2.5V/3.3V, High Bandwidth, Hot Insertion 20-Bit, 2-Port, Bus Switch

Features

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs (PI3C32X384)
- High Bandwidth Operation (>400 MHz)
- Permits Hot Insertion
- 5V I/O Tolerant
- 2.5V Supply Voltage Operation
- Packaging (Pb-free & Green):
  - 48-pin 150-mil wide plastic BQSOP (B)

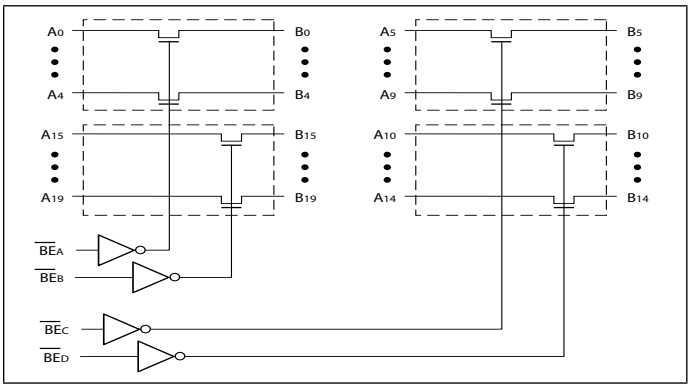
Description

Pericom Semiconductor's PI3C32X384, is a 2.5V or 3.3Volt, highbandwidth 20-bit, 2-port bus switches designed with a low Onresistance 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. Four bus enable signals are provided, one for each of the upper and lower five bits of the two 10-bit buses.

Applications

- High Bandwidth Data switching
- Hot Docking

Block Diagram

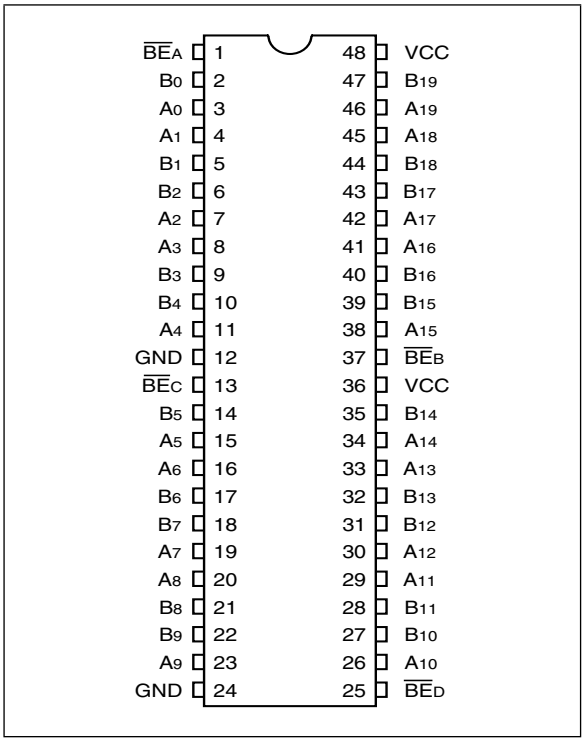


Truth Table(1)

Function	$\overline{BE}$A	$\overline{BE}$B	B0-B4	B5-B9
Disconnect	H	H	Hi-Z	Hi-Z
Connect	L	H	A4-A0	Hi-Z
Connect	H	L	Hi-Z	A19-A15
Connect	L	L	A4-A0	A19-A15
Function	**$\overline{BE}$C**	**$\overline{BE}$D**	**B9-B5**	**B14-B10**
Disconnect	H	H	Hi-Z	Hi-Z
Connect	L	H	A9-A5	Hi-Z
Connect	H	L	Hi-Z	A14-A10
Connect	L	L	A9-A5	A14-A10

Note:
1. H = High Voltage Level, X = Don't Care,
   L = Low Voltage Level, Hi-Z = High Impedance

Pin Configuration



Pin Description

Pin Name	Description
$\overline{BE}$X	Bus Enable Input (Active LOW)
A19 - A0	Bus A
B19 - B0	Bus B
GND	Ground
V_{CC}	Power

Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-65	150	°C
Ambient Temperature with Power Applied	-40	85	°C
Supply Voltage to Ground Potential	-0.5	4.6	V
DC Input Voltage	-0.5	5.5	V
DC Output Current	-	120	mA
Power Dissipation	-	0.5	W

Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

DC Electrical Characteristics (Over the Operating Range, $T_A = -40°C$ to $+85°C$, $V_{CC} = 3.3V \pm 10\%$)

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	
I_{OZH}	High Impedance Output Current	$0 \le A, B \le V_{CC}$			±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18 mA		-0.73	-1.2	V
R_{ON}	Switch On Resistance[3]	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA or 64mA		5	7	Ω
		V_{CC} = Min, V_{IN} = 2.4V, I_{ON} = 15mA		8	15	

Capacitance ($T_A = 25°C$, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3.5	pF
C_{OFF}	A/B Capacitance, Switch Off		5.0	pF
C_{ON}	A/B Capacitance, Switch On		10.0	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 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}		0.5	1.0	mA
ΔI_{CC}	Supply Current per Input HIGH	V_{CC} = Max. V_{IN} = 3.0V[3]			2.5	

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}.

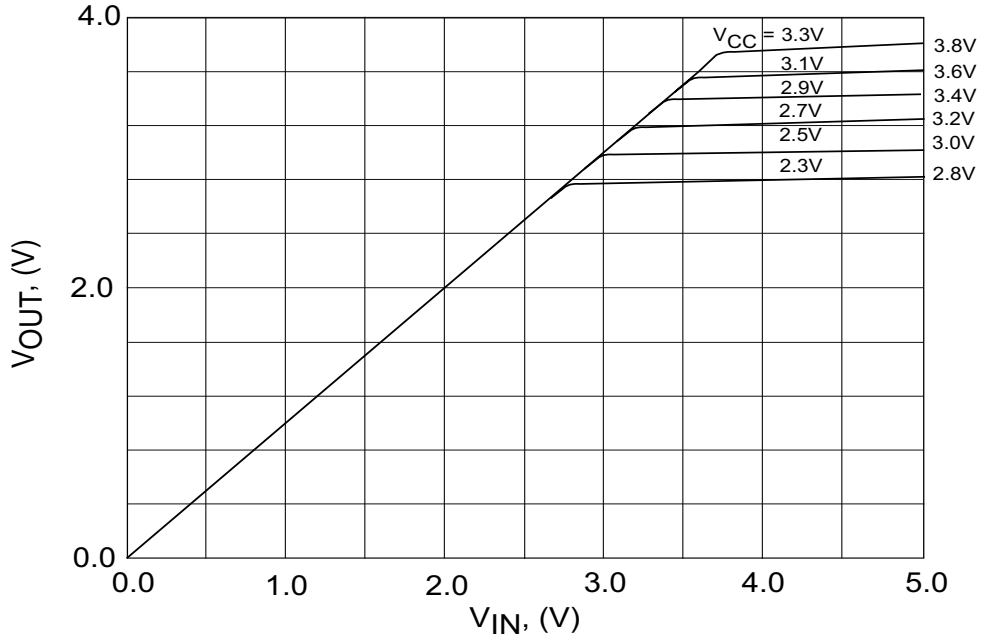
Switching Characteristics over 3.3V Operating Range

Parameters	Description	Test Conditions [1]	Com.		Units
			Min	Max	
t_{PLH} t_{PHL}	Propagation Delay[2,3] Ax to Bx, Bx to Ax	C_L = 50 pF R_L = 500Ω		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time $\overline{BE}$ to Ax or Bx		1.5	6.5	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{BE}$ to Ax or Bx		1.5	5.5	

Switching Characteristics over 2.5V Operating Range

Parameters	Description	Test Conditions [1]	Com.		Units
			Min	Max	
t_{PLH} t_{PHL}	Propagation Delay[2,3] Ax to Bx, Bx to Ax	C_L = 50 pF R_L = 500Ω		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time $\overline{BE}$ to Ax or Bx		1.5	9.8	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{BE}$ to Ax or Bx		1.5	8.3	

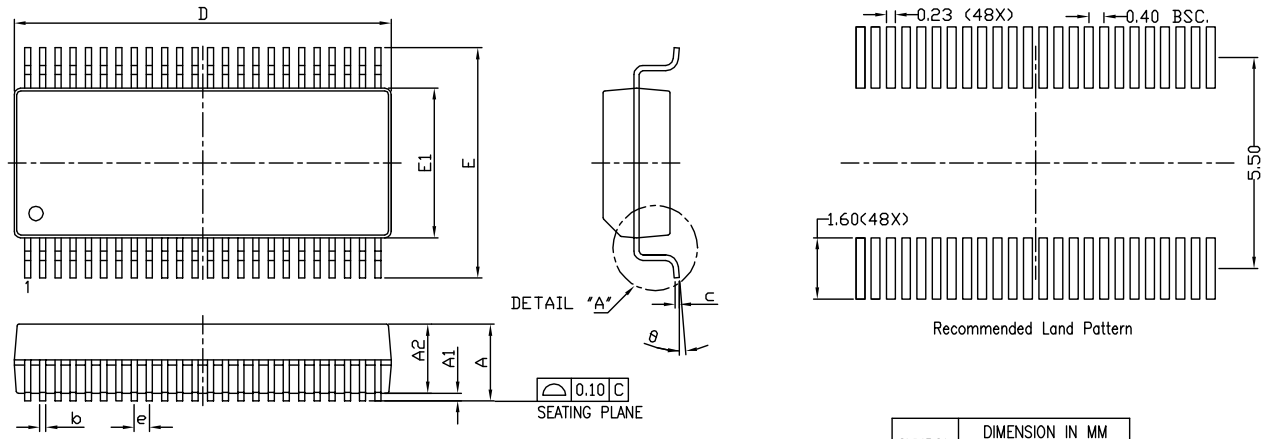
Notes:
1. See test circuit and waveforms.
2. This parameter is guaranteed but not tested on Propagation Delays.
3. The bus switch contributes no propagational delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25 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.

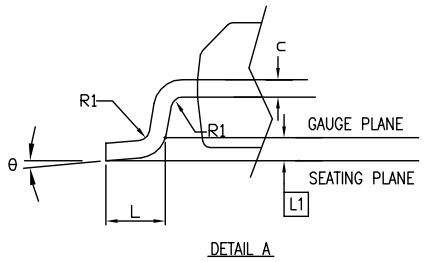


Output Voltage vs. Input Voltage over Various Supply Voltages

Output Voltage vs. Input Voltage over Various Supply Voltages

Packaging Mechanical: 48-pin BQSOP (B)





SYMBOL	DIMENSION IN MM		
	MIN.	NOM	MAX.
A			2.00
A1	0.05		0.25
A2	1.45	1.60	1.75
c	0.09		0.20
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
L	0.50	0.60	0.75
L1	0.25 BASIC		
θ	0		8
b	0.13		0.23
e	0.40 BASIC		
D	9.80	9.90	10.00
R1	0.09		

Notes:
1. Controlling Dimension in Millimeters. Angle in Degrees.
2. Refer JEDEC MO-154/AB
3. Package Outline Exclusive of Mold Flash and Metal Burr

PERICOM Semiconductor Corporation — DATE: 10/15/08

DESCRIPTION: 48-Pin, 154-Mil Wide BQSOP

PACKAGE CODE: B48

DOCUMENT CONTROL #: PD-1210 — REVISION: F

08-0522

Ordering Information

Ordering Code	Package Code	Package Type
PI3C32X384BE	B	Pb-free & Green, 48-pin BQSOP

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/