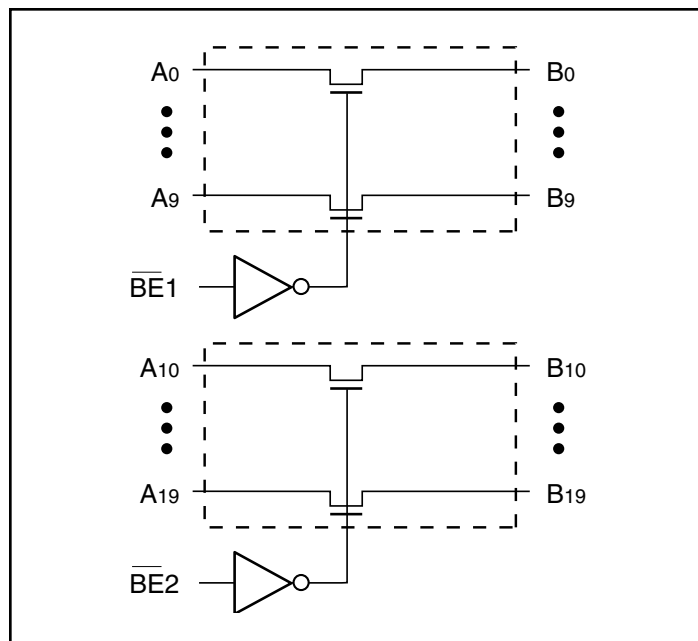


## 2.5V/3.3V, High Bandwidth, Hot Insertion, 20-Bit, 2-Port BusSwitch

### Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- High Bandwidth (>400 MHz)
- Rail-to-Rail 3.3V or 2.5V switching
- Permits Hot Insertion
- High Bandwidth data switching
- Hot Docking
- 2.5V Supply Voltage Operation
- Packaging (Pb-free & Green available):
  - 48-pin 240-mil wide plastic TSSOP (A)
  - 48-pin 150-mil wide plastic BQSOP (B)

### Block Diagram



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

Function	$\overline{BE}_X$	A <sub>19</sub> - A <sub>0</sub>
Disconnect	H	Hi-Z
Connect	L	B <sub>19</sub> - B <sub>0</sub>

#### Note:

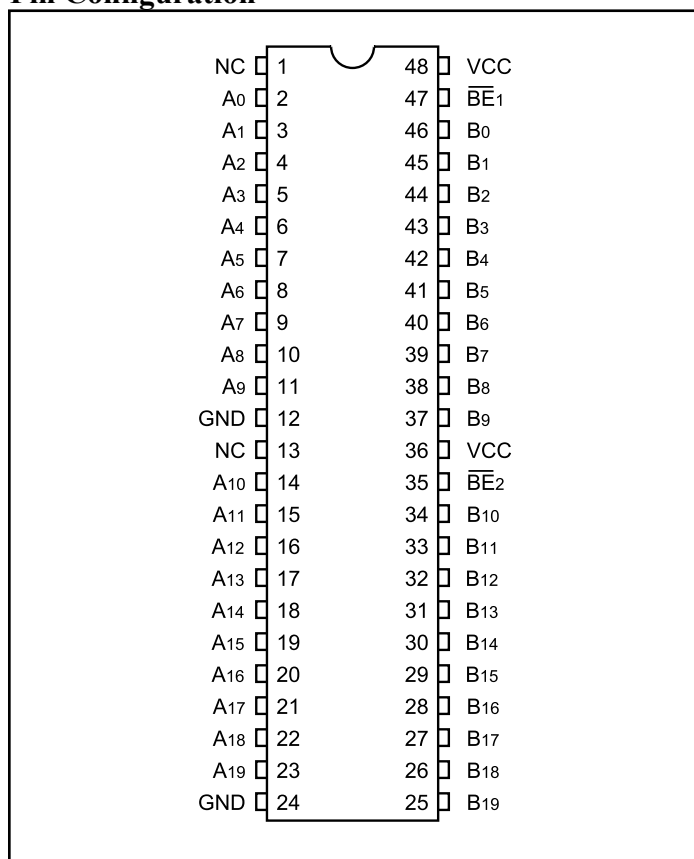
1. H = High Voltage Level  
L = Low Voltage Level  
Hi-Z = High Impedance

### Description

Pericom Semiconductor's PI3C16861 is configured as a 2.5V or 3.3 volt, hot insertion, 20-bit, 2-port bus switch designed with a low On-Resistance (5Ω) 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 ( $\overline{BE}$ ) input signal. The device is 5V I/O Tolerant.

This device is very useful in switching signals that have high bandwidth (>400 MHz) requirements.

### Pin Configuration



### Pin Description

Pin Name	Description
$\overline{BE}_X$	Bus Enable Inputs (Active LOW)
A <sub>19</sub> -A <sub>0</sub>	Bus A
B <sub>19</sub> -B <sub>0</sub>	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 & V <sub>CC</sub> 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 +5.5V
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 Operating Range, T<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 3.3V ±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	
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			±1	
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	
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18mA		-0.73	-1.2	V
R <sub>ON</sub>	Switch On-Resistance <sup>(4)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0V, I <sub>ON</sub> = 48mA		5	7	
		V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 15mA		8	15	Ω

### Capacitance (T<sub>A</sub> = 25°C, f = 1 MHz)

Parameters <sup>(5)</sup>	Description	Test Conditions	Typ.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	3.5	pF
C <sub>OFF</sub>	A/B Capacitance, Switch Off		5.0	
C <sub>ON</sub>	A/B Capacitance, Switch ON		10.0	

**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> = 3.3V, 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		Min.	Typ.	Max.	Units
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$		260	850	$\mu\text{A}$
$\Delta I_{CC}$	Supply Current per Input @ TTL HIGH		$V_{IN} = 3.0\text{V}^{(3)}$				

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at  $V_{CC} = 3.3\text{V}$ ,  $+25^\circ\text{C}$  ambient.
- Per TTL driven input (control input only); A and B pins do not contribute to  $I_{CC}$ .

### Switching Characteristics over 3.3V Operating Range

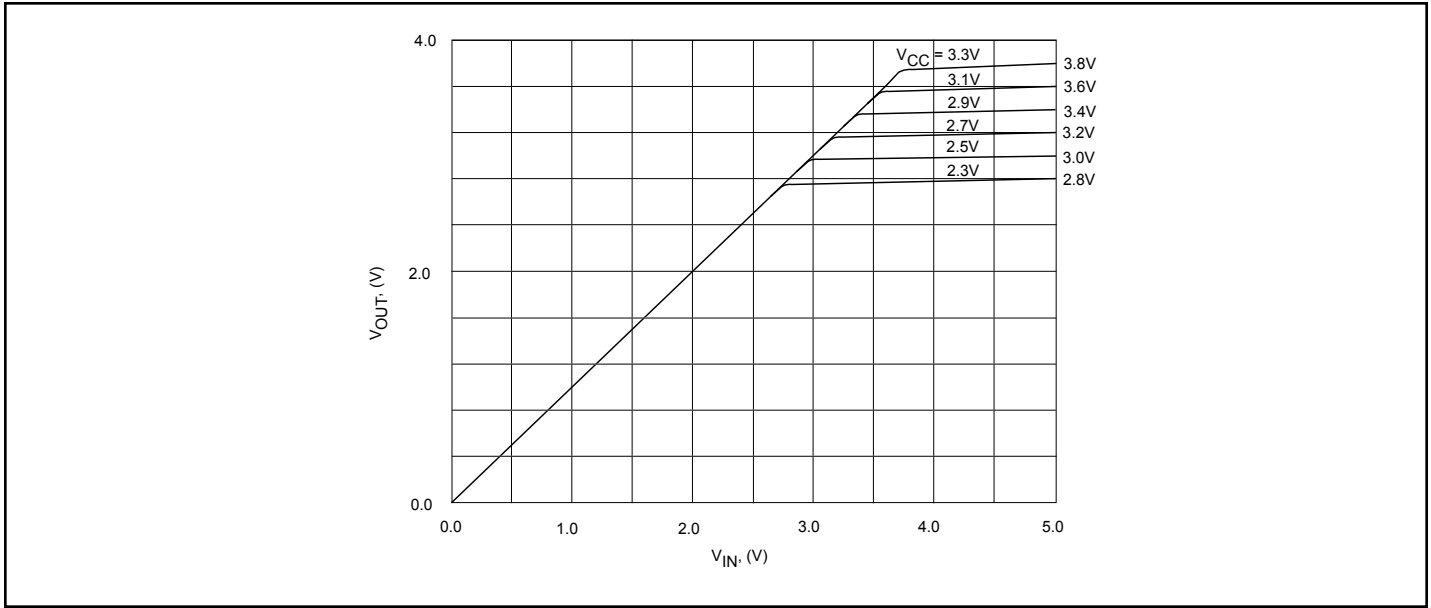
Parameters	Description	Test Conditions	Com.		
			Min.	Max.	Units
$t_{PLH}$ $t_{PHL}$	Propagation Delay <sup>(2, 3)</sup> $A_X$ to $B_X$ , $B_X$ to $A_X$	$C_L = 50\text{pF}$ , $R_L = 500\Omega$		0.25	ns
$t_{PZH}$ $t_{PZL}$	Bus Enable Time, $\overline{BE}$ to $A_X$ or $B_X$		1.5	6.5	
$t_{PHZ}$ $t_{PLZ}$	Bus Disable Time, $BE$ to $A_X$ or $B_X$			5.5	

### Switching Characteristics over 2.5V Operating Range

Parameters	Description	Test Conditions	Com.		
			Min.	Max.	Units
$t_{PLH}$ $t_{PHL}$	Propagation Delay <sup>(2, 3)</sup> $A_X$ to $B_X$ , $B_X$ to $A_X$	$C_L = 50\text{pF}$ , $R_L = 500\Omega$		0.25	ns
$t_{PZH}$ $t_{PZL}$	Bus Enable Time, $BE$ to $A_X$ or $B_X$		1.5	9.8	
$t_{PHZ}$ $t_{PLZ}$	Bus Disable Time, $\overline{BE}$ to $A_X$ or $B_X$			8.3	

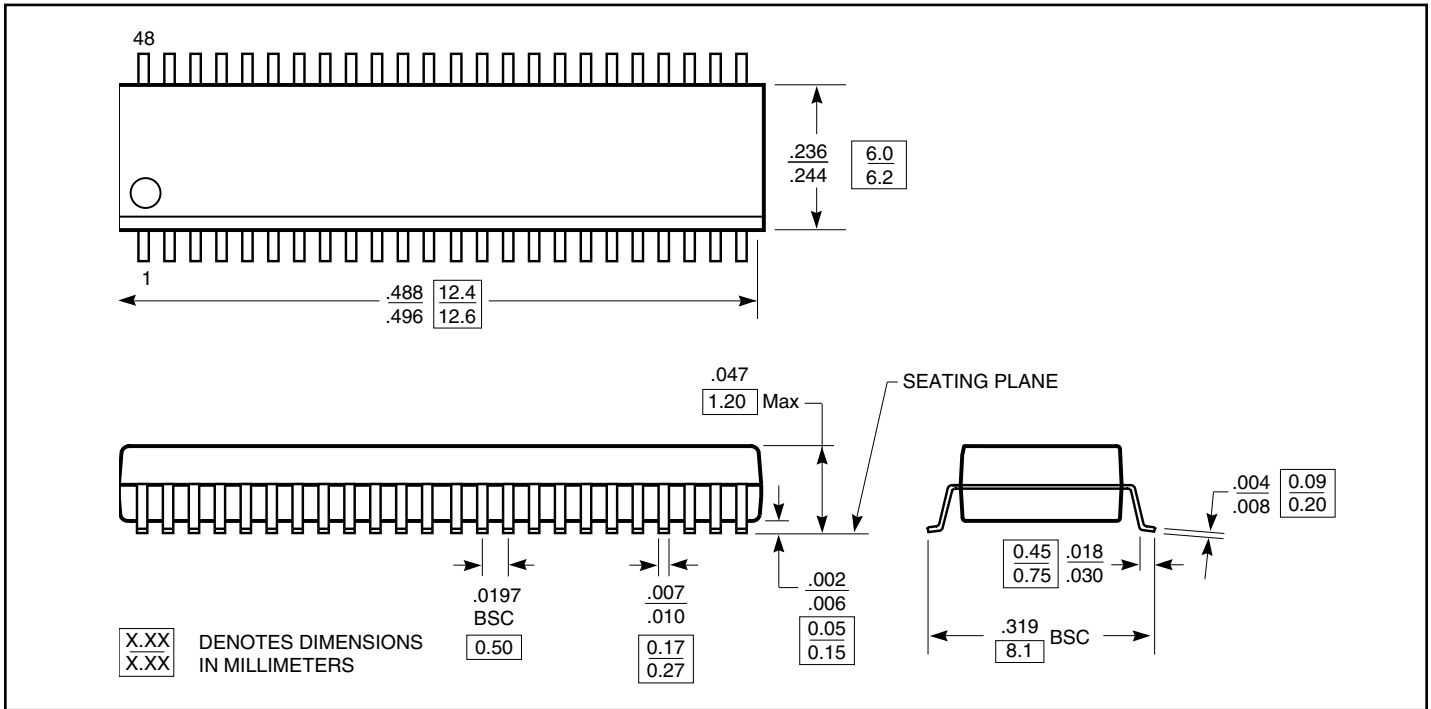
**Notes:**

- See test circuit and waveforms.
- 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 0.25ns 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.

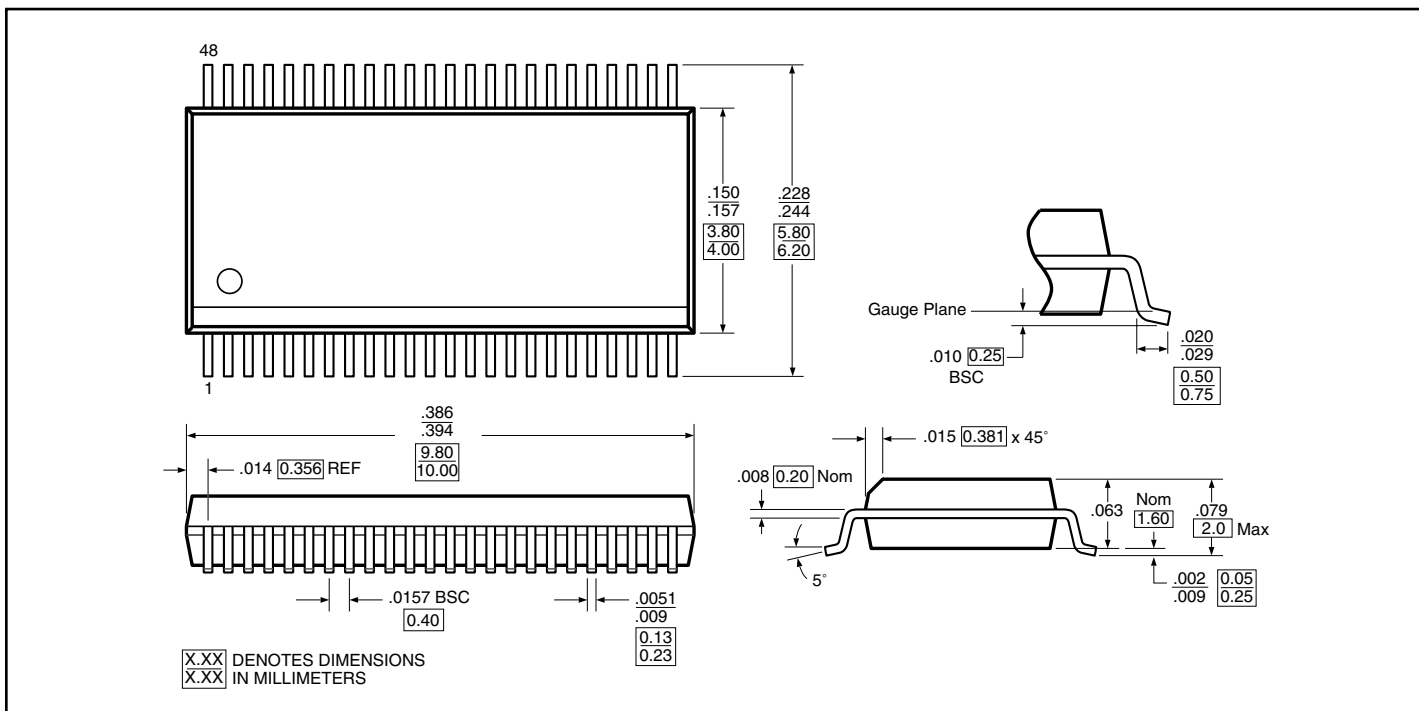


**Output Voltage vs. Input Voltage over Various Supply Voltages**

**Packaging Mechanical: 48-Pin TSSOP (A)**



**Packaging Mechanical: 48-Pin BQSOP (B)**



**Ordering Information**

Ordering Code	Package Code	Package Description
PI3C16861A	A	48-pin TSSOP
PI3C16861AE	A	Pb-free & Green, 48-pin TSSOP
PI3C16861B	B	48-pin BQSOP
PI3C16861BE	B	Pb-free & Green, 48-pin BQSOP

**Notes:**

- Thermal Characteristics can be found on the web at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)