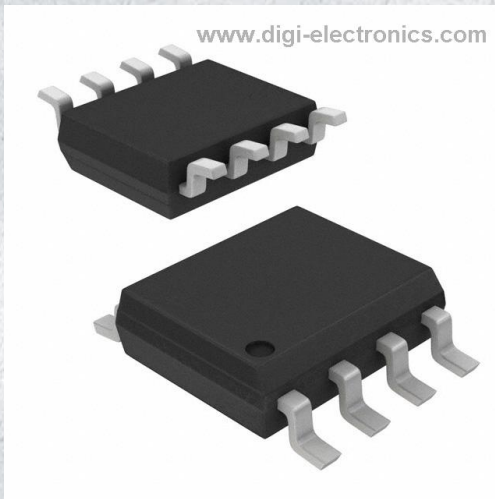


# PI6CL10804WE Datasheet



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	PI6CL10804WE-DG
Manufacturer	<a href="#">Diodes Incorporated</a>
Manufacturer Product Number	PI6CL10804WE
Description	IC CLK BUFFER 1:4 200MHZ 8SOIC
Detailed Description	Clock Fanout Buffer (Distribution) IC 1:4 200 MHz 8-SOIC (0.154", 3.90mm Width)



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## Purchase and inquiry

Manufacturer Product Number:

PI6CL10804WE

Series:

-

Type:

Fanout Buffer (Distribution)

Ratio - Input:Output:

1:4

Input:

LVC MOS

Frequency - Max:

200 MHz

Operating Temperature:

-40°C ~ 85°C

Package / Case:

8-SOIC (0.154", 3.90mm Width)

Base Product Number:

PI6CL10804

Manufacturer:

Diodes Incorporated

Product Status:

Active

Number of Circuits:

1

Differential - Input:Output:

No/No

Output:

LVC MOS

Voltage - Supply:

1.1V ~ 1.6V

Mounting Type:

Surface Mount

Supplier Device Package:

8-SOIC

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99





PI6CL10804

## 1.2V/1.5V, 200MHz, 1:4 Networking Clock Buffer

### Features

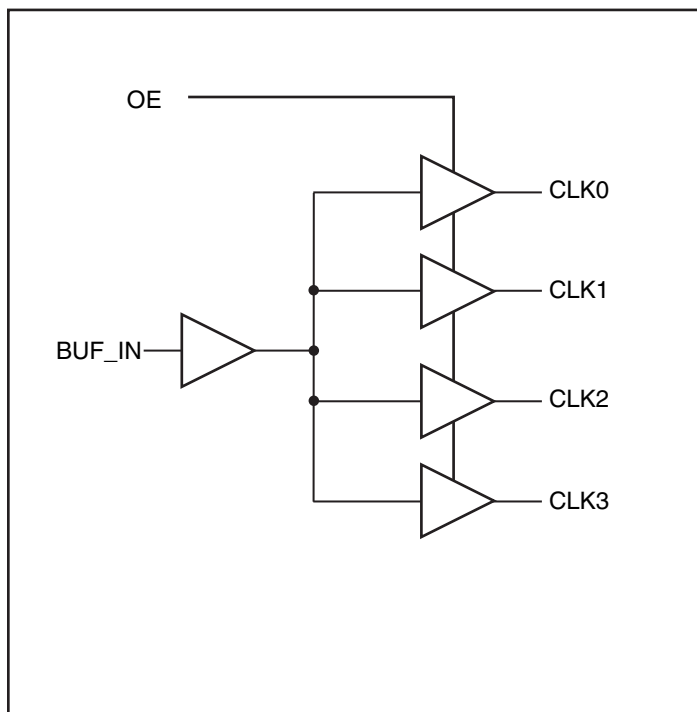
- High-speed, low-noise, non-inverting 1:4 buffer
- Maximum Frequency up to 200 MHz
- Low output skew < 100ps
- Low propagation delay < 3.5ns
- Optimized duty cycle
- 3.3V tolerant input
- 1.2V or 1.5V supply voltage
- Packages (Pb-free & Green available):  
-8-pin SOIC (W)

### Description

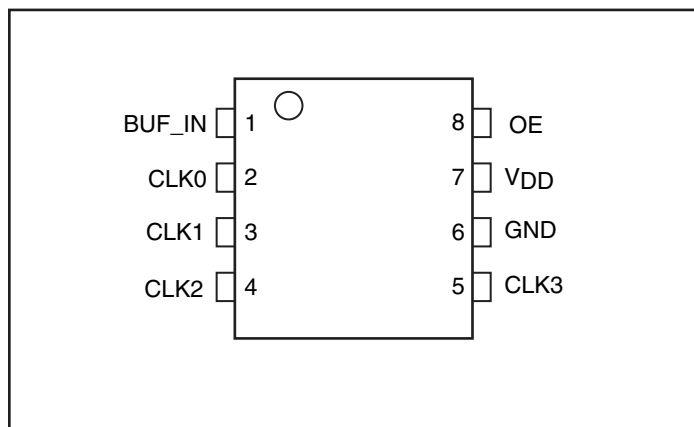
The PI6CL10804 is a 1.2V or 1.5V high-speed, low-noise 1:4 non-inverting clock buffer. The key goal in designing the PI6CL10804 is to target networking applications that require low-skew, low-jitter, and high-frequency clock distribution.

Providing output-to-output skew as low as 100ps, the PI6CL10804 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.

### Block Diagram



### Pin Configuration



### Pin Description

Pin Name	Description
BUF_IN	Input
CLK [0:3]	Outputs
GND	Ground
VDD	Power
OE	Output Enable


**1.5V Absolute Maximum Ratings** (Above which the useful life may be impaired. For user guidelines only, not tested.)

Storage Temperature.....	-65°C to +150°C
V <sub>DD</sub> Voltage .....	-0.5V to +2.6V
Output Voltage (max. 3.6V) .....	-0.5V to V <sub>DD</sub> +0.5V
Input Voltage .....	-0.5V to 3.6V

**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.

**1.5V DC Characteristics (Over Operating Range: V<sub>DD</sub> = 1.5V ± 0.1V, T<sub>A</sub> = -40° to 85°C)**

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. (2)	Max.	Units
V <sub>DD</sub>	Supply Voltage			1.4	1.5	1.6	V
V <sub>IH</sub>	Input HIGH Voltage	Logic HIGH level		0.65 x V <sub>DD</sub>			V
V <sub>IL</sub>	Input LOW Voltage	Logic LOW level		-0.3		0.35 x V <sub>DD</sub>	
I <sub>I</sub>	Input Current	V <sub>DD</sub> = Max, V <sub>in</sub> = V <sub>DD</sub> or GND	I pins			15	μA
V <sub>OH</sub>	Output High Voltage	V <sub>DD</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -2mA	1.05			V
			I <sub>OH</sub> = -8mA	0.75			
V <sub>OL</sub>	Output LOW Voltage	V <sub>DD</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 1mA			0.4	
			I <sub>OL</sub> = 2mA			0.35	
			I <sub>OL</sub> = 8mA			0.35	V

**Notes:**

- For Max. or Min. conditions, use appropriate operating range values.
- Typical values are at V<sub>CC</sub> = 1.5V, +25°C ambient and maximum loading.

**1.5V AC Characteristics (Over Operating Range: V<sub>DD</sub> = 1.5V ± 0.1V, T<sub>A</sub> = -40° to 85°C)**

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ	Max.	Units
F <sub>IN</sub>	Input Frequency		0		200	MHz
t <sub>R</sub> /t <sub>F</sub>	CLKn Rise/Fall Time	20% to 80%			1.5	ns
t <sub>PLH</sub> , t <sub>PHL</sub> <sup>(2)</sup>	Propagation Delay BUF_IN to CLKn	C <sub>L</sub> = 5pF, 125 MHz Outputs are measured @ V <sub>DD</sub> /2	1.0	1.5	3.0	ns
t <sub>SK(O)</sub> <sup>(3)</sup>	Output to Output Skew between any two outputs of the same device @ same transition				100	ps
t <sub>SK(T)</sub> <sup>(3)</sup>	Part to Part Skew between two identical outputs of different parts on the same board <sup>(4)</sup>				300	
t <sub>dc_in</sub>	Duty Cycle In @ 1ns edge rate		45		55	%
t <sub>dc_out</sub>	Duty Cycle Out		40		60	

**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.


**1.2V Absolute Maximum Ratings** (Above which the useful life may be impaired. For user guidelines only, not tested.)

Storage Temperature.....	-65°C to +150°C
V <sub>DD</sub> Voltage .....	-0.5V to +2.5V
Output Voltage (max 2.5V) .....	-0.5V to V <sub>DD</sub> +0.5V
Input Voltage .....	-0.5V to 3.6V

**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.

**1.2V DC Characteristics (Over Operating Range: V<sub>DD</sub> = 1.2V ± 0.1V, T<sub>A</sub> = -40° to 85°C)**

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. (2)	Max.	Units
V <sub>DD</sub>	Supply Voltage		1.1	1.2	1.3	V
V <sub>IH</sub>	Input HIGH Voltage	Logic HIGH level	0.65*V <sub>DD</sub>			V
V <sub>IL</sub>	Input LOW Voltage	Logic LOW level	-0.3		0.35*V <sub>DD</sub>	
I <sub>I</sub>	Input Current <sup>(3)</sup>	V <sub>DD</sub> = Max, V <sub>in</sub> = V <sub>DD</sub> or GND			15	μA
V <sub>OH</sub>	Output High Voltage	V <sub>DD</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -2mA	0.85		V
			I <sub>OH</sub> = -8mA	0.55		
V <sub>OL</sub>	Output LOW Voltage	V <sub>DD</sub> = Min., V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 2mA		0.35	
			I <sub>OL</sub> = -8mA		0.45	

**Notes:**

- For Max. or Min. conditions, use appropriate operating V<sub>DD</sub> and T<sub>A</sub> values.
- Typical values are at V<sub>CC</sub> = 1.2V, +25°C ambient and maximum loading.

**1.2V AC Characteristics (Over Operating Range: V<sub>DD</sub> = 1.2V ± 0.1V, T<sub>A</sub> = -40° to 85°C)**

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ	Max.	Units
F <sub>IN</sub>	Input Frequency		0		200	MHz
t <sub>R</sub> /t <sub>F</sub>	CLK <sub>n</sub> Rise/Fall Time	20% to 80%			1.5	ns
t <sub>PLH</sub> , t <sub>PHL</sub> <sup>(2)</sup>	Propagation Delay BUF_IN to CLK <sub>n</sub>	C <sub>L</sub> = 5pF, 125 MHz Outputs are measured @ V <sub>DD</sub> /2	1.0	2.0	3.5	ns
t <sub>SK(O)</sub> <sup>(3)</sup>	Output to Output Skew between any two outputs of the same device @ same transition				100	ps
t <sub>SK(T)</sub> <sup>(3)</sup>	Part to Part Skew between two identical outputs of different parts on the same board <sup>(4)</sup>				300	
t <sub>dc_in</sub>	Duty Cycle In @ 1ns edge rate		45		55	%
t <sub>dc_out</sub>	Duty Cycle Out		40		60	

**Notes:**

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



### Power Supply Characteristics

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
I <sub>DDQ</sub>	Quiescent Power Supply Current	V <sub>DD</sub> = 1.5V	V <sub>IN</sub> = GND or V <sub>DD</sub>			10	μA
		V <sub>DD</sub> = 1.2V				10	
I <sub>DD_TOT</sub>	Total Power Supply Current	V <sub>DD</sub> = 1.5V	All Outputs Toggling, C <sub>L</sub> = 5pF, F <sub>IN</sub> = 125MHz			15	mA
		V <sub>DD</sub> = 1.2V				10	

#### Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics.
- Typical values are at V<sub>CC</sub> = 1.2V or 1.5V, and +25°C ambient.

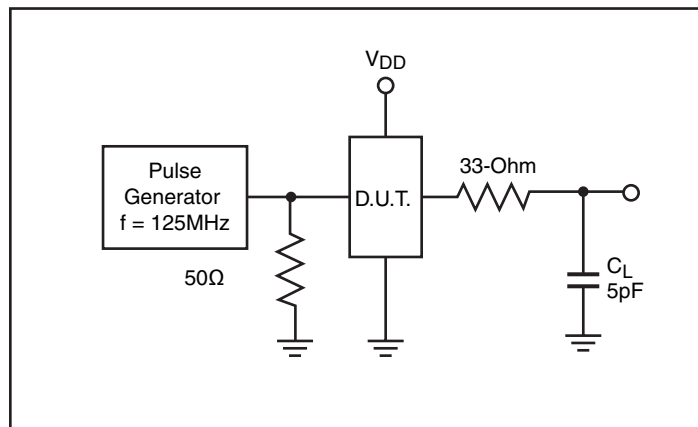
### Capacitance (T<sub>A</sub> = 25°C, f = 1 MHz)

Parameters <sup>(1)</sup>	Description	Test Conditions	Typ	Max.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	2.0	4	pF
C <sub>OUT</sub>	Output Capacitance	V <sub>OUT</sub> = 0V	1.7	6	

#### Note:

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

### Test Circuits for All Outputs

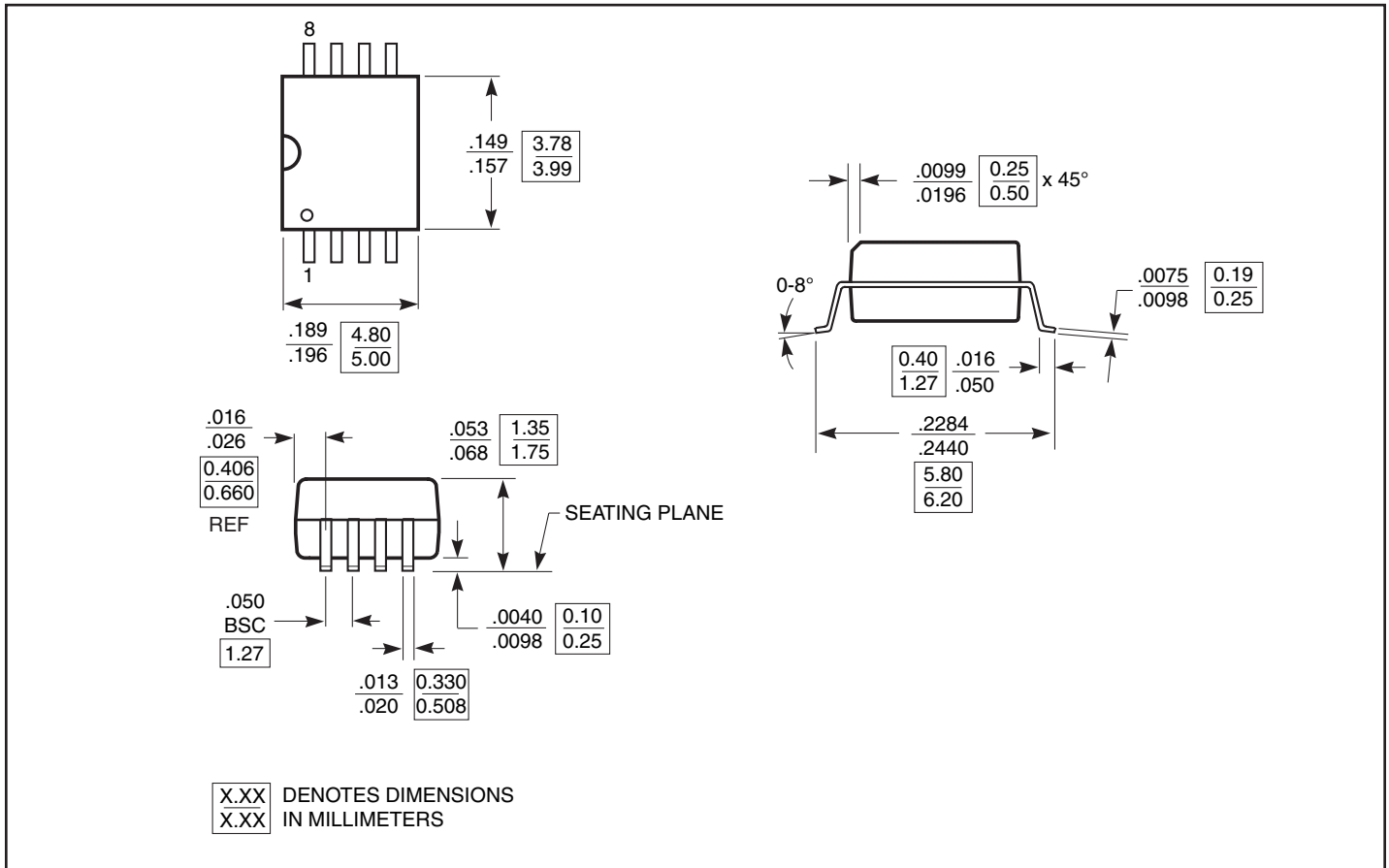


#### Definitions:

C<sub>L</sub> = Load capacitance: includes jig and probe capacitance.



Packaging Mechanical: 8-Pin SOIC (W)



Ordering Information(1,2,3)

Ordering Code	Package Code	Package Type
PI6CL10804WE	W	Pb-free & Green, 8-pin 153-mil wide SOIC

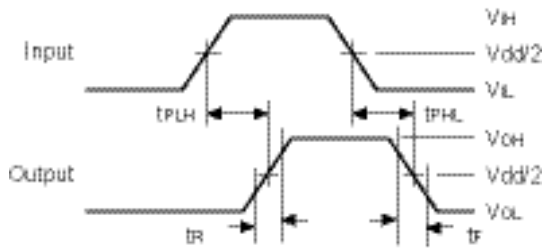
Notes:

1. Thermal Characteristics can be found on the web at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
2. E = Pb-free and Green
3. X suffix = Tape/Reel

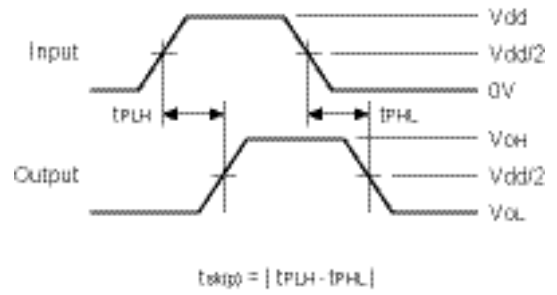


Switching Waveforms

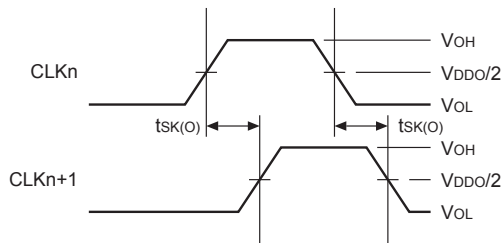
Propagation Delay



Pulse Skew –  $t_{SK(P)}$



Output Skew –  $t_{SK(O)}$





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