



## PI5C3309

### 3:1 Mux/Demux Bus Switch

#### Product Features

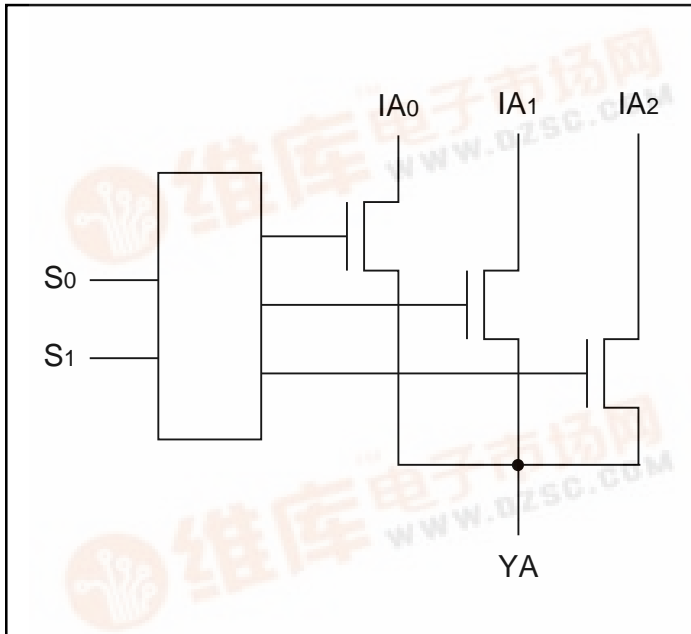
- Near zero propagation delay
- 5-Ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2μA Typical)
  - Ideally suited for notebook applications
- Packages available:
  - 8 pin 173 mil wide plastic TSSOP (L)
  - 8 pin 118 mil wide plastic MSOP (U)

#### Product Description

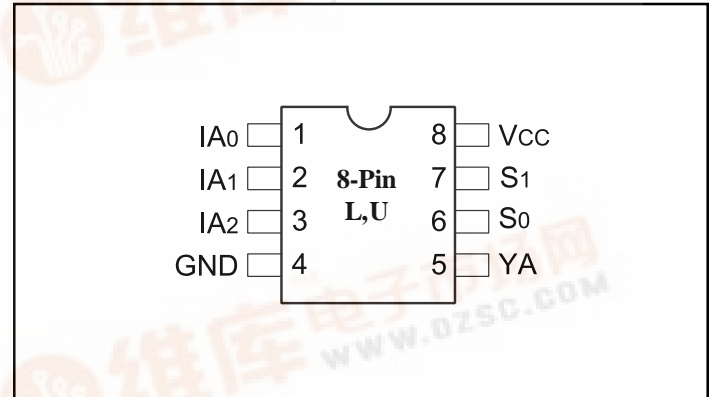
Pericom Semiconductor's PI5C series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

PI5C3309 is a 3:1 Multiplexer/Demultiplexer with 3-State outputs. Inputs can be connected to outputs with low ON resistance (5-ohm) with no additional ground bounce noise or propagation delay.

#### Logic Block Diagram



#### Product Pin Configuration



#### Product Pin Description

Pin Name	Description
IA <sub>n</sub>	Data Inputs
S0-1	Select Inputs
YA	Data Output
GND	Ground
VCC	Power

#### Truth Table<sup>(1)</sup>

Select			
S1	S0	YA	Function
L	L	IA0	S1-0 = 0
L	H	IA1	S1-0 = 1
H	L	IA2	S1-0 = 2
H	H	Hi-Z	S1-0 = 3

**Note:** 1. H = High Voltage Level  
L = Low Voltage Level



## 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 <sub>CC</sub> 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<sub>A</sub> = –40°C to +85°C, V<sub>CC</sub> = 5V ±5%)

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ <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 <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			±1	μA
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND			±1	μA
I <sub>OZH</sub>	High Impedance Output Current	0 ≤ I <sub>N</sub> , Y <sub>N</sub> ≤ V <sub>CC</sub>			±1	μA
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = –18mA		–0.7	–1.2	V
I <sub>OS</sub>	Short Circuit Current <sup>(3)</sup>	I(Y) = 0V, Y(I) = V <sub>CC</sub>	100			mA
V <sub>H</sub>	Input Hysteresis at Control Pins			150		mV
R <sub>ON</sub>	Switch On Resistance <sup>(4)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V, I <sub>ON</sub> = 48mA V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 15mA		5 10	7 15	Ω

## Capacitance (T<sub>A</sub> = 25°C, f = 1 MHz)

Parameters <sup>(5)</sup>	Description	Test Conditions	Typ	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	3	pF
C <sub>OFF</sub>	I <sub>A</sub> Capacitance, Switch Off	V <sub>IN</sub> = 0V	4	pF
C <sub>ON</sub>	I <sub>A</sub> Capacitance, Switch On	V <sub>IN</sub> = 0V	16	pF

### 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> = 5.0V, T<sub>A</sub> = 25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. Measured by the voltage drop between I and Y pin at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (I,Y) pins.
5. This parameter is determined by device characterization but is not production tested.



## Power Supply Characteristics

Parameters	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>		0.1	3.0	μA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH	V <sub>CC</sub> =Max.	V <sub>IN</sub> =3.4V <sup>(3)</sup>			2.5	mA
I <sub>CCD</sub>	Supply Current per Input per MHz <sup>(4)</sup>	V <sub>CC</sub> =Max., I and Y Pins Open $\overline{BE}$ =GND 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> = 5.0V, +25°C ambient.
3. Per TTL driven input (V<sub>IN</sub> = 3.4V, control inputs only); I and Y 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 I and Y 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	PI5C3309		Units
			Com		
			Min.	Max.	
t <sub>IY</sub>	Propagation Delay(2,3) I <sub>N</sub> to Y <sub>N</sub>	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>SY</sub>	Bus Select Time S <sub>N</sub> to Y <sub>N</sub>		0.5	6.6	
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time S <sub>N</sub> to Y <sub>N</sub>		0.5	6.0	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time S <sub>N</sub> to Y <sub>N</sub>		0.5	6.0	

### 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.

## Ordering Information

Part	Pin - Package	Temperature
PI5C3309L	8 - TSSOP (L)	-40°C to +85°C
PI5C3309UX	8 - MSOP (U)	