



3.3V, Hot Insertion, 16-Bit, 4-Port BusSwitch

**Product Features**

- Near-zero propagation delay
- 5Ω switches connect inputs to outputs when enabled
- Fast Switching Speed - 4ns max.
- Permits Hot Insertion
- Pin compatible with 74 series 16244
- Operating Vcc: 3.0V to 3.6V
- Industrial operating temperature: -40°C to +85°C
- Packages available:
  - 48-pin 240 mil wide thin plastic TSSOP (A)
  - 48-pin 300 mil wide plastic SSOP (V)

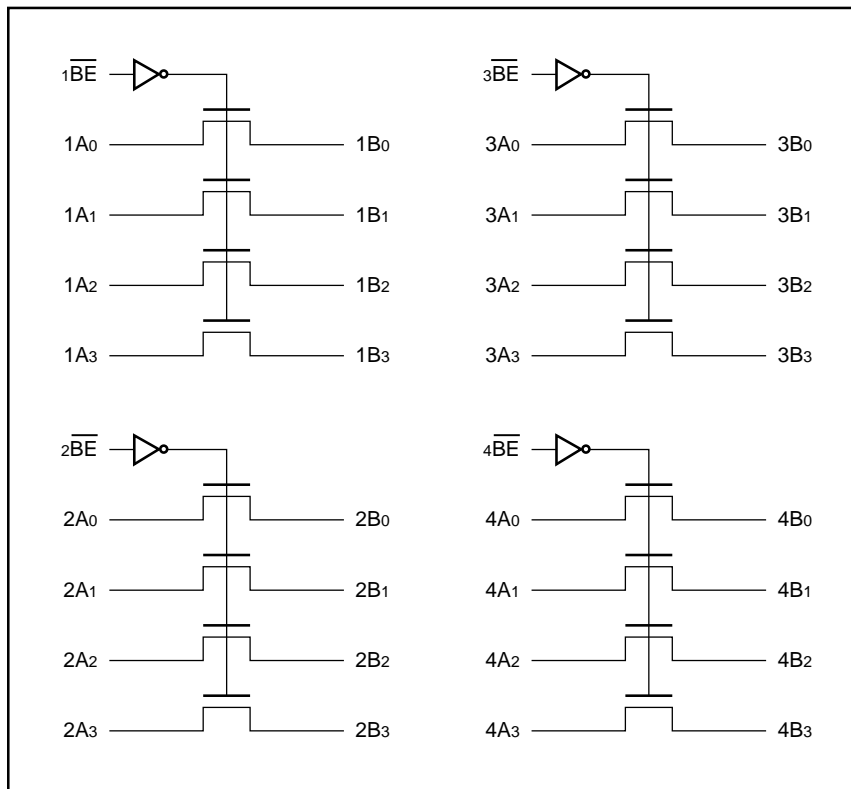
**Product Description**

Pericom Semiconductor's PI3B series of logic circuits are produced using the Company's advanced 0.35 micron CMOS technology.

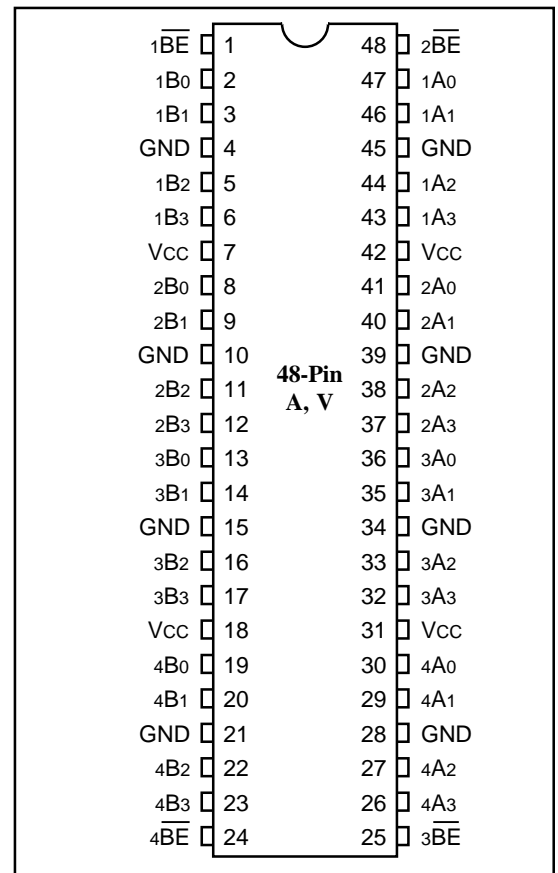
The PI3B16244 and PI3B162244 are 16-bit, 4-port bus switches that are pin compatible with the 74 series 16244 16-bit driver. Four enable signals (nBE) turn the switches on similar to the enable signals of the 16244. The bus switches create no additional propagation delay or ground bounce noise.

The PI3B162244 device has a built-in 25-ohm series resistor to reduce noise because of reflections, thus eliminating the need for an external terminating resistor.

**Logic Block Diagram**



**Product Pin Configuration**



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

Function	nBE	nA0-7
Disconnect	H	Hi-Z
Connect	L	nB0-7

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

**Product Pin Description**

Pin Name	I/O	Description
nBE	I	Bus Output Enable (Active LOW)
nA0-nA7	I/O	Bus A
nB0-nB7	I/O	Bus B

**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 Range .....	-0.5V to +4.6V
DC Input Voltage .....	-0.5V to +4.6V
DC Output Current .....	120 mA
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,  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$ ,  $V_{CC} = 3.0\text{V}$  to  $3.6\text{V}$ )

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	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	$\mu\text{A}$
$I_{OZH}$	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			$\pm 1$	$\mu\text{A}$
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$		-0.7	-1.2	V
$R_{ON}$	Switch On Resistance <sup>(3)</sup>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V},$	16244	5	8	$\Omega$
		$I_{ON} = 48\text{mA}$	162244	20	28	
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V},$	16244	10	15	$\Omega$
		$I_{ON} = 15\text{mA}$	162244	20	35	

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

Parameters <sup>(4)</sup>	Description	Test Conditions	Typ.	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	3.0	pF
$C_{OFF}$	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	8.5	
$C_{ON}$	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	17.0	

**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 <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>	—		10	μA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.0V <sup>(3)</sup>	—	—	750	μA
I <sub>CCD</sub>	Supply Current per Input per MHz <sup>(4)</sup>	V <sub>CC</sub> = Max., A and B Pins Open Control Input Toggling 50% Duty Cycle		—	—	0.25	mA/ MHz

#### Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V<sub>CC</sub> = 3.3V, +25°C ambient.
3. Per TTL driven input (control inputs only); A and B pins do not contribute to I<sub>CC</sub>.
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.

### PI3B16244 Switching Characteristics over Operating Range

Parameters	Description	Conditions <sup>(1)</sup>		Com.		Units
				Min.	Max.	
t <sub>PLH</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx, Bx to Ax	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω	16244		0.25	ns
t <sub>PHL</sub>			162244		1.25	
t <sub>PZH</sub>	Bus Enable Time BE to Ax or Bx	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω,		1	4.5	
t <sub>PZL</sub>				1	5.0	
t <sub>PHZ</sub>	Bus Disable Time BE to Ax or Bx	R = 500Ω		1	5.0	
t <sub>PLZ</sub>						

#### 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.