

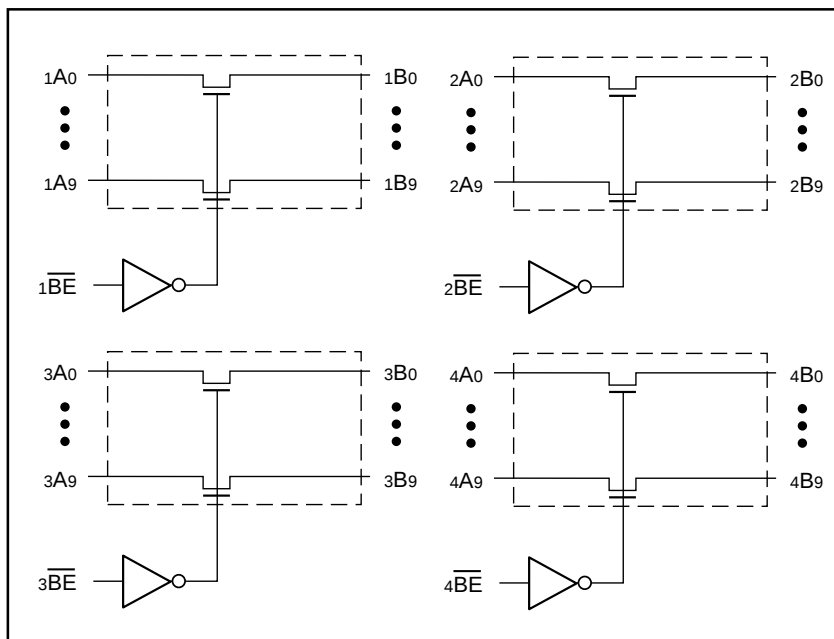
Product Features

- Near zero propagation delay
- 5ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2 μ A Typical) – Ideally suited for notebook applications
- Packages available:
– 96-pin Low Profile Fine Pitch Ball Grid Array (NB96)

Product Description

Pericom Semiconductor's PI5C series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

The PI5C34X461 is a 40-bit, 2-port bus switch designed with a low ON resistance (5ohm) allowing inputs to be connected directly to outputs. The bus switch creates no additional propagational delay or additional ground bounce noise. The switches are turned ON by the Bus Enable (BE) input signal.

Logic Block Diagram

Product Pin Description

Pin Name	Description
NA0 - NA9	Bus A
NB0 - NB9	Bus B
N $\overline{\text{BE}}$	Bus Enable Pins (Active LOW)
NGND	Ground
NV _{CC}	Power

Note: N = 1 through 4 for each set of 10 bit buses

Truth Table⁽¹⁾

Function	N $\overline{\text{BE}}$	A0-9
Disconnect	H	Hi-Z
Connect	L	B0-9

Note: 1. H = High Voltage Level
L = Low Voltage Level
Hi-Z = High Impedance

Product Pinout by Name

Name	Ball Pad	Name	Ball Pad	Name	Ball Pad	Name	Ball Pad
1A0	A3	2A0	E3	3A0	J3	4A0	N3
1B0	A5	2B0	E5	3B0	J5	4B0	N5
1A1	A2	2A1	E2	3A1	J2	4A1	N2
1B1	A6	2B1	E6	3B1	J6	4B1	N6
1A2	A1	2A2	E1	3A2	J1	4A2	N1
1B2	B5	2B2	F5	3B2	K5	4B2	P5
1A3	B2	2A3	F2	3A3	K2	4A3	P2
1B3	B6	2B3	F6	3B3	K6	4B3	P6
1A4	B1	2A4	F1	3A4	K1	4A4	P1
1B4	C5	2B4	G5	3B4	L5	4B4	R5
1A5	C2	2A5	G2	3A5	L2	4A5	R2
1B5	C6	2B5	G6	3B5	L6	4B5	R6
1A6	C1	2A6	G1	3A6	L1	4A6	R1
1B6	D5	2B6	H5	3B6	M5	4B6	T5
1A7	D2	2A7	H2	3A7	M2	4A7	T2
1B7	D6	2B7	H6	3B7	M6	4B7	T6
1A8	D1	2A8	H1	3A8	M1	4A8	T1
1B8	D4	2B8	H4	3B8	M4	4B8	T4
1A9	D3	2A9	H3	3A9	M3	4A9	T3
1B9	C4	2B9	G4	3B9	L4	4B9	R4
NC	B3	NC	F3	NC	K3	NC	P3
1 $\overline{\text{BE}}$	A4	2 $\overline{\text{BE}}$	E4	3 $\overline{\text{BE}}$	J4	4 $\overline{\text{BE}}$	N4
1VCC	B4	2VCC	F4	3VCC	K4	4VCC	P4
1GND	C3	2GND	G3	3GND	L3	4GND	R5

Product Pinout [LFBGA(N96) Package]

	1	2	3	4	5	6
A	1A2	1A1	1A0	1 $\overline{\text{BE}}$	1B0	1B1
B	1A4	1A3	NC	1VCC	1B2	1B3
C	1A6	1A5	1GND	1B9	1B4	1B5
D	1A8	1A7	1A9	1B8	1B6	1B7
E	2A2	2A1	2A0	2 $\overline{\text{BE}}$	2B0	2B1
F	2A4	2A3	NC	2VCC	2B2	2B3
G	2A6	2A5	2GND	2B9	2B4	2B5
H	2A8	2A7	2A9	2B8	2B6	2B7
J	3A2	3A1	3A0	3 $\overline{\text{BE}}$	3B0	3B1
K	3A4	3A3	NC	3VCC	3B2	3B3
L	3A6	3A5	3GND	3B9	3B4	3B5
M	3A8	3A7	3A9	3B8	3B6	3B7
N	4A2	4A1	4A0	4 $\overline{\text{BE}}$	4B0	4B1
P	4A4	4A3	NC	4VCC	4B2	4B3
R	4A6	4A5	4GND	4B9	4B4	4B5
T	4A8	4A7	4A9	4B8	4B6	4B7

Product Pin Assignment (Top View)

Maximum Ratings

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

Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	–40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V _{CC} Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120mA
Power Dissipation	0.5W

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.

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 5V ±5%)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
V _{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0			V
V _{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	–0.5		0.8	
I _{IH}	Input HIGH Current	V _{CC} = Max., V _{IN} = V _{CC}			±1	μA
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = GND			±1	
I _{OZH}	High Impedance Output Current	0 - A, B - V _{CC}			±1	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = –18mA		–0.7	–1.2	V
I _{OS}	Short Circuit Current ⁽³⁾	A (B) = 0V, B (A) = V _{CC}	100			mA
V _H	Input Hysteresis at Control Pins			150		mV
R _{ON}	Switch On Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = 48mA V _{CC} = Min., V _{IN} = 2.4V, I _{ON} = 15mA		5 10	7 15	ohm

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters ⁽⁵⁾	Description	Test Conditions	Typ	Max.	Units
C _{IN}	Input Capacitance	V _{IN} = 0V		6	pF
C _{OFF}	A/B Capacitance, Switch Off	V _{IN} = 0V		6	
C _{ON}	A/B Capacitance, Switch On	V _{IN} = 0V		8	

Notes:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 5.0V, T_A = 25°C ambient and maximum loading.
- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- Measured by the voltage drop between A and B pin at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (A,B) pins.
- This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

Parameters	Description	Test Conditions ⁽¹⁾		Min.	Typ ⁽²⁾	Max.	Units
I _{CC}	Quiescent Power Supply Current	V _{CC} = Max.	V _{IN} = GND or V _{CC}		0.1	10	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} = Max.	V _{IN} = 3.4V ⁽³⁾			2.5	mA
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	V _{CC} = Max., A and B Pins Open BE = GND Control Input Toggling 50% Duty Cycle				0.25	mA/ MHz

Notes:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V_{CC} = 5.0V, +25°C ambient.
- Per TTL driven input (V_{IN} = 3.4V, control inputs only); A and B pins do not contribute to I_{CC}.
- This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A and B inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

Switching Characteristics over Operating Range

Parameters	Description	Conditions ⁽¹⁾	PI5C34X461		Units
			Com.		
			Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) A _x to B _x , B _x to A _x	C _L = 50pF R _L = 500ohm		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time BE to A _x or B _x		1.5	6.5	
t _{PHZ} t _{PLZ}	Bus Disable Time BE to A _x or B _x		1.5	5.5	

Notes:

- See test circuit and waveforms.
- This parameter is guaranteed but not tested on Propagation Delays.
- The bus switch contributes no propagational delay other than the RC delay of the ON resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 50pF load. Since this time constant is much smaller than the rise/fall times of typical driving signals, it adds very little propagational delay to the system. Propagational delay of the bus switch when used in a system is determined by the driving circuit on the driving side of the switch and its interaction with the load on the driven side.

Ordering Information

Part	Pin - Package	Dimensions
PI5C34X461NB	96 - LFBGA (NB96)	5.5mm x 13.5mm
PI5C34X2461NB	96 - LFBGA (NB96)	5.5mm x 13.5mm

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