PERICOM

PI2B3125
PI2B3126

2.5V, Hot Insertion, 4-Bit, 2-Port Bus Switch with Individual Enables

Product Features

- Near zero propagation delay
- Fast Switching Speed - 3.5ns max.
- Permits Hot Insertion
- Ultra Low Quiescent Power (10µA max.)
  – 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)

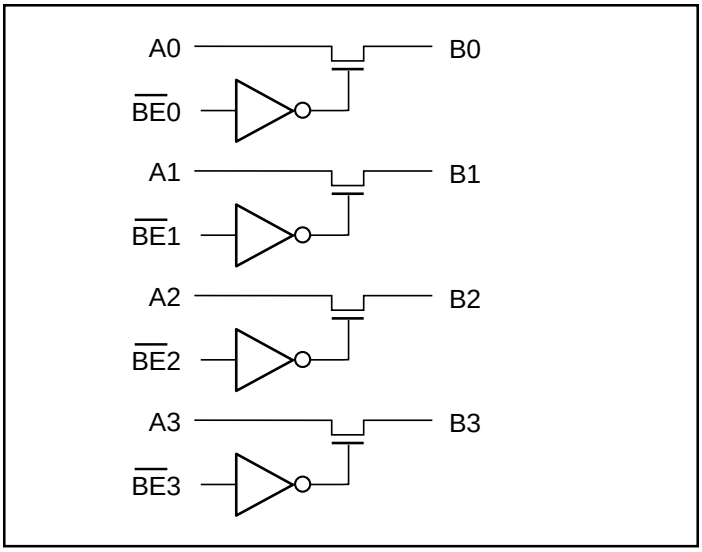
Product Description

Pericom Semiconductor's PI2B series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading speed grades.

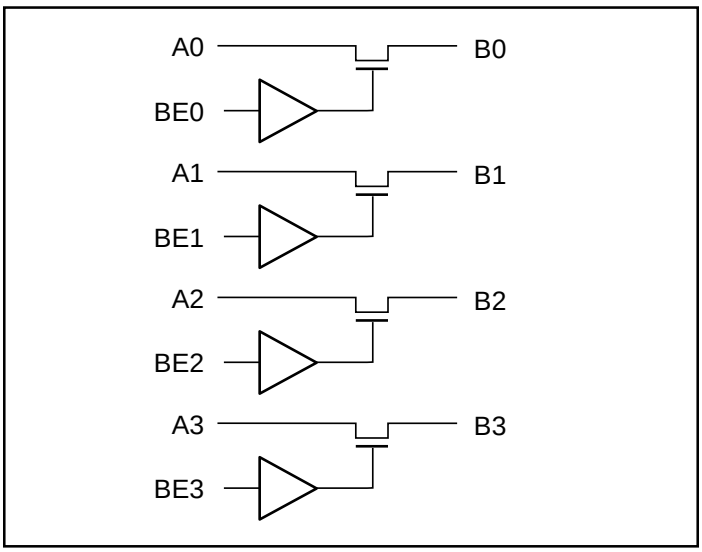
The PI2B3125 and PI2B3126 are 2.5-Volt, 4-bit bus switches designed with four individual bus switches with fast individual enables in an industry standard 74XX125/126 pinout. When enabled via the associated Bus Enable ($\overline{BE}$) pin, the "A" pin is directly connected to the "B" pin for that particular gate. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI2B3125 device has active LOW enables, and the PI2B3126 has active HIGH enables.

PI2B3125 Logic Block Diagram



PI2B3126 Logic Block Diagram



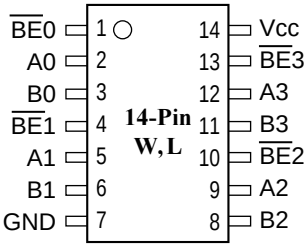
Maximum Ratings

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

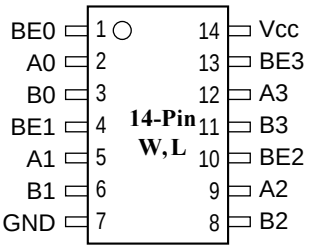
Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	–40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V_{CC} Only)	–0.5V to +4.6V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +4.6V
DC Input Voltage	–0.5V to +4.6V
DC Output Current	120mA
Power Dissipation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

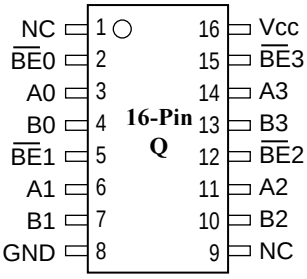
PI2B3125 14-Pin Product Pin Configuration



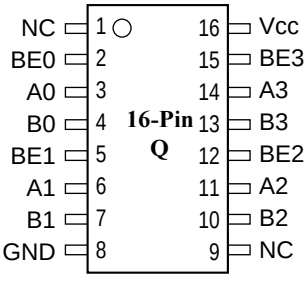
PI2B3126 14-Pin Product Pin Configuration



PI2B3125 16-Pin Product Pin Configuration



PI2B3126 16-Pin Product Pin Configuration



Product Pin Description

Pin Name	Description
$\overline{BE}$n	Switch Enable (PI2B3125)
BEn	Switch Enable (PI2B3126)
A3-A0	Bus A
B3-B0	Bus B
VCC	Power
GND	Ground

Truth Table(1)

PI2B3125 $\overline{BE}$n	PI2B3125 BEn	An	Bn	V_{CC}	Function
X*	X	Hi-Z	Hi-Z	GND	Disconnect
H	L	Hi-Z	Hi-Z	V_{CC}	Disconnect
L	H	Bn	An	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.

DC Electrical Characteristics (Over the Operating Range, $T_A = –40°C$ to $+85°C$, $V_{CC} = 2.3V$ to $2.7V$)

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	1.6			V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	–0.3		0.8	V
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	$0 \le A, B \le V_{CC}$			±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA			–1.2	V
ON	Switch ON Resistance(3)	V_{CC} = Min., Vi_{IN} = 0.0V, I_{ON} = 64mA		5	8	Ω
		V_{CC} = Min., V_{IN} = 1.6V, I_{ON} = 15mA		13	20	

Capacitance ($T_A = 25°C$, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typical	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	4.0	pF
C_{OFF}	A/B Capacitance, Switch Off			

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 2.5V$, $T_A = 25°C$ 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.

Power Supply Characteristics

Parameters	Description	Test Conditions		Min.	Typ.	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}			10	µA
ΔI_{CC}	Supply Current per Input HIGH		V_{IN} = 2.1V[3]		1.9	300	

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at $V_{CC} = 2.5V$, +25°C ambient.
3. Per driven input (control inputs only); A and B pins do not contribute to I_{CC}.

Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	Com.		Units
			Max.	Min.	
t_{PLH} t_{PHL}	Propagation Delay[2,3] Ax to Bx, Bx to Ax	C_L = 50pF, R_L = 500 ohms		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time BE or $\overline{BE}$ to Ax or Bx	C_L = 50pF, R_L = 500 ohms, R = 500 ohms	1	4.5	
t_{PHZ} t_{PLZ}	Bus Disable Time BE or $\overline{BE}$ to Ax or Bx		1	5.0	

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.

Applications Information

Logic Inputs

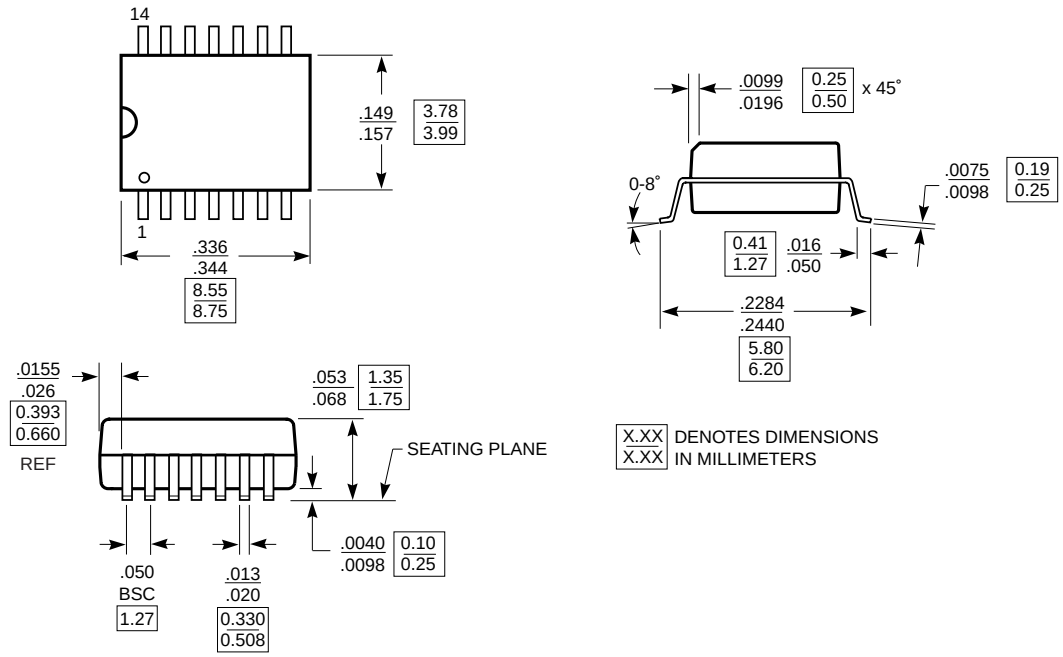
The logic control inputs can be driven up to +2.7V regardless of the supply voltage. For example, given a +2.5V supply, Bus Enable (BE or $\overline{BE}$) may be driven low to 0V and high to 2.7V. Driving BE or $\overline{BE}$ Rail-to-Rail® minimizes power consumption.

Power-Supply Sequencing

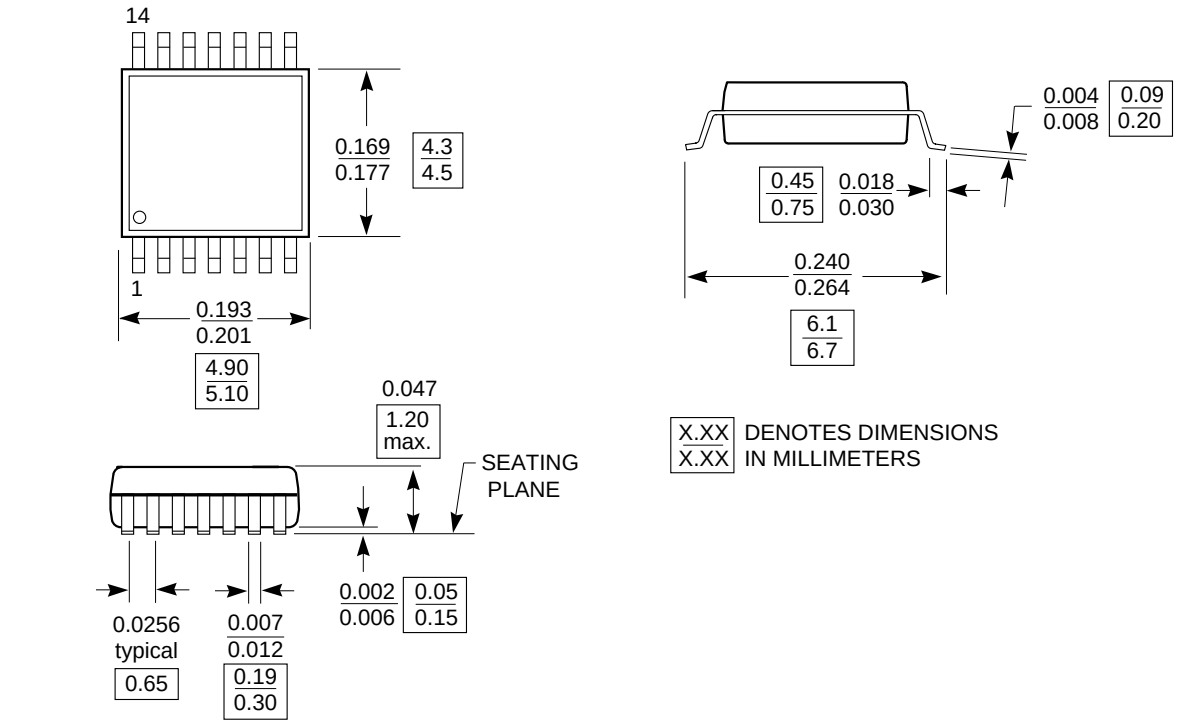
Proper power-supply sequencing is advised for all CMOS devices. It is recommended to always apply Vcc before applying signals to the input/output or control pins.

Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd.

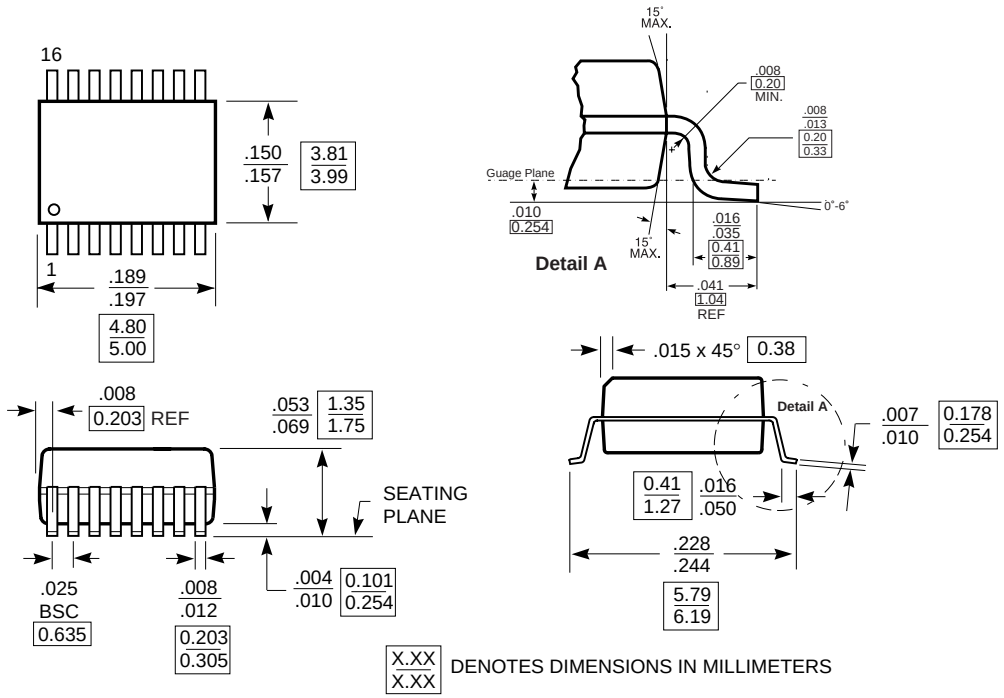
14-pin SOIC (W) Package



14-pin TSSOP (L) Package



16-pin QSOP (Q) Package



Ordering Information

Part Number	Pin / Package	Temperature
PI2B3125Q	16-QSOP (Q)	–40°C to +85°C
PI2B3125W	14-SOIC (W)	–40°C to +85°C
PI2B3125L	14-TSSOP (L)	–40°C to +85°C
PI2B3126Q	16-QSOP (Q)	–40°C to +85°C
PI2B3126W	14-SOIC (W)	–40°C to +85°C
PI2B3126L	14-TSSOP (L)	–40°C to +85°C