

Industrial Grade Low-Skew, 1-to-2 LVCMOS/LVTTL Fanout Buffer

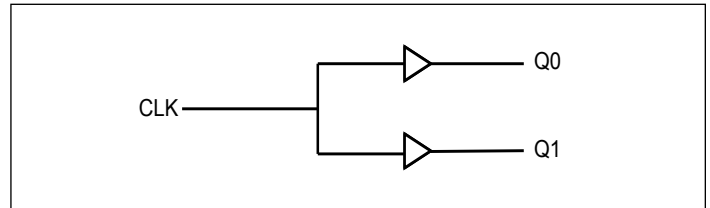
Features

- Two LVCMOS/LVTTL Outputs
- LVCMOS/LVTTL Clock Input Accepts LVCMOS or LVTTL Input Levels
- Maximum Output Frequency: 250MHz
- Output Skew: 25ps (Typical)
- Full 3.3V, 2.5V Operation Modes
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free “Green” Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>
- Packaging (Pb-free & Green):
 - Small 8-pin SOIC (W) package saves board space

Description

The PI6C49CB02J is an industrial grade low-skew, 1-to-2 LVCMOS/LVTTL high-performance fanout buffer. The PI6C49CB02J has a single-ended clock input. The single-ended clock input accepts LVCMOS or LVTTL input levels. The PI6C49CB02J features a pair of LVCMOS/LVTTL outputs. Guaranteed output and part-to-part skew characteristics make the PI6C49CB02J ideal for clock distribution applications demanding well-defined performance and repeatability.

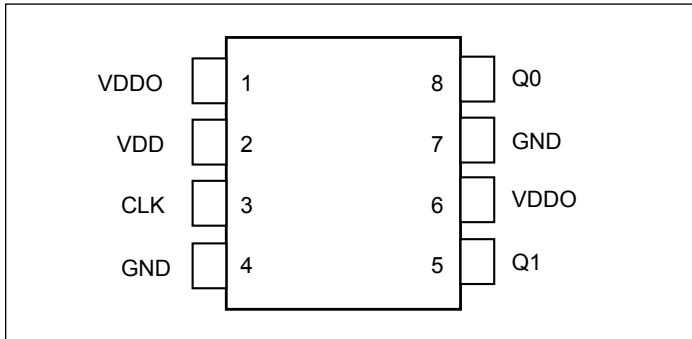
Block Diagram



Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, “Green” and Lead-free.
3. Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Pin Configuration



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 | Pull-down | LVC MOS/LVTTL Clock Input |
| 4, 7 | GND | Power | — | Power Supply Ground |
| 5 | Q1 | Output | — | Single Clock Output. LVC MOS/LVTTL Interface Levels. |
| 8 | Q0 | Output | — | Single Clock Output. LVC MOS/LVTTL Interface Levels. |

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

Pin Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|----------------|--------------------------|-----------------|------|------|------|------------|
| C_N | Capacitance | — | — | 4 | — | pF |
| $R_{PULLDOWN}$ | Input Pull-down Resistor | — | — | 51 | — | k Ω |
| 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 |
| Junction Temperature | 125°C (Max) |

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.

Recommended Operation Conditions

| Parameter | Min. | Typ. | Max. | Units |
|---|--------|------|--------|-------|
| Ambient Operating Temperature | -40 | — | +105 | °C |
| Power Supply Voltage (measured in respect to GND) | +2.375 | — | +3.465 | V |

Power Supply DC Characteristics

| 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 | $T_A = -40^\circ\text{C to } 85^\circ\text{C}$ | — | — | 5 | mA |
| IDDO | Output Supply Current | Unloaded, 25 MHz, $T_A = -40^\circ\text{C to } 85^\circ\text{C}$ | — | — | 6.5 | mA |
| IDD | Power Supply Current | $T_A = -40^\circ\text{C to } 105^\circ\text{C}$ | — | — | 5 | mA |
| IDDO | Output Supply Current | Unloaded, 25 MHz, $T_A = -40^\circ\text{C to } 105^\circ\text{C}$ | — | — | 6.5 | mA |

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

LVC MOS / LV TTL DC Characteristics, $T_A = -40^\circ\text{C}$ to 105°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 = $V_{IN} = 3.465\text{V}$ | — | — | 100 | μA |
| | | VDD = $V_{IN} = 2.625\text{V}$ | — | — | 80 | |
| I_{IL} | Input Low Current | VDD = 3.465V, $V_{IN} = 0\text{V}$ | -5 | — | — | μA |
| | | VDD = 2.625V, $V_{IN} = 0\text{V}$ | -5 | — | — | |
| V_{OH} | Output High Voltage | VDDO = 3.3V $I_{OH} = -100\mu\text{A}$ | 2.9 | — | — | V |
| | | VDDO = 2.5V $I_{OH} = -100\mu\text{A}$ | 2.2 | — | — | V |
| V_{OL} | Output Low Voltage | VDDO = 3.3V $I_{OL} = 100\mu\text{A}$ | — | — | 0.2 | V |
| | | VDDO = 2.5V $I_{OL} = 100\mu\text{A}$ | — | — | 0.2 | V |

AC Characteristics, VDD = 3.3V ± 5%, T_A = -40°C to 105°C

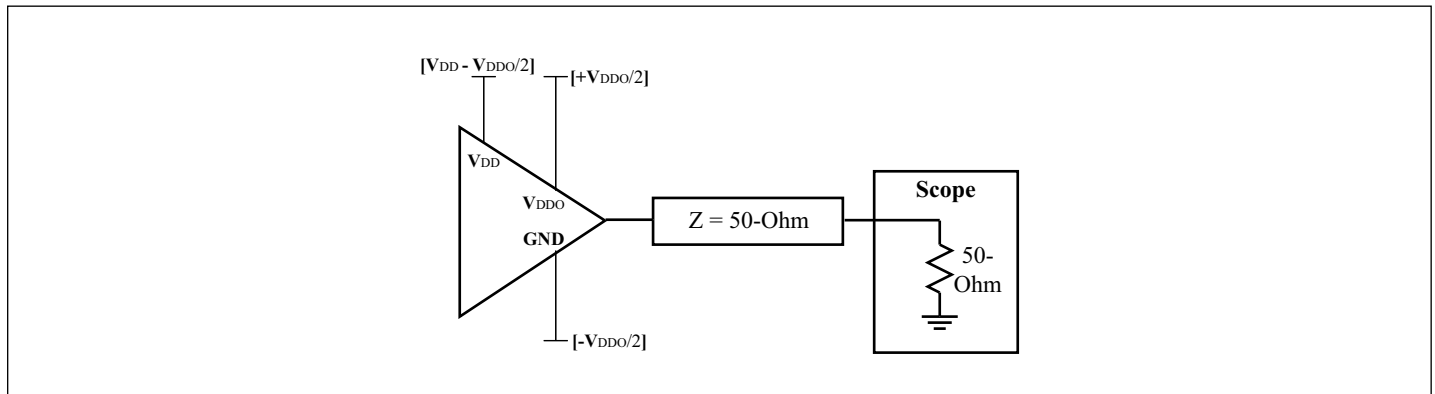
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|------------------|---|--------------------------------|------|------|------|-------|
| f _{MAX} | Output Frequency | VDDO = 3.3V | 4 | — | 250 | MHz |
| | | VDDO = 2.5V | 4 | — | 250 | |
| t _{pLH} | Propagation Delay, Low-to-High ⁽¹⁾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

Note:

Parameters measured at f_{MAX} unless otherwise noted.

1. Measured from VDD/2 of the input to VDDO/2 of the output.
2. Defined as skew between outputs at the same supply voltage and with equal load conditions. Measured at VDDO/2.
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.
4. Defined from 20% to 80%.
5. Measured at VDDO/2.

AC Test Circuit Load



AC Characteristics, VDD = 2.5V ± 5%, T_A = -40°C to 105°C

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------|---|-----------------------------|------|------|------|-------|
| f _{MAX} | Output Frequency | VDDO = 2.5V | 4 | — | 250 | MHz |
| t _{pLH} | Propagation Delay, Low-to-High ⁽¹⁾ | VDDO = 2.5V, f ≤ 250MHz | 1.5 | — | 2.8 | ns |
| t _{sk(o)} | Output Skew ⁽²⁾ | — | — | 25 | 75 | ps |
| t _{sk(pp)} | Part-to-Part Skew ⁽³⁾ | — | — | 250 | 800 | ps |
| t _R | Output Rise Time ⁽⁴⁾ | VDDO = 2.5V | 100 | 350 | 500 | ps |
| t _F | Output Fall Time ⁽⁴⁾ | VDDO = 2.5V | 100 | 350 | 500 | ps |
| odc | Output Duty Cycle ⁽⁵⁾ | f ≤ 133MHz | 48 | — | 52 | % |
| | | 133MHz < f ≤ 200MHz | 47 | — | 53 | % |
| | | 200MHz < f ≤ 250MHz | 42 | — | 58 | % |
| t _{jit} | Additive RMS Jitter | 156.25MHz (@12kHz to 20MHz) | — | 0.1 | — | ps |
| | | 125MHz (@12kHz to 20MHz) | — | 0.07 | — | ps |

Note:

Parameters measured at f_{MAX} unless otherwise noted.

1. Measured from VDD/2 of the input to VDDO/2 of the output.
2. Defined as skew between outputs at the same supply voltage and with equal load conditions. Measured at VDDO/2.
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.
4. Defined from 20% to 80%.
5. Measured at VDDO/2.

Part Marking



- YY: Year
- WW: Workweek
- 1st X: Assembly Code
- 2nd X: Fab Code

Packaging Mechanical: 8-SOIC (W)

| SYMBOLS | MIN. | NOM. | MAX. |
|----------------|----------|------|------|
| A | — | — | 1.75 |
| A1 | 0.10 | — | 0.25 |
| A2 | 1.25 | — | — |
| b | 0.31 | — | 0.51 |
| c | 0.10 | — | 0.25 |
| D | 4.80 | 4.90 | 5.00 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27 BSC | | |
| L | 0.40 | — | 1.27 |
| h | 0.25 | — | 0.50 |
| θ° | 0 | — | 8 |

NOTE:
 1. ALL DIMENSIONS ARE IN mm. ANGLES IN DEGREES
 2. DIMENSIONS EXCLUDE BURRS, MOLD FLASH OR PROTRUSIONS
 3. REFER JEDEC MS-012
 4. RECOMMENDED LAND PATTERN IS FOR REFERENCE ONLY.

20-1273

DIODES PERICOM
 INCORPORATED ENABLING SERIAL CONNECTIVITY

DATE: 06/02/20

DESCRIPTION: 8-Pin, 150mil-Wide, SOIC

PACKAGE CODE: W (W8)

DOCUMENT CONTROL #: PD-1001

REVISION: H

For latest package information:

See <http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/>.

Ordering Information

| Ordering Code | Package Code | Package Description |
|----------------|--------------|---------------------------|
| PI6C49CB02JWEX | W | 8-pin, 150mil-Wide (SOIC) |

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. J = Industrial Grade
5. E = Pb-free and Green
6. X suffix = Tape/Reel

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