

**3.3V, High-Bandwidth, 16-Bit to 32-Bit, Demux
PCI Hot-Plug Bus Switch w/ Undershoot Protection**
Product Features

- R_{ON} is 5Ω typical
- Pullup on B1 and B2 ports
- Undershoot protection on A-port only
- Low Power: $70\mu A$ typical
- Industrial Operation Temperature: $-40^{\circ}C$ to $+85^{\circ}C$
- Near Zero propagation delay
- Switching speed: 5ns max.
- Channel on capacitance: 15pF max.
- V_{CC} Operating Range: +2V to +3.6V
- ESD>2000V . . . Human Body Model
- >100 MHz bandwidth (or clock rate) at 20pF load capacitance
- Packages available: 56-pin TSSOP (A56)

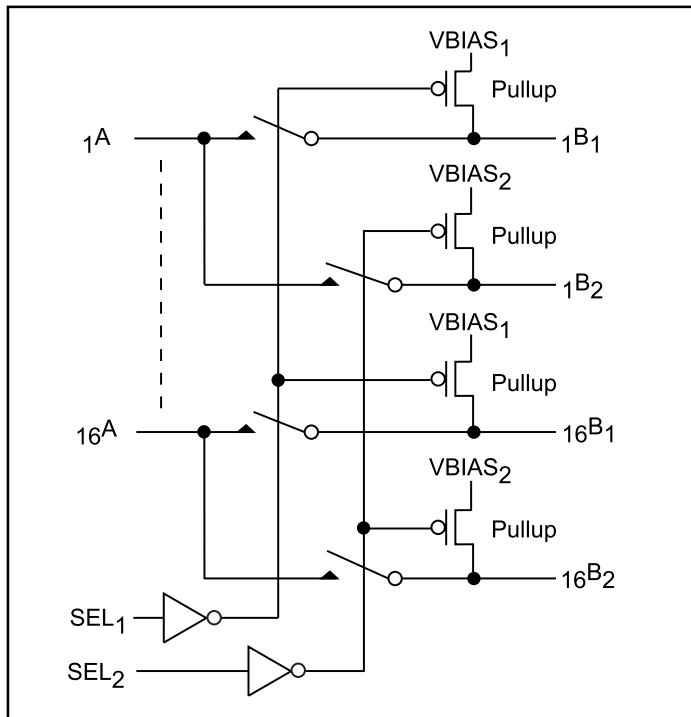
Product Description

Pericom Semiconductor's PI3C series of bus switch circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

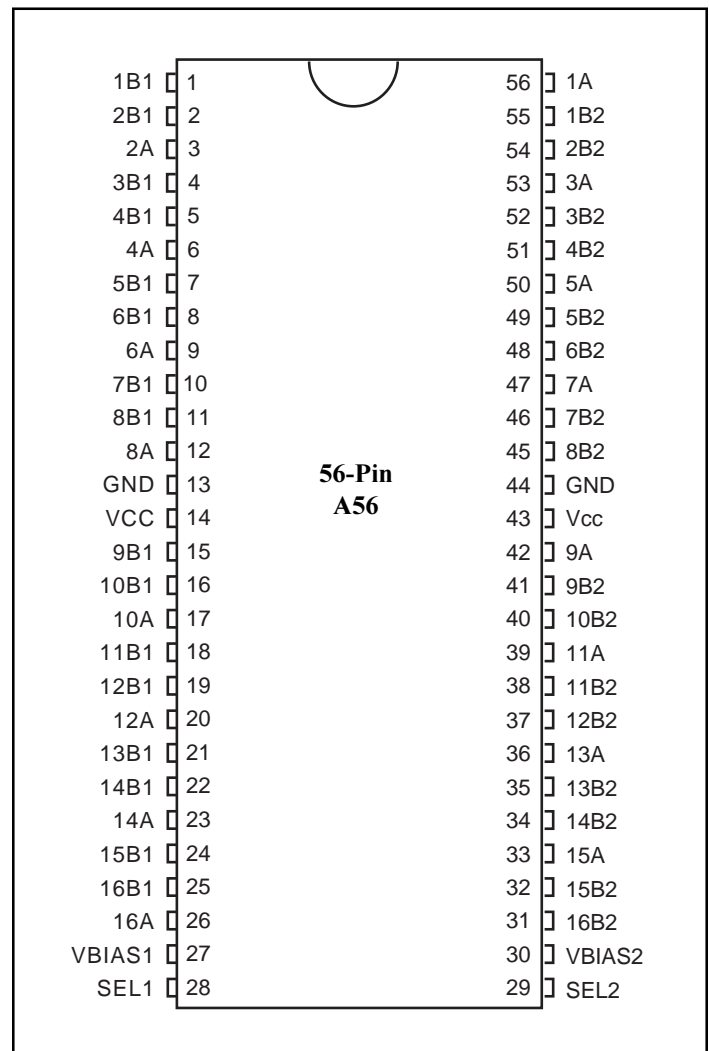
The PI3C32160C is a 16- to 32-bit demultiplexer bus switch. Industry leading advantages include a propagation delay of 250ps, resulting from 5Ω channel resistance and low I/O capacitance. A1 port demultiplexes to either 1B and 2B or to both. The switch is bidirectional.

Application

Provides PCI Hot Plugging.

Logic Block Diagram

Truth Table

Function	SEL ₁	SEL ₂
nA to nB ₁	L	H
nA to nB ₂	H	L
nA to nB ₁ and nB ₂	L	L
nB ₁ , nB ₂ = V _{BIAS}	H	H

Pin Description


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 _{CC} 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	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°C to +85°C, V_{CC} = 3.3V ±10%)

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	
I _{IH}	Input HIGH Current	V _{CC} = Max., V _{IN} = V _{CC}	—	—	±1	μA
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = GND	—	—	±1	
I _{OZH}	High-Impedance Output Current	A = 0V or V _{CC} Max., V _{BIAS1} = V _{BIAS2} = 2.4V	—	—	±1	
I _{OZL}	Low Impedance Output Current	B = 0V or V _{CC} Max., V _{BIAS1} = V _{BIAS2} = 2.4V	-0.2	—	-2	mA
V _{IK}	Clamp diode Voltage	V _{CC} = Min., I _{IN} = -18mA	—	-0.70	-1.8	V
R _{ON}	Switch On Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0.0V I _{ON} = 48mA or 64mA	—	5	7	Ω
		V _{CC} = Min., V _{IN} = 2.4V I _{ON} = 15mA	—	8	15	

Capacitance (T_A = 25°C f = 1 MHz)

Parameters ⁽⁵⁾	Description	Test Conditions	Typ.	Units
C _{IN}	Input Capacitance	V _{IN} = 0V	3.5	pF
C _{ON}	A/B Capacitance, Switch ON		12	
C _{OFF}	A Capacitance, Switch OFF		9	
C _{OFF}	B Capacitance, Switch OFF		4.5	

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 3.3V, T_A = 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 ⁽¹⁾	Min.	Typ. ⁽²⁾	Max.	Units
I _{CC}	Quiescent Power Supply Current	V _{CC} = Max., V _{IN} = GND or V _{CC}	—	260	500	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} = Max., V _{IN} = 3.0V ⁽³⁾	—	—	750	

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.

PI3C32160C Switching Characteristics Over Operating Range

Parameters	Description	Conditions ⁽¹⁾	Com.		Units	
			Min.	Max.		
t _{PLH} t _{PHL}	Propogation Delay ^(2,3) Ax to Bx, Bx to Ax	C _L = 50pF R _L = 500Ω	—	0.25	ns	
t _{pZH}	Bus Enable Time SEL to Ax or Bx	C _L = 50pF R _L = 500Ω	VBIAS = GND	1.3		5.0
t _{pZL}			VBIAS = 3V			
t _{pHZ}	Bus Disable Time SEL to Ax or Bx		VBIAS = GND			
t _{pLZ}			VBIAS = 3V	0.5		5.0

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.