3.3V, 20:10 DDR Mux/Demux Bus Switch w/Dual Enables

Product Features

- Near-zero propagation delay
- 20-ohm switches connect inputs to outputs
- Fast Switching Speed –3ns (max.)
- Low Off Capacitance (3pF)
- Pull-down on B output
- Packages available:
  –48-pin 154 Mil (3.9mm) Wide BQSOP (B)

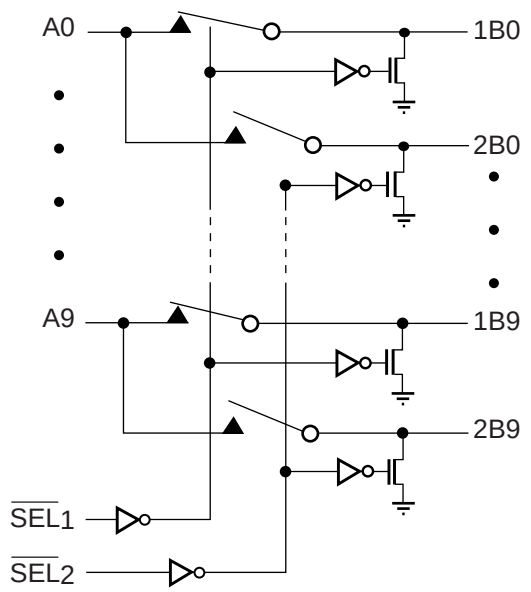
Product Description

Pericom Semiconductor's PI2B series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

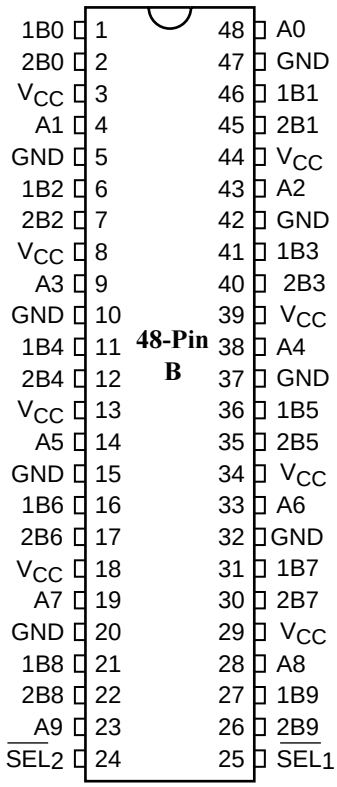
The PI2BV3868 is a 20:10, 2.5V/3.3V Mux/Demux bus switch designed with a low ON-resistance allowing inputs to be connected directly to outputs. The bus switch creates no additional propagation delay or additional ground bounce noise. The switches are turned ON by two Low Enable Select ($\overline{SEL}$) signals.

The PI2BV3868 switch can be used for High-Performance Memory Module Applications, where the seperate SELECTS allow for transferring clock, address, or data to two destinations.

Logic Block Diagram



Pin Configuration



Pin Description

Pin Name	Description
SEL_Y	Bus Enable Input
A_X	Demux Inputs
$_YB_X$	Mux Inputs
GND	Ground
V_{CC}	Power

Notes:
H = High Voltage Level; L = Low Voltage Level
X = 0 through 9; Y = 1 or 2

Truth Table

Function	$\overline{SEL_1}$	$\overline{SEL_2}$
A_X to $_1B_X$; Terminate $_2B_X$	L	H
A_X to $_2B_X$; Terminate $_1B_X$	H	L
nA to nB_1 and nB_2	L	L
nB_1, nB_2 = Hi-Z	H	H

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	–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°C to +85°C, V_{CC} = 3.3V±10%)

Parameters	Description	Test Conditions[1]	Min.	Typ[2]	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	1.6	–	V_{CC}+0.3	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	–0.3	–	0.9	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA	–	–	–1.2	
I_{IH}/I_{IL}	Input High/Low Current	V_{CC} = Max; V_{IN} = V_{CC} or GND	–	–	±10	µA
R_{ON}	Switch ON Resistance[4]	V_{CC} = Min., V_{IN} = 0.9V, I_{ON} = 20mA	–	17	33	Ω
		V_{CC} = Min., V_{IN} = 1.6V, I_{ON} = 15mA	–	22	30	
$R_{P/D}$	Pull-Down Resistance[5]	$V_{BIAS\ (B\text{-}Ports)}$ = 1.8V, I_{OZH} ≤180µA	10	–	–	kΩ

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[1]	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3	pF
C_{OFF}(A)	A Capacitance, Switch Off		6	
C_{OFF}(B)	B Capacitance, Switch Off		3	
C_{ON}(A/B)	A/B Capacitance, One Switch On		9	
C_{ON}(A/B_0 & A/B_1)	A/B Capacitance, All Switches On		12	

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.
5. Pull-down resistance is measured with the switch OFF and calculated by $V_{BIAS(B\text{-}Port)}$ / I_{OZH}.

Power Supply Characteristics

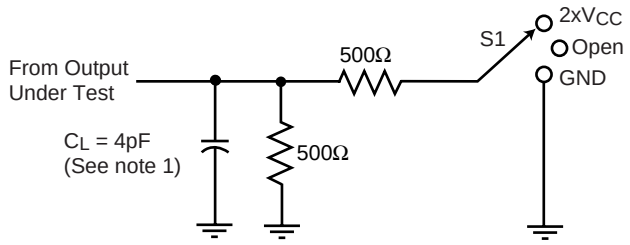
Parameters	Description	Test Conditions[1]	Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max, V_{IN} = GND or V_{CC}	–	–	10	µA

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

Switching Characteristics over Operating Range

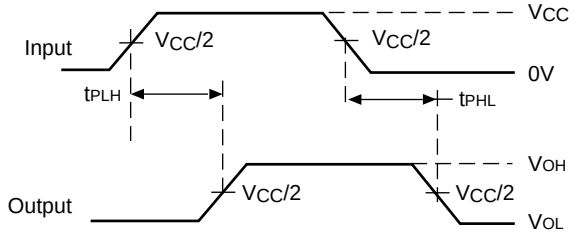
Parameters	Description	Conditions(1)	PI2BV3868 Com. Min.	PI2BV3868 Com. Typ.	PI2BV3868 Com. Max.	Units
f_{OATA}	Max Data Frequency(8)	–	–	–	266	MHz
t_{PLH} t_{PHL}	Propagation Delay (2,3,7) A_N to B_N, B_N to A_N (t_{PD})	C_L = 4pF R_L = 500 ohms	–	0.5	1	ns
t_{PZH} t_{PZL}	Bus Enable Time(6) SEL to A_N, B_N		0.6	–	2.5	
			0.6	–	2.5	
t_{PHZ} t_{PLZ}	Bus Disable Time(5) SEL to A_N, B_N		0.6	–	1.8	
			0.6	–	1.8	

Parameter Measurements

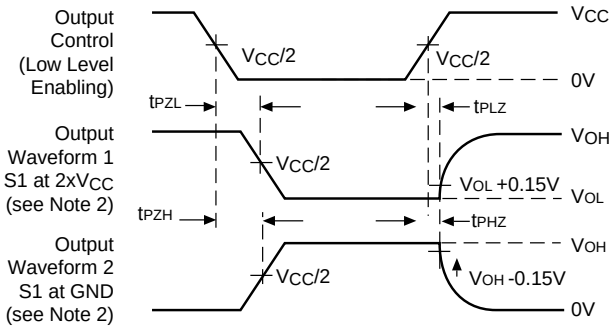


Load Circuit

Test	S1
t_{PD}	Open
t_{PLZ}/t_{PZL}	$2xV_{CC}$
t_{PHZ}/t_{PZH}	GND



Voltage Waveforms
Propagation Delay Times

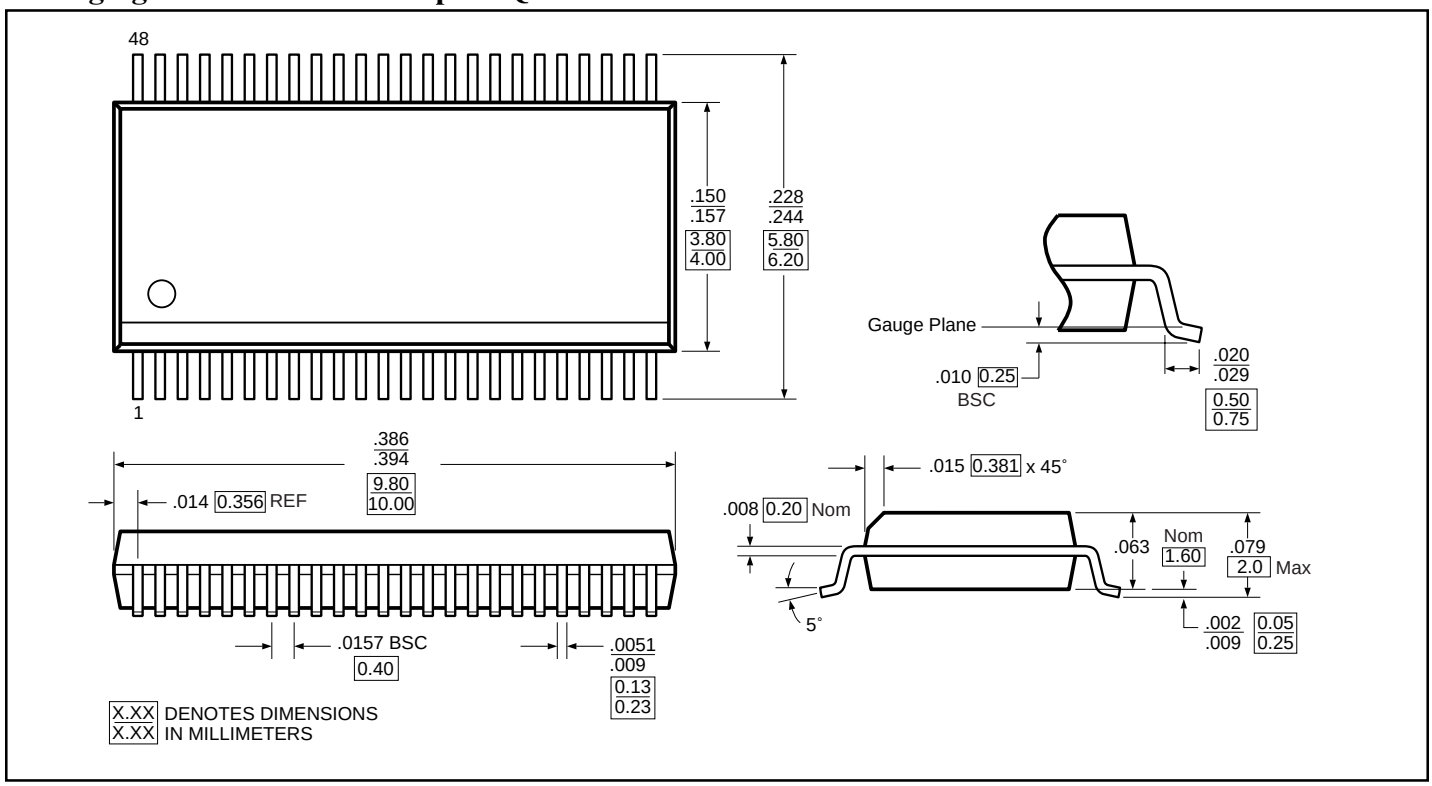


Voltage Waveforms
Enable and Disable Times

Notes:

1. C_L includes probe and jig capacitance.
2. Waveform 1 is for an output with internal conditions such that the output is LOW except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is HIGH except when disabled by the output control.
3. All input pulses are supplied by generators having the following characteristics: PRR<10MHz, Z_O = 50 ohms, $t_R \le 2$ns, $t_F \le 2$ns.
4. The outputs are measured one at a time with one transition per measurement.
5. t_{PLZ} and t_{PHZ} are the same as t_{DIS}.
6. t_{PZL} and t_{PZH} are the same as t_{EN}.
7. t_{PLH} and t_{PHL} are the same as t_{PD}.
8. Guaranteed by design, but not production tested.

Packaging Mechanical B-48: 48-pin BQSOP



Ordering Information

Part	Pin - Package	Temperature
PI2BV3868B	48 - BQSOP (B)	40°C to +85°C