



3.3V 1:9 Clock Buffer

Features

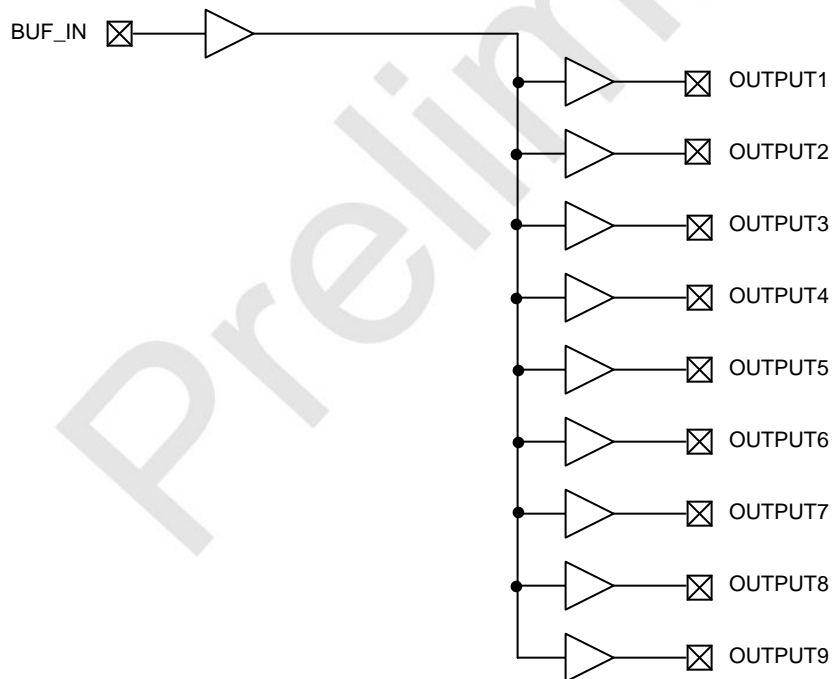
- One-Input to Nine-Output Buffer/Driver
- Buffers all frequencies from DC to 133.33MHz
- Low power consumption for mobile applications
Less than 32mA at 66.6MHz with unloaded outputs
- Input-Output delay: 6nS(max)
- Output-output skew less than 250pS
- 16-pin SOIC Package
- Supply Voltage: 3.3V ± 0.3V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

Functional Description

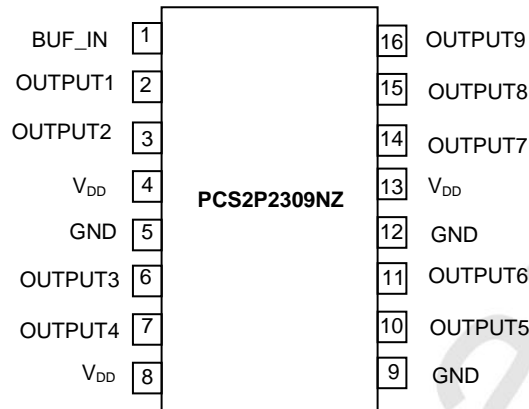
PCS2P2309NZ is a low-cost high-speed buffer designed to accept one clock input and distribute up to nine clocks in mobile PC systems and desktop PC systems. The device operates at 3.3V and outputs can run up to 133.33MHz.

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



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} = 12mA		0.4	V
V _{OH}	Output HIGH Voltage ²	I _{OH} = -12mA	2.4		V
I _{DD}	Supply Current	Commercial temp.	Unloaded outputs at 66.66MHz	30	mA
		Industrial temp.		32	

Notes: 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.

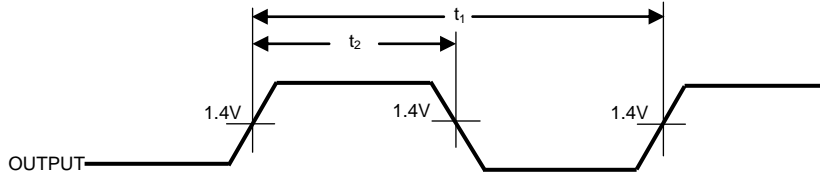
Switching Characteristics for Commercial and Industrial Temperature Devices¹

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

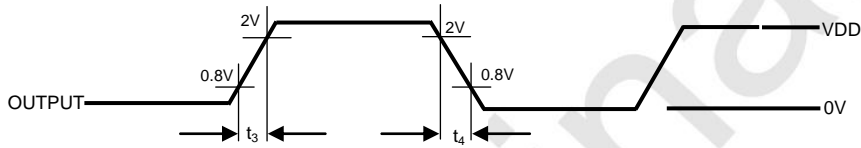
Note: 1. All parameters specified with loaded outputs.
 2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

Switching Waveforms

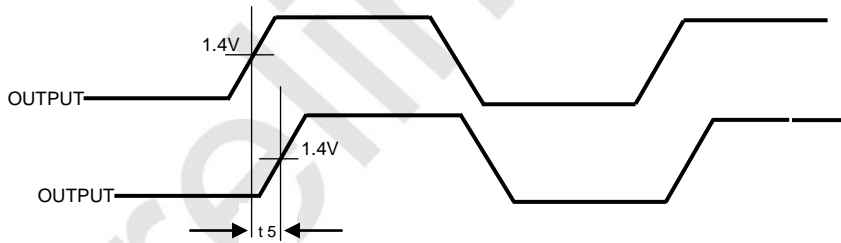
Duty Cycle Timing



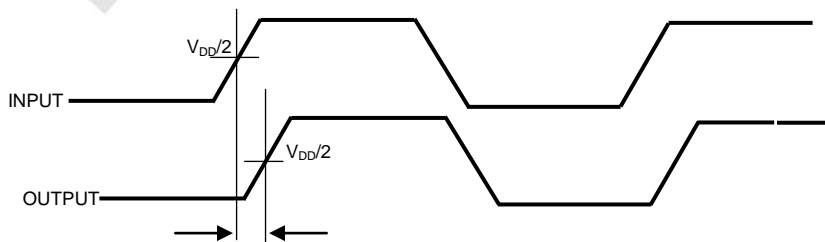
All Outputs Rise/Fall Time



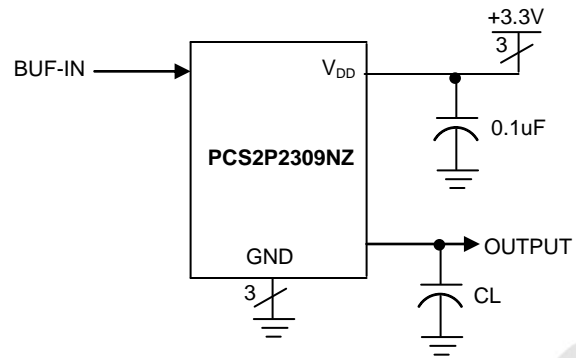
Output-Output Skew



Input-Output Propagation Delay



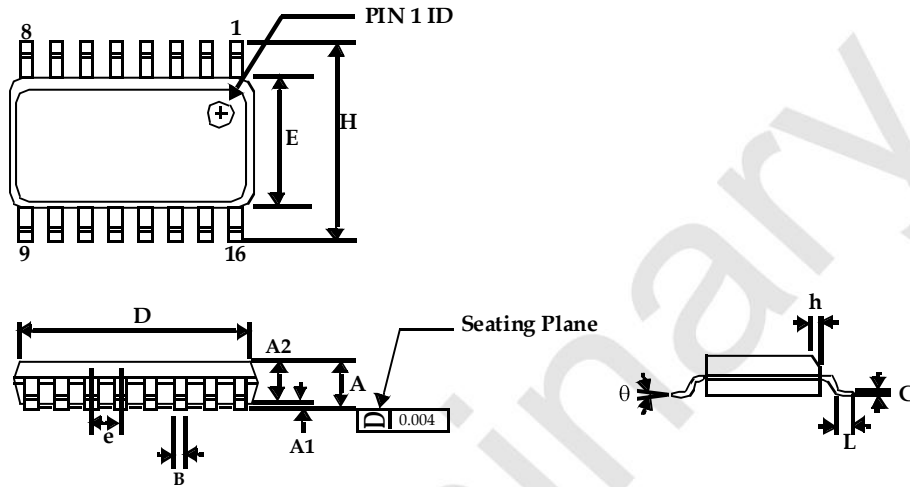
Test Circuit



Preliminary

Package Information

16-lead (150 Mil) Molded SOIC



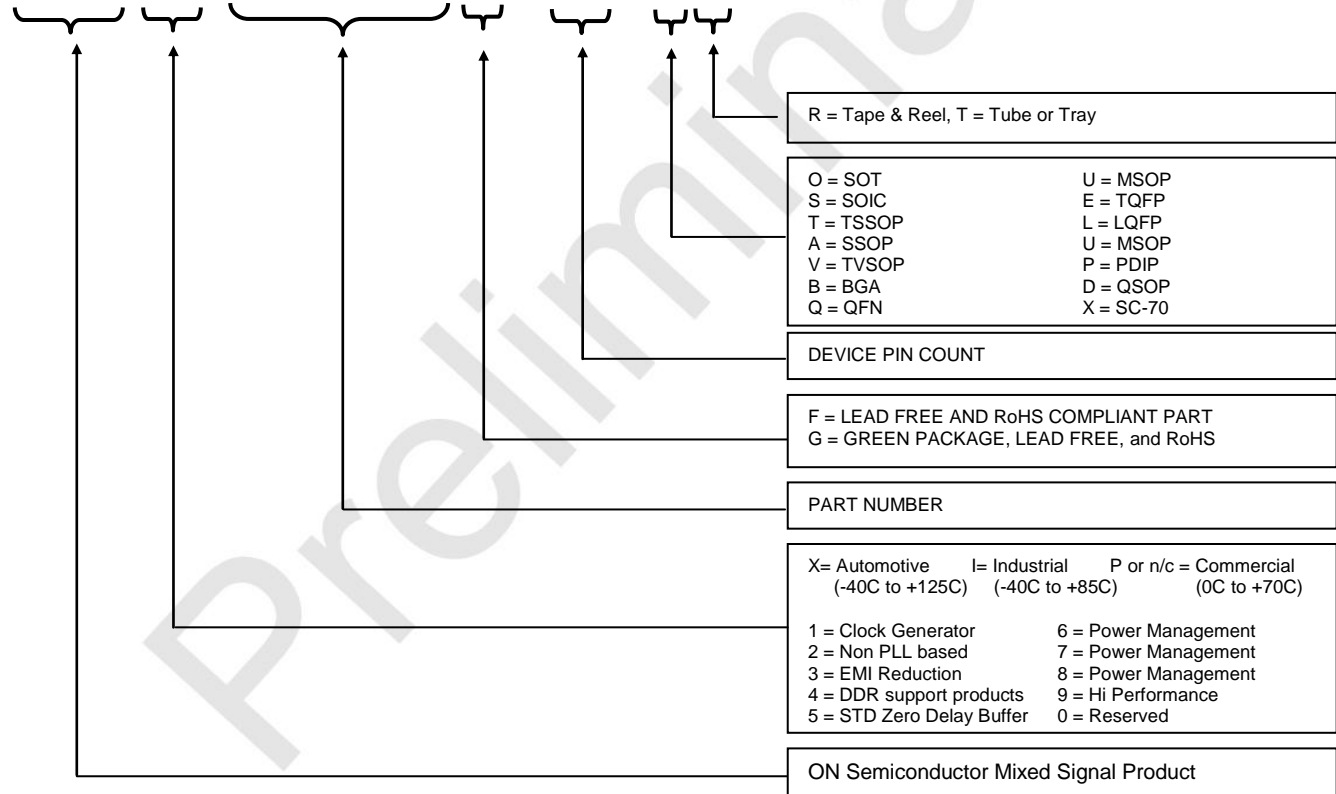
Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
A2	0.049	0.059	1.25	1.50
B	0.013	0.022	0.33	0.53
C	0.008	0.012	0.19	0.27
D	0.386	0.394	9.80	10.01
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	0.228	0.244	5.80	6.20
h	0.010	0.016	0.25	0.41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

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


Device Ordering Information

PCS2P2309NZG-16-SR



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

Note: This product utilizes US Patent #6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003.

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