

**3.3V, Hot Insertion, 4-Bit,  
2-Port Bus Switch  
with Individual Enables**

**Product Features**

- Near zero propagation delay
- 5 Ohm switches connect inputs to outputs
- Fast Switching Speed - 4ns max.
- Permits Hot Insertion
- Ultra Low Quiescent Power (0.1µA Typical)
  - Ideally suited for notebook applications
- Packages available:
  - 14-pin 150 mil wide plastic SOIC (W)
  - 14-pin 170 mil wide plastic TSSOP (L)
  - 16-pin 150 mil wide plastic QSOP (Q)

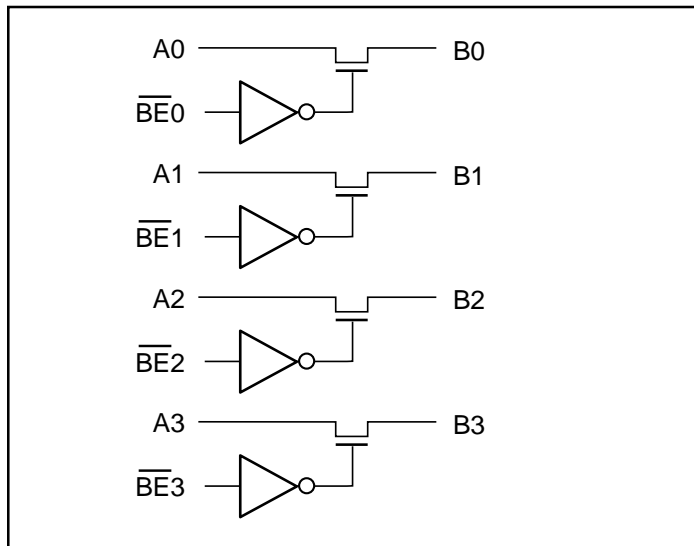
**Product Description**

Pericom Semiconductor’s PI3B series of logic circuits are produced using the Company’s advanced sub micron CMOS technology, achieving industry leading speed grades.

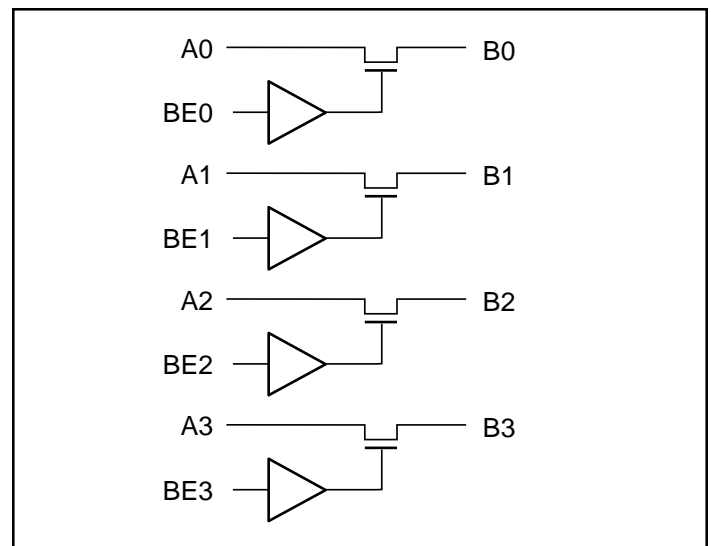
The PI3B3125 and PI3B3126 are 3.3 Volt, 4-bit bus switches designed with four individual 50hm bus switches with fast individual enables in an industry standard 74XX125/126 pinout. When enabled via the associated Bus Enable ( $\overline{BE}$ ) pin, the “A” pin is directly connected to the “B” pin for that particular gate. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI3B3125 device has active LOW enables, and the PI3B3126 has active HIGH enables.

**PI3B3125 Logic Block Diagram**



**PI3B3126 Logic Block Diagram**



### Maximum Ratings

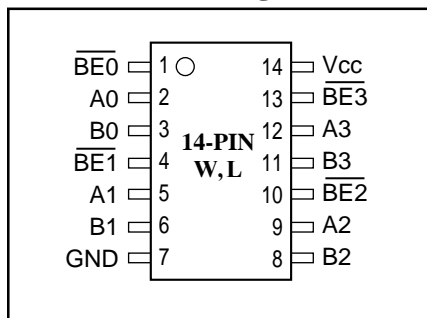
(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature .....	-65°C to +150°C
Ambient Temperature with Power Applied .....	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V <sub>CC</sub> Only) ...	-0.5V to +4.6V
Supply Voltage to Ground Potential (Outputs & D/O Only) .	-0.5V to +4.6V
DC Input Voltage .....	-0.5V to +4.6V
DC Output Current .....	120mA
Power Dissipation .....	0.5W

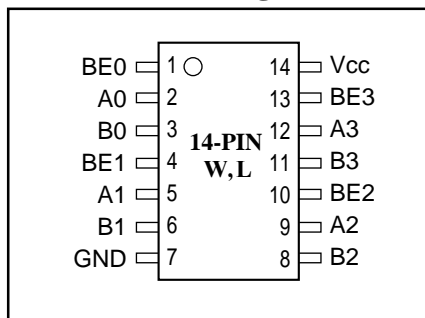
**Note:**

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.

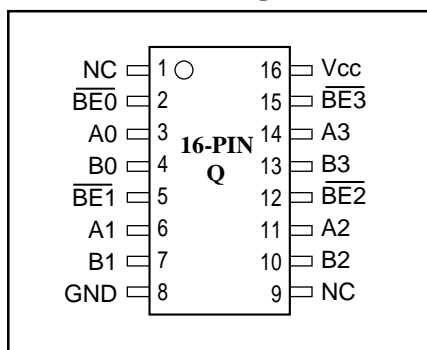
### PI3B3125 14-Pin Product Pin Configuration



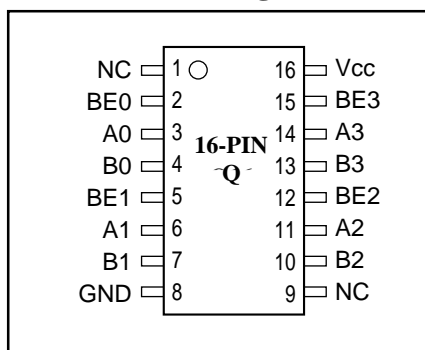
### PI3B3126 14-Pin Product Pin Configuration



### PI3B3125 16-Pin Product Pin Configuration



### PI3B3126 16-Pin Product Pin Configuration



### Product Pin Description

Pin Name	Description
$\overline{BEn}$	Switch Enable (PI3B3125)
BEn	Switch Enable (PI3B3126)
A3-A0	Bus A
B3-B0	Bus B
V <sub>CC</sub>	Power
GND	Ground

### Truth Table<sup>(1)</sup>

PI3B3125 BEn	PI3B3126 BEn	An	Bn	Vcc	Function
X*	X	Hi-Z	Hi-Z	GND	Disconnect
H	L	Hi-Z	Hi-Z	V <sub>CC</sub>	Disconnect
L	H	Bn	An	V <sub>CC</sub>	Connect

**Notes:**

- H = High Voltage Level, L = Low Voltage Level  
 HI-Z = High Impedance, X = Dont Care
- \* A pull-up resistor should be provided for power-up protection.

**DC Electrical Characteristics** (Over the Operating Range,  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V} \pm 10\%$ )

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	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	V
$I_{IH}$	Input HIGH Current	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			$\pm 1$	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	$\mu\text{A}$
$I_{OFF}$	Off Current	$V_{CC} = 0, V_{OUT} = 3$ to $3.6\text{V}$			10	$\mu\text{A}$
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$			-1.2	V
$R_{ON}$	Switch On Resistance <sup>(3)</sup>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$ or $60\text{mA}$		5	8	$\Omega$
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	17	

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

Parameters <sup>(4)</sup>	Description	Test Conditions	Typ.	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	3.5	pF
$C_{OFF}$	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	8	pF

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^\circ\text{C}$  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.
- This parameter is determined by device characterization but is not production tested.

**Power Supply Characteristics**

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND}$ or $V_{CC}$		0.1	3	$\mu\text{A}$
$\Delta I_{CC}$	Supply Current per Input HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.0\text{V}$ <sup>(3)</sup>			750	$\mu\text{A}$

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at  $V_{CC} = 3.3\text{V}$ ,  $+25^\circ\text{C}$  ambient.
- Per driven input (control inputs only); A and B pins do not contribute to  $I_{CC}$ .

**PI3B3125 Switching Characteristics over Operating Range**

Parameters	Description	Conditions <sup>(1)</sup>	PI3B3125		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx, Bx to Ax	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time	C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω,	1.0	3.0	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time	R = 500Ω	1.0	4.0	ns

**PI3B3126 Switching Characteristics over Operating Range**

Parameters	Description	Conditions <sup>(1)</sup>	PI3B3125		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx, Bx to Ax	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time	C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω,	1.0	2.5	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time	R = 500Ω	1.0	4.0	ns

**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 0.25ns 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 Number	Pin / Package	Temperature
PI3B3125Q	16-QSOP (Q)	-40°C to +85°C
PI3B3125W	14-SOIC (W)	-40°C to +85°C
PI3B3125L	14-TSSOP (L)	-40°C to +85°C
PI3B3126Q	16-QSOP (Q)	-40°C to +85°C
PI3B3126W	14-SOIC (W)	-40°C to +85°C
PI3B3126L	14-TSSOP (L)	-40°C to +85°C