

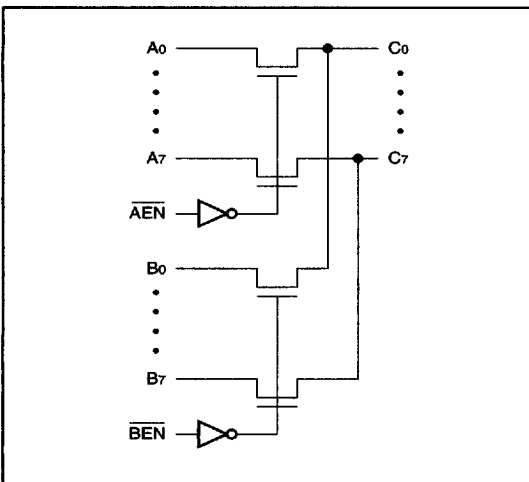
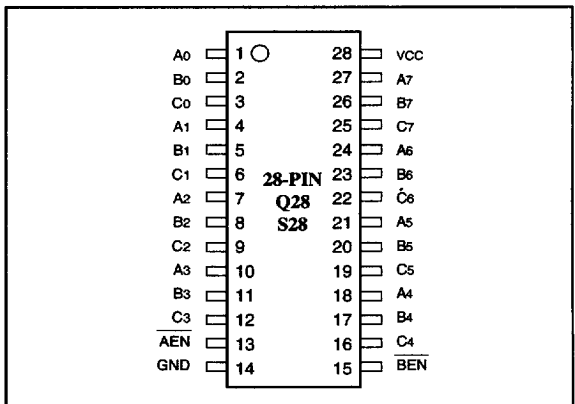
Bus Switch 16-to-8 Multiplexer
Product Features:

- Near-zero propagation delay
- Low noise, 25Ω version (PI5C32390)
- 5Ω switches connect inputs to outputs (PI5C3390)
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2 μA typical) – Ideally suited for notebook applications
- Packages available:
 - 28-pin 150-mil wide plastic QSOP (Q28)
 - 28-pin 300-mil wide plastic SOIC (S28)

Product Description:

Pericom Semiconductor's PI5C series of logic circuits are produced in the Company's advanced 0.8 micron CMOS technology, achieving industry leading performance.

The PI5C3390 and PI5C32390 are 16-to-8 multiplexer switches with a low ON resistance allowing inputs to be connected directly to outputs. The two enable inputs connect each of eight I/O to the common I/O pin. This multiplexer function can be used to select and route logic signals to form crossbar switches, isolate bus capacitance, or provide a zero delay switch connection. The bus switch creates no additional ground bounce noise or additional propagation delay. The PI5C32390 is designed with an internal 25Ω resistor reducing noise reflection in high-speed applications.

Logic Block Diagram

Product Pin Configuration

Truth Table⁽¹⁾

AEN	BEN	A Sw	B Sw	Function
H	H	Off	Off	Disconnect
L	H	On	Off	A to C
H	L	Off	On	B to C
L	L	On	On	A, B to C

Product Pin Description

Pin Name	I/O	Description
AEN, BEN	I	Bus Output Enable (Active LOW)
A0-A7	I/O	Bus A
B0-B7	I/O	Bus B
C0-C7	I/O	Bus C

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	-55°C to +125°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & Vcc 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	120 mA
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 $+85^\circ\text{C}$, $V_{CC} = 5V \pm 5\%$)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	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	V	
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	μA	
I_{OZH}	High Impedance Output Current	$0 \leq A, B, C \leq V_{CC}$	—	—	± 1	μA	
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18 \text{ mA}$	—	-0.7	-1.2	V	
I_{OS}	Short Circuit Current ⁽³⁾	A, B (C) = 0V, c (A, B) = V_{CC}	100	—	—	mA	
V_H	Input Hysteresis at Control Pins		—	150	—	mV	
R_{ON}	Switch On Resistance ⁽⁴⁾	$V_{CC} = \text{Min.}, V_{IN} = 0.0V,$ $I_{ON} = 48 \text{ mA}$	PI5C3390 PI5C32390	— 20	5 28	7 40	Ω
		$V_{CC} = \text{Min.}, V_{IN} = 2.4V,$ $I_{ON} = 15 \text{ mA}$	PI5C3390 PI5C32390	— 20	10 35	15 48	Ω

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

Parameters ⁽⁵⁾	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0V$	—	6	pF
C_{OFF}	A/B Capacitance, Switch Off	$V_{IN} = 0V$	—	6	pF
C_{ON}	A/B Capacitance, Switch On	$V_{IN} = 0V$	—	8	pF

Notes:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 5.0V$, $T_A = 25^\circ\text{C}$ 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, B, and C pins at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (A,B,C) pins.
- This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

Parameters	Description	Test Conditions ⁽¹⁾		Min.	Typ ⁽²⁾	Max.	Units
I _{cc}	Quiescent Power Supply Current	V _{cc} = Max.	V _{IN} = GND or V _{cc}	—	0.2	30	μA
ΔI _{cc}	Supply Current per Input @ TTL HIGH	V _{cc} = Max.	V _{IN} = 3.4V ⁽³⁾	—	—	3.5	mA
I _{ccd}	Supply Current per Input per MHz ⁽⁴⁾	V _{cc} = Max., A, B, and C Pins Open BE = GND Control Input Toggling 50% Duty Cycle		—	—	0.25	mA/ MHz

- Notes:**
- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
 - Typical values are at V_{cc} = 5.0V, +25°C ambient.
 - Per TTL driven input (V_{IN} = 3.4V, control inputs only); A, B, and C pins do not contribute to I_{cc}.
 - This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A, B, and C inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.
 - Values for these conditions are examples of the I_{cc} formula. These limits are guaranteed but not tested.

PI5C3390 Switching Characteristics over Operating Range

Parameters	Description	Conditions ⁽¹⁾	PI5C3390			Unit
			Com			
			Min	Typ	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) A, B to/from C	C _L = 50 pF R _L = 500Ω	—	0.25	—	ns
t _{PZH} t _{PZL}	Bus Enable Time AEN/BEN to A, B, C		1.5	—	6.5	ns
t _{PHZ} t _{PLZ}	Bus Disable Time AEN/BEN to A, B, C		1.5	—	5.5	ns

PI5C32390 Switching Characteristics over Operating Range

Parameters	Description	Conditions ⁽¹⁾	PI5C32390			Unit
			Com			
			Min	Typ	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) A, B to/from C	C _L = 50 pF R _L = 500Ω	—	1.25	—	ns
t _{PZH} t _{PZL}	Bus Enable Time AEN/BEN to A, B, C		1.5	—	6.5	ns
t _{PHZ} t _{PLZ}	Bus Disable Time AEN/BEN to A, B, C		1.5	—	5.5	ns

- Notes:**
- See test circuit and wave forms.
 - This parameter is guaranteed but not tested on Propagation Delays.
 - 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.