A product Line of
Diodes Incorporated

PI6C49CB02Q

Automotive AEC-Q100 Qualified Low Skew, 1-To-2 LVCMOS / LVTTL Fanout Buffer

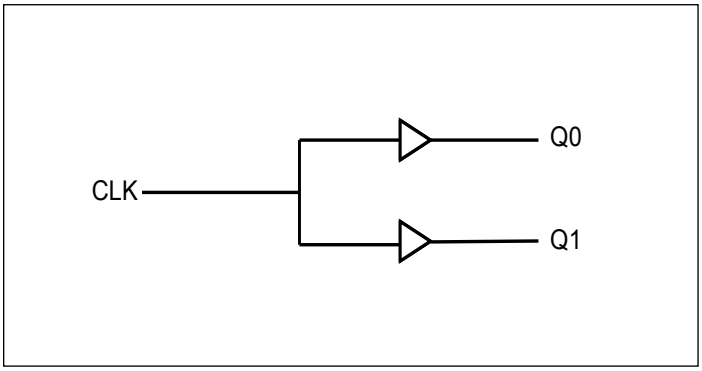
Features

- 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
- AEC-Q100 Qualified
- Automotive Grade 2 temperature range (-40 to 105 °C)
- Automotive Grade 3 temperature range (-40 to 85 °C)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free "Green" Device (Note 3)
- The PI6C49CB02Q is suitable for automotive applications requiring specific change control and is AEC-Q100 qualified, has a grade 2, -40 to 105 °C temperature rating and grade 3, -40 to 85 °C temperature rating, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.
- Package: 8-Pin, SOIC (W)

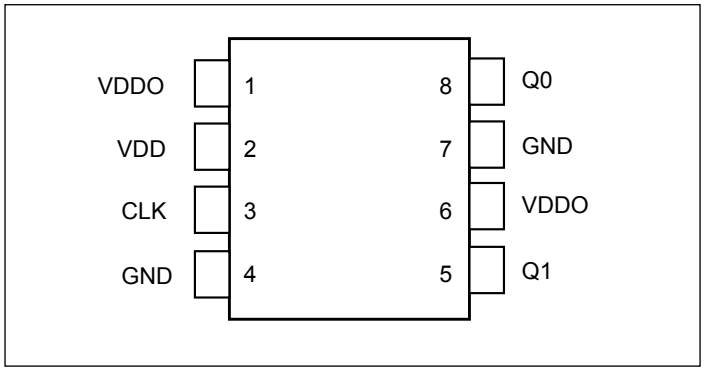
Description

The PI6C49CB02Q is an automotive qualified low skew, 1-to-2 LVCMOS/LVTTL High Performance Fanout Buffer. The PI6C49CB02Q has a single ended clock input. The single ended clock input accepts LVCMOS or LVTTL input levels. The PI6C49CB02Q features a pair of LVCMOS/LVTTL outputs. Guaranteed output and part-to-part skew characteristics make the PI6C49CB02Q ideal for clock distribution applications demanding well defined performance and repeatability.

Block Diagram



Pin Assignment



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.

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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	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.	Typ.	Max.	Units
C_N	Capacitance			4		pF
$R_{PULLDOWN}$	Input Pull-down Resistor			51		kΩ
R_{OUT}	Output Impedance		5	7	12	Ω

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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 (Automotive Grade 2)	-40		+105	°C
Ambient Operating Temperature (Automotive Grade 3)	-40		+85	°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°C to 85°C			5	mA
IDDO	Output Supply Current	Unloaded, 25 MHz, T_A = -40°C to 85°C			6.5	mA
IDD	Power Supply Current	T_A = -40°C to 105°C			5	mA
IDDO	Output Supply Current	Unloaded, 25 MHz, T_A = -40°C to 105°C			6.5	mA

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

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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

LVCMOS / LVTTL DC Characteristics, T_A = -40°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} = 3.465V			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

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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(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(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)	$f \leq$ 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

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

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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	
tp_{LH}	Propagation Delay, Low-to-High(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(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)	$f \leq$ 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

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

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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(1)	VDDO = 2.5V, $f \leq$ 250MHz	1.5		2.8	ns
tsk(o)	Output Skew(2)			25	75	ps
tsk(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)	$f \leq$ 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

Note:

Parameters measured at f_{MAX} unless otherwise noted.

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

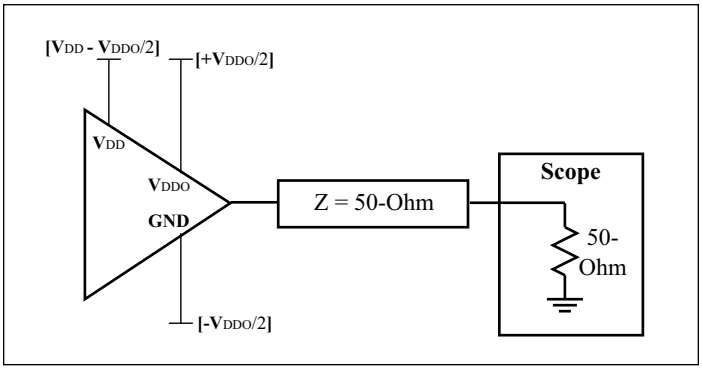
2. Defined as skew between outputs at the same supply voltage and with equal load conditions. Measured at VDDO /2.

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
tp_{LH}	Propagation Delay, Low-to-High(1)	VDDO = 2.5V, $f \leq$ 250MHz	1.5		2.8	ns
tsk(o)	Output Skew(2)			25	75	ps
tsk(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)	$f \leq$ 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

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%

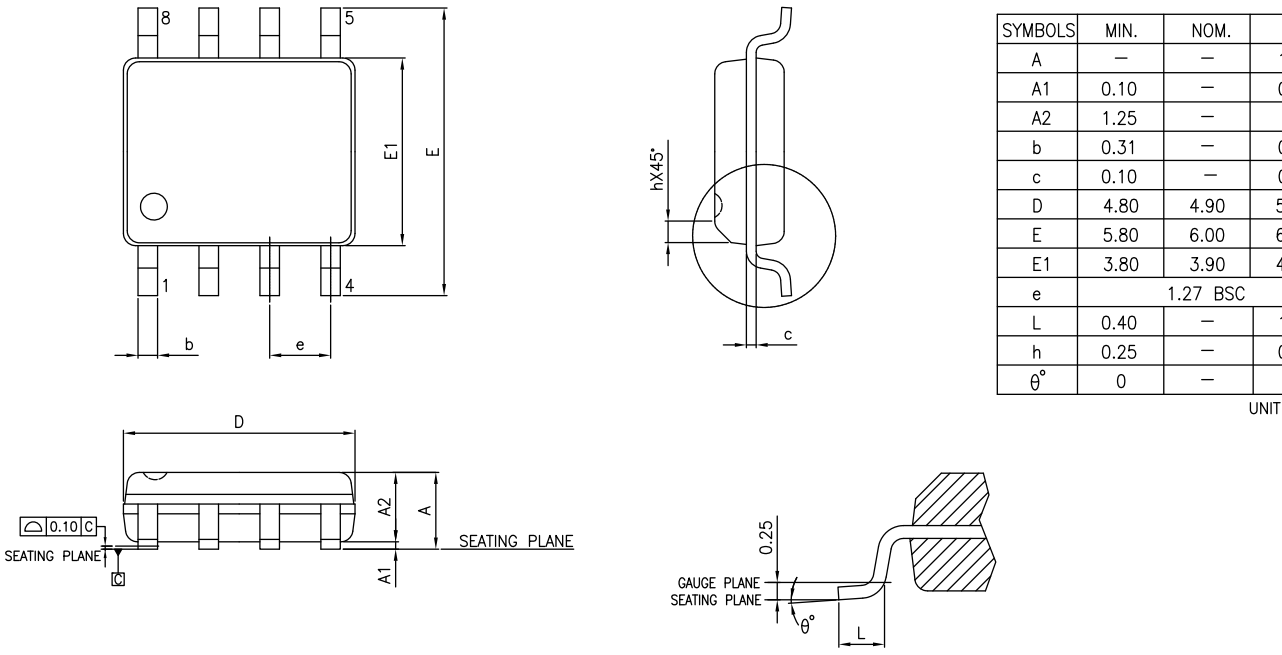
5. Measured at VDDO /2

Part Marking

PI6C49C
B02Q*WE
*YYWWXX̄

*: Die Rev (2 or 3)
YY: Year
WW: Workweek
1st X: Assembly Site Code
2nd X: Wafer Site 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

UNIT : mm

NOTE :
1. ALL DIMENSIONS ARE IN mm. ANGLES IN DEGREES
2. DIMENSIONS EXCLUDE BURRS, MOLD FLASH OR PROTRUSIONS
3. REFER JEDEC MS-012

PERICOM Enabling Serial Connectivity — DATE: 02/21/14

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

PACKAGE CODE: W (W8)

DOCUMENT CONTROL #: PD-1001 — REVISION: G

15-0103

For latest package info.
please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Package Code	Operating Temperature	Package Description
PI6C49CB02Q2WEX	W	-40 to 105°C	8-pin, 150mil-Wide (SOIC)
PI6C49CB02Q3WEX	W	-40 to 85°C	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. Q = Automotive Compliant
5. 2 and 3 = AEC-Q100 Grade Level
6. E = Pb-free and Green
7. X suffix = Tape/Reel

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