

# PCS2P2309NZ

## Product Preview

### 3.3 V 1:9 Clock Buffer

#### 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 3.3 V and outputs can run up to 133.33 MHz.

PCS2P2309NZ is designed for low EMI and power optimization and consumes less than 32 mA at 66.6 MHz, 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.

#### Features

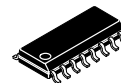
- One-Input to Nine-Output Buffer/Driver
- Buffers All Frequencies from DC to 133.33 MHz
- Low Power Consumption for Mobile Applications  
Less than 32 mA at 66.6 MHz with Unloaded Outputs
- Input-Output Delay: 6 nS (max)
- Output-Output Skew less than 250 pS
- 16-pin SOIC Package
- Supply Voltage: 3.3 V  $\pm$  0.3 V
- Commercial and Industrial Temperature Range
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



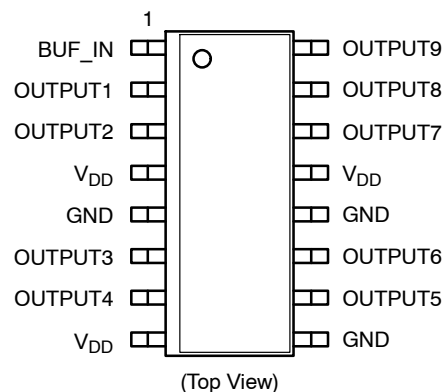
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SOIC-16  
S SUFFIX  
CASE 751BG

#### PIN CONFIGURATION



#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

# PCS2P2309NZ

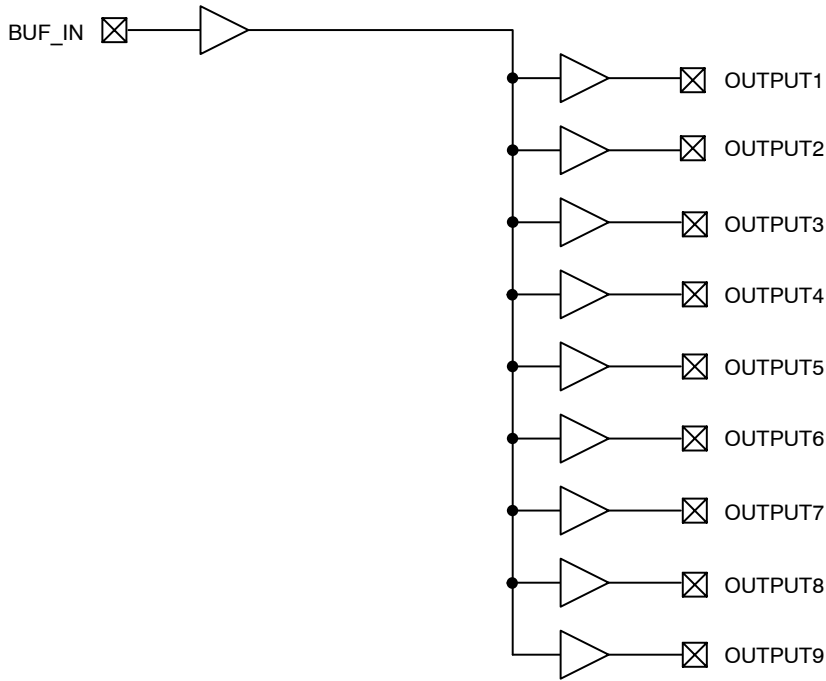


Figure 1. Block Diagram

Table 1. PIN DESCRIPTION

Pin#	Pin Name	Description
4, 8, 13	V <sub>DD</sub>	3.3 V 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

Table 2. 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 <sub>DD</sub> + 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# PCS2P2309NZ

**Table 3. OPERATING CONDITIONS**

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

**Table 4. ELECTRICAL CHARACTERISTICS** (for Commercial and Industrial Temperature Devices)

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

1. BUF\_IN input has a threshold voltage of V<sub>DD</sub>/2.

2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

**Table 5. SWITCHING CHARACTERISTICS** (for Commercial and Industrial Temperature Devices) (Note 3)

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

3. All parameters specified with loaded outputs.

4. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

# PCS2P2309NZ

## Switching Waveforms

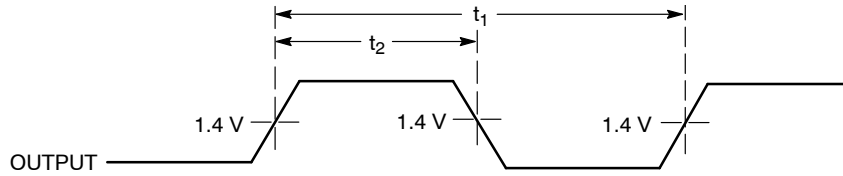


Figure 2. Duty Cycle Timing

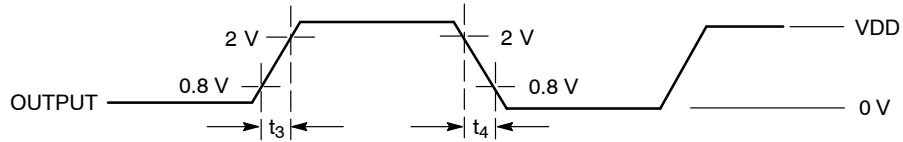


Figure 3. All Outputs Rise/Fall Time

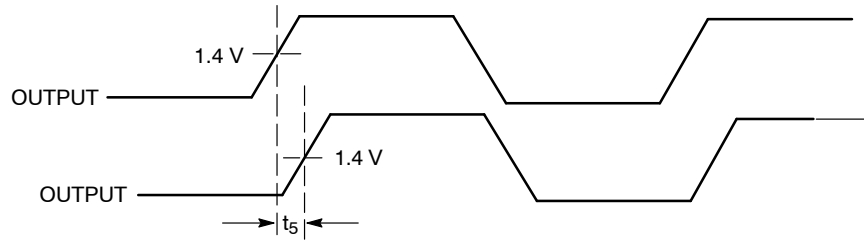


Figure 4. Output-Output Skew

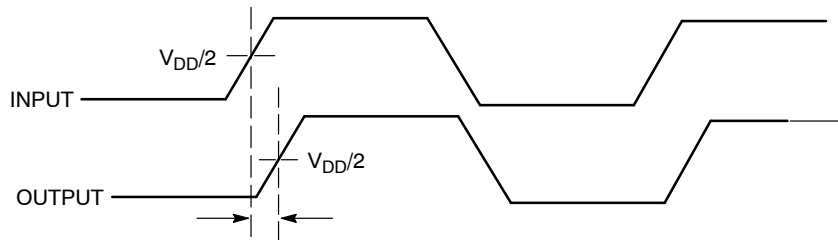


Figure 5. Input-Output Propagation Delay

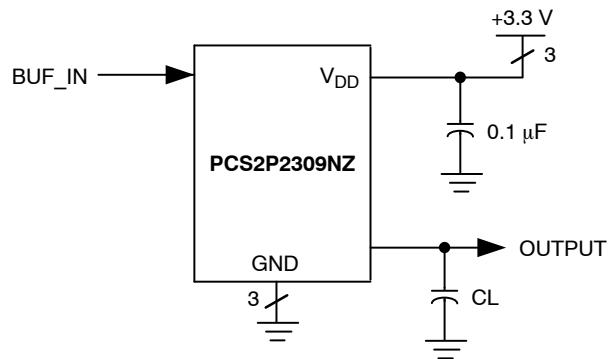
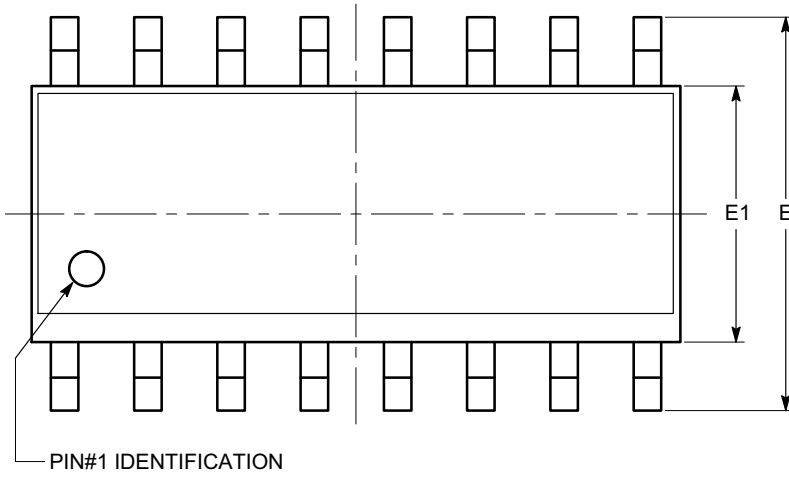


Figure 6. Test Circuit

# PCS2P2309NZ

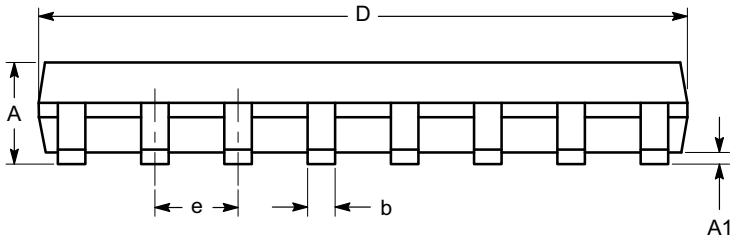
## PACKAGE DIMENSIONS

SOIC-16, 150 mils  
CASE 751BG-01  
ISSUE O

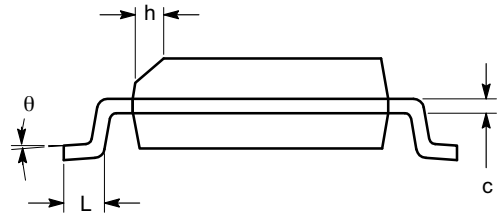


SYMBOL	MIN	NOM	MAX
A	1.35		1.75
A1	0.10		0.25
b	0.33		0.51
c	0.19		0.25
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
h	0.25		0.50
L	0.40		1.27
$\theta$	0°		8°

TOP VIEW



SIDE VIEW



END VIEW


**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MS-012.

# PCS2P2309NZ

**Table 6. ORDERING INFORMATION**

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
P2I2309NZG-16-ST	2I2309NZG	16-pin 150-mil SOIC, Green	Industrial
PCS2I2309NZG16SR	2I2309NZG	16-pin 150-mil SOIC ,Tape and Reel, Green	Industrial

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