

# PI3B3245

# 3.3V, Hot Insertion, 8-Bit, 2-Port *NanoSwitch*<sup>™</sup>

#### Features

- → Near-Zero propagation delay
- → 5-ohm switches connect inputs to outputs
- → Fast Switching Speed: 4.5ns (max.)
- → Ultra-Low Quiescent Power (0.2µA Typical)
  - Ideally suited for notebook applications
- → TTL-compatible control of inputs levels
- ➔ ESD protection (2kV Human Body Model and 200V Machine Model)
- → Packaging (Pb-free & Green):
  - □ 20-pin QSOP (Q)
  - □ 20-pin TSSOP (L)
  - □ 20-pin SOIC (S)

## **Block Diagram**



#### **Truth Table**

Function	BE	A0-7
Disconnect	Н	Hi-Z
Connect	L	B0-7

#### Note:

H = High Voltage Level, L = Low Voltage Level, Hi-Z = High Impedance

#### Description

Pericom Semiconductor's PI3B3245 is a 3.3V 8-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 switches are turned ON by the Bus Enable ( $\overline{\text{BE}}$ ) input signal.

## **Pin Configuration**



#### **Pin Description**

Pin Name	Description	
BE	Bus Enable Input (Active LOW)	
A0-7	Bus A	
B0-7	Bus B	
GND	Ground	
V <sub>CC</sub>	Power	

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## Absolute Maximum Ratings

Parameter		Max.	Units
Storage Temperature		150	°C
Ambient Temperature with Power Applied	-40	85	°C
Supply Voltage to Ground Potential	-0.5	4.6	V
DC Input Voltage	-0.5	4.6	V
DC Output Current	-	120	mA
Power Dissipation	-	0.5	W

Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

## **DC Electrical Characteristics** (Over the Operating Range, $T_A = -40^{\circ}C$ to $+85^{\circ}C$ , $V_{CC} = 3.3V \pm 10\%$ )

Parameters	Description	Test Conditions <sup>(1)</sup>	Min	<b>Typ</b> <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	V
I <sub>IH</sub>	Input HIGH Current	$V_{CC} = Max., V_{IN} = V_{CC}$			±1	μΑ
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND			±1	μΑ
I <sub>OZH</sub>	High Impedance Output Current	$0 \le A_N, B_N \le V_{CC}$			±1	μΑ
V <sub>IK</sub>	Clamp Diode Voltage	$V_{CC} = Min., I_{IN} = -18 \text{ mA}$			-1.2	V
R <sub>ON</sub>	Switch On Resistance <sup>(3)</sup>	$V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA$ or $64mA$		5	8	Ω
		$V_{CC} = Min, V_{IN} = 2.4V, I_{ON} = 15mA$		10	17	

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<sub>CC</sub> = 3.3V,  $T_A$  = 25°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.

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

Parameters <sup>(1)</sup>	Description	Test Conditions	Тур	Units
C <sub>IN</sub>	Input Capacitance	$V_{\rm IN}=0V$	3.0	pF
C <sub>OFF</sub>	A/B Capacitance, Switch Off	$V_{\rm IN}=0V$	8.0	pF
C <sub>ON</sub>	A/B Capacitance, Switch On	$V_{\rm IN} = 0V$	16.0	pF

Notes:

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

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#### **Power Supply Characteristics**

Parameters	Description	Test Conditions <sup>(1)</sup>		Min	Тур (2)	Max	Units
I <sub>CC</sub>	Quiescent Power Supply Current	$V_{CC} = Max.$	$V_{IN} = GND \text{ or } V_{CC}$		0.1	3.0	μΑ
ΔI <sub>CC</sub>	Supply Current per Input HIGH	V <sub>CC</sub> = Max.	$V_{\rm IN} = 3.0 V^{(3)}$			750	μΑ

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 input only); A and B pins do not contribute to I<sub>CC</sub>.

Switching	<b>Characteristics</b>	over	<b>Operating Rang</b>	je
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			Co	m.	
Parameters	Description	Test Conditions	Min	Max	Units
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(1,2)</sup> Ax to Bx, Bx to Ax			0.25	
t <sub>PZH</sub> t <sub>PZL</sub>	$\frac{Bus Enable Time}{BE to Ax or Bx}$	$CL = 50 \text{ pF}$ $RL = 500\Omega$	1.0	4.0	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time BE to Ax or Bx		1.0	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 0.25 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.

# **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,  $A_N$  may be driven low to 0V and high to 3.6V. Driving  $B_N$  Rail-to-Rail<sup>®</sup> minimizes power consumption.

#### Power-Supply Sequencing and Hot-Plug Information

Proper power-supply sequencing is recommended for all CMOS devices. Always apply  $V_{CC}$  and GND before applying signals to input/output or control pins.

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# Packaging Mechanical: 20-Pin QSOP (Q)



# Packaging Mechanical: 20-Pin TSSOP (L)



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PS8162i

# Packaging Mechanical: 20-Pin SOIC (S)



## **Ordering Information**

Ordering Code	Package Code	Package Type
PI3B3245QE	Q	Pb-free & Green, 20-pin QSOP
PI3B3245LE	L	Pb-free & Green, 20-pin TSSOP
PI3B3245SE	S	Pb-free & Green, 20-pin SOIC

#### Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/ 1.
- 2. E = Pb-free and Green
- 3. Adding an X suffix = Tape/Reel

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