PI49FCT20802/ PI49FCT20803

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

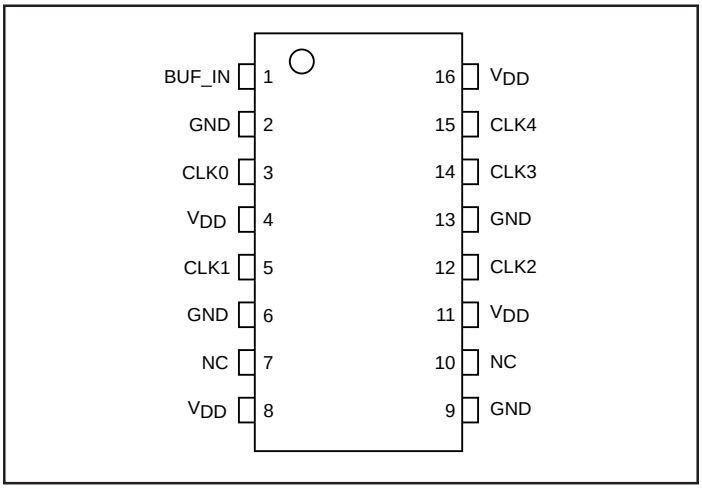
Features

- 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
- Packages (Pb-Free & Green):
  - 16-pin TSSOP (L)
  - 16-pin QSOP (Q)

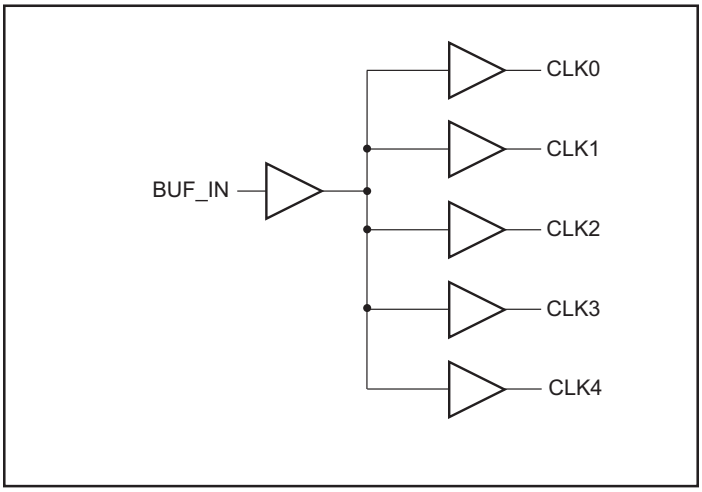
Description

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.

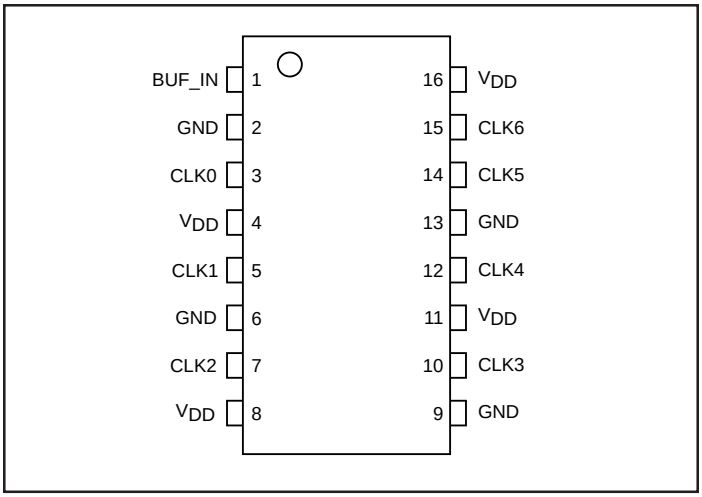
Pin Configuration (PI49FCT20802)



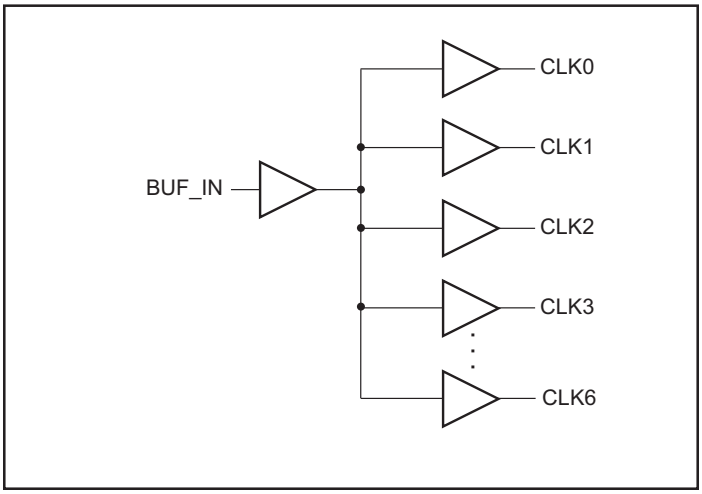
Block Diagram (PI49FCT20802)



Pin Configuration (PI49FCT20803)



Block Diagram (PI49FCT20803)



Maximum Ratings

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

Storage Temperature	–65°C to +150°C
Supply Voltage V_{DD}	–0.5V to +3.6V
Input/Output Voltages[1]	–0.5V to V_{DD}+0.5V
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	2.5V±0.2V
Industrial Temperature	–40°C to +85°C
Commercial Temperature	0°C to +70°C
Capacitive Loading	10pF to 25pF

DC Electrical Characteristics (Over the Operating Range)

Parameters	Description	Test Conditions[2]		Min.	Typ.[3]	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} = Min., I_{IN} = –18mA			–0.7	–1	V
V_{OH}	Output HIGH Voltage	V_{DD} = Min.	I_{OH} = –1mA	2			
			I_{OH} = –8mA	1.8[3]			
V_{OL}	Output LOW Voltage	V_{DD} = Min.	I_{OL} = 1mA			0.4	
			I_{OL} = 8mA			0.6	

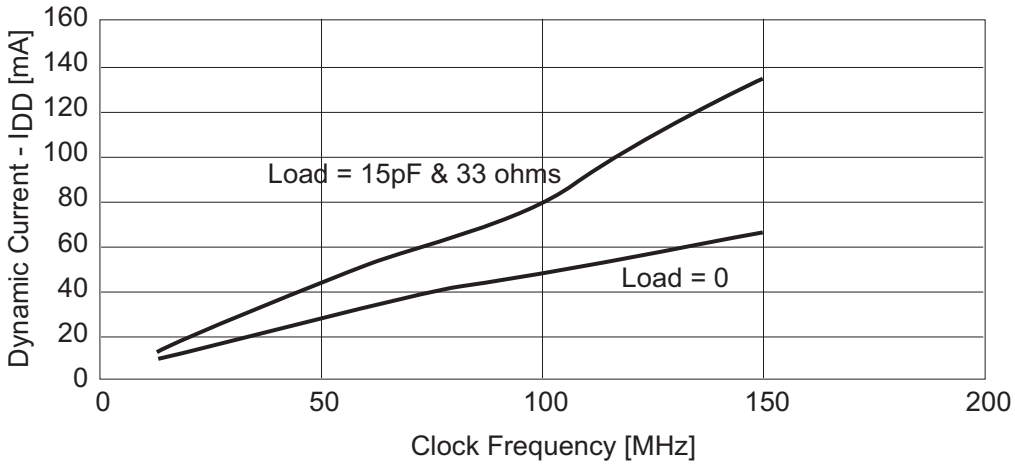
Notes:
1. This value is limited to 3.6V maximum.
2. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
3. Typical values are at V_{DD} = 2.5V, +25°C ambient and maximum loading.

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 Inputs	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°C, f = 1 MHz)

Parameters	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	

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

Switching Characteristics (V_{DD}=2.5V±0.2V, T_A=85°C)

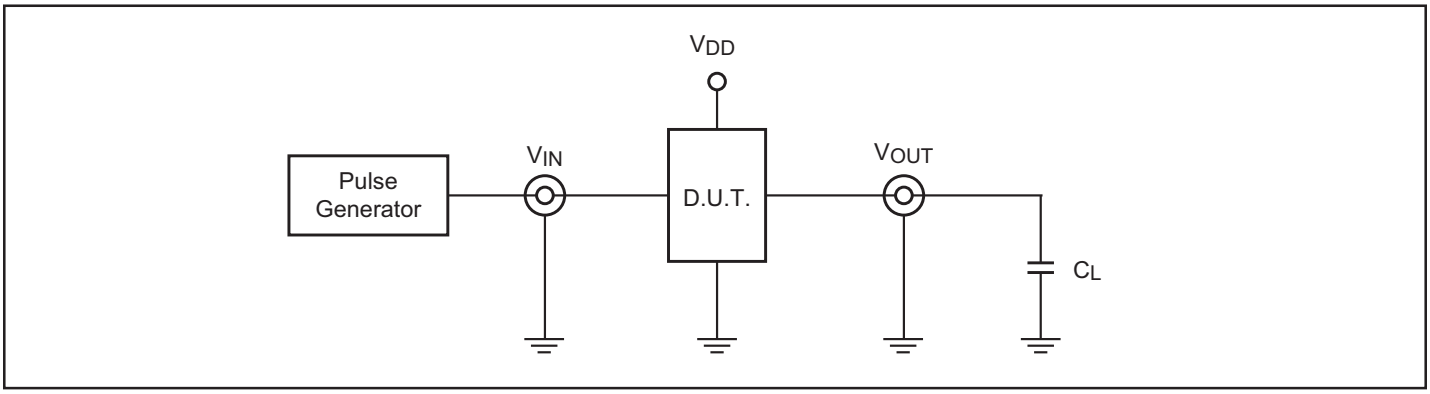
Parameters	Description	Test Conditions[8]	Min.	Typ.	Max.	Units
f_{CLK}	Output Frequency				150	MHz
t_R/t_F	Rise/Fall time V_O = 0.7V ~ 1.7 V	C_L = 22pF, 100 MHz		1.0	1.25	ns
		C_L = 12pF, 150 MHz		1.0	1.2	
t_{PD}	Propagation Delay	C_L = 22pF, 100 MHz		3.5	3.5	
		C_L = 12pF, 150 MHz		2.4	2.7	
$t_{SK(o)}$	Output Skew	C_L = 22pF, 100 MHz		100	150	ps
		C_L = 12pF, 150 MHz		100	150	
$t_{SK(p)}$	Pulse Skew	C_L = 22pF, 100 MHz		250	300	
		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.

Product Pin Description

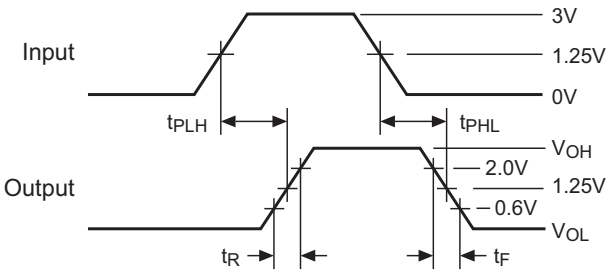
Pin Name		Description
PI49FCT20802	**PI49FCT20803**	
BUF_IN	BUF_IN	Input
CLK [0:4]	CLK [0:6]	Outputs
GND	GND	GND
V_{DD}	V_{DD}	Power

Test Circuits for All Outputs

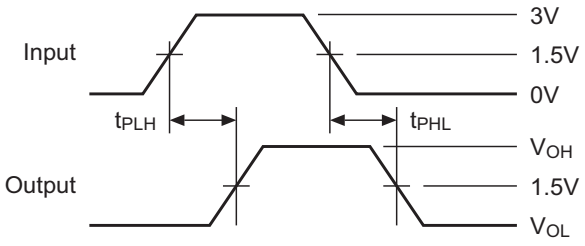


Switching Waveforms

Propagation Delay

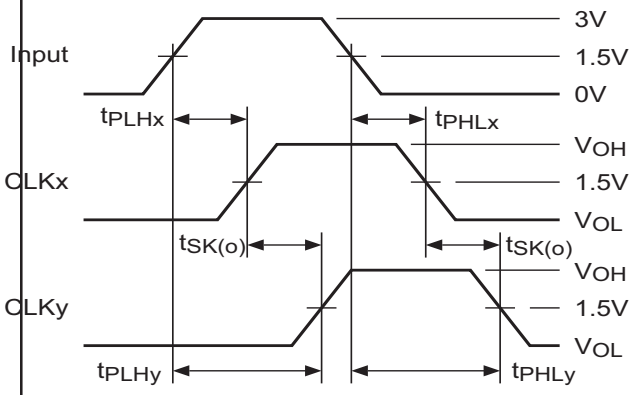


Pulse Skew – $t_{SK(P)}$



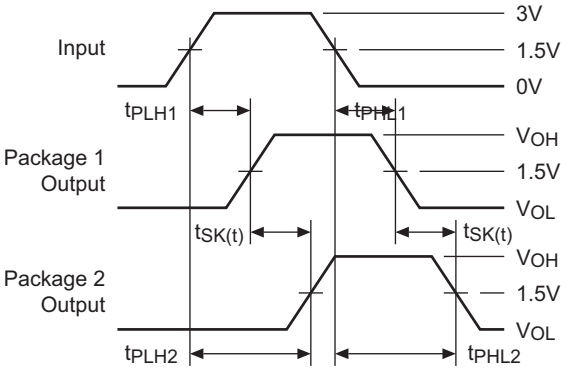
$t_{SK(p)} = | t_{PHL} - t_{PLH} |$

Output Skew – $t_{SK(O)}$



$t_{SK(o)} = t_{PLHy} - t_{PLHx}$ or $t_{PHLy} - t_{PHLx}$

Package Skew – $t_{SK(T)}$

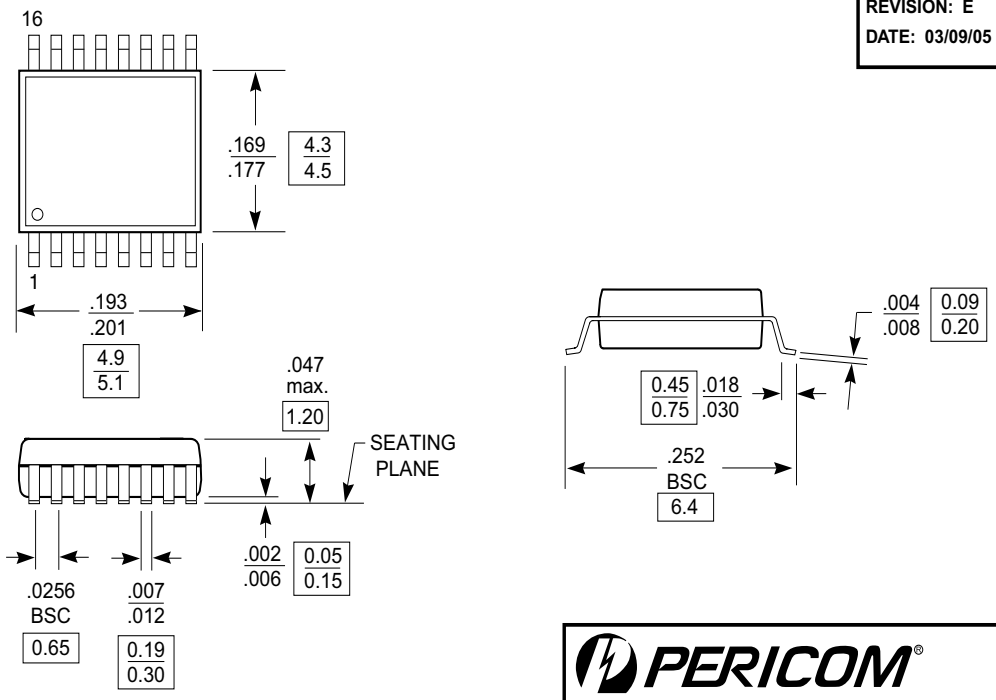


$t_{SK(t)} = t_{PLH2} - t_{PLH1}$ or $t_{PHL2} - t_{PHL}$

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 dimentions in millimeters
3. Ref: JEDEC MO-153F/AB

Pericom Semiconductor Corporation
3545 N. 1st Street, San Jose, CA 95134
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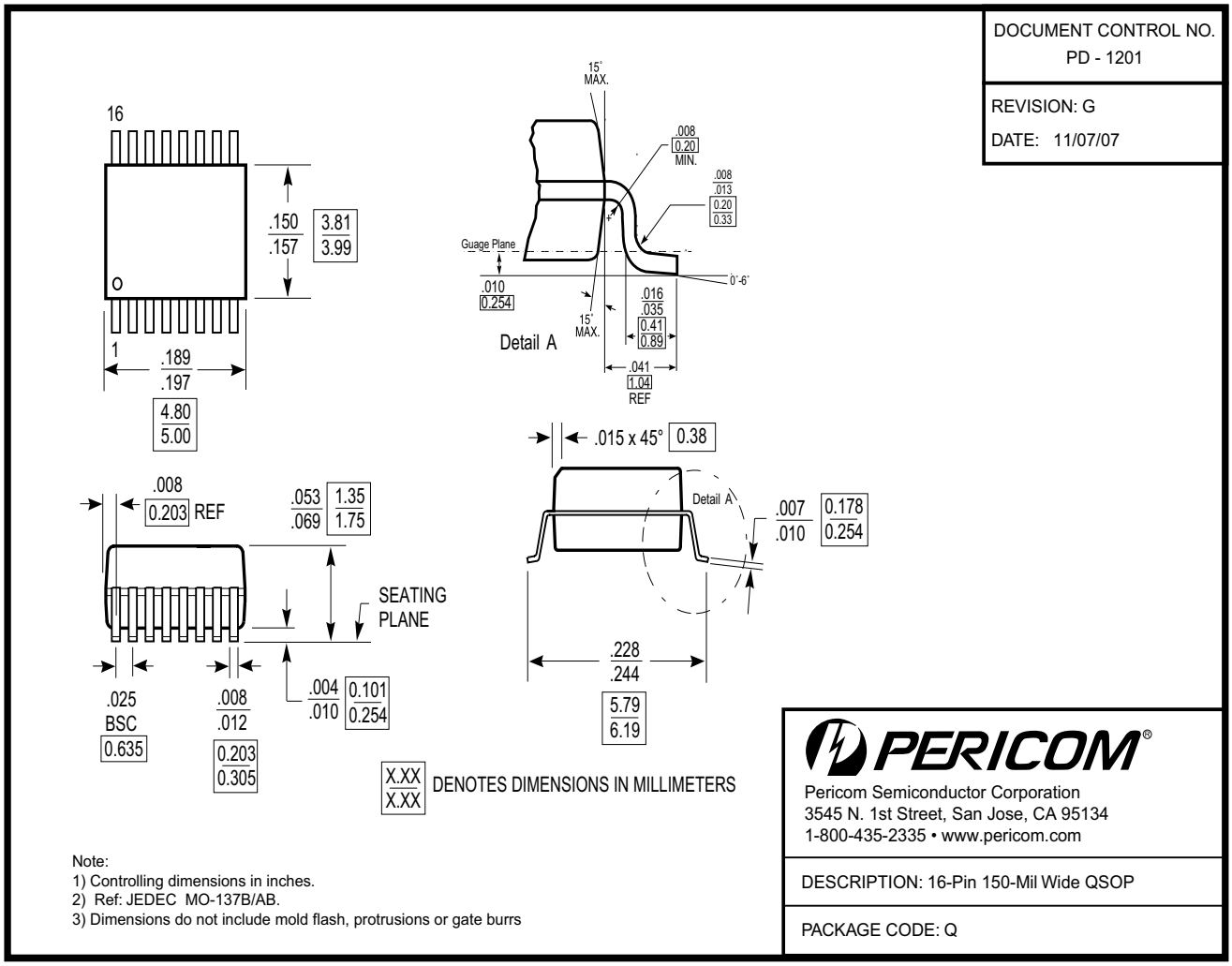
DESCRIPTION: 16-Pin, 173-Mil Wide, TSSOP

PACKAGE CODE: L

Packaging Mechanical: 16-Pin QSOP (Q)



Ordering Information

Ordering Code	Package Code	Package Description
PI49FCT20802QE	Q	Pb-free & Green, 16-pin 150-mil wide QSOP
PI49FCT20802LE	L	Pb-free & Green, 16-pin 173-mil wide TSSOP
PI49FCT20803QE	Q	Pb-free & Green, 16-pin 150-mil wide QSOP
PI49FCT20803LE	L	Pb-free & Green, 16-pin 173-mil wide TSSOP

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