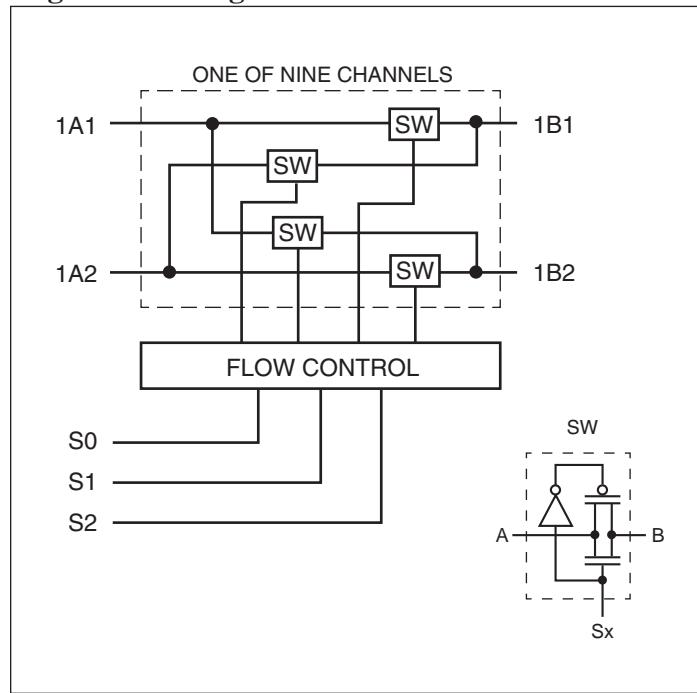


Product Features

- Near-zero propagation 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)

Logic Block Diagram



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

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).

Pin Configuration

S0	1	○	48	S1
1A1	2		47	S2
1A2	3		46	1B1
GND	4		45	1B2
2A1	5		44	2B1
2A2	6		43	2B2
VCC	7		42	GND
3A1	8		41	3B1
3A2	9		40	3B2
GND	10		39	GND
4A1	11		38	4B1
4A2	12		37	4B2
5A1	13		36	5B1
5A2	14		35	5B2
GND	15		34	GND
6A1	16		33	6B1
6A2	17		32	6B2
7A1	18		31	7B1
7A2	19		30	7B2
GND	20		29	GND
8A1	21		28	8B1
8A2	22		27	8B2
9A1	23		26	9B1
9A2	24		25	9B2

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 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 $+85^\circ\text{C}$, $V_{CC} = 3.0\text{V}$ 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	$V_{CC} = \text{Max.}$, $V_{IN} = V_{CC}$			± 1	μA
I_{IL}	Input Low Current	$V_{CC} = \text{Max.}$, $V_{IN} = \text{GND}$			± 1	
I_{OZ}	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			± 1	
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}$, $I_{IN} = -18\text{mA}$		-0.7	-1.2	V
R_{ON}	Switch ON Resistance ⁽³⁾	$V_{CC} = \text{Min.}$, $V_{IN} = 0.0\text{V}$ $I_{ON} = 48\text{mA}$		5	8	Ω
		$V_{CC} = \text{Min.}$, $V_{IN} = 2.4\text{V}$ $I_{ON} = 15\text{mA}$		10	15	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ 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 ($T_A = 25^\circ\text{C}$, $f=1\text{ MHz}$)

Parameters ⁽¹⁾	Descriptions	Test Conditions	Typ	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	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 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_{CC}.
4. This current applies to the control 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	4.5	ns
t _{PZH} t _{PZL}	Bus Enable Time Sx to Ax or Bx	C _L = 50pF R _L = 500-ohm			
t _{PHZ} t _{PLZ}	Bus Disable Time Sx to Ax or Bx	R = 500-ohm	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 the 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 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

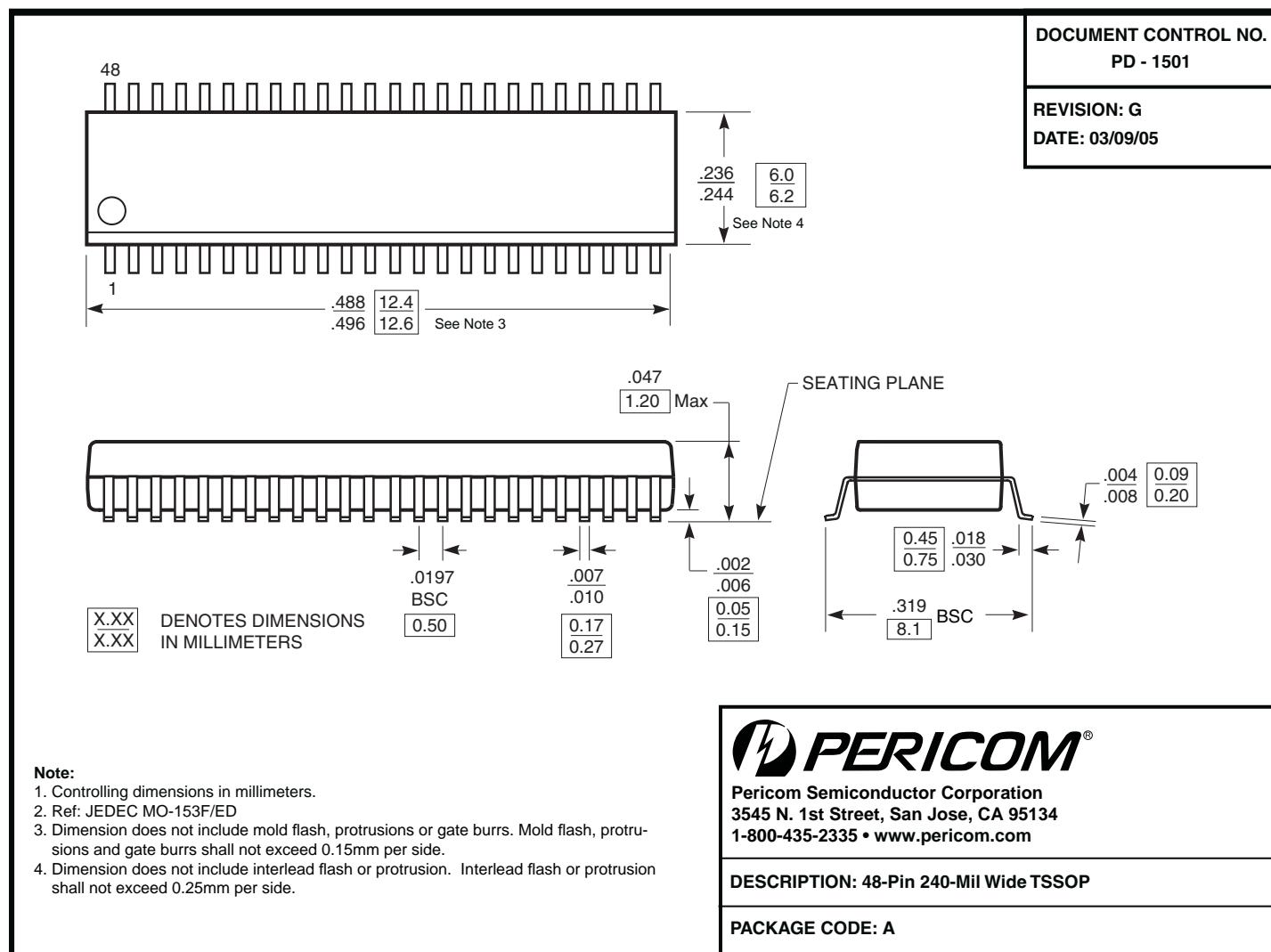
Logic Inputs

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 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

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

Mouser Electronics

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[PI3B16209AE](#) [PI3B16209AEX](#)