



**THE DATASHEET OF
PCS2I2309NZG16SR**





3.3V 1:9 Clock Buffer

Features

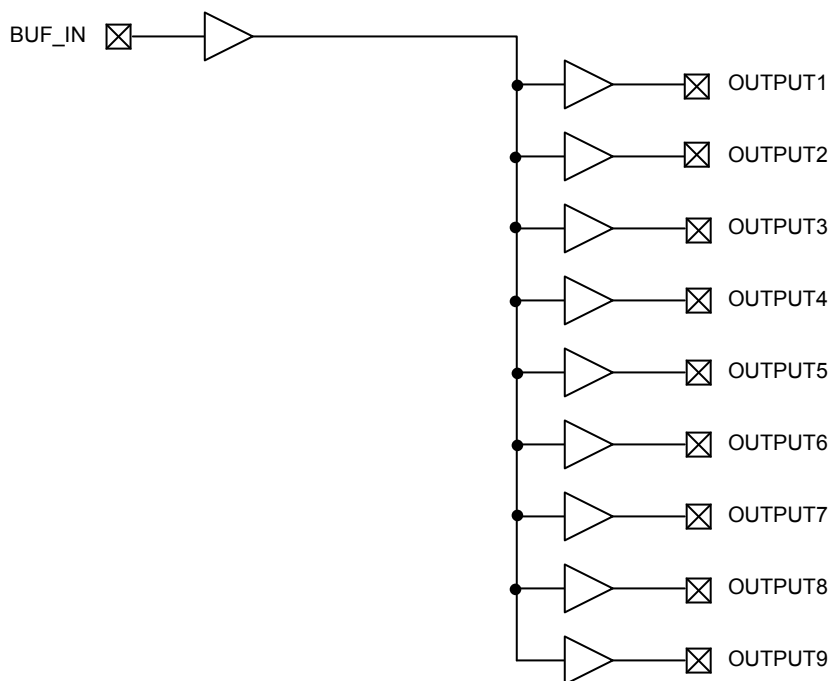
- One-Input to Nine-Output Buffer/Driver
- Buffers all frequencies from DC to 133.33MHz
- Low power consumption for mobile applications
Less than 32mA at 66.6MHz with unloaded outputs
- Input-Output delay: 6nS(max)
- Output-output skew less than 250pS
- 16-pin SOIC Package
- Supply Voltage: 3.3V ± 0.3V

Functional Description

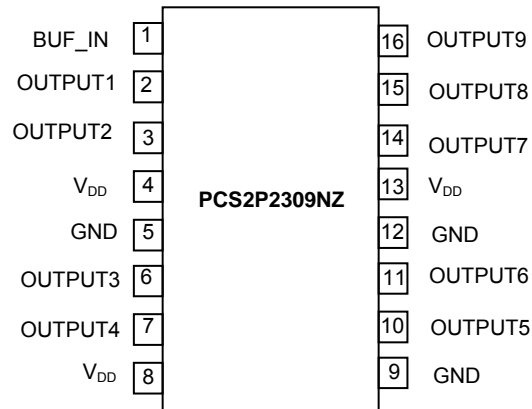
PCS2P2309NZ is a low-cost high-speed buffer designed to accept one clock input and distribute up to nine clocks in mobile PC systems and desktop PC systems. The device operates at 3.3V and outputs can run up to 133.33MHz.

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.

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 | Operating Temperature | -40 | 85 | °C |
| C _L | Load Capacitance, F _{out} < 100MHz | | 30 | pF |
| | Load Capacitance, 100MHz < F _{out} < 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

| 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 | 0°C to +70°C | Unloaded outputs at 66.66MHz | 30 | mA |
| | | -40°C to +85°C | | 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.

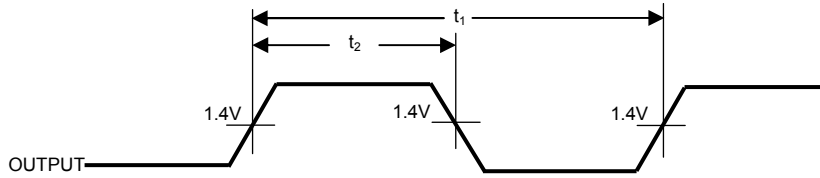
Switching Characteristics¹

| 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 |

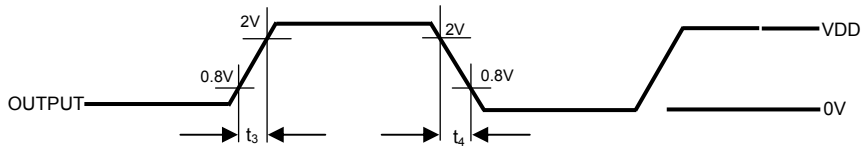
Note: 1. All parameters specified with loaded outputs.
2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

Switching Waveforms

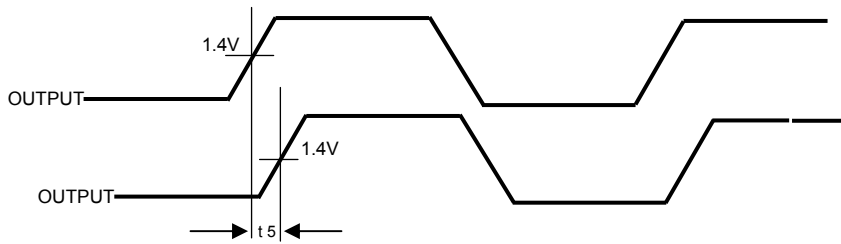
Duty Cycle Timing



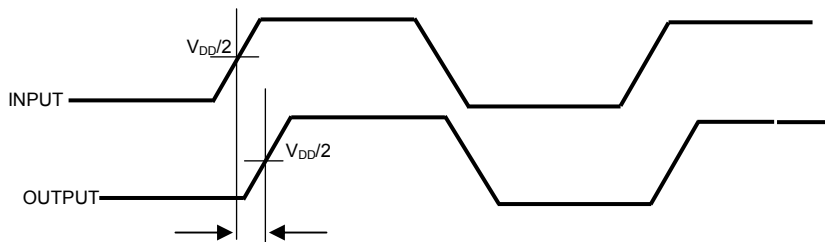
All Outputs Rise/Fall Time



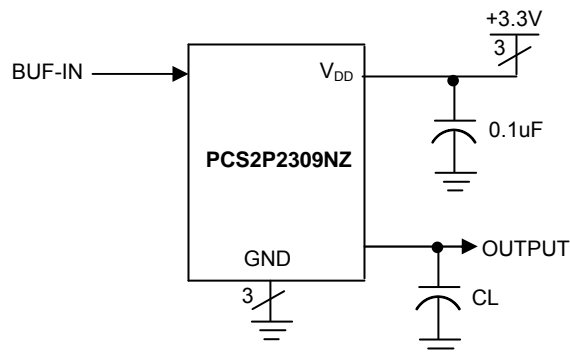
Output-Output Skew



Input-Output Propagation Delay

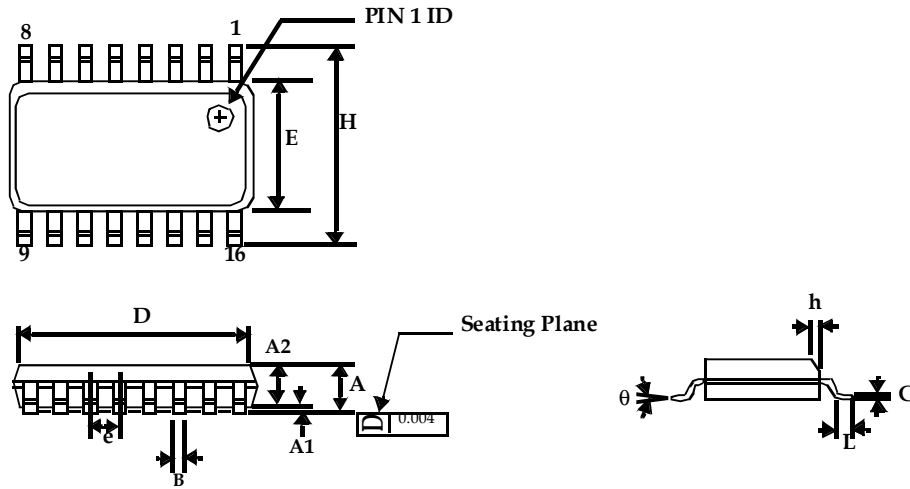


Test Circuit



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° |

PCS2P2309NZ

Ordering Code

| Part Number | Marking | Package Type | Temperature |
|------------------|----------|---|----------------|
| P2I2309NZG-16-ST | 2I2309NZ | 16-pin 150-mil SOIC, Green | -40°C to +85°C |
| PCS2I2309NZG16SR | 2I2309NZ | 16-pin 150-mil SOIC ,Tape and Reel, Green | -40°C to +85°C |

A "G" placed at the end of last row of marking or just below the last row toward the center of package indicates Pb-free for 16 pin SOIC packages.

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