3.3V, 18-Bit Bus Exchange *NanoSwitch*™

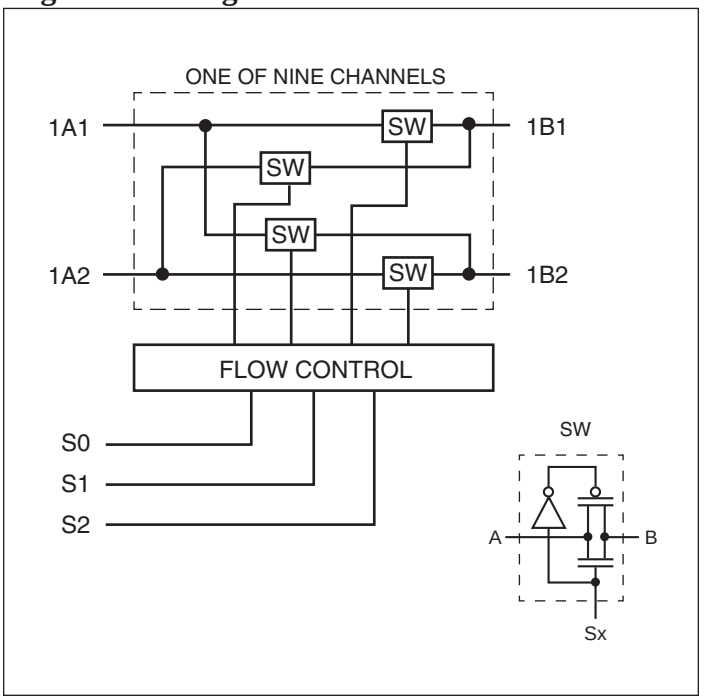
Product Features

- Near-zero propogation delay
- 5-ohm switches connect inputs to outputs
- Fast switching speed: 5ns (max.)
- Operating Range: 3.0V to 3.6V
- Packaging (Pb-free & Green Available):
  – 48-pin, 240-mil wide thin plastic TSSOP (A)

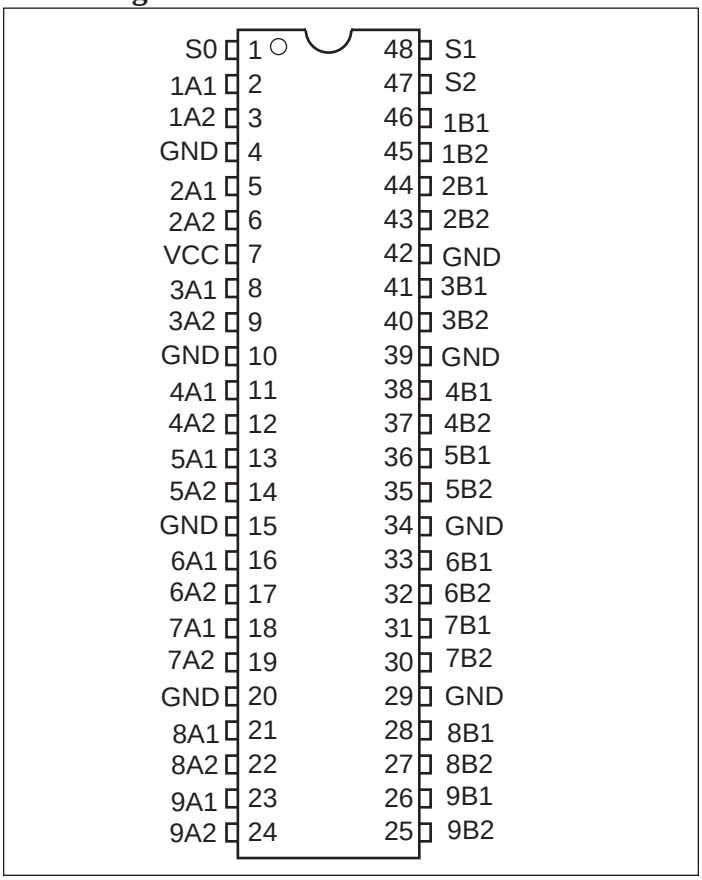
Description

The PI3B16209 is a 3.3 volt, 18-bit bus exchange switch designed with a low On-resistance (5-ohm) allowing inputs to be connected directly to outputs. The device operates as either an 18-bit bus switch or as a 9-bit exchanger, providing data exchange between four signal ports via the data select pins (S0-S2).

Logic Block Diagram



Pin Configuration



Truth Table[1]

Function	S2	S1	S0	A1	A2
Disconnect	L	L	L	Z	Z
A1 to B1	L	L	H	B1	Z
A1 to B2	L	H	L	B2	Z
A2 to B1	L	H	H	Z	B1
A2 to B2	H	L	L	Z	B2
Disconnect	H	L	H	Z	Z
A1 to B1, A2 to B2	H	H	L	B1	B2
A1 to B2, A2 to B1	H	H	H	B2	B1

Pin Description

Pin Name	I/O	Description
S0-S2	I	Select Inputs
xAx	I/O	Bus A
xBx	I/O	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	–0°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	1.0W

Note:
Stresses greater than those limited 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 inthe 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} = 3.0V to 3.6V.)

Parameters	Description	Test Conditions[1]	Min.	Typ[2]	Max.	Units
V_{IH}	Input HIGH Voltage	Guarantee 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_{OZ}	High Impedance Output Current	0 ≤ A, B, ≤ V_{CC}			±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		–0.7	–1.2	V
R_{ON}	Switch ON Resistance[3]	V_{CC} = Min., V_{IN} = 0.0V I_{ON} = 48mA		5	8	Ω
		V_{CC} = Min., V_{IN} = 2.4V I_{ON} = 15mA		10	15	

Notes:
1. For Max. or Min. conditions, use appropriatr value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, T_A = 25°C ambient and maximum loafing.
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 (TA = 25°C, f=1 MHz)

Parameters[1]	Descriptions	Test Conditions	Typ	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3	pF
C_{OFF}	A/B Capacitance, Switch Off		14	
C_{ON}	A/B Capacitance, Switch On		30	

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

Power Supply Characteristics

Parameters	Description	Conditions		Min.	Typ(2)	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}			10	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.0V(3)			750	
I_{CCD}	Supply Current per Input per MZ(4)	V_{CC} = Max. A & B Pins Open Control Input Toggling 50% Duty Cycle				0.25	mA/ MHz

Notes:
1. For Max. or Min. conditions, use appropriatr 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_{CC}.
4. This current applies to the contol inputs only and represents 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

Switching Characteristics over Operating Range

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

Notes:
1. This parameter is guaranteed but not tested on Propogation Delays.
2. This bus switch contributes no propogational delay other than the RC delay of the ON resistance of the switch and the load capacitance. The time constant for tjhe switch alone is of the order of 0.25ns for 50pF load. Since this time constnt is much smaller than the rise/fall times of typical driving signals, it adds very little propogational delay to the system. Propogatioonal delayy 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 tthe load on the driven side.

Applications Information

Logic Inputs

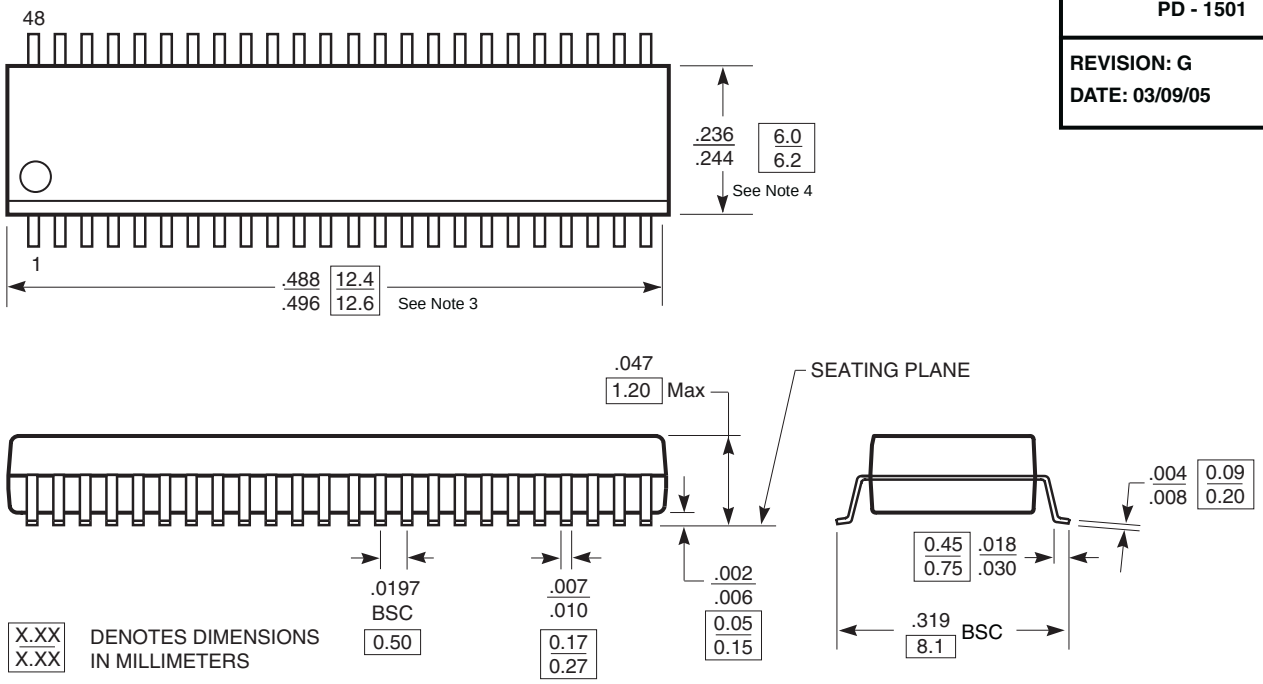
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For Example, given a +3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

Power-Supply Sequencing and Hot-Plug Information

Proper power-supply sequencing is recommended for all CMOS devicces. Always apply VCC and GND before applying signals to input/output or control pins.

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

Package Mechanical: 48-Pin TSSOP (A) Package



DOCUMENT CONTROL NO.
PD - 1501

REVISION: G
DATE: 03/09/05

Note:
1. Controlling dimensions in millimeters.
2. Ref: JEDEC MO-153F/ED
3. Dimension does not include mold flash, protrusions or gate burrs. Mold flash, protrusions and gate burrs shall not exceed 0.15mm per side.
4. Dimension does not include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.25mm per side.

PERICOM®
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1-800-435-2335 • www.pericom.com

DESCRIPTION: 48-Pin 240-Mil Wide TSSOP

PACKAGE CODE: A

Ordering Information

Ordering Code	Package Code	Package Description
PI3B16209A	A	48-pin 240-mil wide TSSOP
PI3B16209AE	A	Pb-free & Green, 48-pin 240-mil wide TSSOP

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free and Green