



**THE DATASHEET OF
PI49FCT3802QEX**



1:5/1:7 Clock Buffer for Networking Applications

Features

- High Frequency >156 MHz
- High-speed, low-noise, non-inverting buffer
 - PI49FCT3802 is 1:5 buffer
 - PI49FCT3803 is 1:7 buffer
- Low-skew (<250ps) between any two output clocks
- Low duty cycle distortion <250ps
- Low propagation delay <2.5ns
- 5V Tolerant input
- Multiple V_{DD}, GND pins for noise reduction
- 3.3V supply voltage
- Packaging (Pb-free & Green available):
 - 16-pin TSSOP (L)
 - 16-pin QSOP (Q)

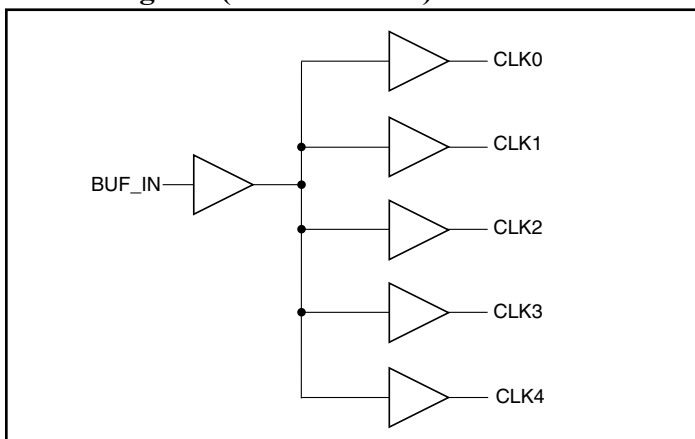
Description

The PI49FCT380x is a 3.3V compatible, high-speed, low-noise non-inverting clock buffer. The key goal in designing the PI6C380x is to target networking applications that require low-skew, low-jitter, and high-frequency clock distribution. Providing output-to-output skew as low as 250ps, the PI49FCT380x is an ideal clock distribution device for synchronous systems. Designing synchronous networking systems requires a tight level of skew from a large number of outputs.

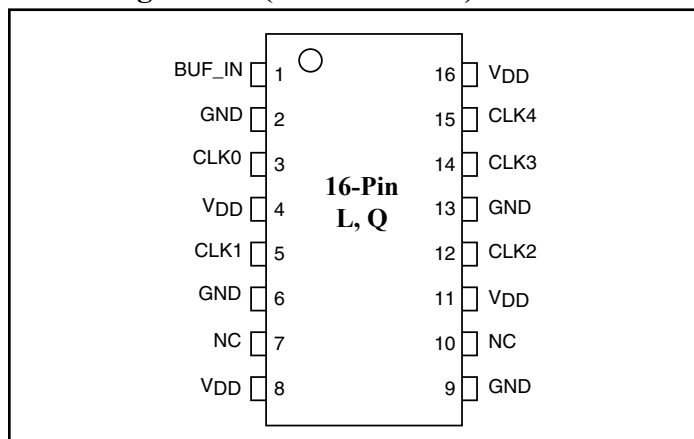
Pin Description

| Pin Name | | Description |
|-----------------|-----------------|-------------|
| 3802 | 3803 | |
| BUF_IN | BUF_IN | Input |
| CLK[0:4] | CLK[0:4] | Outputs |
| GND | GND | GND |
| V _{DD} | V _{DD} | Power |

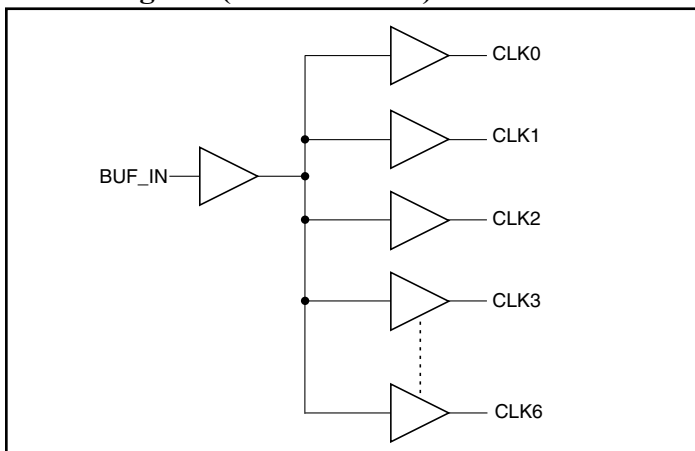
Block Diagram (PI49FCT3802)



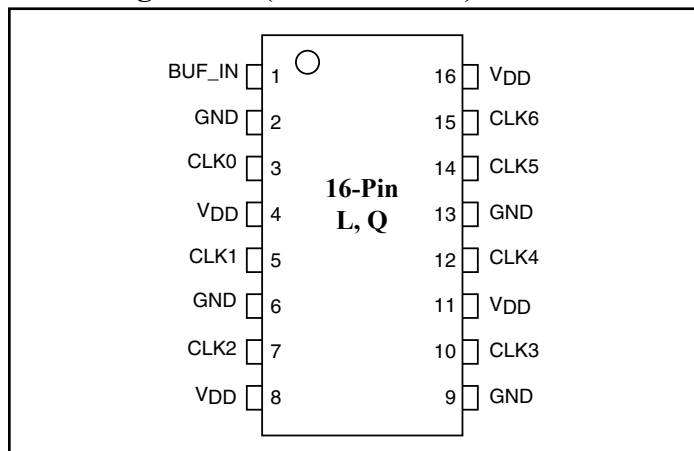
Pin Configuration (PI49FCT3802)



Block Diagram (PI49FCT3803)



Pin Configuration (PI49FCT3803)



Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

| | |
|-------------------------------|-----------------|
| Storage Temperature..... | -65°C to +150°C |
| V _{DD} Voltage | -0.5V to 5.5V |
| Output Voltage..... | -0.5V to 5.5V |
| Input Voltage | -0.5V to 5.5V |
| DC Output Current..... | -60mA to +60mA |
| Power Dissipation | 500mW |

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Operating Range

| | |
|-------------------------------|----------------|
| V _{DD} Voltage | 3.3V ± 0.3V |
| Commercial Temperature..... | 0°C to +70°C |
| Industrial Temperature | -40°C to +85°C |
| Input Frequency | DC to 156 MHz |
| Capacitive Loading | 10pF to 50pF |

DC Electrical Characteristics (Over the Operating Range)

| Parameters | Description | Test Conditions ⁽¹⁾ | Min. | Typ. ⁽²⁾ | Max. | Units |
|-----------------|---------------------|---|--------------------------|----------------------|------|-------|
| V _{IH} | Input HIGH Voltage | Guaranteed Logic HIGH Level (Input Pins) | 2.0 | | 5.5 | V |
| V _{IL} | Input LOW Voltage | Guaranteed Logic LOW Level (Input Pins) | -0.5 | | 0.8 | |
| I _{IH} | Input HIGH Current | V _{DD} = Max. V _{IN} = V _{DD} | | | 1 | µA |
| I _{IL} | Input LOW Current | V _{DD} = Max. V _{IN} = GND | | | -1 | |
| V _{IK} | Clamp Diode Voltage | V _{DD} = Min., I _{IN} = -18mA | | -0.7 | -1.2 | V |
| V _{OH} | Output HIGH Voltage | V _{CC} = Min., V _{IN} = V _{IH} or V _{IL} | I _{OH} = -0.1mA | V _{DD} -0.2 | | |
| | | | I _{OH} = -12mA | 2.4 ⁽³⁾ | 3.0 | |
| V _{OL} | Output LOW Voltage | V _{CC} = Min., V _{IN} = V _{IH} or V _{IL} | I _{OH} = 0.1mA | | 0.2 | |
| | | | I _{OH} = 12mA | | 0.3 | 0.5 |
| I _{OH} | Output HIGH Current | V _{DD} = 3.0V, V _{IN} = V _{IH} OR V _{IL} , V _{OUT} = 1.5V ⁽⁴⁾ | -45 | -75 | -180 | mA |
| I _{OL} | Output LOW Current | V _{DD} = 3.0V, V _{IN} = V _{IH} OR V _{IL} , V _{OUT} = 1.5V ⁽⁴⁾ | 50 | 92 | 200 | |

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{DD} = 3.3V, +25°C ambient and maximum loading.
3. V_{OH} = V_{DD} - 0.6V at rated current.
4. This parameter is determined by device characterization but is not production tested.
5. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

Power Supply Characteristics

| Parameters | Description | Test Conditions | | Min. | Typ. ⁽²⁾ | Max. | Units |
|------------------|--------------------------------------|------------------------------------|---|------|---------------------|------|-------|
| I _{DDQ} | Quiescent Power Supply Current | V _{DD} = Max. | V _{IN} = GND or V _{DD} | | 0.1 | 30 | μA |
| ΔI _{DD} | Supply Current per Inputs @ TTL High | V _{DD} = Max. | V _{IN} = V _{DD} - 0.6V(3) | | 47 | 300 | |
| I _{DD} | Dynamic Supply Current | V _{DD} = 3.6V, No load | 50 MHz | | 43 | | mA |
| | | | 67 MHz | | 56 | | |
| | | | 80 MHz | | 66 | | |
| | | | 100 MHz | | 81 | | |
| | | | 125 MHz | | 97 | | |
| | | | 156 Mhz | | 121 | | |

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V_{DD} = 3.3V, +25°C ambient.
- Per TTL driven input (V_{IN} = V_{DD} - 0.6V); all other inputs at V_{DD} or GND.

Capacitance (T_A = 25°C, f = 1 MHz)

| Parameters ⁽¹⁾ | Description | Test Conditions | Typ | Max. | Units |
|---------------------------|--------------------|-----------------------|-----|------|-------|
| C _{IN} | Input Capacitance | V _{IN} = 0V | 3.0 | 4 | pF |
| C _{OUT} | Output Capacitance | V _{OUT} = 0V | — | 6 | |

Note:

- This parameter is determined by device characterization but is not production tested.

Switching Characteristics (V_{DD} = 3.3V ± 0.3V, T_A = 85°C)

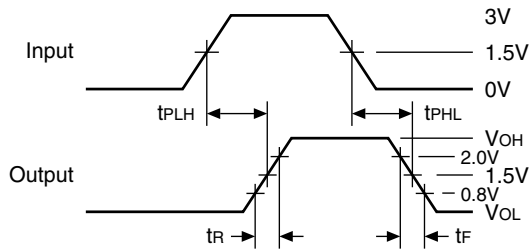
| Parameters | Description | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---|-----------------------------------|------|------|------|-------|
| t _R /t _F | CLK _n Rise/Fall Time 0.8V ~ 2.0V | C _L = 15pF, 125 Mhz | | 0.7 | 1.0 | ns |
| t _{PLH} t _{PHL} | Propagation Delay BUF_IN to CLK _n | | 1.0 | 2.2 | 2.5 | |
| t _{sk(o)} ⁽³⁾ | Skew between two outputs of the same package (same transition) | | | 110 | 250 | ps |
| t _{sk(p)} ⁽³⁾ | Skew between opposite transitions (t _{PHL} - t _{PLH}) of the same output | | | 200 | 250 | |
| t _{sk(t)} ⁽³⁾ | Skew between two outputs of different packages ⁽⁴⁾ | | | | 0.55 | ns |

Notes:

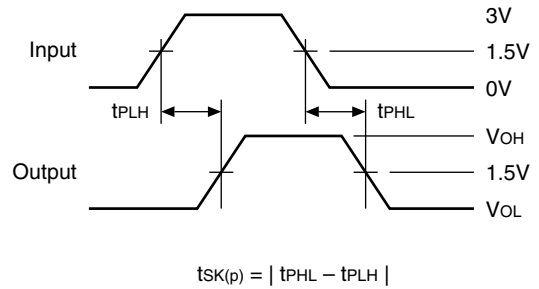
- See test circuit and waveforms.
- Minimum limits are guaranteed but not tested on Propagation Delays.
- Skew measured at worse cast temperature (max. temp).
- Identical conditions: loading, transitions, supply voltage, temperature, package type and speed grade.

Switching Waveforms

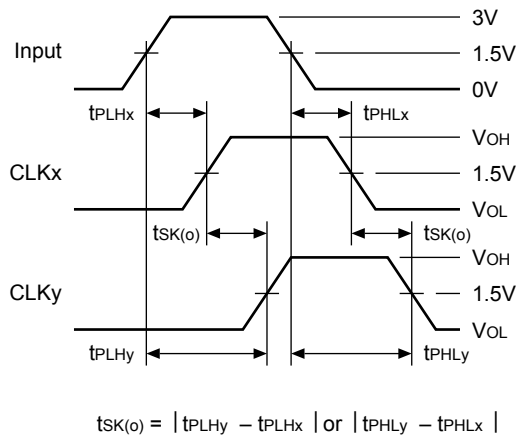
Propagation Delay



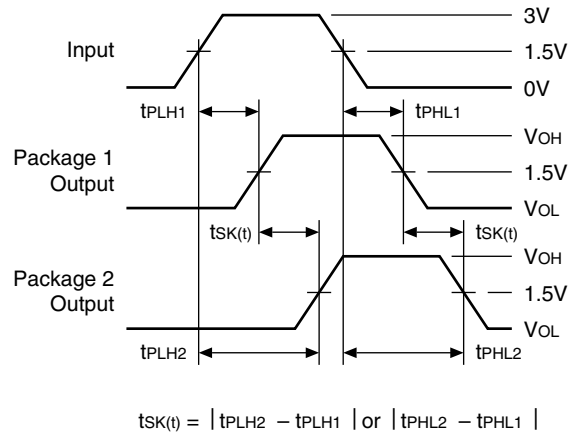
Pulse Skew – $t_{SK(P)}$



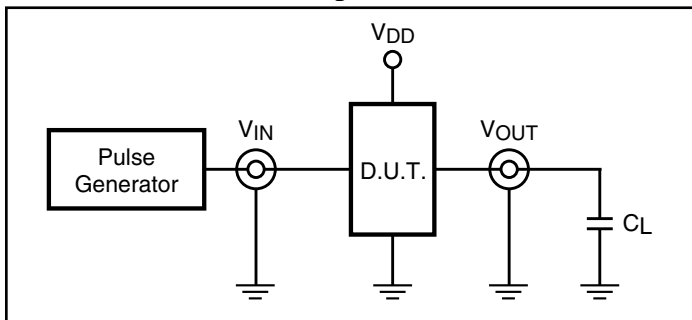
Output Skew – $t_{SK(O)}$



Package Skew – $t_{SK(T)}$



Test Circuits for All Outputs



Definitions:

C_L = Load capacitance: includes jig and probe capacitance.
 R_T = Termination resistance, should be equal to Z_{out} of the Pulse Generator.

Ordering Information



| Ordering Code | Package Code | Package Description |
|----------------------|---------------------|-------------------------------|
| PI49FCT3802L | L | 16-pin TSSOP |
| PI49FCT3802LE | L | Pb-free & Green, 16-pin TSSOP |
| PI49FCT3802Q | Q | 16-pin QSOP |
| PI49FCT3802QE | Q | Pb-free & Green, 16-pin QSOP |
| PI49FCT3803L | L | 16-pin TSSOP |
| PI49FCT3803LE | L | Pb-free & Green, 16-pin TSSOP |
| PI49FCT3803Q | Q | 16-pin QSOP |
| PI49FCT3803QE | Q | Pb-free & Green, 16-pin QSOP |

Notes:

1. Thermal characteristics can be found on the web at www.pericom.com/packaging/

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View PI49FCT3802QEX on WIN SOURCE](#)
-  [Diodes Incorporated Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management