



**PI3B16245
PI3B162245 (25Ω)**

**3.3V, Hot Insertion,
16-Bit, 2-Port BusSwitch**

Product Features:

- Near-zero propagation delay
- 5Ω switches connect inputs to outputs
- Fast Switching Speed - 4ns max.
- Permits Hot Insertion
- Pin compatible with 74 series 16245
- Operating Vcc Range: 2.3V to 3.6V
- Industrial operating temperature: -40°C to +85°C
- Packages available:
 - 48-pin 240 mil wide thin plastic TSSOP (A48)
 - 48-pin 300 mil wide plastic SSOP (V48)

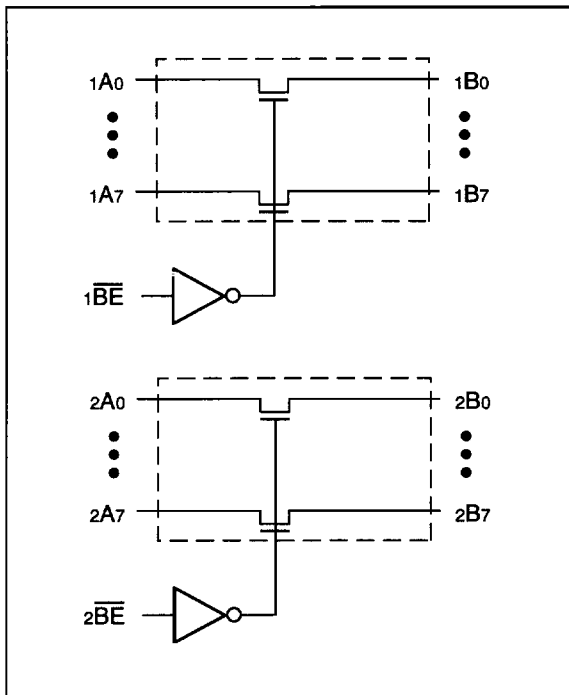
Product Description:

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

The PI3B16245 and PI3B162245 are 3.3 volt 16-bit, 2-port bus switches that are pin compatible with the 74 series 16245 16-bit transceiver. Two enable signals (\overline{nBE}) turn the switches on similar to the enable signals of the 16245. The bus switch creates no additional propagational delay or additional ground bounce noise.

The PI3B162245 device has a built-in 25-ohm series resistor to reduce noise due to reflections, thus eliminating the need for an external terminating resistor.

Logic Block Diagram

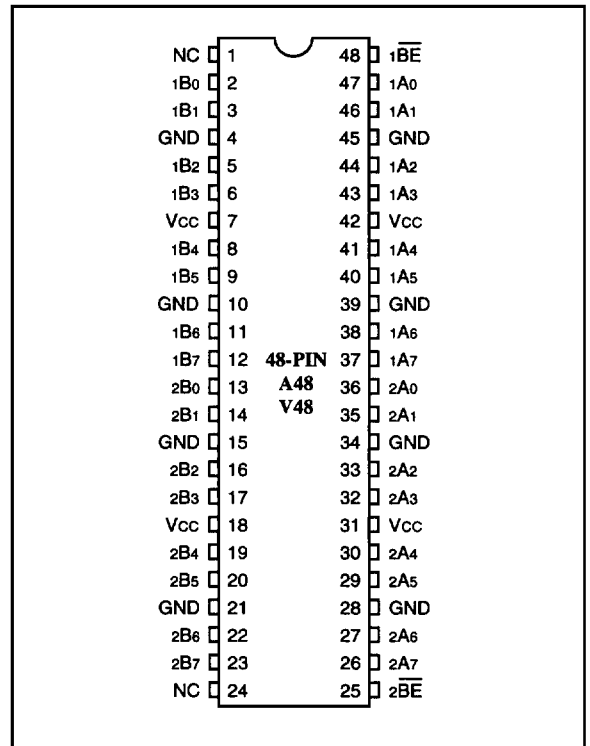


Truth Table⁽¹⁾

| Function | \overline{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 |
|------------------|-----|-------------------------------|
| \overline{nBE} | I | Bus Enable Input (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 | -0°C to +85°C |
| Supply Voltage Range | -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.

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 3.6V)

| 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 | V | |
| 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 | μA | |
| I_{OZH} | High Impedance Output Current | $0 \leq A, B \leq V_{CC}$ | — | — | ± 1 | μA | |
| V_{IK} | Clamp Diode Voltage | $V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$ | — | -0.7 | -1.2 | V | |
| R_{ON} | Switch On Resistance ⁽³⁾ | $V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V},$ $I_{ON} = 48\text{mA}$ | 16245 | — | 5 | 7 | Ω |
| | | | 162245 | 20 | 28 | 40 | |
| | | $V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V},$ $I_{ON} = 15\text{mA}$ | 16245 | — | 10 | 15 | Ω |
| | | | 162245 | 20 | 35 | 48 | |

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

| Parameters ⁽⁴⁾ | Description | Test Conditions | Typ | Units |
|---------------------------|-----------------------------|----------------------|-----|-------|
| C_{IN} | Input Capacitance | $V_{IN} = 0\text{V}$ | | pF |
| C_{OFF} | A/B Capacitance, Switch Off | $V_{IN} = 0\text{V}$ | | pF |
| C_{ON} | A/B Capacitance, Switch On | $V_{IN} = 0\text{V}$ | | pF |

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ 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 ⁽¹⁾ | | Min. | Typ ⁽²⁾ | 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 @ TTL HIGH | V _{cc} =Max. | V _{IN} =3.0V ⁽³⁾ | | | 750 | μA |
| I _{CCD} | Supply Current per Input per MHz ⁽⁴⁾ | V _{cc} =Max. A and B Pins Open BE=GND 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_{cc} = 3.3V, +25°C ambient.
3. Per TTL driven input (control inputs only); A and B pins do not contribute to I_{cc}.
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.

Switching Characteristics over Operating Range

| Parameters | Description | Conditions ⁽¹⁾ | Com. | | Unit |
|------------------|--|----------------------------------|--------|------|------|
| | | | Min. | Max. | |
| t _{PLH} | Propagation Delay ^(2,3) Ax to Bx, Bx to Ax | Cl = 50 pF Rl = 500Ω | 16245 | 0.25 | ns |
| t _{PHL} | | | 162245 | 1.25 | |
| t _{PZH} | Bus Enable Time | Cl = 50 pF R _L = 500Ω | 1 | 3.5 | |
| t _{PZL} | BE to Ax or Bx | | | | |
| t _{PHZ} | Bus Disable Time | Cl = 50 pF R _L = 500Ω | 1 | 4 | |
| t _{PLZ} | BE to Ax or Bx | | | | |

Notes:

1. See test circuit and wave forms.
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 0.25 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.