PI5C3307

## 2-Bit Bus Switch with Active High Enable

Product Features

- Near zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2μA typical)
  - Ideally suited for notebook applications
- Packages available:
 - 8-pin plastic SOIC (W)

Product Description

Pericom Semiconductor's PI5C series of logic circuits are produced using the Company's advanced sub-micron CMOS technology, achieving industry leading speed grades.

The PI5C3307 is a 2-bit digital switch designed with a fast enable. When enabled via the associated Bus Enable (BE) pin, the "A" pin is directly connected to the "B" pin. The bus switch introduces no additional propagation delay or additional ground bounce noise. The PI5C3307 device has an active HIGH enable.

PI5C3307 Logic Block Diagram
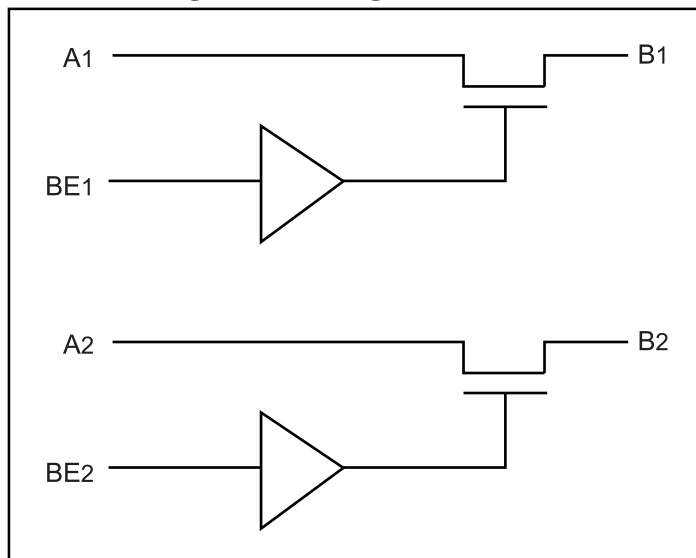
Product Pin Configuration
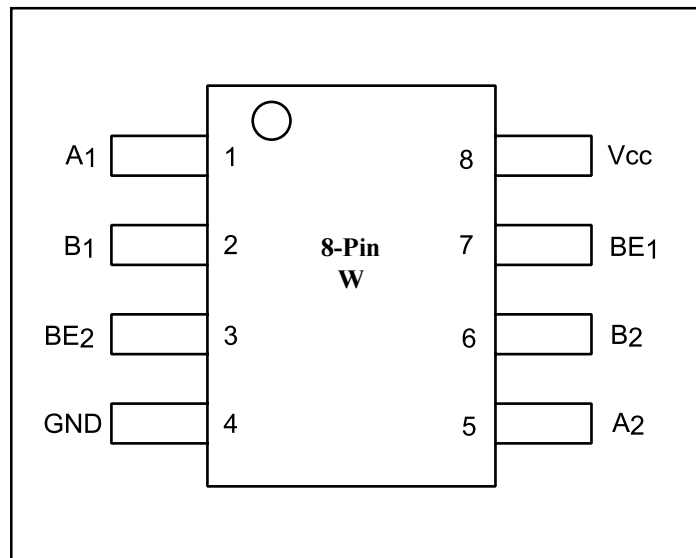
Truth Table[1]

BE	A	B	Vcc	Function
L	Hi-Z	Hi-Z	Vcc	Disconnect
H	B	A	Vcc	Connect

Notes:

1. H = High Voltage Level, L = Low Voltage Level
   Hi-Z = High Impedance, X = Don't Care

Product Pin Description

Pin Name	Description
BE_2 - BE_1	Switch Enable
A_2 - A_1	Bus A
B_2 - B_1	Bus B
Vcc	Power
GND	Ground

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 & Vcc 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 ± 10%)

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	
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND			±1	
I_{OZH}	High Impedance Output Current	V_{CC} = Max., V_{OUT} = 0V or V_{CC}			±1	µA
I_{OZL}	Low Impedance Output Current	V_{CC} = Max., V_{OUT} = 0V or V_{CC}			±1	
V_H	Input Hysteresis at Control Pins			300		mV
R_{ON}	Switch On Resistance[3]	V_{CC} = 4.5V, V_{IN} = 0.0V, I_{ON} = 30mA or 64mA		5	7	Ω
		V_{CC} = 4.5V, V_{IN} = 2.4V, I_{ON} = 15mA		10	15	
		V_{CC} = 4V, V_{IN} = 2.4V, I_{ON} = 15mA		14	20	

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3	pF
C_{OFF}	A/B Capacitance, Switch Off	V_{IN} = 0V	5	pF
C_{ON}	A/B Capacitance, Switch On	V_{IN} = 0V	10	pF

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 5.0V, T_A = 25°C ambient and maximum loading.
3. 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.
4. This parameter is determined by device characterization but is not production tested.

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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	3.0	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.4V[3]			2.5	mA

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at Vcc = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, control inputs only); A and B pins do not contribute to Icc.
4. 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]	PI5C3307				Units
			Vcc = 5V ± 10%		Vcc = 4V		
			Min.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay[2,3] A to B, B to A	C_L = 50pF R_L = 500Ω		0.25		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time		1.0	4.9		5.5	
t_{PHZ} t_{PLZ}	Bus Disable Time		1	4.2		4.5	

Notes:
1. See test circuit and waveforms.
2. This parameter is guaranteed but not tested on Propagation Delays.
3. 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 0.25 ns for 50 pF 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	Temperature
PI5C3307W	8 - SOIC (W8)	-40°C to +85°C

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