# Low Skew, 1-To-2 LVCMOS / LVTTL Fanout Buffer

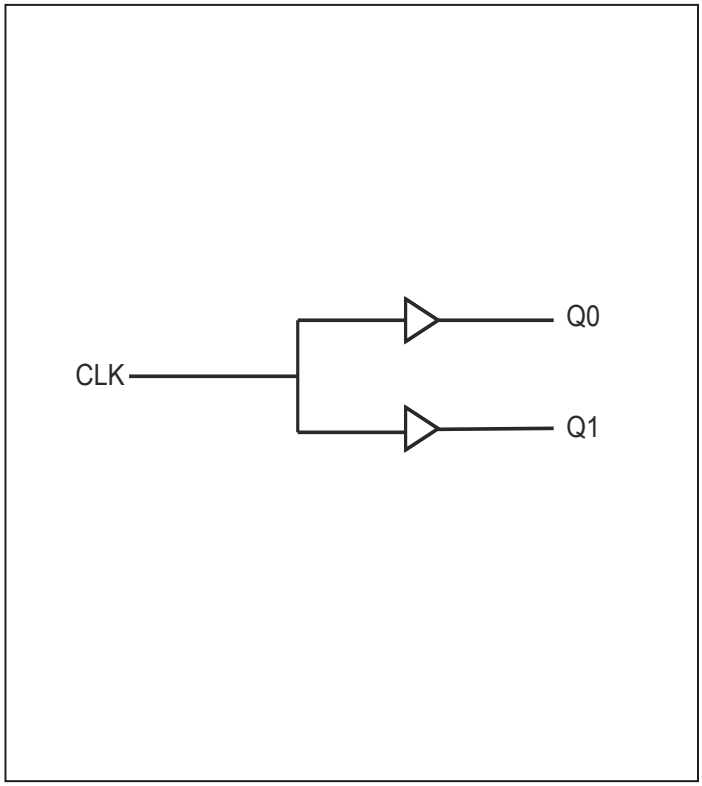
## Features

- 2 LVCMOS / LVTTL outputs
- LVCMOS / LVTTL clock input accepts LVCMOS or LVTTL input levels
- Maximum output frequency: 250MHz
- Output skew: 25ps (typical)
- Part-to-part skew: 250ps (typical)
- Small 8 lead SOIC package saves board space
- Full 3.3V, 2.5V operation modes
- -40°C to 85°C ambient operating temperature
- Lead-Free package fully RoHS compliant

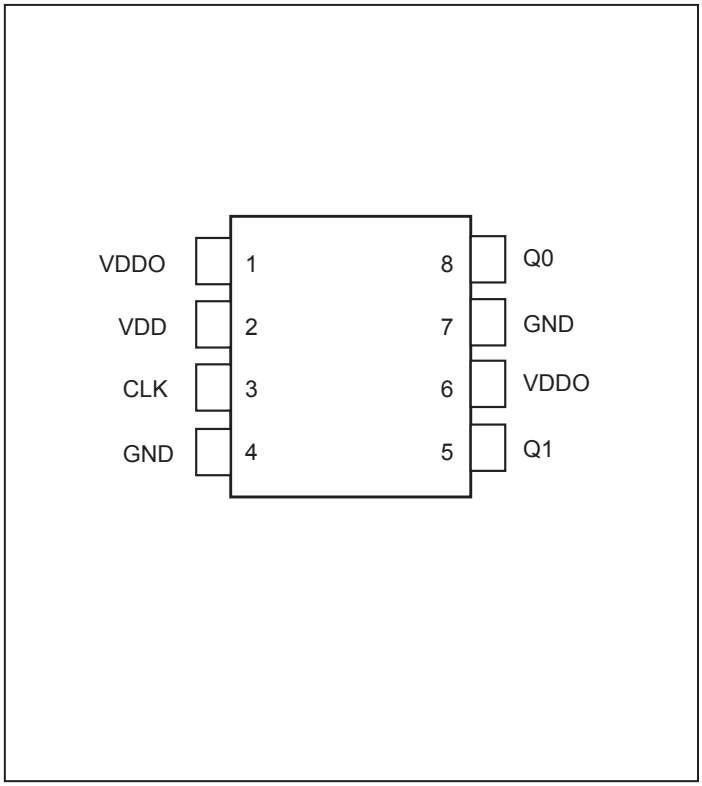
## Description

The PI6C49X0202 is a low skew, 1-to-2 LVCMOS/LVTTL High Performance Fanout Buffer. The PI6C49X0202 has a single ended clock input. The single ended clock input accepts LVCMOS or LVTTL input levels. The PI6C49X0202 features a pair of LVCMOS/LVTTL outputs. Guaranteed output and part-to-part skew characteristics make the PI6C49X0202 ideal for clock distribution applications demanding well defined performance and repeatibility.

## Block Diagram




## Pin Assignment



## Pin Descriptions

| Pin# | Pin Name | Pin Type | | Pin Description |
|---|---|---|---|---|
| 1, 6 | VDDO | Power | | Output supply pins. |
| 2 | VDD | Power | | Core supply pin. |
| 3 | CLK | Input | Pulldown | LVCMOS / LVTTL clock input. |
| 4, 7 | GND | Power | | Power supply ground. |
| 5 | Q1 | Output | | Single clock output. LVCMOS / LVTTL interface levels. |
| 8 | Q0 | Output | | Single clock output. LVCMOS / LVTTL interface levels. |

Note: *Pulldown* refer to internal input resistors, typical values in Pin Characteristics table.

## Pin Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typical | Max. | Units |
|---|---|---|---|---|---|---|
| $C_N$ | Capacitance | | | 4 | | pF |
| $R_{PULLDOWN}$ | Input Pulldown Resistor | | | 51 | | kΩ |
| $R_{OUT}$ | Output Impedance | | 5 | 7 | 12 | Ω |

## Maximum Ratings

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

Maximum Supply Voltage, VDD, VDDO . . . . . 4.6V
Inputs, $V_I$ . . . . . –0.5V to VDD +0.5V
Output, $V_O$ . . . . . –0.5V to VDDO +0.5V
Storage Temperature . . . . . -65°C to 150°C
ESD Protection (HBM) . . . . . 2000V

Note:

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These ratings are stress specifications only. Functional operation of product at these conditions or any conditions beyond those listed in the DC Characteristics or AC Characteristics

is not implied. Exposure to absolute maximum rating conditions for extended periods may affect product reliability.

## POWER SUPPLY DC CHARACTERISTICS, $T_A$ = -40°C to 85°C

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| VDD | Core Supply Voltage | 3.3V Operation | 3.135 | 3.3 | 3.465 | V |
| | | 2.5V Operation | 2.375 | 2.5 | 2.625 | |
| VDDO | Output Power Supply Voltage | 3.3V Supply | 3.135 | 3.3 | 3.465 | V |
| | | 2.5V Supply | 2.375 | 2.5 | 2.625 | |
| IDD | Power Supply Current | | | | 5 | mA |
| IDDO | Output Supply Current | unloaded, 25MHz | | | 6.5 | mA |

Note: Parameters measured up to $f_{max}$ unless otherwise noted.

## LVCMOS / LVTTL DC CHARACTERISTICS, $T_A$ = -40°C to 85°C

| Symbol | Parameter | Conditions | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| $V_{IH}$ | Input High Voltage | VDD = 3.3V | | 2 | | VDD+0.3 | V |
| | | VDD = 2.5V | | 1.7 | | VDD+0.3 | |
| $V_{IL}$ | Input Low Voltage | VDD = 3.3V | | -0.3 | | 0.8 | V |
| | | VDD = 2.5V | | -0.3 | | 0.8 | |
| $I_{IH}$ | Input High Current | VDD = $V_{IN}$ = 3.465V | | | | 100 | µA |
| | | VDD = $V_{IN}$ = 2.625V | | | | 80 | |
| $I_{IL}$ | Input Low Current | VDD = 3.465V, $V_{IN}$ = 0V | | -5 | | | µA |
| | | VDD = 2.625V, $V_{IN}$ = 0V | | -5 | | | |
| $V_{OH}$ | Output High Voltage | VDDO = 3.3V | $I_{OH}$ = -100µA | 2.9 | | | V |
| | | VDDO = 2.5V | $I_{OH}$ = -100µA | 2.2 | | | V |
| $V_{OL}$ | Output Low Voltage | VDDO = 3.3V | $I_{OL}$ = 100µA | | | 0.2 | V |
| | | VDDO = 2.5V | $I_{OL}$ = 100µA | | | 0.2 | V |

## AC CHARACTERISTICS, VDD = 3.3V ± 5%, $T_A$ = -40°C to 85°C

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $f_{MAX}$ | Output Frequency | VDDO = 3.3V | 4 | | 250 | MHz |
| | | VDDO = 2.5V | 4 | | 250 | |
| $tp_{LH}$ | Propagation Delay, Low-to-High; NOTE 1 | VDDO = 3.3V, $f \leq$ 250MHz | 1.4 | | 2.2 | ns |
| | | VDDO = 2.5V, $f \leq$ 250MHz | 1.5 | | 3.0 | |
| *tsk*(o) | Output Skew; NOTE 2 | | | 25 | 80 | ps |
| *tsk*(pp) | Part-to-Part Skew; NOTE 3 | | | 250 | 800 | ps |
| $t_R$ | Output Rise Time NOTE 4 | VDDO = 3.3V | 100 | 300 | 400 | ps |
| | | VDDO = 2.5V | 100 | 350 | 500 | |
| $t_F$ | Output Fall Time NOTE 4 | VDDO = 3.3V | 100 | 300 | 400 | ps |
| | | VDDO = 2.5V | 100 | 350 | 500 | |
| odc | Output Duty Cycle NOTE 5 | $f \leq$ 133MHz | 48 | | 52 | % |
| | | 133MHz < $f \leq$ 200MHz | 47 | | 53 | % |
| | | 200MHz < $f \leq$ 250MHz | 47 | | 53 | % |
| $t_{jit}$ | Additive RMS Jitter | 156.25MHz (@12kHz to 20MHz) | | 0.1 | | ps |
| | | 125MHz (@12kHz to 20MHz) | | 0.07 | | ps |

Parameters measured at $f_{MAX}$ unless otherwise noted.

NOTE 1: Measured from VDD /2 of the input to VDDO /2 of the output.

NOTE 2: Defined as skew between outputs at the same supply voltage and with equal load conditions. Measured at VDDO /2.

NOTE 3: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of inputs on each device, the outputs are measured at VDDO /2.

NOTE 4: Defined from 20% to 80%

NOTE 5: Measured at VDDO /2

## AC CHARACTERISTICS, VDD = 2.5V ± 5%, $T_A$ = -40°C to 85°C

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $f_{MAX}$ | Output Frequency | VDDO = 2.5V | 4 | | 250 | MHz |
| $tp_{LH}$ | Propagation Delay, Low-to-High; NOTE 1 | VDDO = 2.5V, $f \leq$ 250MHz | 1.5 | | 2.8 | ns |
| *tsk*(o) | Output Skew; NOTE 2 | | | 25 | 75 | ps |
| *tsk*(pp) | Part-to-Part Skew; NOTE 3 | | | 250 | 800 | ps |
| $t_R$ | Output Rise Time NOTE 4 | VDDO = 2.5V | 100 | 350 | 500 | ps |
| $t_F$ | Output Fall Time NOTE 4 | VDDO = 2.5V | 100 | 350 | 500 | ps |
| odc | Output Duty Cycle NOTE 5 | $f \leq$ 133MHz | 48 | | 52 | % |
| | | 133MHz < $f \leq$ 200MHz | 47 | | 53 | % |
| | | 200MHz < $f \leq$ 250MHz | 42 | | 58 | % |
| $t_{jit}$ | Additive RMS Jitter | 156.25MHz (@12kHz to 20MHz) | | 0.1 | | ps |
| | | 125MHz (@12kHz to 20MHz) | | 0.07 | | ps |

Parameters measured at $f_{MAX}$ unless otherwise noted.

NOTE 1: Measured from VDD /2 of the input to VDDO /2 of the output.

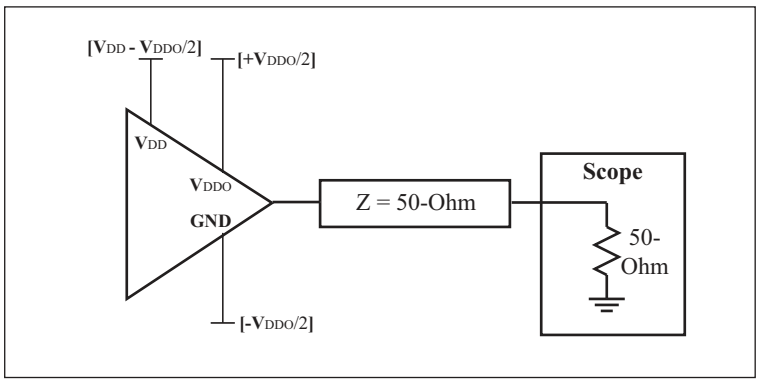
NOTE 2: Defined as skew between outputs at the same supply voltage and with equal load conditions. Measured at VDDO /2.

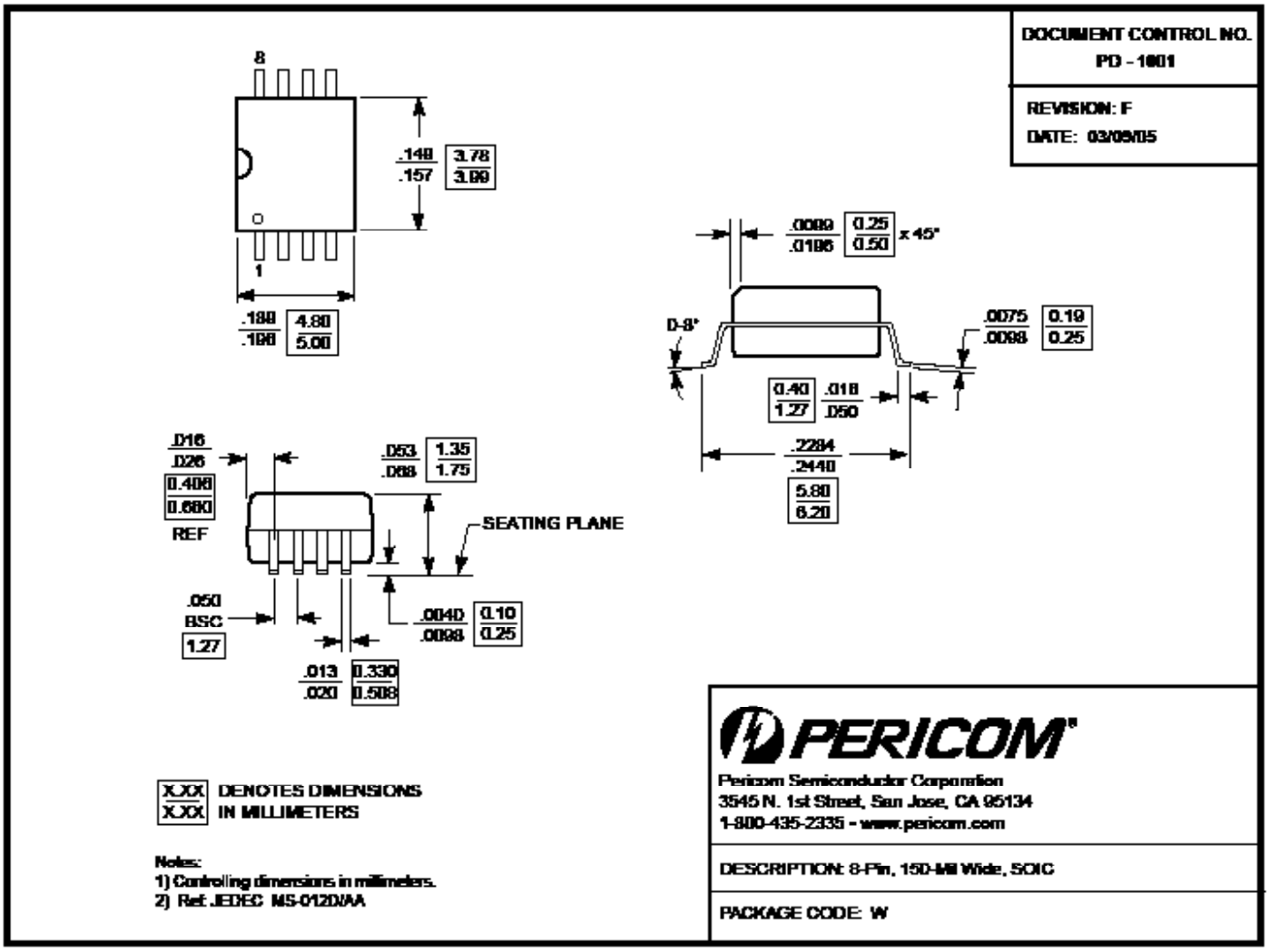
NOTE 3: Defined as skew between outputs on different devices operating at the same supply voltages and with equal load conditions. Using the same type of inputs on each device, the outputs are measured at VDDO /2.

NOTE 4: Defined from 20% to 80%

NOTE 5: Measured at VDDO /2

## AC Test Circuit Load






**Note:**
- For latest package info, please check: http://www.pericom.com/products/packaging/mechanicals.php

## Ordering Information(1-3)

| Ordering Code | Package Code | Package Description |
|---|---|---|
| PI6C49X0202WIE | W | 8-pin, Pb-free & Green, SOIC |
| PI6C49X0202WIEX | W | 8-pin, Pb-free & Green, SOIC, Tape & Reel |

**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