

3.3V 1:9 Clock Buffer

Features

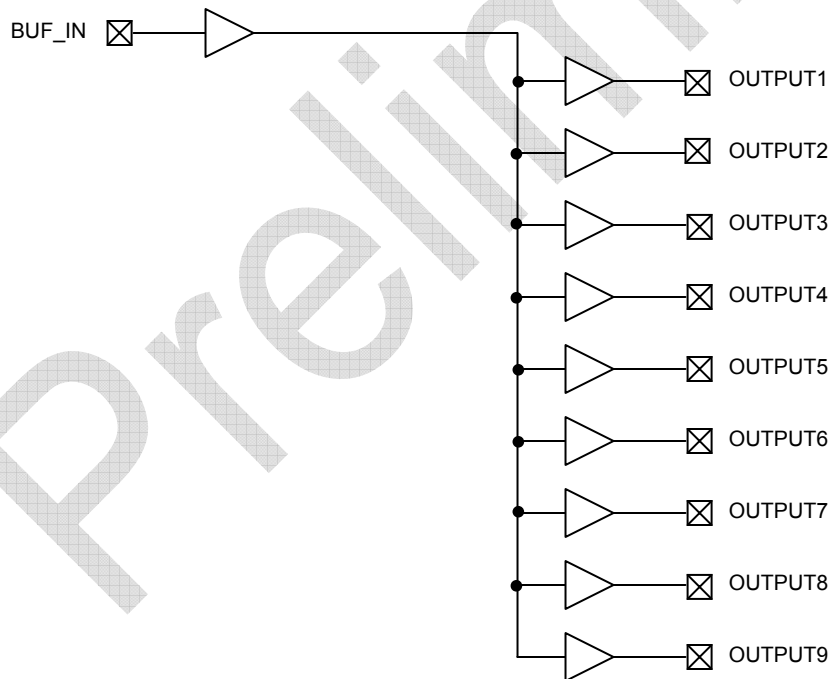
- One-Input to Nine-Output Buffer/Driver
- Buffers all frequencies from DC to 133.33MHz
- Low power consumption for mobile applications
Less than 32mA at 66.6MHz with unloaded outputs
- Input-Output delay: 6nS(max)
- Output-output skew less than 250pS
- 16 pin SOIC Package
- Supply Voltage: 3.3V±0.3V
- Commercial and Industrial temperature range

Functional Description

PCS2P2309NZ is a low-cost high-speed buffer designed to accept one clock input and distribute up to nine clocks in mobile PC systems and desktop PC systems. The device operates at 3.3V and outputs can run up to 133.33MHz.

PCS2P2309NZ is designed for low EMI and power optimization and consumes less than 32mA at 66.6MHz, making it ideal for the low-power requirements of mobile systems. It is available in an 16 pin SOIC Package over Commercial and Industrial temperature range.

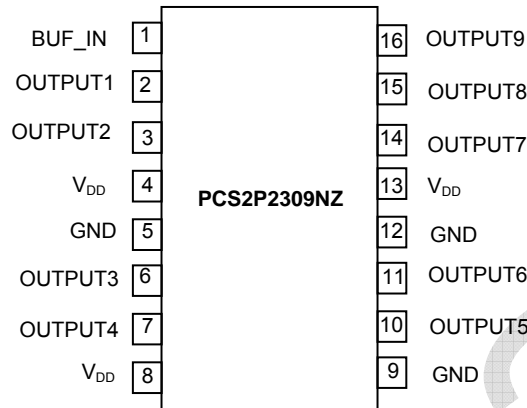
Block Diagram



May 2008

rev 0.4

Pin Configuration



Pin Description

Pin#	Pin Name	Description
4, 8, 13	V _{DD}	3.3V Digital Voltage Supply
5, 9, 12	GND	Ground
1	BUF_IN	Input Clock
2, 3, 6, 7, 10, 11, 14, 15, 16	OUTPUT [1:9]	Outputs

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage to Ground Potential	-0.5	+4.6	V
DC Input Voltage (Except REF)	-0.5	V _{DD} + 0.5	V
DC Input Voltage (REF)	-0.5	7	V
Storage Temperature	-65	+150	°C
Max. Soldering Temperature (10 sec)		260	°C
Junction Temperature		150	°C
Static Discharge Voltage (As per JEDEC STD22- A114-B)		2000	V

Note: These are stress ratings only and functional usage is not implied. Exposure to absolute maximum ratings for prolonged periods can affect device reliability.

Operating Conditions

Parameter	Description	Min	Max	Unit
V _{DD}	Supply Voltage	3.0	3.6	V
T _A	Commercial Temp.	0	70	°C
	Industrial Temp.	-40	85	°C
C _L	Load Capacitance, Fout < 100MHz		30	pF
	Load Capacitance, 100MHz < Fout < 133.33MHz		15	pF
C _{IN}	Input Capacitance		7	pF
BUF_IN, OUTPUT [1:9]	Operating Frequency	DC	133.33	MHz
t _{PU}	Power-up time for all V _{DD} 's to reach minimum specified voltage (power ramps must be monotonic)	0.05	50	mS

Electrical Characteristics for Commercial and Industrial Temperature Devices

Symbol	Parameter	Test Conditions	Min	Max	Unit
V _{IL}	Input LOW Voltage ¹			0.8	V
V _{IH}	Input HIGH Voltage ¹		2.2		V
I _{IL}	Input LOW Current	V _{IN} = 0V		50.0	µA
I _{IH}	Input HIGH Current	V _{IN} = V _{DD}		100.0	µA
V _{OL}	Output LOW Voltage ²	I _{OL} = 12 mA		0.4	V
V _{OH}	Output HIGH Voltage ²	I _{OH} = -12 mA	2.4		V
I _{DD}	Supply Current	Commercial temp.	Unloaded outputs at 66.66MHz	30	mA
		Industrial temp.		32	

Switching Characteristics for Commercial and Industrial Temperature Devices³

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t ₃	Rise Time ²	Measured between 0.8V and 2.0V		1.5	2	nS
t ₄	Fall Time ²	Measured between 2.0V and 0.8V		1.5	2	nS
t _D	Duty Cycle ² = t ₂ ÷ t ₁	Measured at 1.4V (For an Input Clock Duty Cycle 50%)	45	50	55	%
t ₅	Output to Output Skew ²	All outputs equally loaded			±250	pS
t ₆	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge ²	Measured at V _{DD} /2		4	6	nS

Note:

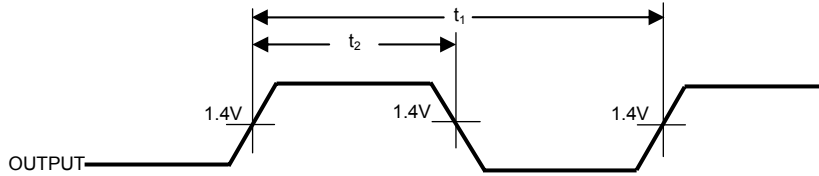
1. BUF_IN input has a threshold voltage of V_{DD}/2.
2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.
3. All parameters specified with loaded outputs.

May 2008

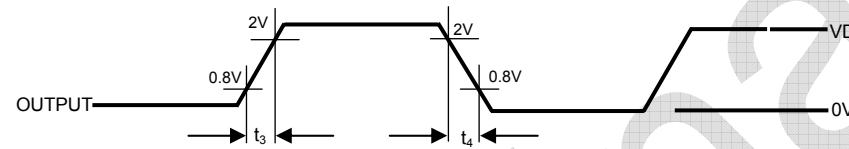
rev 0.4

Switching Waveforms

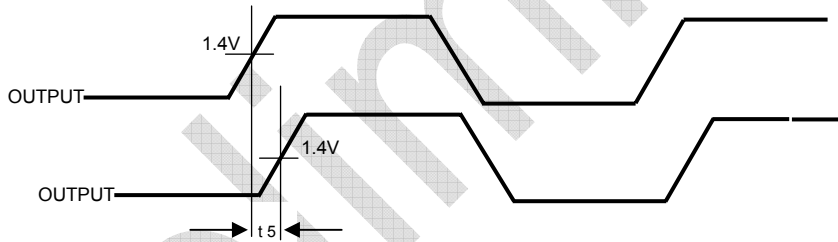
Duty Cycle Timing



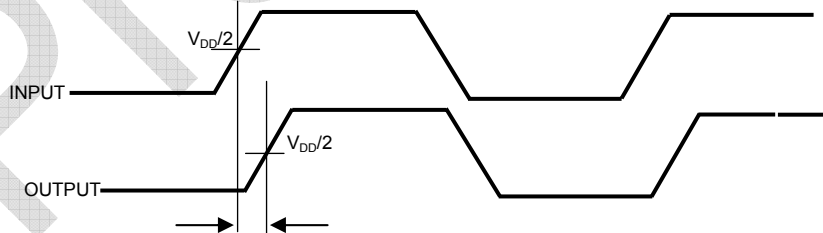
All Outputs Rise/Fall Time

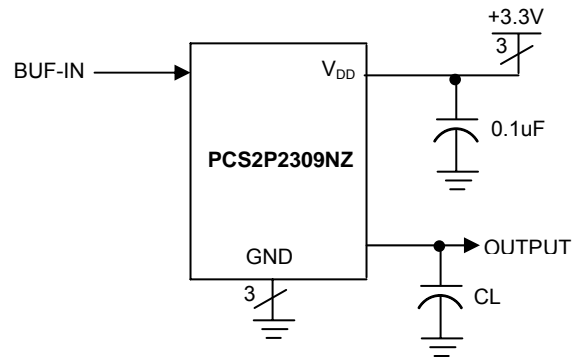


Output-Output Skew



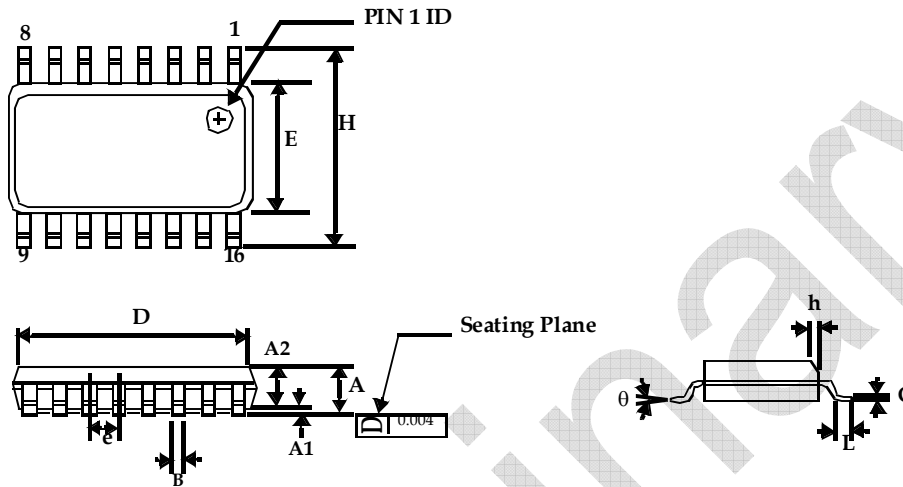
Input-Output Propagation Delay





Preliminary

16-lead (150 Mil) Molded SOIC



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
A2	0.049	0.059	1.25	1.50
B	0.013	0.022	0.33	0.53
C	0.008	0.012	0.19	0.27
D	0.386	0.394	9.80	10.01
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	0.228	0.244	5.80	6.20
h	0.010	0.016	0.25	0.41
L	0.016	0.035	0.40	0.89
θ	0°	8°	0°	8°

May 2008

rev 0.4

Ordering Code

Part Number	Marking	Package Type	Temperature
PCS2P2309NZF-16-ST	2P2309NZF	16-pin 150-mil SOIC, Pb Free	Commercial
PCS2P2309NZF-16-SR	2P2309NZF	16-pin 150-mil SOIC, Tape and Reel, Pb Free	Commercial
PCS2I2309NZF-16-ST	2I2309NZF	16-pin 150-mil SOIC, Pb Free	Industrial
PCS2I2309NZF-16-SR	2I2309NZF	16-pin 150-mil SOIC, Tape and Reel, Pb Free	Industrial
PCS2P2309NZG-16-ST	2P2309NZG	16-pin 150-mil SOIC, Green	Commercial
PCS2P2309NZG-16-SR	2P2309NZG	16-pin 150-mil SOIC, Tape and Reel, Green	Commercial
PCS2I2309NZG-16-ST	2I2309NZG	16-pin 150-mil SOIC, Green	Industrial
PCS2I2309NZG-16-SR	2I2309NZG	16-pin 150-mil SOIC, Tape and Reel, Green	Industrial

Device Ordering Information

PCS2P2309NZG-16-SR

R = Tape & Reel, T = Tube or Tray

O = SOT	U = MSOP
S = SOIC	E = TQFP
T = TSSOP	L = LQFP
A = SSOP	U = MSOP
V = TVSOP	P = PDIP
B = BGA	D = QSOP
Q = QFN	X = SC-70

DEVICE PIN COUNT

F = LEAD FREE AND RoHS COMPLIANT PART
G = GREEN PACKAGE, LEAD FREE, and RoHS

PART NUMBER

X= Automotive (-40C to +125C)	I= Industrial (-40C to +85C)	P or n/c = Commercial (0C to +70C)
1 = Clock Generator	6 = Power Management	
2 = Non PLL based	7 = Power Management	
3 = EMI Reduction	8 = Power Management	
4 = DDR support products	9 = Hi Performance	
5 = STD Zero Delav Buffer	0 = Reserved	

PulseCore Semiconductor Mixed Signal Product

Licensed under US patent #5,488,627, #6,646,463 and #5,631,920.



Giving you the edge

PCS2P2309NZ

May 2008

rev 0.4



PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200
Campbell, CA 95008
Tel: 408-879-9077
Fax: 408-879-9018
www.pulsecoresemi.com

Copyright © PulseCore Semiconductor
All Rights Reserved
Part Number: PCS2P2309NZ
Document Version: 0.4

Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003
Many PulseCore Semiconductor products are protected by issued patents or by applications for patent

© Copyright 2006 PulseCore Semiconductor Corporation. All rights reserved. Our logo and name are trademarks or registered trademarks of PulseCore Semiconductor. All other brand and product names may be the trademarks of their respective companies. PulseCore reserves the right to make changes to this document and its products at any time without notice. PulseCore assumes no responsibility for any errors that may appear in this document. The data contained herein represents PulseCore's best data and/or estimates at the time of issuance. PulseCore reserves the right to change or correct this data at any time, without notice. If the product described herein is under development, significant changes to these specifications are possible. The information in this product data sheet is intended to be general descriptive information for potential customers and users, and is not intended to operate as, or provide, any guarantee or warranty to any user or customer. PulseCore does not assume any responsibility or liability arising out of the application or use of any product described herein, and disclaims any express or implied warranties related to the sale and/or use of PulseCore products including liability or warranties related to fitness for a particular purpose, merchantability, or infringement of any intellectual property rights, except as express agreed to in PulseCore's Terms and Conditions of Sale (which are available from PulseCore). All sales of PulseCore products are made exclusively according to PulseCore's Terms and Conditions of Sale. The purchase of products from PulseCore does not convey a license under any patent rights, copyrights; mask works rights, trademarks, or any other intellectual property rights of PulseCore or third parties. PulseCore does not authorize its products for use as critical components in life-supporting systems where a malfunction or failure may reasonably be expected to result in significant injury to the user, and the inclusion of PulseCore products in such life-supporting systems implies that the manufacturer assumes all risk of such use and agrees to indemnify PulseCore against all claims arising from such use.