3.3V, 10-Bit, 2-Port BusSwitch with SSTL-2 Enable

Product Features

- Near zero propagation delay
- 20 Ohm switches connect inputs to outputs
- Fast Switching Speed - 3.8ns (max.)
- Packages available:
  - 24-pin 150 mil wide plastic QSOP (Q)
  - 24-pin 173 mil wide plastic TSSOP (L)

Product Description

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

The PI3B3863 is a 10-bit, 3.3 volt two-port bus switch 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, which is SSTL-2 compatible.

Logic Block Diagram
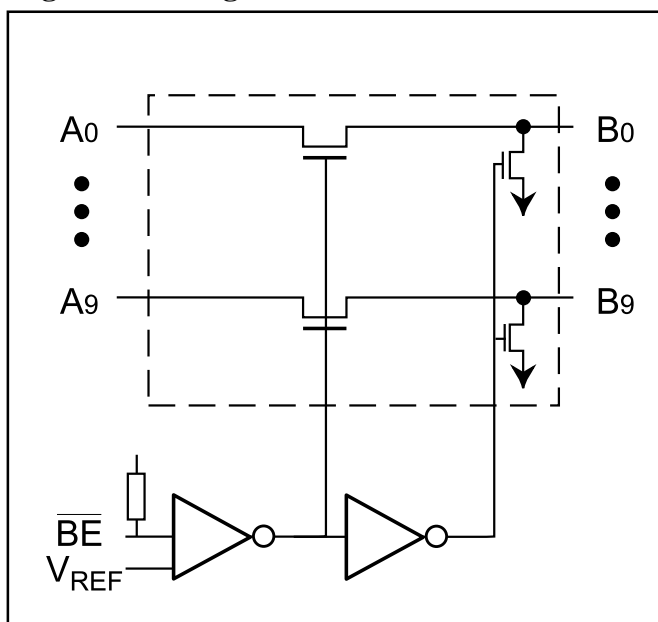
Product Pin Configuration
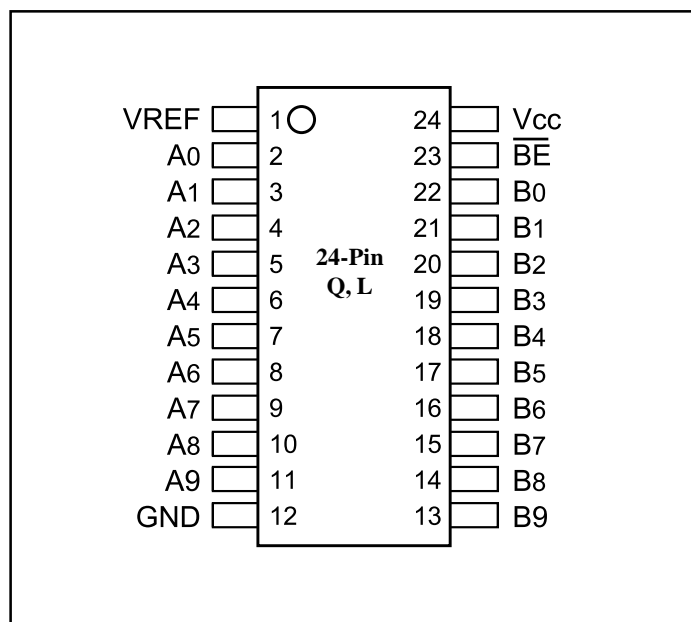
Truth Table[1]

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

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

Product Pin Description

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

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 +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, $T_A = 0°C$ to $+70°C$, $V_{CC} = 3.3V \pm 5\%$)

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
V_{IH}	Input HIGH Voltage ($\overline{BE}$)	Guaranteed Logic HIGH Level	V_{REF}+0.18		3	V
V_{IL}	Input LOW Voltage ($\overline{BE}$)	Guaranteed Logic LOW Level	-0.3		V_{REF} - 0.18	V
V_{REF}	Input Reference Voltage		1.15	1.25	1.35	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			±100	µA
I_{OZH}	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			±250	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} = 0.8V, I_{ON} = 20mA & V_{IN} = 1.6V, I_{ON} = 15mA	17	25	36	Ω

Capacitance ($T_A = 25°C$, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	4.5	pF
C_{OFF}	A Capacitance, Switch Off	V_{IN} = 0V	3.5	pF
C_{ON}(A/B)	A/B Capacitance, Switch On	V_{IN} = 0V	9.5	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 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.
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}		1.8	2.5	mA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.0V[3]		1.9	2.5	mA

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 (control input only); A and B pins do not contribute to I_{CC}.

Switching Characteristics over Operating Range

Parameters	Description	Conditions[2,3]	PI3B3863 Com.		Units
			Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay[2,3] Ax to Bx, Bx to Ax	C_L = 50pF, R_L = 500Ω		1	ns
t_{PZH} t_{PZL}	Bus Enable Time BE to Ax or Bx	C_L = 20pF, R_L = 500Ω, R = 500Ω,	1	3	
		C_L = 50pF, R_L = 500Ω, R = 500Ω,	1	3.5	
t_{PHZ} t_{PLZ}	Bus Disable Time BE to Ax or Bx	C_L = 20pF, R_L = 500Ω, R = 500Ω,	1	3.2	
		C_L = 50pF, R_L = 500Ω, R = 500Ω,	1	3.8	

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	Pin-Package	Temperature
PI3B3863Q	24 - QSOP(Q)	–40°C to +85°C
PI3B3863L	24 - TSSOP(L)	–40°C to +85°C