

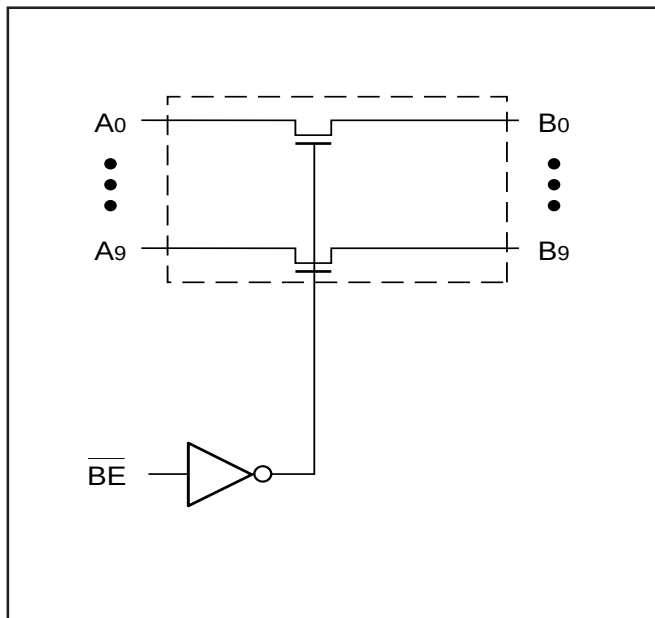
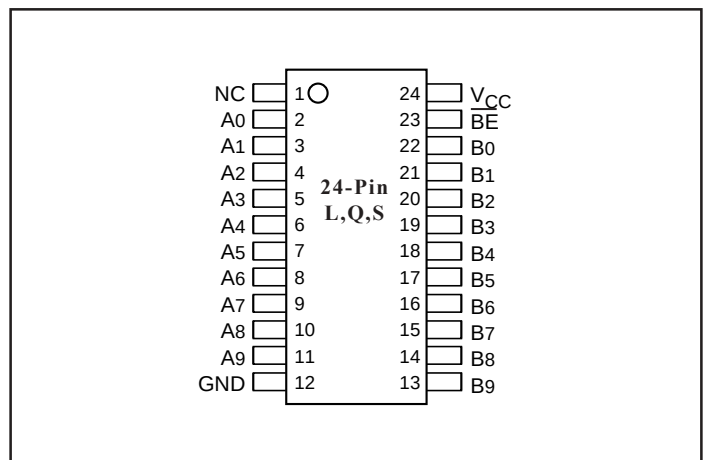
Product Features:

- Near zero propagation delay
- 5-ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2 μ A Typical) – Ideally suited for notebook applications
- Packages available:
 - 24-pin 150 mil wide plastic QSOP (Q)
 - 24-pin 300 mil wide plastic SOIC (S)
 - 24-pin 173 mil wide plastic TSSOP (L)

Product Description:

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

The PI5C3861 is a 10-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 propagation delay or additional ground bounce noise. The switches are turned ON by the Bus Enable ($\overline{\text{BE}}$) input signal.

Logic Block Diagram

Product Pin Configuration

Product Pin Description

Pin Name	Description
$\overline{\text{BE}}$	Bus Enable Input (Active LOW)
A0–9	Bus A
B0–9	Bus B
GND	Ground
VCC	Power

Truth Table⁽¹⁾

Function	$\overline{\text{BE}}$	A0–9
Disconnect	H	Hi-Z
Connect	L	B0–9

NOTE: 1. H = High Voltage Level
L = Low Voltage Level
Hi-Z = High Impedance

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	-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, $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 5\text{V} \pm 5\%$)

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 - A, B - 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) = 0V, B (A) = V_{CC}	100			mA
V_H	Input Hysteresis at Control Pins			150		mV
R_{ON}	Switch On Resistance ⁽⁴⁾	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{ mA}$ $V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{ mA}$		5 10	7 15	ohm

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

Parameters ⁽⁵⁾	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$		6	pF
C_{OFF}	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$		6	pF
C_{ON}	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$		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 $V_{CC} = 5.0\text{V}$, $T_A = 25^{\circ}\text{C}$ 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 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.
- 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}		0.1	10	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} =Max.	V _{IN} =3.4V ⁽³⁾			2.5	mA
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	V _{CC} =Max., A and B Pins Open BE=GND Control Input Toggling 50% Duty Cycle				0.25	mA/ MHz

Notes:

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, control inputs only); A and B pins do not contribute to I_{CC}.
4. This current applies to the control inputs only and represent 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

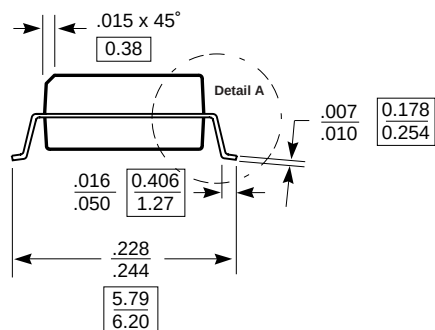
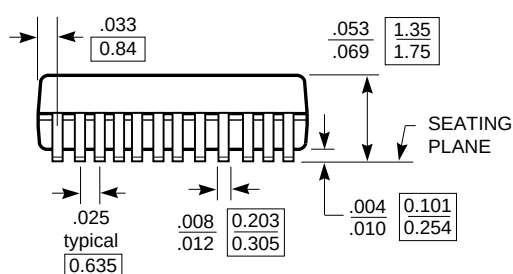
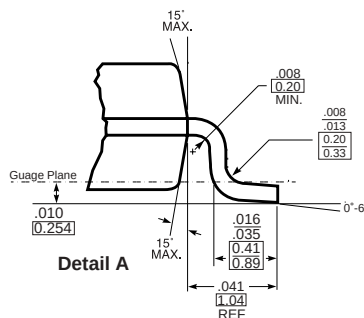
Parameters	Description	Conditions ⁽¹⁾	PI5C3861		Unit
			Com.		
			Min	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) Ax to Bx, Bx to Ax	C _L = 50 pF R _L = 500-ohm		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx		1.5	6.5	ns
t _{PHZ} t _{PLZ}	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx		1.5	5.5	ns

Notes:

1. See test circuit and wave forms.
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 0.25 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.

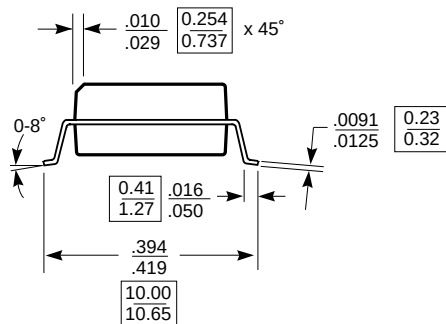
Diagram of a 24-pin DIP package. The package is rectangular with 12 pins on each long side. Dimensions are provided in inches and millimeters:

- Pin pitch: $.050$ inches / 1.27 mm
- Package width: $.337$ inches / 8.56 mm
- Package height: $.150$ inches / 3.81 mm
- Pin diameter: $.010$ inches / $.254$ mm
- Pin length: $.110$ inches / 2.79 mm



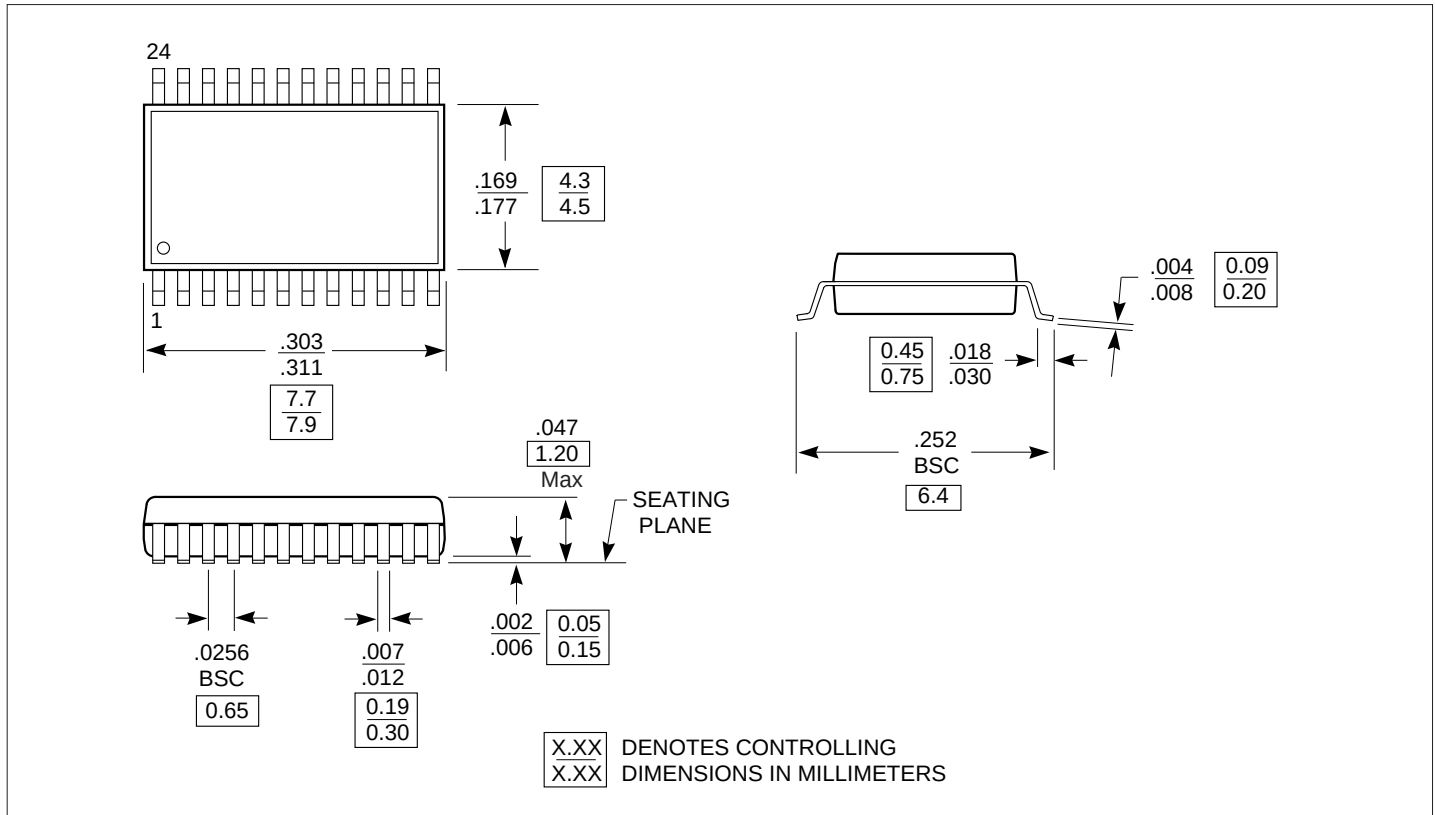
X.XX DENOTES DIMENSIONS
X.XX IN MILLIMETERS

The drawing shows a 24-pin DIP package. The top view indicates a total width of .5985 inches (15.20 mm) and .6141 inches (15.60 mm). The pin pitch is .021 inches (0.533 mm) and .031 inches (0.787 mm). The side view shows a total height of .2914 inches (7.40 mm) and .2992 inches (7.60 mm). The package has a .0926 inch (2.35 mm) thick body and a .1043 inch (2.65 mm) thick base. The seating plane is indicated. The bottom view shows a .0040 inch (0.10 mm) gap and a .0118 inch (0.30 mm) gap. The package is .050 inches (1.27 mm) wide and .013 inches (0.33 mm) high. The package is .020 inches (0.51 mm) wide and .033 inches (0.84 mm) high.



X.XX DENOTES DIMENSIONS
X.XX IN MILLIMETERS

Packaging Mechanical: 24-pin TSSOP (package code L)



Ordering Information

Part Number	Package Information
PI5C3861Q	16-pin QSOP (Q)
PI5C3861S	16-pin SOIC (S)
PI5C3861L	16-pin TSSOP (L)