

2-Bit Bus Switch with Active Low Enables

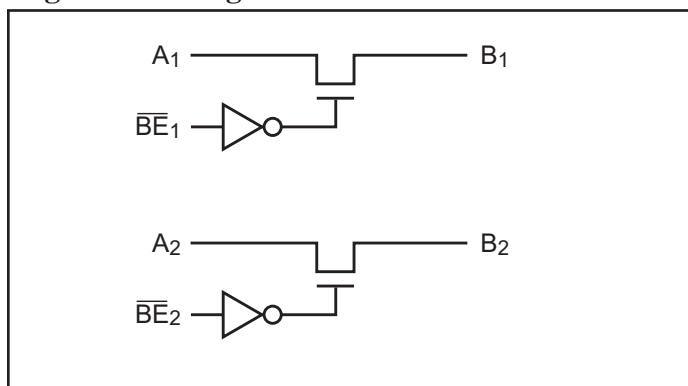
Features

- Near zero propagation delay
- 5-ohm 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 (Pb-free and Green available):
– 8-pin, 173-mil wide plastic TSSOP (L)
– 8-pin, 118-mil wide plastic MSOP (U)

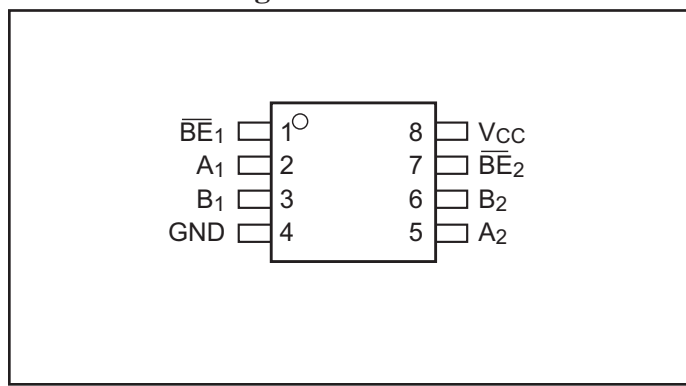
Description

The PI5C3306 is a 2-bit bus switch designed with two 5-ohm bus switches with fast individual enables. When enabled via the associated Bus Enable (BE) pin, the “A” pin is directly connected to the “B” pin for that particular gate. The bus switch introduces no additional propagation delay or additional ground bounce noise. The PI5C3306 device has active LOW enables.

Logic Block Diagram



Product Pin Configuration



Pin Description

Pin Name	Description
\overline{BE}_n	Switch Enable
A ₂ -A ₁	Bus A
B ₂ -B ₁	Bus B
V _{CC}	Power
GND	Ground

Truth Table ⁽¹⁾

\overline{BE}_n	A _n	B _n	V _{CC}	Function
X*	Hi-Z	Hi-Z	GND	Disconnect
H	Hi-Z	Hi-Z	V _{CC}	Disconnect
L	B _n	A _n	V _{CC}	Connect

Notes:

1. H=High Voltage Level, L=Low Voltage Level
Hi-Z=High Impedance, X=Don't Care
- * A pull-up resistor should be provided for power-up protection.

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	–0.5V to +4.6V
DC Input Voltage	–0.5V to +5.5V
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 Operating Range, $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 5.0\text{V} \pm 10\%$)

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	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			± 1	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			± 1	
I_{OZ}	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			± 1	
V_H	Input Hysteresis at Control Pins			300		mV
R_{ON}	Switch on Resistance ⁽³⁾	$V_{CC} = 4.5\text{V}, V_{IN} = 0.0\text{V}, I_{ON} = 30\text{mA}$ or 64mA		5	7	Ω
		$V_{CC} = 4.5\text{V}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	15	

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 5.0\text{V}$, $T_A = 25^{\circ}\text{C}$ ambient and maximum loading.
- 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.

Capacitance ($T_A = 25^{\circ}\text{C}$, $f = 1\text{ MHz}$)

Parameters ⁽¹⁾	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	3	pF
C_{OFF}	A/B Capacitance, Switch Off		5	
C_{ON}	A/B Capacitance, Switch On		10	

Notes:

- 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	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND}$ or V_{CC}		0.1	3.0	μA
ΔI_{CC}	Quiescent Current per Input HIGH		$V_{IN} = 3.4\text{V}^{(3)}$			2.5	mA

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at $V_{CC} = 5.0\text{V}$, $+25^{\circ}\text{C}$ ambient.
- Per TTL driven input ($V_{IN} = 3.4\text{V}$, control inputs only); A and B pins do not contribute to I_{CC} .

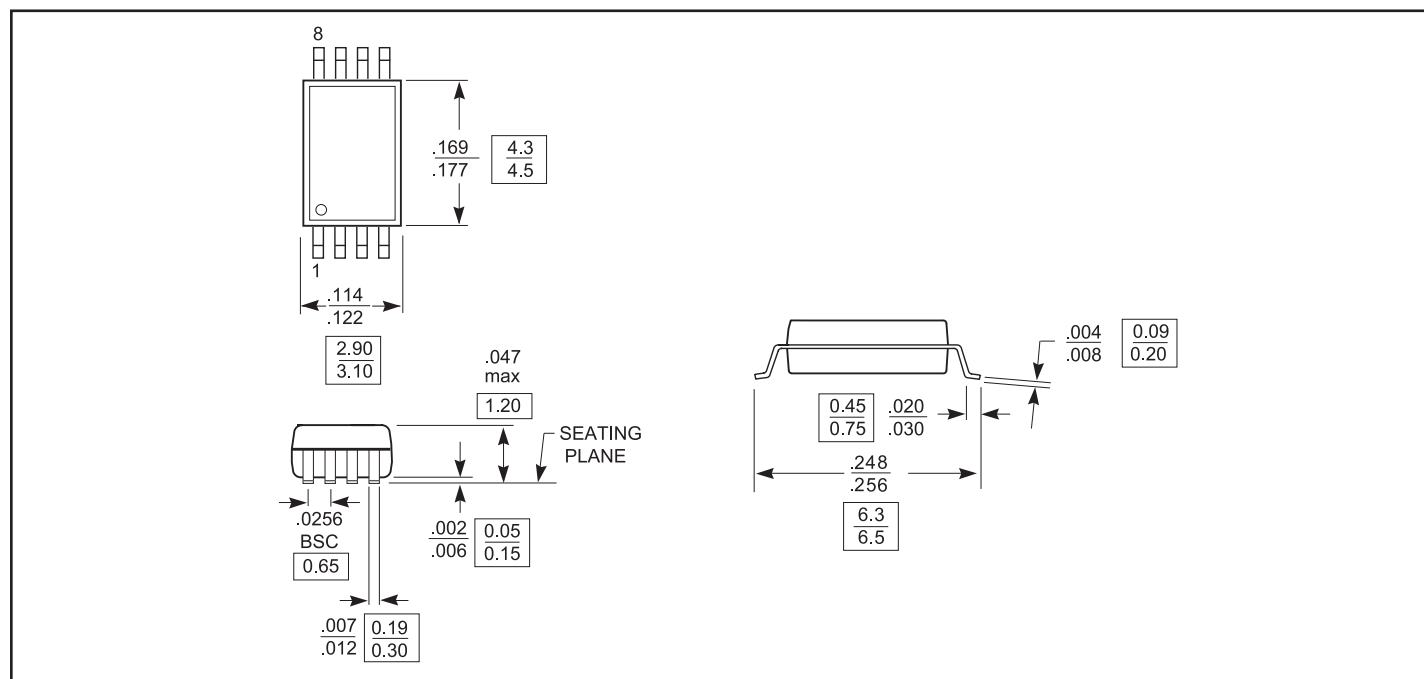
Switching Characteristics over Operating Range

Parameters	Description	Conditions	PI5C3306				Units
			V _{CC} = 5V ±10%		V _{CC} = 4V		
			Min.	Max.	Min.	Max.	
t _{PLH} t _{PHL}	Propogation Delay ^(1,2) 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		1.0	4.2		4.5	

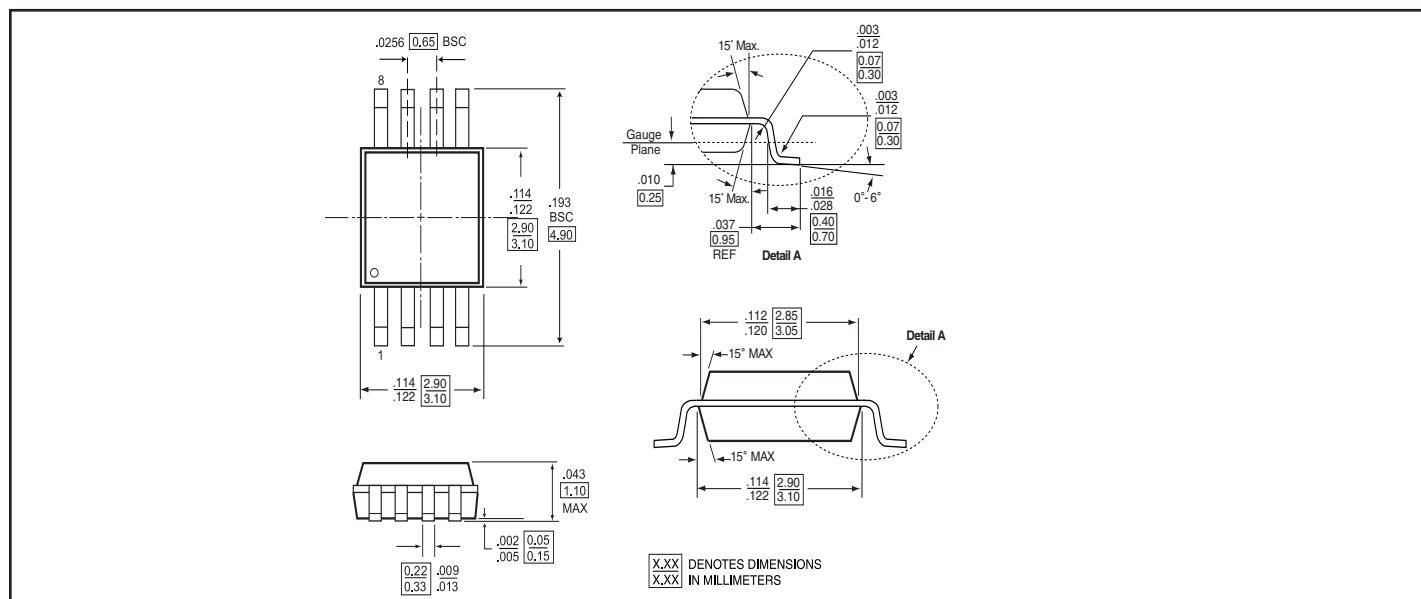
Notes:

1. This parameter is guaranteed but not tested on Propagation Delays.
2. 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.

Packaging Mechanical: 8-pin TSSOP (L)



Packaging Mechanical: 8-pin MSOP (U)



Ordering Information

Ordering Code	Packaging Code	Package Description
PI5C3306L	L	8-pin TSSOP
PI5C3306LE	L	Pb-free & Green, 8-pin TSSOP
PI5C3306UX	U	8-pin MSOP Tape/Reel

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel