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**3.3V, Low Capacitance 16-Bit to 32-Bit, DeMux  
NanoSwitch™ with Precharged Outputs**
**Features**

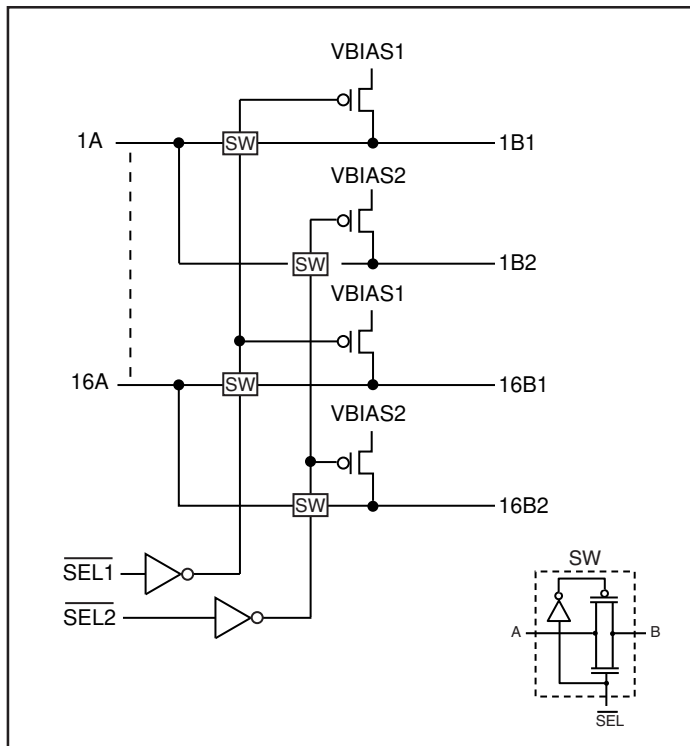
- RON is 5-ohm (typ.)
- Pullup on B1 and B2 ports
- Low Power: 50µW (typ.)
- Industrial Operation Temperature: -40°C to +85°C
- Near-Zero propagation delay
- Switching speed: 4.5ns (max.)
- Channel on capacitance: 14pF (max.)
- VCC Operating Range: 3V to +3.6V
- Packaging (Pb-free & Green available):  
– 56-pin TSSOP (A)

**Description**

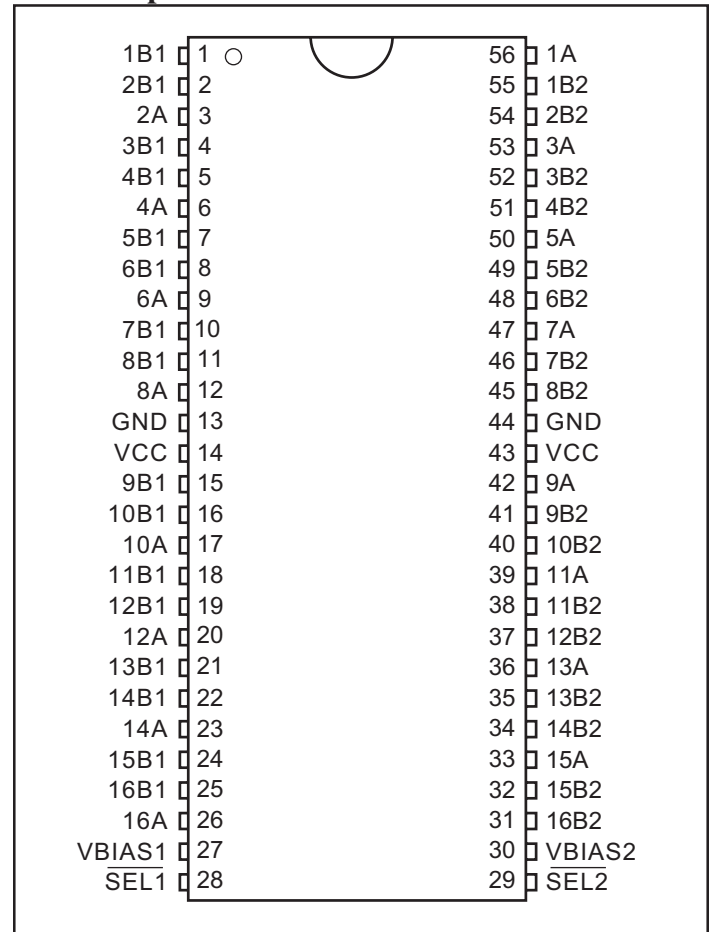
Pericom Semiconductor's PI3B32160 is a 16-bit to 32-bit demultiplexer bus switch. Industry leading advantages include a propagation delay of 250ps, resulting from 5-ohm channel resistance and low I/O capacitance. A port demultiplexes to either 1B and 2B or to both. The switch is bidirectional.

**Application**

- Provides PCI Hot Plugging

**Block Diagram**


Function	$\overline{\text{SEL1}}$	$\overline{\text{SEL2}}$
nA to nB1	L	H
nA to nB2	H	L
nA to nB1 and nB2	L	L
nB1, nB2 = VBIAS	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 .....	-0.3V 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 $+85^\circ\text{C}$ , $V_{CC} = 3.3\text{V} \pm 10\%$ , $V_{BIAS} = 1.3\text{V}$ to $V_{CC}$ )

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	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	
$I_{OZH}^{(3)}$	High Impedance Output Current	$A = 0\text{V}$ or $V_{CC} \text{ max.}, V_{BIAS1} = V_{BIAS2} = V_{CC} \text{ max.}$			+1	
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$		-0.9	-1.8	V
$R_{ON}$	Switch On Resistance <sup>(4)</sup>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$		5	7	$\Omega$
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		9	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.
- 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 pins 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.	Max.	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	2.6	3.2	pF
$C_{OFF}$	A Capacitance, Switch Off	$V_{IN} = 0\text{V}$	8.0	9.5	pF
$C_{OFF}$	B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	4.2	4.7	pF
$C_{ON}$	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	11	14	pF

**Notes:**

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



### Power Supply Characteristics

Parameters <sup>(5)</sup>	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>			20	μA
ΔI <sub>CC</sub>	Supply Current per Input @TTL HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.0V <sup>(3)</sup> other pin = V <sub>CC</sub> or GND			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 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<sub>CC</sub> = 3.3V, +25°C ambient.
3. Per TTL driven input (V<sub>IN</sub> = 3.0V, control inputs only); A and B pins do not contribute to I<sub>CC</sub>.
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.
5. Values for these conditions are examples of the I<sub>CC</sub> formula. These limits are guaranteed but not tested.

### Switching Characteristics over Operating Range

Parameters	Description	Conditions	PI3B32160			Units
			Com.			
			Min.	Typ.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(1,2)</sup> A to B	C <sub>L</sub> =50pF R <sub>L</sub> =500-ohm		0.25		ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time SEL to A,B		1.3		4.5	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time SEL to A,B		1.3		4.5	

**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.

## Applications Information

### Logic Inputs

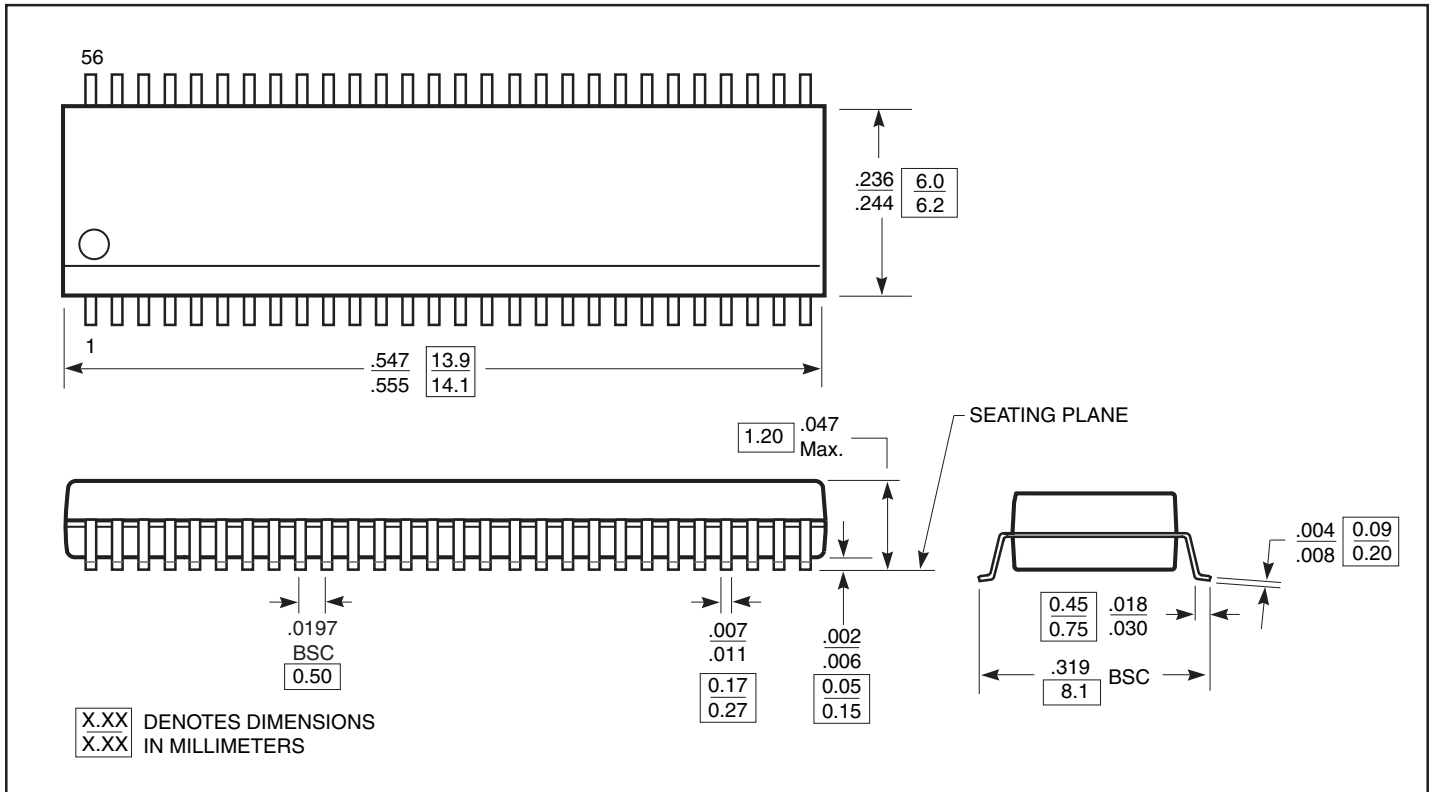
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a +3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

### Power-Supply Sequencing and Hot Plug Information

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

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

## Packaging Mechanical: 56-Pin TSSOP (A)



## Ordering Information

Ordering Code	Package Code	Package Type
PI3B32160A	A	56-pin TSSOP
PI3B32160AE	A	Pb-free & Green, 56-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