISION HISTORY

Rev	Date	Description
_3	20040224	Product data (9397 750 12943). Supersedes data of 2002 Oct 24 (9397 750 10628). Modifications: <ul style="list-style-type: none">• Corrected package outline version from SOT505-2 to SOT505-1 in Ordering information table and Package outline sections.
_2	20021024	Product data (9397 750 10628). ECN 853-2362 28701 dated 06 August 2002. Supersedes data of 2001 Jun 19 (9397 750 08511).
_1	20010619	Product data (9397 750 08511).

High-speed serial logic translators

PTN3310/PTN3311

Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	Definitions
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products—including circuits, standard cells, and/or software—described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Contact information

For additional information please visit
<http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

© Koninklijke Philips Electronics N.V. 2004
 All rights reserved. Printed in U.S.A.

Date of release: 02-04

For sales offices addresses send e-mail to:
sales.addresses@www.semiconductors.philips.com

Document order number:

9397 750 12943

Let's make things better.

Philips
Semiconductors



PHILIPS