

10-Bit, 2-Port BusSwitch

Product Features:

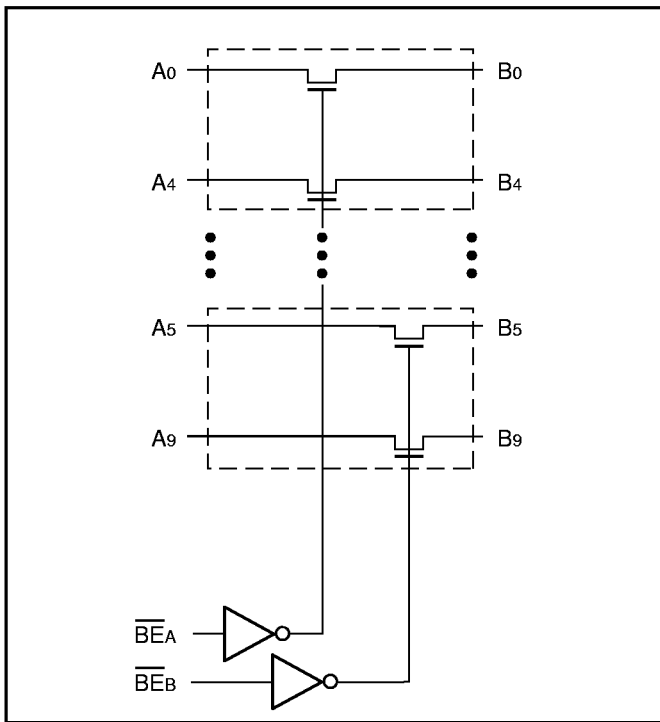
- Near-zero propagation delay
- Low noise, 25Ω version (PI5B32384)
- 5Ω switches connect inputs to outputs (PI5B3384)
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2 μA typical) – Ideally suited for notebook applications
- Packages available:
 - 24-pin 150-mil wide plastic QSOP (Q24)
 - 24-pin 150-mil wide plastic TQSOP (R24)

Product Description:

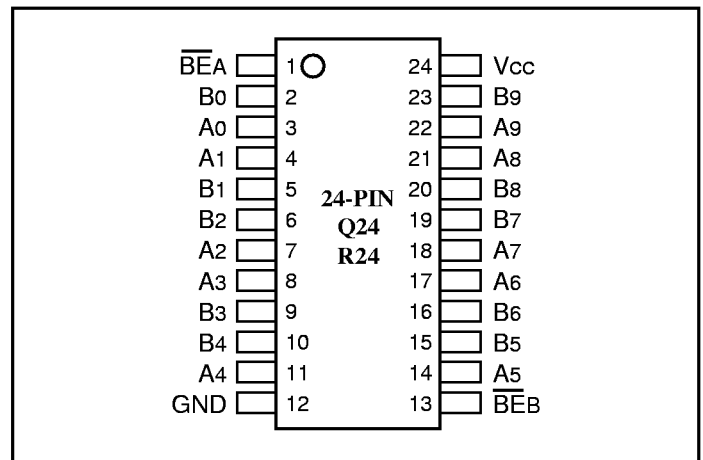
Pericom Semiconductor’s PI5B series of logic circuits are produced in the Company’s advanced sub-micron CMOS technology, achieving industry performance.

The PI5B3384, and PI5B32384 are 3.3Volt 10-bit, 2-port busswitches designed with a low ON resistance allowing inputs to be connected directly to outputs. The bus switch creates no additional propagational delay or additional ground bounce noise. The switches are turned ON by the Bus Enable (\overline{BE}) input signal. Two bus enable signals are provided, one for each of the upper and lower five bits of the two 10-bit buses. The PI5B32384 is designed with an internal 25Ω resistor reducing noise reflection in high-speed applications.

Logic Block Diagram



Product Pin Configuration



Truth Table⁽¹⁾

Function	\overline{BEA}	\overline{BEB}	B0-B4	B5-B9
Disconnect	H	H	Hi-Z	Hi-Z
Connect	L	H	A0-A4	Hi-Z
Connect	H	L	Hi-Z	A5-A9
Connect	L	L	A0-A4	A5-A9

Product Pin Description

Pin Name	Description
\overline{BEA} , \overline{BEB}	Bus Enable Inputs (Active LOW)
A0-A9	Bus A
B0-A9	Bus B
GND	Ground
Vcc	Power

Note:

1. H = High Voltage Level
X = Don't Care
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	-65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & Vcc Only)	-0.5V to +4.6V
Supply Voltage to Ground Potential (Outputs & D/O Only)	-0.5V to +4.6V
DC Input Voltage	-0.5V to +4.6V
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 $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 5\%$)

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} = Max., V _{IN} = V _{CC}	—	—	±1	μA	
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = GND	—	—	±1	μA	
I _{OZH}	High-Impedance Output Current	0 ≤ A, B ≤ V _{CC}	—	—	±1	μA	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = -18mA —	—	—	-0.8	V	
R _{ON}	Switch On Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = 48 mA or 64mA	PI5B3384	—	5	7	Ω
			PI5B32384	20	28	40	
		V _{CC} = Min., V _{IN} = 2.4V, I _{ON} = 15 mA	PI5B3384	—	10	15	Ω
			PI5B32384	20	35	48	

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

Parameters ⁽⁵⁾	Description	Test Conditions	Typ	Units
C _{IN}	Input Capacitance	V _{IN} = 0V	4	pF
C _{OFF}	A/B Capacitance, Switch Off	V _{IN} = 0V	4	pF
C _{ON}	A/B Capacitance, Switch On	V _{IN} = 0V	8	pF

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 3.3V, T_A = 25°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}	PI5C3384 PI5C32384	—	0.1	3.0	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} = Max., V _{IN} = 3.0V ⁽³⁾		—	—	750	μA

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 (V_{IN} = 3.0V, 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.

PI5B3384 Switching Characteristics over Operating Range

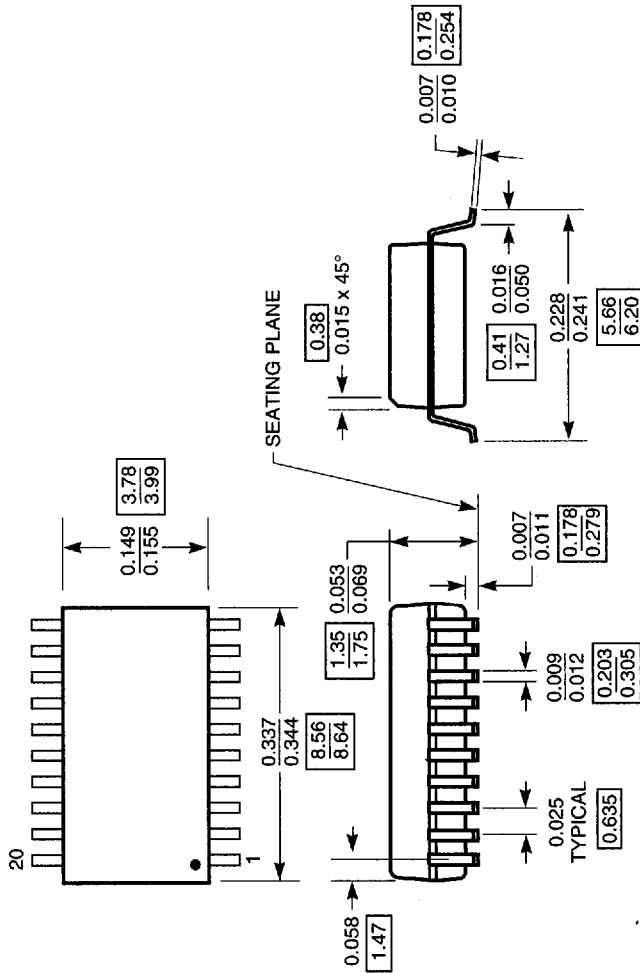
Parameters	Description	Conditions ⁽¹⁾	PI5B3384		Unit
			Com.		
			Min	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) A _x to B _x , B _x to A _x	C _L = 50pF R _L = 500Ω		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time $\overline{\text{BE}}_x$ to A _x or B _x	C _L = 20pF R _L = 500Ω C _L = 50pF R _L = 500Ω	1	2 3.5	ns
t _{PHZ} t _{PLZ}	Bus Disable Time $\overline{\text{BE}}_x$ to A _x or B _x	C _L = 20pF R _L = 500Ω C _L = 50pF R _L = 500Ω	1	2 4	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.

DOCUMENT CONTROL NO.
PD- 1202

REVISION:
DATE: **11/13/95**



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DENOTES DIMENSIONS
IN MILLIMETERS



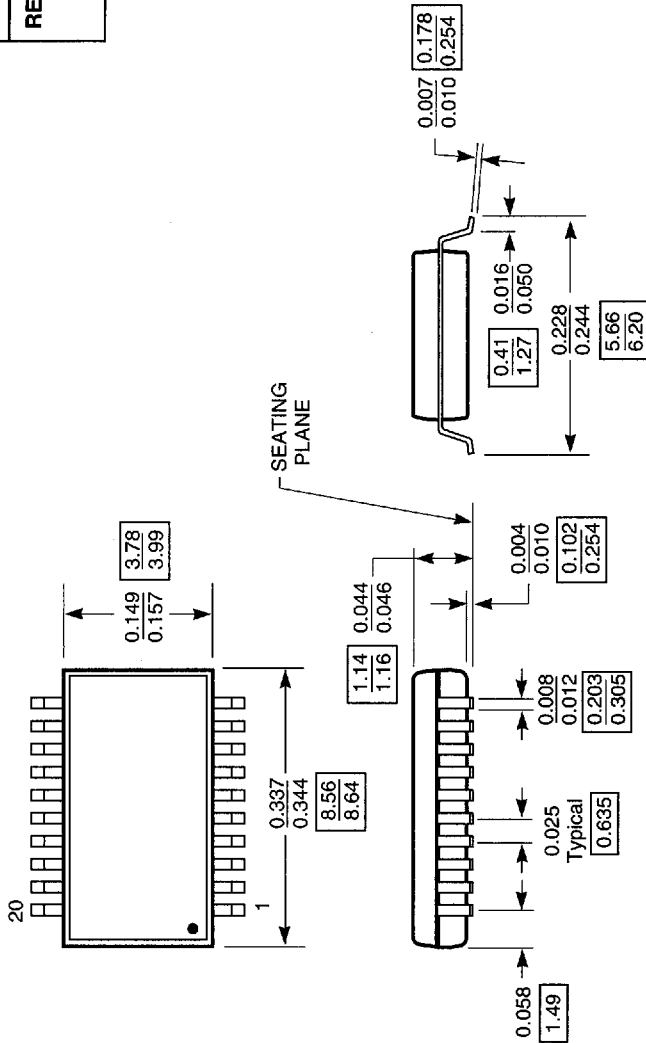
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DESCRIPTION: **20-PIN QSOP (150 MIL WIDE)**
PACKAGE CODE: **Q20**

PACKAGE
MECHANICAL DIMENSIONS

DOCUMENT CONTROL NO.
PD-1301

REVISION:
DATE: 11/13/95



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X.XX

DENOTES DIMENSIONS
IN MILLIMETERS



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DESCRIPTION: 20-PIN TSSOP (150 MIL WIDE)
PACKAGE CODE: R20