

1:5/1:7 2.5V Clock Buffer for Networking Applications

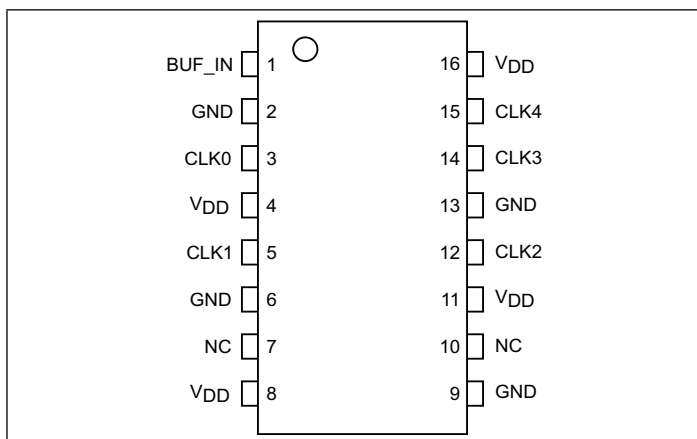
Features

- High Frequency >150 MHz
- High-speed, low-noise, non-inverting clock buffer
 - PI49FCT20802 is a 1:5 buffer
 - PI49FCT20803 is a 1:7 buffer
- Low skew < 150ps
- Low duty cycle distortion < 300ps
- Low propagation delay < 3.5ns
- Multiple V_{DD}, GND pins for noise reduction
- 2.5V supply voltage and 3V tolerant input
- Packaging (Pb-free & Green):
 - 16-pin TSSOP (L)
 - 16-pin QSOP (Q) - PI49FCT20802 only

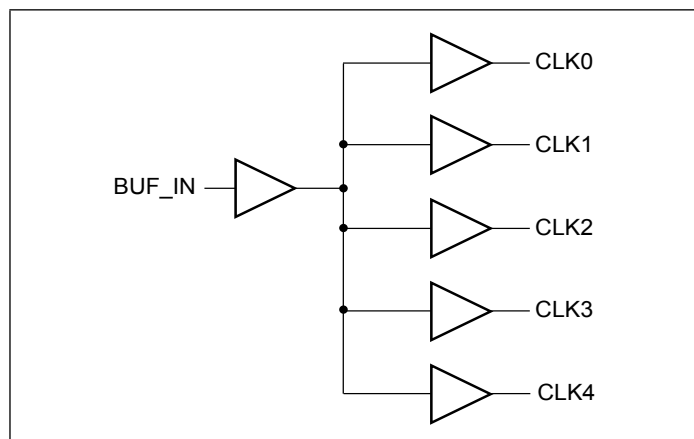
Description

The PI49FCT2080x is 2.5V, high-speed, low noise, non-inverting clock buffer. It is designed to target networking applications that require low-skew, low-jitter, and high-frequency clock distribution. It provides output-to-output skew as low as 150ps, and is an ideal clock distribution device for synchronous systems. PI49FCT2080x is a clock buffer from a single input that produces five outputs on PI49FCT20802 and seven outputs on PI49FCT20803. PI49FCT2080x is characterized for operation from -40°C to 85°C.

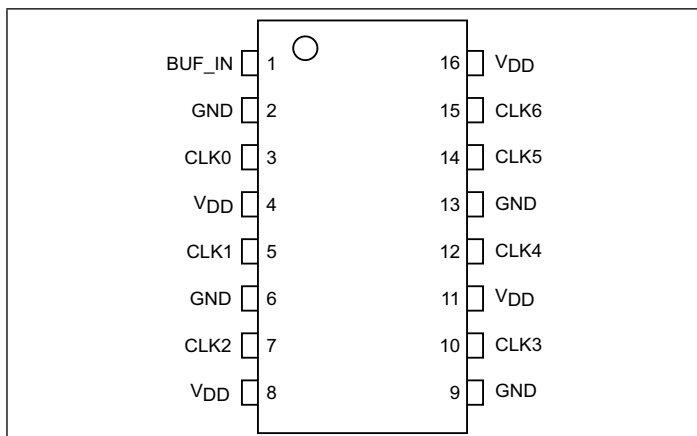
Pin Configuration (PI49FCT20802)



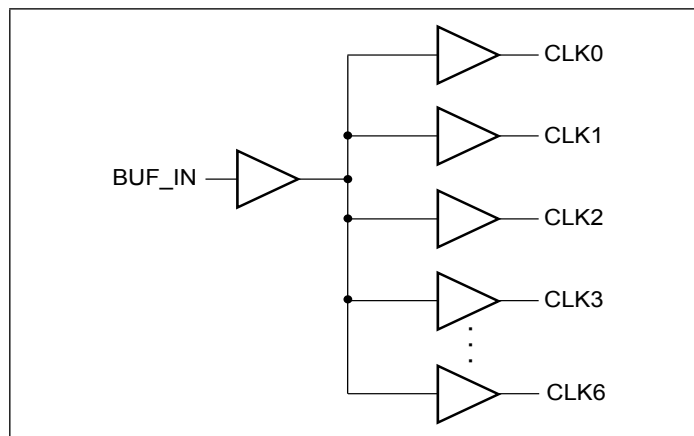
Block Diagram (PI49FCT20802)



Pin Configuration (PI49FCT20803)



Block Diagram (PI49FCT20803)





Absolute Maximum Ratings (Over operating free-air temperature range)

Parameter	Min.	Max.	Units
Storage temperature	-65	150	°C
Supply Voltage V_{DD}	-0.5	3.6	V
Input/Output Voltages ⁽¹⁾	-0.5	$V_{DD} + 0.5$	V
DC Output Current	-60	60	mA
Power Dissipation	-	500	mW

Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

Operating Range

Parameter	Min.	Max.	Units
V_{DD} Voltage	2.5±0.2		V
Industrial Temperature	-40	85	°C
Commercial Temperature	0	70	°C
Capacitive Loading	10	25	pF

DC Electrical Characteristics (Over the Operating Range)

Parameters	Description	Test Conditions ⁽¹⁾	Min	Typ ⁽²⁾	Max	Units
V_{IH}	Input HIGH Voltage		1.7			V
V_{IL}	Input LOW Voltage				0.7	
I_I	Input Current	$V_{DD} = 0$ or V_{DD}			±1	mA
V_{IK}	Clamp Diode Voltage	$V_{DD} = \text{Min.}, I_{IN} = -18 \text{ mA}$		-0.7	-1	V
V_{OH}	Output HIGH Voltage	$V_{DD} = \text{Min.}$	$I_{OH} = -1 \text{ mA}$	2		
			$I_{OH} = -8 \text{ mA}$	1.8 ⁽³⁾		
V_{OL}	Output LOW Voltage	$V_{DD} = \text{Min.}$	$I_{OH} = 1 \text{ mA}$		0.4	
			$I_{OH} = 8 \text{ mA}$		0.6	

Notes:

1. This value is limited to 3.6V maximum.
2. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
3. Typical values are at $V_{DD} = 2.5\text{V}$, +25°C ambient and maximum loading.



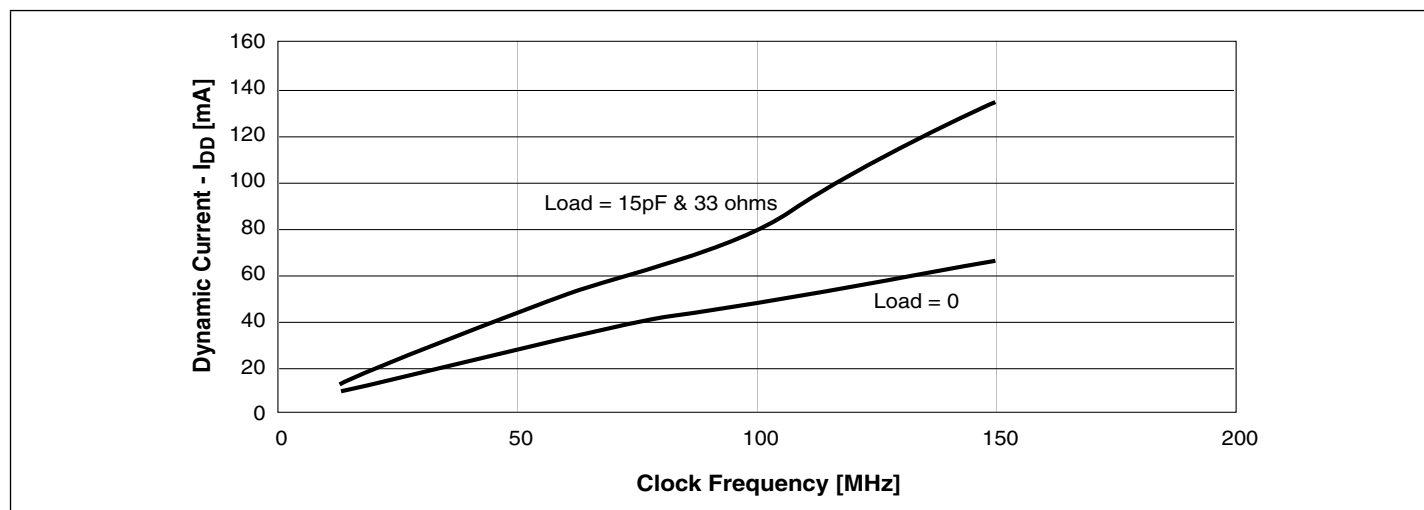
Power Supply Characteristics

Parameters	Description	Test Conditions ⁽⁴⁾	Min	Typ ⁽⁵⁾	Max	Units
I_{DDQ}	Quiescent Power Supply Current	$V_{IN} = 0$ or V_{DD}		0.1	20	μA
ΔI_{DD}	Supply Current per Input	$V_{IN} = V_{DD} - 0.6V^{(6)}$		47	300	
I_{DD}	Dynamic Supply Current (See Graph 1)	$V_{DD} = 2.7V$, 15pF & 33-ohm load, $f = 150$ MHz		136		mA

Notes:

- 4. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- 5. Typical values are at $V_{DD} = 2.5V$, +25°C ambient and maximum loading.
- 6. Per TTL driven input ($V_{IN} = V_{DD} - 0.6V$); all other inputs at V_{DD} or GND.

Graph 1. Dynamic Current vs. Clock Frequency



Capacitance ($T_A = 25^\circ C$, $f = 1$ MHz)

Parameters ⁽³⁾	Description	Test Conditions	Typ ⁽⁷⁾	Max	Units
C_{IN}	Input Capacitance	$V_{IN} = 0V$	3	4	pF
C_{OUT}	Output Capacitance	$V_{OUT} = 0V$		6	

Notes:

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



Switching Characteristics (VDD = 2.5V ± 0.2V, TA = 85°C)

Parameters	Description	Test Conditions ⁽⁸⁾	Min	Typ	Max	Units
f _{CLK}	Output Frequency				150	MHz
t _{R/F}	Rise/Fall time V _O = 0.7V ~ 1.7 V	C _L = 22pF, 100 MHz		1.0	1.25	ns
		C _L = 12pF, 150 MHz		1.0	1.2	
t _{PD}	Propagation Delay	C _L = 22pF, 100 MHz		3.5	3.5	
		C _L = 12pF, 150 MHz		2.4	2.7	
t _{SK(o)}	Output Skew	C _L = 22pF, 100 MHz		100	150	
		C _L = 12pF, 150 MHz		100	150	
t _{SK(p)}	Pulse Skew	C _L = 22pF, 100 MHz		250	300	ps
		C _L = 12pF, 150 MHz		250	300	
t _{SK(d)}	Device-to-device skew ⁽⁹⁾	C _L = 12pF, 150 MHz		400	600	

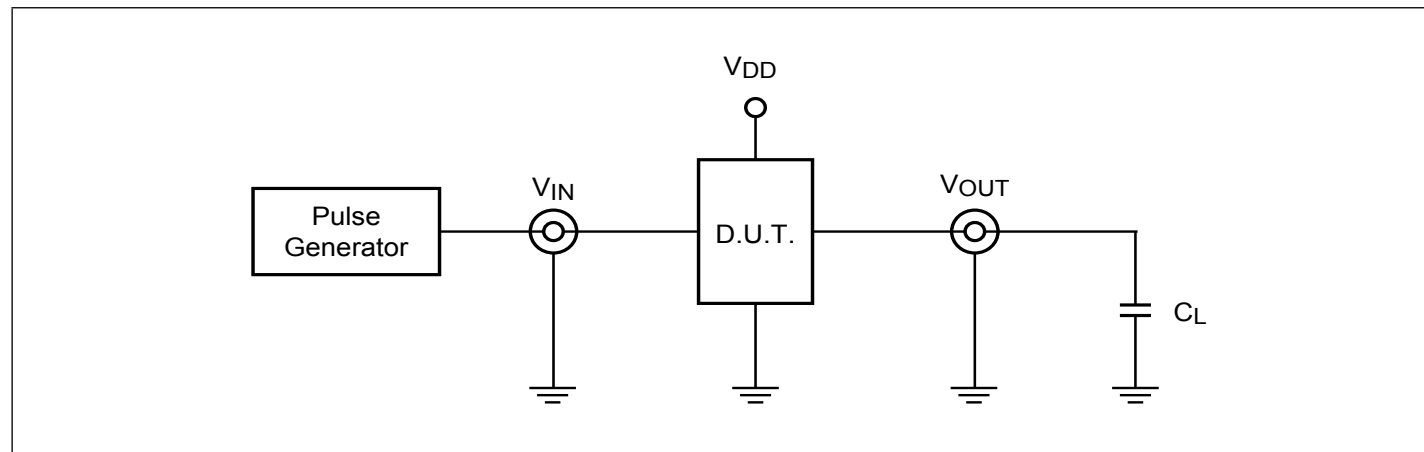
Notes:

- 8. See test circuit and waveforms.
- 9. Identical conditions: loading, transitions, supply voltage, temperature, package type and speed grade.

Pin Description

Pin Name		Description
PI49FCT20802	PI49FCT20803	
BUF_IN	BUF_IN	Input
CLK [0:4]	CLK [0:6]	Outputs
GND	GND	Ground
V _{DD}	V _{DD}	Power

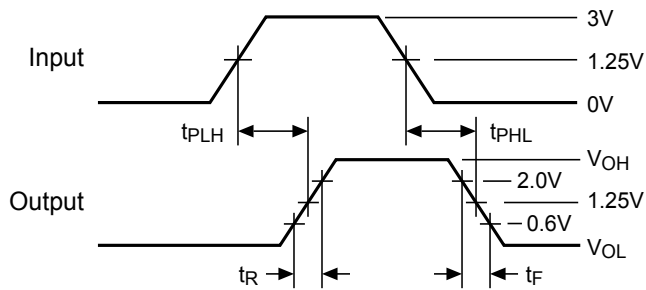
Test Circuits for All Outputs



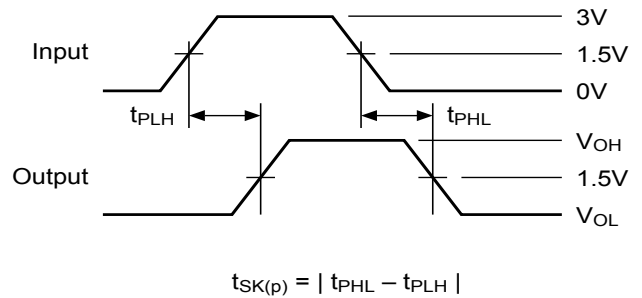


Switching Waveforms

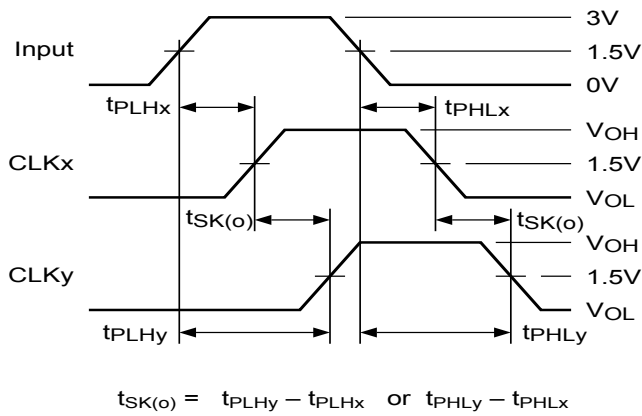
Propagation Delay



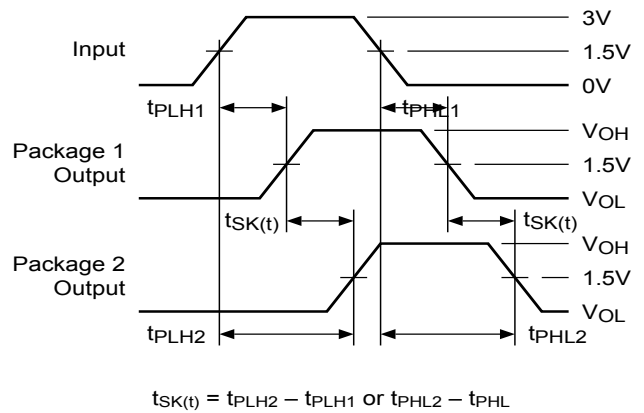
Pulse Skew - $t_{SK(P)}$



Output Skew - $t_{SK(O)}$



Package Skew - $t_{SK(T)}$



PI49FCT20802/PI49FCT20803

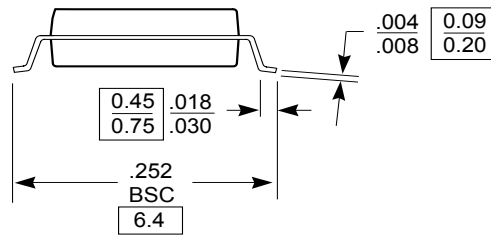
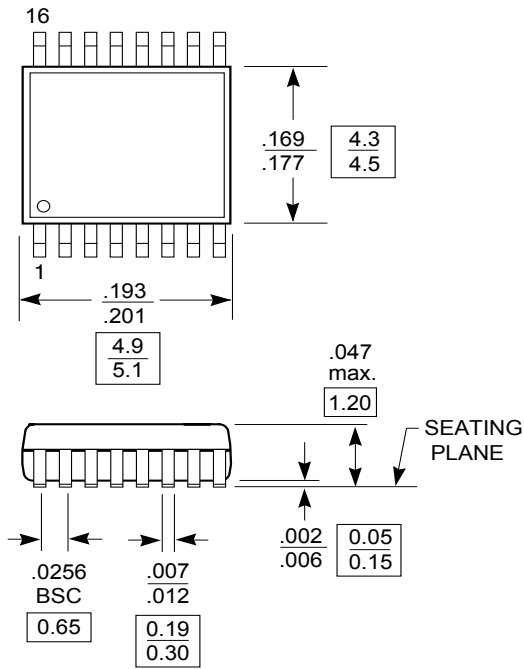
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Networking Applications



Packaging Mechanical: 16-Pin TSSOP (L)

DOCUMENT CONTROL NO.
PD - 1310

REVISION: E
DATE: 03/09/05



- Note:**
1. Package Outline Exclusive of Mold Flash and Metal Burr
 2. Controlling dimensions in millimeters
 3. Ref. JEDEC MO-153F/AB



Pericom Semiconductor Corporation
3545 N. 1st Street, San Jose, CA 95134
1-800-435-2335 • www.pericom.com

DESCRIPTION: 16-Pin, 173-Mil Wide, TSSOP

PACKAGE CODE: L

