3.3V/5V, 160 MHz, 4 output, CMOS Clock Buffer

Features

- 160 MHz maximum frequency
- Low skew: 250ps
- Fast rise/fall time: 1.5ns
- Output Enable with tri-states
- Industrial Temperature
- 3.3V or 5V power supply
- Packaging (Pb-free & Green available):
  −8-pin SOIC (W)

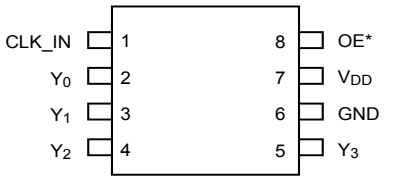
Applications

- 33 MHz for PCI
- 106.25 MHz for Fibre Channel
- 125 MHz for Ethernet
- 133 MHz for PCIX
- 155.52 MHz for OC3/SONET

Description

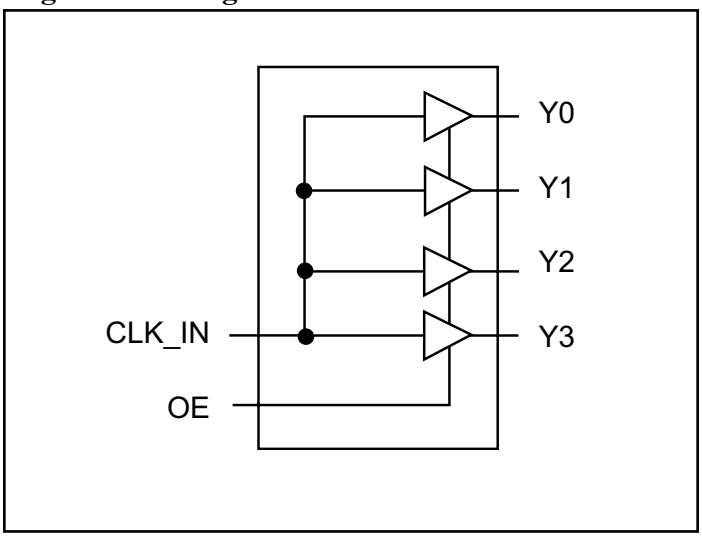
PI6C18551 is a low skew, low noise and high-speed clock buffer for computing, networking and communication applications. It is a non-inverting buffer with four outputs from a single input. The outputs are controlled by output enable pin (OE), outputs are tri-states when OE is LOW, and outputs are enabled when OE is HIGH.

Pin Description



*External pull-up recommended

Logic Block Diagram



Function Table

Inputs		Outputs
CLK_IN	OE	Y[3:0]
X	L	Z
L	H	L
H	H	H

Note:
1. X = Don't Care; Z = Tri-state

Pin Description

Pin Name	Type	Pin No	Descriptions
CLK_IN	Input	1	Input clock with pull-up resistor
Y0	Output	2	Output clock
Y1	Output	3	Output clock
Y2	Output	4	Output clock
Y3	Output	5	Output clock
GND	Ground	6	GROUND
V_{DD}	Power	7	3.3V or 5V power supply
OE	Input	8	Output Enable with pull-up resistor. External pull-up resistor is recommended.

External Components

A minimum number of external components are required for proper operation. A decoupling capacitor of 0.01µF should be connected between V_{DD} on pin 7 and GND on pin 6, as close to the device as possible. A 33-Ohm series terminating resistor may be used on each clock output if the trace is longer than 1 inch. An external 100k-Ohm pull-up resistor should be used on pin 8, OE.

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

Symbol	Parameters	Min.	Max.	Units
V_{DD}	Supply Voltage		7	V
V_I	Input Voltage	-0.5	V_{DD}+0.5	
V_O	Output Voltage	-0.5	V_{DD}+0.5	
Ts	Storage Temperature	-65	150	°C
Ta	Ambient Temperature	-40	85	
Tso	Soldering Temperature		260	

DC Electrical Characteristics (V_{DD} = 3.3V ±5%, T_A = -40 to 85°C)

Symbol	Parameters	Condition	Min.	Typ.	Max.	Units
V_{DD}	3.3V I/O Supply Voltage		3.135		3.465	V
V_{IH}	Input High Voltage	CLK_IN, Note 1	$V_{DD}/2 + 0.7$		3.8	
		OE	2		V_{DD}	
V_{IL}	Input Low Voltage	CLK_IN, Note 1			$V_{DD}/2 - 0.7$	
		OE			0.8	
V_{OH}	Output High Voltage	I_{OH} = -12mA	2.4			
V_{OL}	Output Low Voltage	I_{OL} = 12mA			0.4	
I_{DD}	Power Supply Current	No load at 135 MHz		34		mA
Z_O	Output Impedance			20		Ohm
R_{PU}	Internal Pull-up Resistor	CLK_IN & OE		192		k-Ohm
I_{OS}	Short Circuit Current			–46		mA

Notes:
1. Nominal switching threshold is $V_{DD/2}$

DC Electrical Characteristics (V_{DD} = 5V ±5%, T_A = -40 to 85°C)

Symbol	Parameters	Condition	Min.	Typ.	Max.	Units
V_{DD}	5V I/O Supply Voltage		4.75		5.25	V
V_{IH}	Input High Voltage	CLK_IN, Note 1	$V_{DD}/2 + 1$		5.5	
		OE	2		V_{DD}	
V_{IL}	Input Low Voltage	CLK_IN, Note 1			$V_{DD}/2 - 1$	
		OE			0.8	
V_{OL}	Output Low Voltage	I_{OL} = 12mA			0.4	
V_{OH}	Output High Voltage (CMOS Level)	I_{OH} = -12mA	4			
I_{DD}	Power Supply Current	No load at 135MHz		61		mA
Z_O	Output Impedance			20		Ohm
R_{PU}	Internal Pull-up Resistor	CLK_IN & OE		193		k-Ohm
I_{OS}	Short Circuit Current			–90		mA

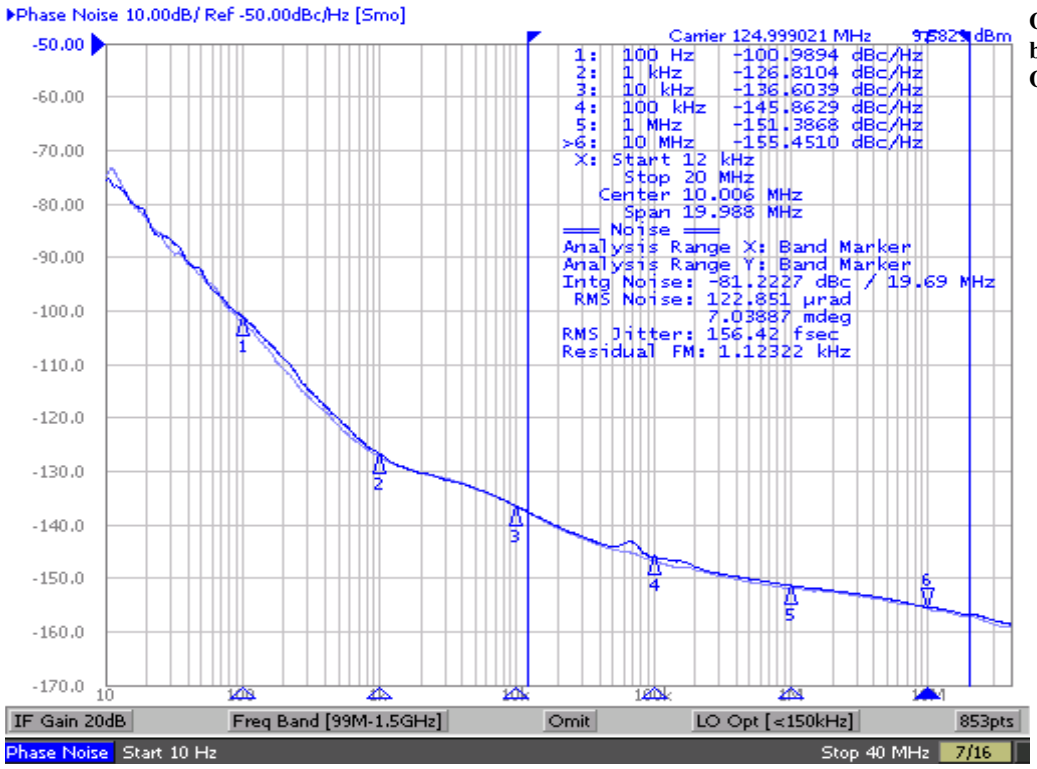
Notes:
1. Nominal switching threshold is $V_{DD/2}$

AC Electrical Characteristics (V_{DD} = 3.3±5%, T_A = -40 to 85°C)

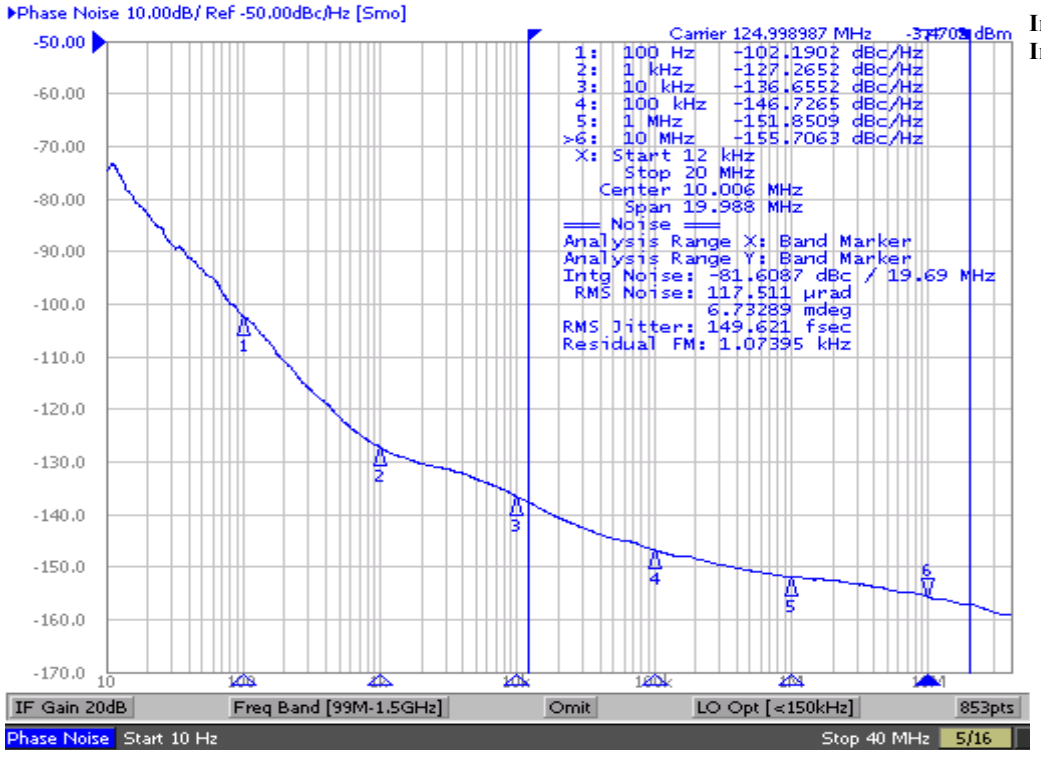
Symbol	Parameters	Condition	Min.	Typ.	Max.	Units
Fin	Input Frequency		0		160	MHz
Fo	Output Frequency	3.3V, 15pF load(5)			160	
Fo	Output Frequency	5V, l5pF load(5)			135	
T_R	Rise Time	0.8V to 2.0V			1.5	ns
T_F	Fall Time	2.0V to 0.8V			1.5	
T_{PD}	Propagation Delay	3.3V, 135MHz(2)	2	4	8	
T_{PD}	Propagation Delay	5V, 135MHz(2)	1.5	3	6	
T_{SK}	Output Skew	$V_{DD}/2$(3)			250	ps
T_{jit}	Additive Jitter	RMS @ 12KHz~20MHz		45.6		fs

Notes:
1. With rail to rail input clock.
2. All outputs with equal loading.
3. Duty cycle on outputs will match incoming clock duty cycle.
4. With external series resistor 33Ω positioned close to each output pin.

Jitter (RMS @ 12KHz~20MHz)

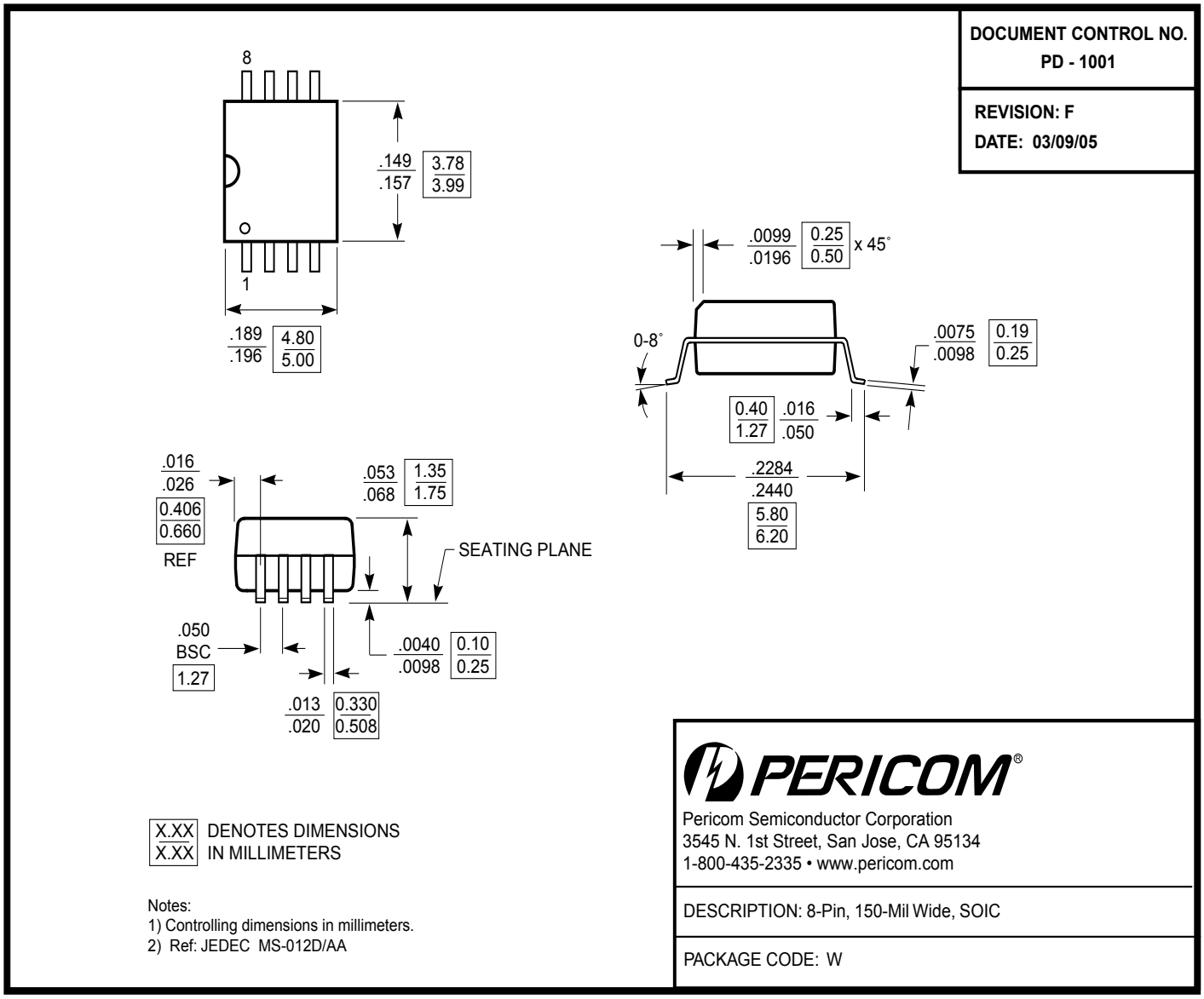


Output phase noise vs. input (light blue line) plot
Output RMS phase jitter=156.4fs



Input phase noise plot
Input RMS phase jitter=149.6fs

Packaging Mechcanical: 8-pin SOIC (W)



Ordering Information[1,2,3]:

Ordering Code	Package Code	Package Description
PI6C18551WE	W	Pb-free & Green, 8-pin SOIC

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free and Green
3. Adding an X Suffix = Tape/Reel