

DATA SHEET

PTN1111

1:10 PECL clock distribution device

Product data

2001 Jun 19

1:10 PECL clock distribution device

PTN1111

FEATURES

- 80 ps part-to-part skew
- 20 ps output-to-output skew
- Differential design
- PECL inputs and outputs
- V_{BB} reference output voltage available
- 75 k Ω input pulldown resistors
- Low voltage V_{CC} range of 2.375 V to +3.8 V
- High signaling rate capability (above 1 GHz)
- Pin and function compatible to MC100EP111, MC100LVEP111
- Available in LQFP32 package

DESCRIPTION

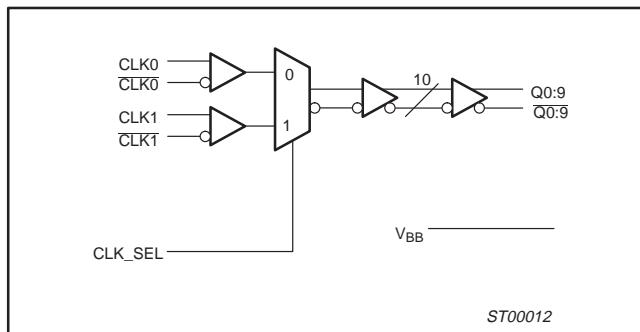
The PTN1111 is a low-skew, 1:10 PECL clock distribution device. One selected clock signal out of two selectable inputs is fanned out to 10 identical, precision time-aligned differential outputs.

The PTN1111 is provided with a V_{BB} reference voltage to allow for single-ended PECL input and with complementary clock inputs to allow for differential PECL input.

The main purpose and benefit of the PTN1111 is low skew: between individual outputs of a single PTN1111 (within-part skew or output-to-output skew) as well as measured from part-to-part. Within-part skew is realized by careful attention to internal layout and design of the PTN1111, whereas part-to-part skew is achieved by control and monitoring of relevant process parameters.

The PTN1111 can be used for high-performance, high-speed clock distribution in systems which utilize PECL as the primary signaling standard. Designers can take advantage of the device's performance to distribute clocks across a board or backplane, at an extremely high degree of time alignment, thereby affording system processors to achieve maximum utilization of the clock cycle.

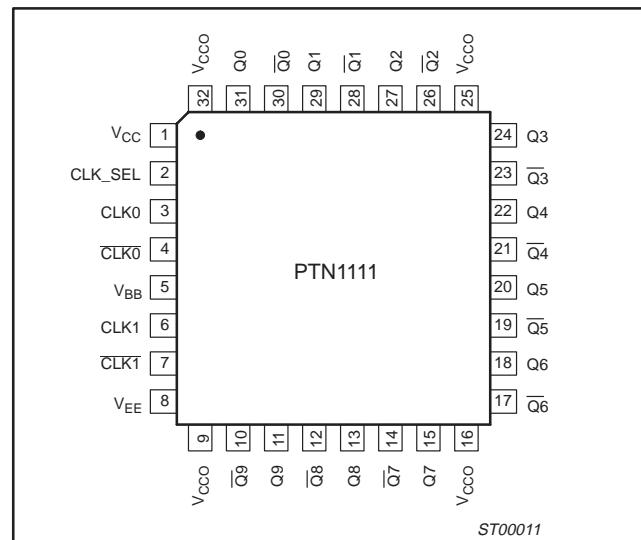
LOGIC DIAGRAM



ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PTN1111BD	LQFP32	Plastic low profile quad flat package; 32 leads; body 7 x 7 x 1.4 mm	SOT358-1

PIN CONFIGURATION



PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
1	V_{CC}	Power supply voltage
2	CLK_SEL	Clock select input
3, 4	CLK0, $\bar{CLK0}$	Differential PECL clock input pair
5	V_{BB}	Voltage reference output
6, 7	CLK1, $\bar{CLK1}$	Differential PECL clock input pair
8	V_{EE}	Ground
9, 16, 25, 32	V_{CCO}	Output driver power supply voltages
10–15, 17–24, 26–31	Q0:9, $\bar{Q0:9}$	Differential PECL output pairs

1:10 PECL clock distribution device

PTN1111

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

SYMBOL	PARAMETER	LIMITS	UNIT
V_{CC}	Supply voltage	-0.5 to +4.6	V
ESDHBM	Electrostatic discharge (Human Body Model; 1.5 kΩ, 100 pF)	>2	kV
ESDMM	Electrostatic discharge (Machine Model; 0 kΩ, 200 pF)	>200	V

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{CC}	Supply voltage	2.375	3.8	V
V_{IR}	Receiver input voltage	V_{EE}	V_{CC}	V
T_{amb}	Operating ambient temperature range in free air	-40	+85	°C

DC ELECTRICAL CHARACTERISTICS $T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ unless otherwise specified; $V_{CC} = 3.3$ V

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
V_{OH}	Output HIGH voltage	2.275	2.345	2.420	V
V_{OL}	Output LOW voltage	1.490	1.595	1.680	V
V_{IH}	Input HIGH voltage	2.135	—	2.420	V
V_{IL}	Input LOW voltage	1.490	—	1.825	V
V_{BB}	Output reference voltage	1.92	—	2.04	V
V_{CC}	Power supply voltage	2.375	—	3.8	V
I_{IH}	Input HIGH current	—	—	150	μA
I_{EE}	Power supply current, internal	—	80	120	mA
I_{CC}	Power supply current including load: 50 Ω to $V_{CC} - 2.0$ V	—	340	—	mA

NOTE:

- 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} .

AC ELECTRICAL CHARACTERISTICS $T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ unless otherwise specified; $V_{CC} = V_{CCmin}$ to V_{CCmax} ; $V_{EE} = 0$ V

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
t_{PLH} t_{PHL}	Propagation delay input (differential) to output	—	400	680	ps
	Propagation delay input (single-ended) to output	—	400	680	ps
t_{skew}	Clock output skew, within device	—	20	40	ps
	Clock output skew, part-to-part	—	80	110	ps
	Clock output pulse skew	—	50	160	ps
f_{MAX}	Maximum input frequency	—	1.5	—	GHz
t_{Pclk_set}	Propagation delay CLK_SEL transition to stable $Q_n/Q_{\bar{n}}$ output	—	5	10	ns
V_{PP}^1	Input swing	0.5	0.8	1.3	V
t_r/t_f	Output rise/fall time at 20% and 80% intersects	—	200	—	ps

NOTE:

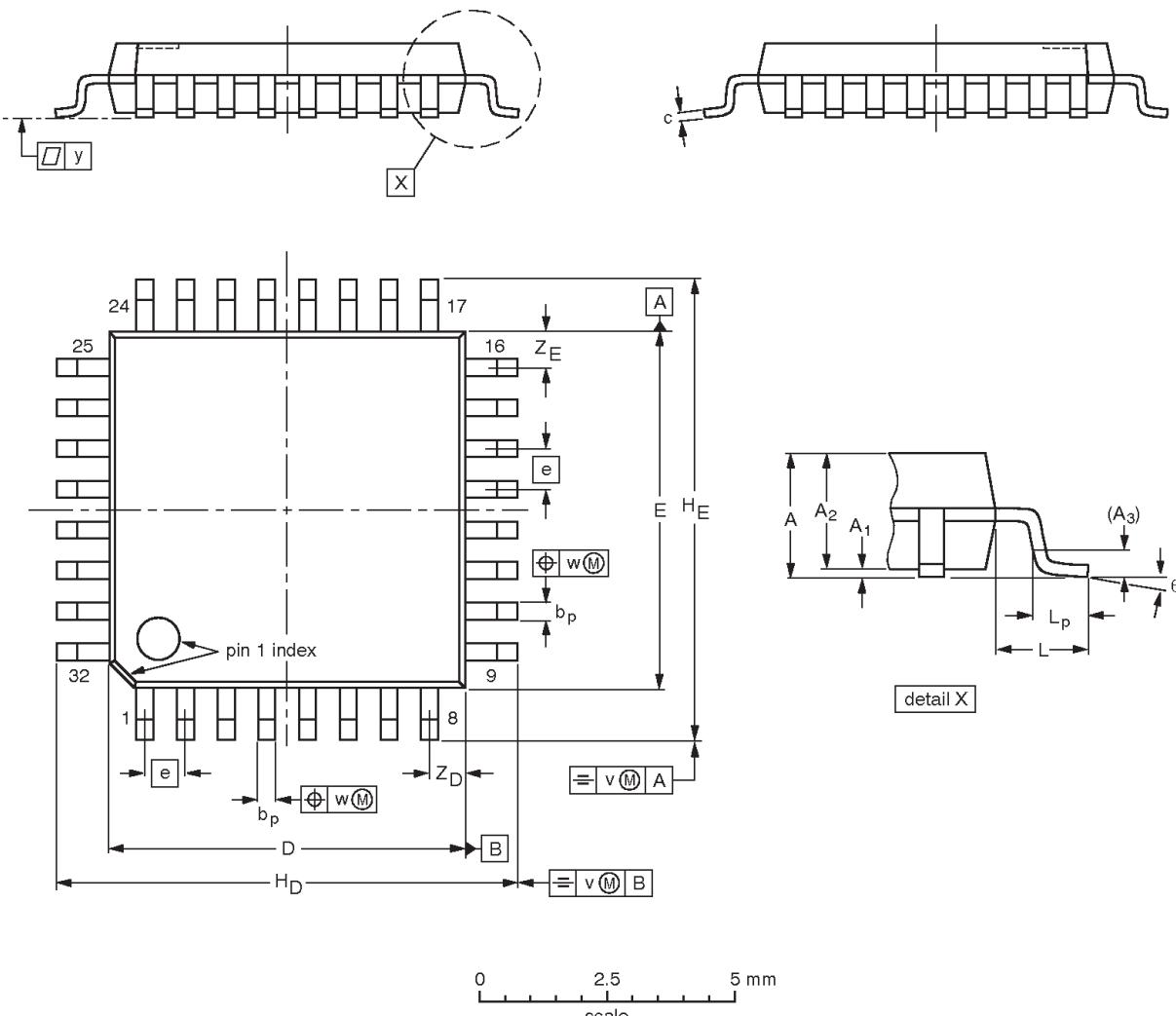
- Required to maintain AC specifications. Actual device accepts V_{PP} of 100 mV or higher.

1:10 PECL clock distribution device

PTN1111

LQFP32: plastic low profile quad flat package; 32 leads; body 7 x 7 x 1.4 mm

SOT358-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _D	H _E	L	L _p	v	w	y	Z _D ⁽¹⁾	Z _E ⁽¹⁾	θ
mm	1.60 0.05	0.20 1.35	1.45	0.25	0.4 0.3	0.18 0.12	7.1 6.9	7.1 6.9	0.8	9.15 8.85	9.15 8.85	1.0	0.75 0.45	0.2	0.25	0.1	0.9 0.5	0.9 0.5	7° 0°

Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT358-1	136E03	MS-026				99-12-27 00-01-19

Data sheet status

Data sheet status ^[1]	Product status ^[2]	Definitions
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.
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.
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. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A.

[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>.

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, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. 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.

Philips Semiconductors
811 East Arques Avenue
P.O. Box 3409
Sunnyvale, California 94088-3409
Telephone 800-234-7381

© Copyright Philips Electronics North America Corporation 2001
All rights reserved. Printed in U.S.A.

Date of release: 06-01
Document order number: 9397 750 08509

Let's make things better.