

## 16-Bit BusSwitch

### Product Features:

- Near-zero propagation delay
- 5Ω switches connect inputs to outputs when enabled
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2 μA typical)
  - Ideally suited for notebook applications
- Pin compatible with 74 series16244
- 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)
  - 48-pin 150 mil wide plastic BQSOP (B)

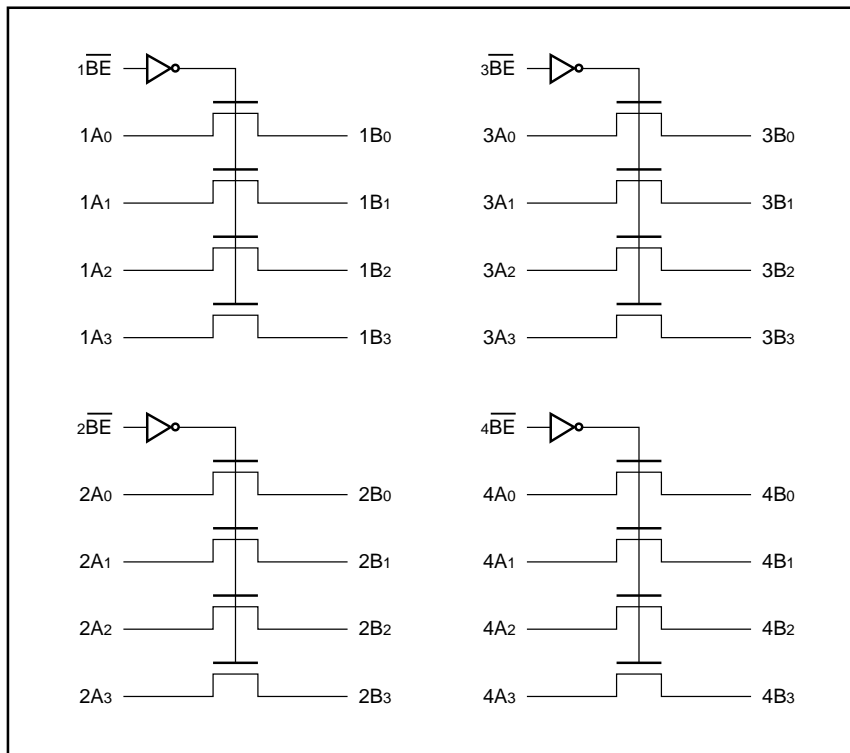
### Product Description:

Pericom Semiconductor's PI5C series of logic circuits are produced in the Company's advanced 0.6 micron CMOS technology.

The PI5C16244 and PI5C162244 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 switch creates no additional propagation delay or ground bounce noise.

The PI5C162244 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

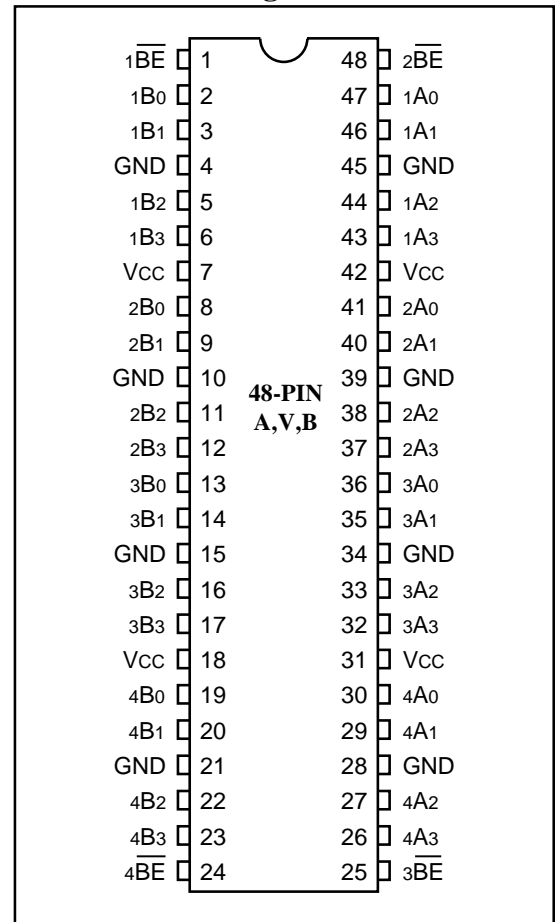


### Truth Table<sup>(1)</sup>

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 Configuration



### 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 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 .....	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  $+85^\circ\text{C}$ ,  $V_{CC} = 5V \pm 10\%$ )

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	Max.	Units	
V <sub>IH</sub>	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0	—	—	V	
V <sub>IL</sub>	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5	—	0.8	V	
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>	—	—	±1	µA	
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND	—	—	±1	µA	
I <sub>OZH</sub>	High Impedance Output Current	0 ≤ A, B ≤ V <sub>CC</sub>	—	—	±1	µA	
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18 mA	—	-0.7	-1.2	V	
I <sub>OS</sub>	Short Circuit Current <sup>(3)</sup>	A (B) = 0V, B (A) = V <sub>CC</sub>	100	—	—	mA	
V <sub>H</sub>	Input Hysteresis at Control Pins		—	150	—	mV	
R <sub>ON</sub>	Switch On Resistance <sup>(4)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V, I <sub>ON</sub> = 48 mA	16244	—	5	7	Ω
			162244	20	28	40	
		V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 15 mA	16244	—	10	15	Ω
			162244	20	35	48	

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

Parameters <sup>(5)</sup>	Description	Test Conditions	Typ.	Max.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	—	6	pF
C <sub>OFF</sub>	A/B Capacitance, Switch Off	V <sub>IN</sub> = 0V	—	6	pF
C <sub>ON</sub>	A/B Capacitance, Switch On	V <sub>IN</sub> = 0V	—	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<sub>CC</sub> = 5.0V, T<sub>A</sub> = 25°C ambient and maximum loading.
- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- 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>	—	0.1	3.0	μA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.4V <sup>(3)</sup>	—	—	2.5	mA
I <sub>CCD</sub>	Supply Current per Input per MHz <sup>(4)</sup>	V <sub>CC</sub> = Max., A and B Pins Open nBE = GND Control Input Toggling 50% Duty Cycle		—	—	0.25	mA/ MHz

#### Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V<sub>CC</sub> = 5.0V, +25°C ambient.
- Per TTL driven input (V<sub>IN</sub> = 3.4V, control inputs only); A and B pins do not contribute to I<sub>CC</sub>.
- 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.

### PI5C16244 Switching Characteristics over Operating Range

Parameters	Description	Conditions <sup>(1)</sup>	PI5C16244		Unit
			Com.		
			Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> xAX to xBx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω	—	0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time xBE to xAx or xBx		1.5	5.6	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time xBE to xAx or xBx		1.5	5.2	ns

### PI5C162244 Switching Characteristics over Operating Range

Parameters	Description	Conditions <sup>(1)</sup>	PI5C162244		Unit
			Com.		
			Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> xAX to xBx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω	—	1.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time xBE to xAx or xBx		1.5	5.6	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time xBE to xAx or xBx		1.5	5.2	ns

#### Notes:

- See test circuit and wave forms.
- This parameter is guaranteed but not tested on Propagation Delays.
- 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.