



## 3.3V 1:5 Clock Buffer

### Features

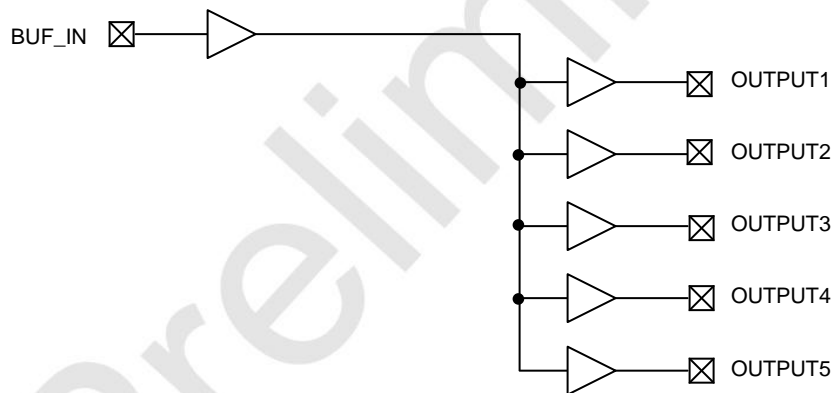
- One-Input to Five-Output Buffer/Driver
- Buffers all frequencies from DC to 133.33MHz
- Low power consumption for mobile applications  
Less than 32mA at 66.6MHz with unloaded outputs
- Input-Output delay: 6nS(max)
- Output-output skew less than 250pS
- 8-pin SOIC Package
- Supply Voltage: 3.3V ± 0.3V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

### Functional Description

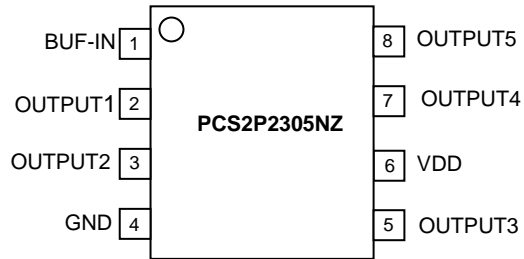
PCS2P2305NZ is a low-cost high-speed buffer designed to accept one clock input and distribute up to five clocks in mobile PC systems and desktop PC systems. The device operates at 3.3V and outputs can run up to 133.33MHz.

PCS2P2305NZ 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 8-pin SOIC Package over Commercial and Industrial temperature range.

### Block Diagram



## Pin Configuration



## Pin Description

Pin#	Pin Name	Description
6	V <sub>DD</sub>	3.3V Digital Voltage Supply
4	GND	Ground
1	BUF_IN	Input Clock
2, 3, 5, 7, 8	OUTPUT [1:5]	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 <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

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 <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, Fout < 100MHz		30	pF
	Load Capacitance, 100MHz < Fout < 133.33MHz		15	pF
C <sub>IN</sub>	Input Capacitance		7	pF
BUF_IN, OUTPUT [1:5]	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

**Electrical Characteristics for Commercial and Industrial Temperature Devices**

Symbol	Parameter	Test Conditions	Min	Max	Unit
V <sub>IL</sub>	Input LOW Voltage <sup>1</sup>			0.8	V
V <sub>IH</sub>	Input HIGH Voltage <sup>1</sup>		2.2		V
I <sub>IL</sub>	Input LOW Current	V <sub>IN</sub> = 0V		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 <sup>2</sup>	I <sub>OL</sub> = 12mA		0.4	V
V <sub>OH</sub>	Output HIGH Voltage <sup>2</sup>	I <sub>OH</sub> = -12mA	2.4		V
I <sub>DD</sub>	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<sub>DD</sub>/2.  
 2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

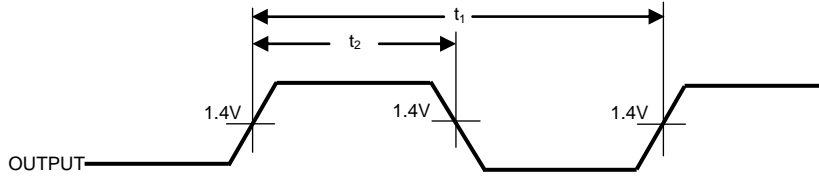
**Switching Characteristics for Commercial and Industrial Temperature Devices<sup>1</sup>**

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

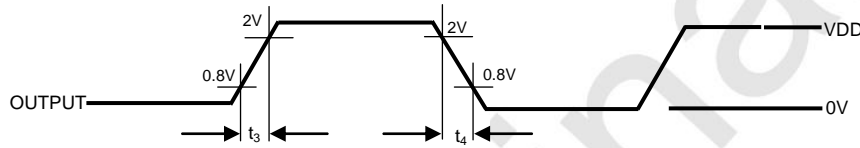
Notes: 1. All parameters specified with loaded outputs.  
 2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

**Switching Waveforms**

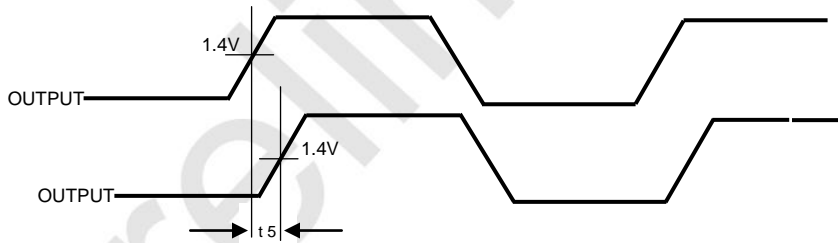
**Duty Cycle Timing**



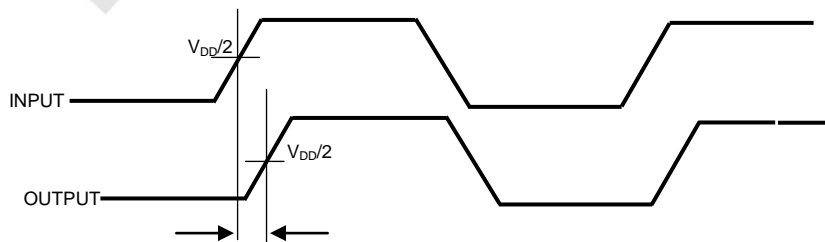
**All Outputs Rise/Fall Time**



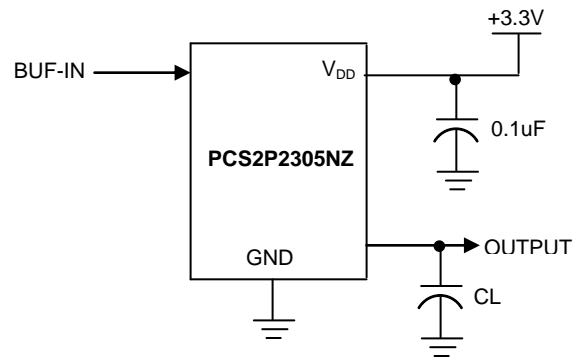
**Output-Output Skew**



**Input-Output Propagation Delay**



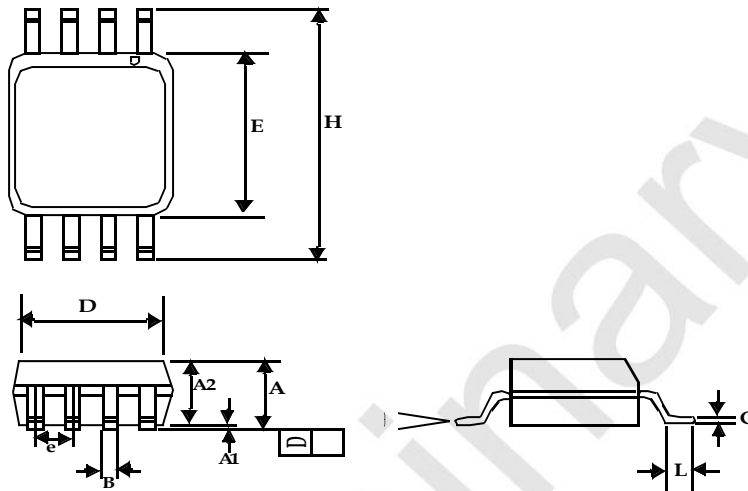
**Test Circuit**



Preliminary

Package Information

8-lead (150-mil) SOIC Package



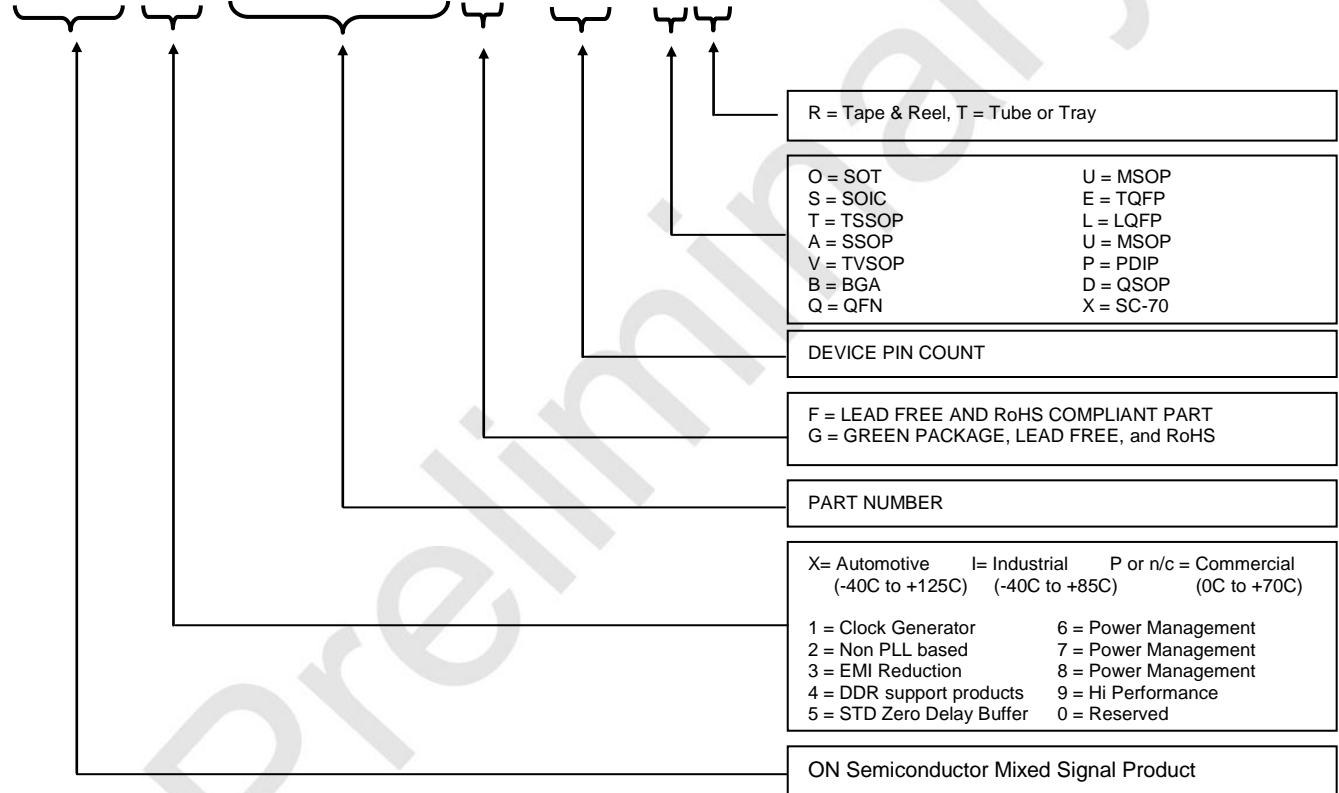
Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
$\theta$	0°	8°	0°	8°

## Ordering Code


Part Number	Marking	Package Type	Temperature
PCS2P2305NZF-08-ST	2P2305NZF	08-pin 150-mil SOIC, Pb Free	Commercial
PCS2P2305NZF-08-SR	2P2305NZF	08-pin 150-mil SOIC, Tape and Reel, Pb Free	Commercial
PCS2I2305NZF-08-ST	2I2305NZF	08-pin 150-mil SOIC, Pb Free	Industrial
PCS2I2305NZF-08-SR	2I2305NZF	08-pin 150-mil SOIC, Tape and Reel, Pb Free	Industrial

## Device Ordering Information

PCS2P2305NZF-08-SR



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

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. U.S. Patent Pending; Timing-Safe and Active Bead are trademarks of PulseCore Semiconductor, a wholly owned subsidiary of ON Semiconductor. This literature is subject to all applicable copyright laws and is not for resale in any manner.

#### PUBLICATION ORDERING INFORMATION

##### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free  
USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free  
USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855  
Toll Free USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5773-3850

**ON Semiconductor Website:**  
[www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative