

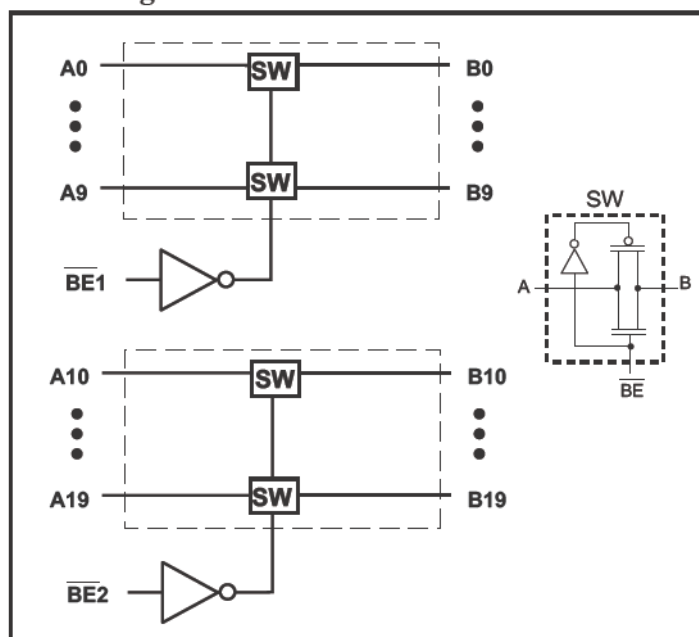
#### Features

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- Fast Switching Speed: 5ns (max.)
- Direct bus connection when switches are ON
- 32X384 function with flow through pinout make board layout easier
- V<sub>CC</sub> Operating Range: 3.0V to 3.6V
- Industrial operating temperature: -40°C to +85°C
- Packaging (Pb-free & Green available):  
-48-pin 240-mil wide plastic TSSOP (A)

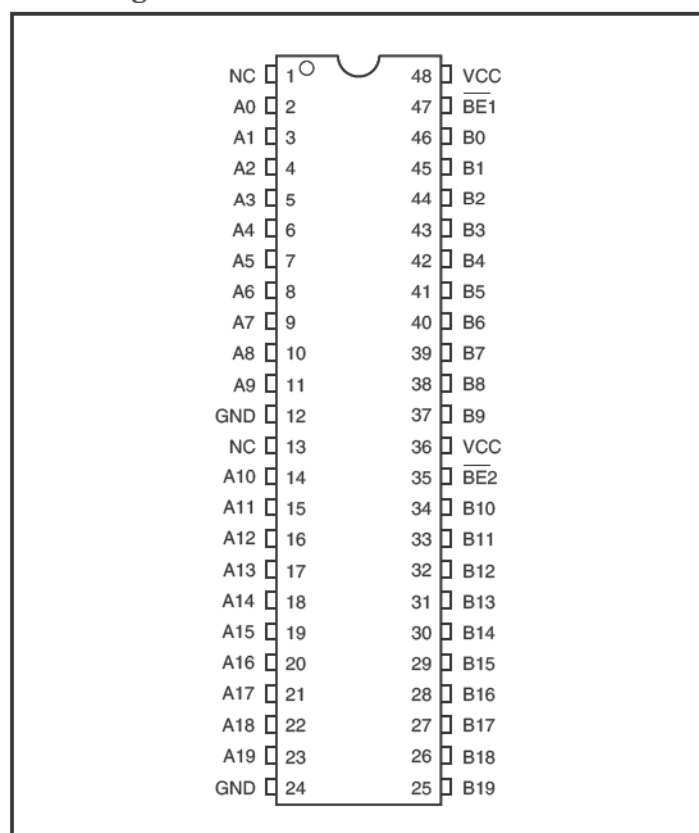
#### Description

Pericom Semiconductor's PI3B16861 is configured as a 3.3 volt, hot-insertion, 20-bit, 2-port bus switch designed with a low On-Resistance (5-ohm) allowing inputs to be connected directly to outputs. The bus switch creates no additional propagational delay or additional ground bounce noise. The switch is turned ON by the Bus Enable ( $\overline{\text{BEx}}$ ) input signal.

#### Block Diagram



#### Pin Configuration



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

Function	$\overline{\text{BEx}}$	A19-A0
Disconnect	H	Hi-Z
Connect	L	B19-B0

#### Note:

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

#### Pin Description

Pin Name	Description
$\overline{\text{BEx}}$	Bus Enable Inputs (Active LOW)
A19-A0	Bus A
B19-B0	Bus B

**Maximum Ratings**

(Above which 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 .....	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  $3.6\text{V}$ )

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	
$I_{IH}$	Input HIGH Current	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			$\pm 1$	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	
$I_{OZH}$	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			$\pm 1$	
$V_{IK}$	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>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$		5	8	$\Omega$
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	15	

**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.

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

Parameters <sup>(1)</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		8.5	
$C_{ON}$	A/B Capacitance, Switch On		17.0	

**Notes:**

- This parameter is determined by device characterization but is not production tested.

**Switching Characteristics over Operating Range**

Parameters	Description	Conditions	Com.		Units
			Min.	Max.	
$t_{PLH}$ $t_{PHL}$	Propagation Delay <sup>(1,2)</sup> Ax to Bx, Bx to Ax	$C_L = 50\text{pF}$ $R_L = 500\text{-ohm}$		0.25	ns
$t_{PZH}$ $t_{PZL}$	Bus Enable Time BEx to Ax or Bx	$C_L = 50\text{pF}$ $R_L = 500\text{-ohm}$	1	4.5	
$t_{PHZ}$ $t_{PLZ}$	Bus Disable Time BEx to Ax or Bx	$R = 500\text{-ohm}$	1	5	

**Notes:**

1. This parameter is guaranteed but not tested on Propagation Delays.
2. 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.

**Power Supply Characteristics**

Parameters	Description	Conditions <sup>(1)</sup>		Min.	Type <sup>(2)</sup>	Max.	Units
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$			10	$\mu\text{A}$
$\Delta I_{CC}$	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.0\text{V}^{(3)}$			750	
$I_{CCD}$	Supply Current per Input per MHz <sup>(4)</sup>	$V_{CC} = \text{Max.}$ A and B Pins Open $\overline{\text{BE}} = \text{GND}$ 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  $V_{CC} = 3.3\text{V}$ , +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.

## Applications Information

### Logic Inputs

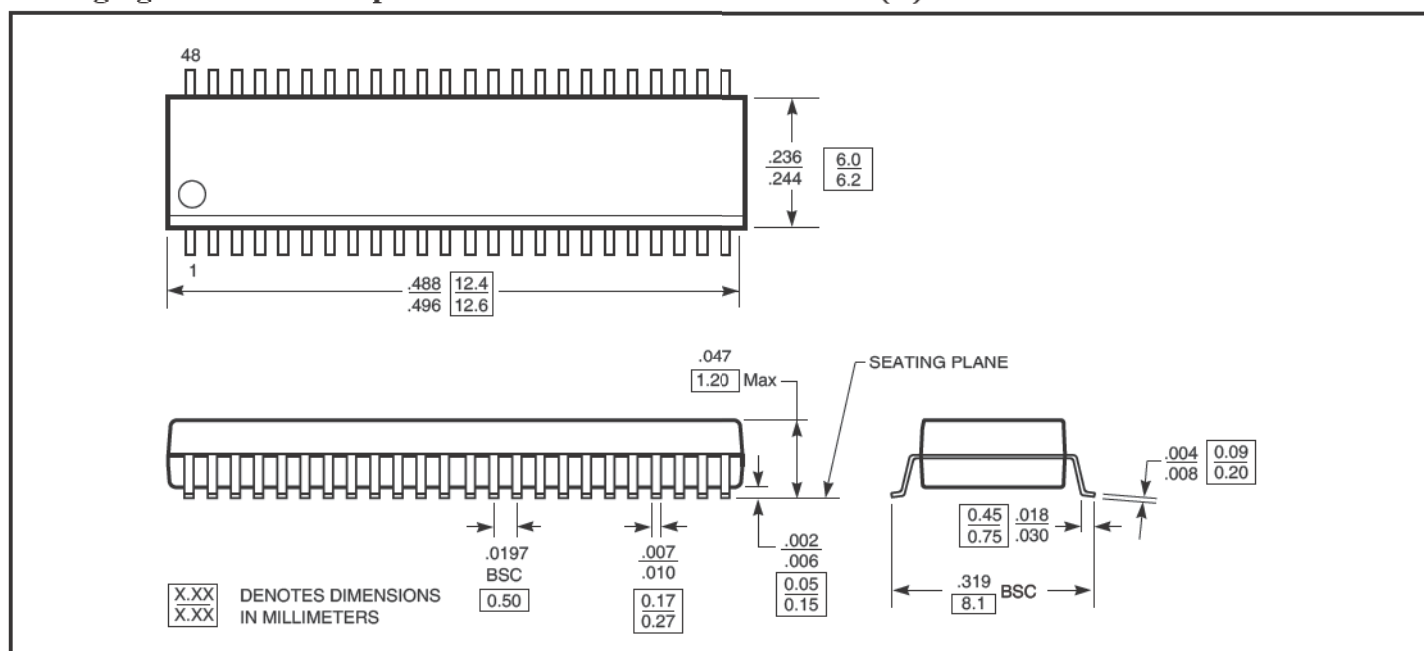
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a +3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

### Power-Supply Sequencing and Hot Plug Information

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V<sub>CC</sub> and GND before applying signals to input/output or control pins.

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

## Packaging Mechanical: 48-pin 240 Mil-Wide Thin Plastic TSSOP (A)



## Ordering Information

Ordering Code	Package Code	Package Type
PI3B16861AE	A	Pb-free & Green, 48-pin TSSOP

### Notes:

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel