3.3V, 24:12 Mux/Demux BusSwitch

Product Features

- Permits Hot Insertion
- 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
- TTL - compatible control of input levels
- Fast switching speed - 4.5ns max.
- Packages available:
  –48-pin 150 mil wide plastic BQSOP (B)

Product Description

Pericom Semiconductor's PI3B series of logic circuits are produced using the Company's advanced sub micron CMOS technology, achieving industry leading performance.

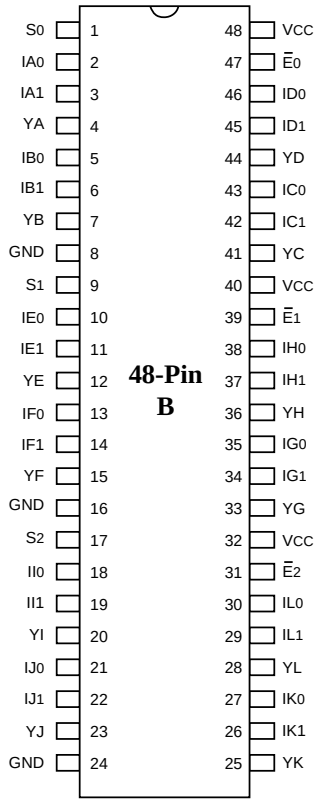
The PI3B33X257 is a 3.3V, 24:12 multiplexer/demultiplexer with three-state outputs. Inputs can be connected to outputs with low on resistance (5 Ohm) with no additional ground bounce noise or propagation delay.

Truth Table[1]

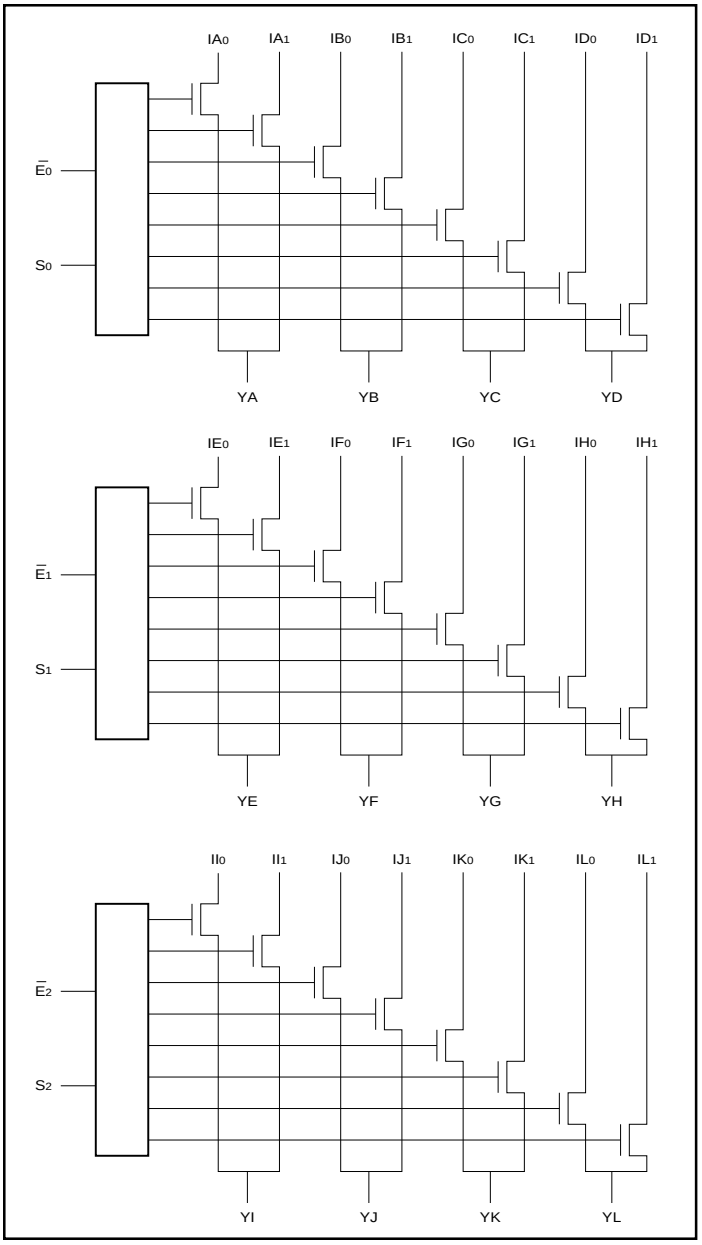
$\overline{En}$	Sn	YA[2]	YB[2]	YC[2]	YD[2]	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	IA0	IB0	IC0	ID0	S = 0
L	H	IA1	IB1	IC1	ID1	S = 1

Notes: 1. H = High Voltage Level
L = Low Voltage Level
2. n = 0 YA, YB, YC, YD
n = 1 YE, YF, YG, YH
n = 2 YI, YJ, YK, YL

48-Pin Product Configuration



Logic Block Diagram



Product Pin Description

Pin Name	Description
IAn-ILn	Data Inputs
S	Select Inputs
$\overline{E}n$	Enable
YA-YL	Data Outputs
GND	Ground
V_{CC}	Power
NC	No Connect

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_{CC} 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_A = –40°C to +85°C, V_{CC} = 3.3V ±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}			±50	µA
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND			±1	µA
I_{OZH}	High Impedance Output Current	0 ≤ I, Y ≤ V_{CC}			±50	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA			–1.2	V
R_{ON}	Switch On Resistance[3]	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA or 64mA V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA		5 10	7 15	Ω

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ.	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3.0		pF
C_{OFF}	In/Yn Capacitance, Switch Off	V_{IN} = 0V	17.0		pF
C_{ON}	In/Yn Capacitance, Switch On	V_{IN} = 0V	25.0		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_{CC} = 3.3V, T_A = 25°C ambient and maximum loading.
3. 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.
4. 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	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} = 3.4V, control inputs only); I and Y pins do not contribute to I_{CC}.

Switching Characteristics over Operating Range

Parameters	Description	Conditions(1)	PI3B33X257 Com. Min.	PI3B33X257 Com. Max.	Units
t_{IY}	Propagation Delay(2,3) In to Yn	C_L = 50pF, R_L = 500Ω		0.25	ns
t_{SY}	Bus Select Time Sn to Yn		1	4.5	
t_{PZH} t_{PZL}	Bus Disable Time $\overline{E}$ to Yn		1	4.5	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{E}$ to Yn		1	4.8	

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 Number	Pin / Package	Temperature
PI33X257B	48-BQSOP (B48)	–40°C to +85°C