PI3VT32X245-A

16-Bit, 2-Port, Low Voltage Translator Bus Switch

Features

➔ Near-Zero propagation delay

➔ Low On-Resistance switches connect inputs to outputs

➔ 2.5V to 3.3V Supply Voltage Operation

➔ 2.5V or 1.8V switching

➔ Packaging (Pb-free & Green available):
  ▫ 40-pin 150 mil wide BQSOP (B)

Features

➔ 3.3V to 2.5V level shifting (voltage translation)

➔ 2.5V to 1.8V level shifting (voltage translation)

Description

Pericom Semiconductor's PI3VT series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

The PI3VT32X245-A, a 2.5V or 3.3V 16-bit 2-port bus switch, is designed with a low ON resistance (5 ohms). The switches are turned ON or enabled by the Bus Enable ($\overline{BE}n$) input signals.

Given a 3.3V supply and an input voltage of 3.3V, the switch translates to an output voltage of 2.5V. Similarly, when operated with a 2.5V supply and given 2.5V inputs, the device translates the outputs to 1.8V.

Block Diagram
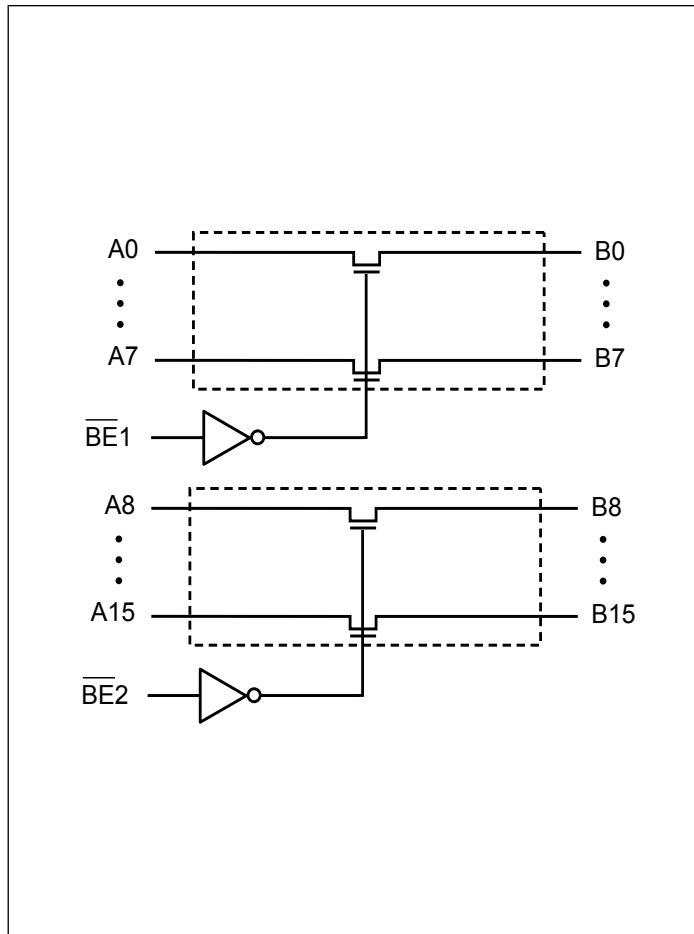
Pin Configuration

12-0246

1

08/10/12
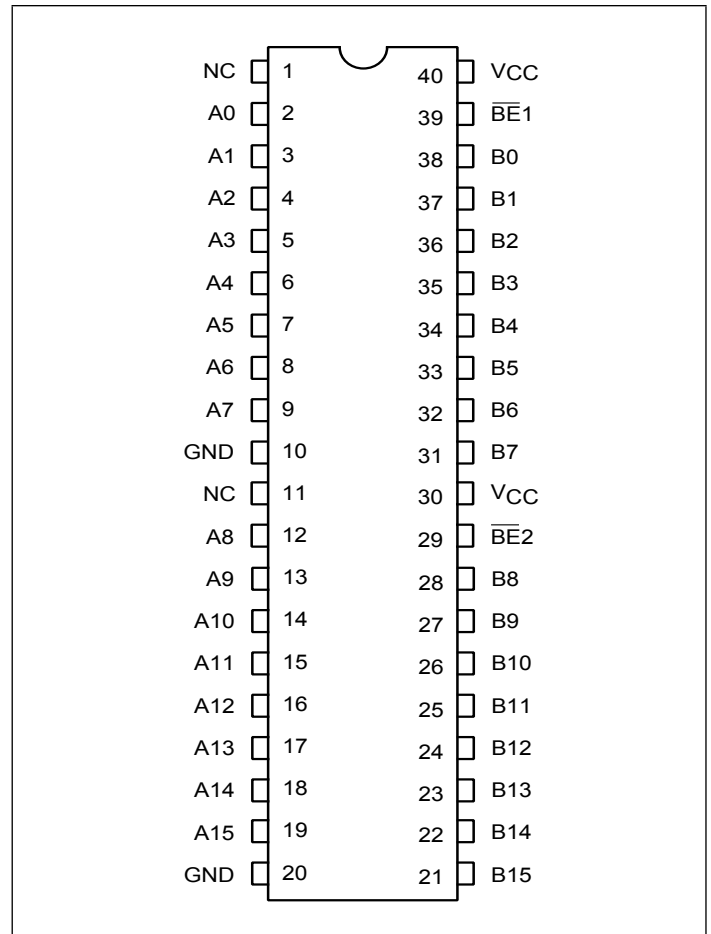
Pin Description

Pin Name	I/O	Description
$\overline{BE}_N$	I	Bus Enable Input (Active LOW)
A0 – A15	I/O	Bus A
B0 – B15	I/O	Bus B

Truth Table[1]

Function	$\overline{BE}_N$	A0 - 15
Disconnect	H	Hi-Z
Connect	L	B0 – 15

Notes:

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

Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-65	150	ºC
Ambient Temperature with Power Applied	-40	85	ºC
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 ±10%)

Parameters	Description	Test Conditions[1]	Min	Typ [2]	Max	Units
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	1.8		V_{CC} +0.3V	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5		0.8	
V_{IH}	Input HIGH Voltage	V_{CC} = 2.5V	1.6		V_{CC} +0.3V	V
V_{IL}	Input LOW Voltage	V_{CC} = 2.5V	-0.5		0.6	
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	$0 \leq A, B \leq V_{CC}$			±1	
R_{ON}	Switch On Resistance	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = -8mA		5	9	Ω
		V_{CC} = Min., V_{IN} = 1.7V, I_{ON} = -8mA		18	30	
		V_{CC} = 2.3V, V_{IN} = 0.0V, I_{ON} = −8mA		6	10	
		V_{CC} = 2.3V, V_{IN} = 1.3V, I_{ON} = −8mA		35	50	
V_P	Pass Voltage	V_{IN} = V_{CC} = 3.3V, I_{OUT} = −5μA	2.1	2.3	2.7	V
		V_{IN} = V_{CC} = 2.5V, I_{OUT} = −5μA		1.6		

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[3]	Description	Test Conditions	Typ	Units
C_{IN}	Input Capacitance		3.5	
C_{OFF}	A/B Capacitance, Switch Off	V_{IN} = 0V	5.0	pF
C_{ON}	A/B Capacitance, Switch On		10.0	

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. 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}			6	µA
ΔI_{CC}	Supply Current per Input HIGH		V_{IN} = 3V[3]			100	

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

Switching Characteristics over 3.3V±0.3V Operating Range

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

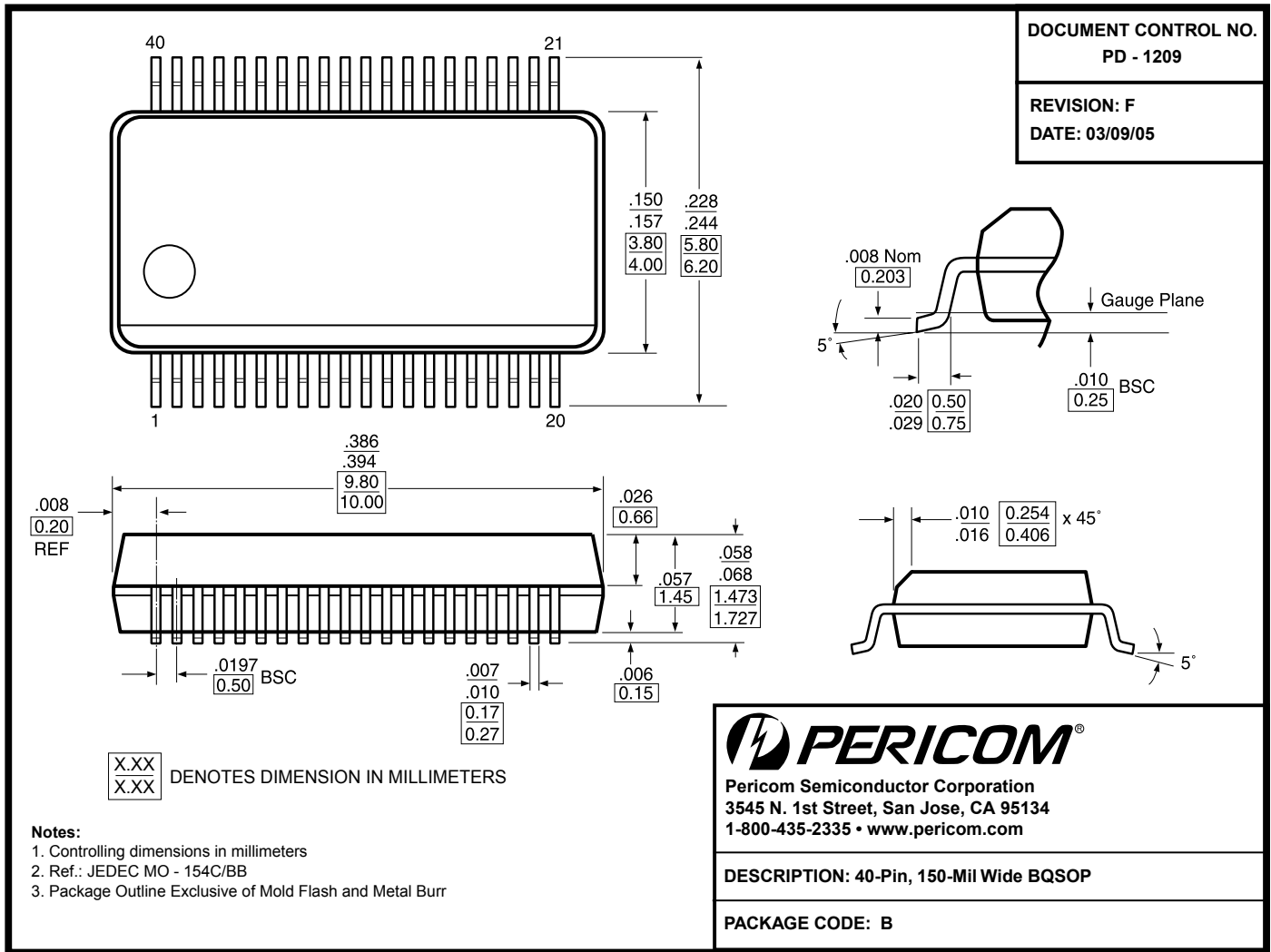## Switching Characteristics over 2.5V±0.2V Operating Range

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

Packaging Mechanical: 40-pin BQSOP (B)

DOCUMENT CONTROL NO.
PD - 1209

REVISION: F
DATE: 03/09/05

.008 Nom
0.203

Gauge Plane

5°

.010 BSC
0.25

.020 0.50
.029 0.75

.150 .228
.157 .244
3.80 5.80
4.00 6.20

.386
.394
9.80
10.00

.008
0.20
REF

.026
0.66

.058
.068
1.473
1.727

.057
1.45

.010 0.254 x 45°
.016 0.406

5°

.0197 BSC
0.50

.007 .006
.010 0.15
0.17
0.27

X.XX
--- DENOTES DIMENSION IN MILLIMETERS
X.XX

Notes:
1. Controlling dimensions in millimeters
2. Ref.: JEDEC MO - 154C/BB
3. Package Outline Exclusive of Mold Flash and Metal Burr

Pericom Semiconductor Corporation
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DESCRIPTION: 40-Pin, 150-Mil Wide BQSOP

PACKAGE CODE: B

Ordering Information

Ordering Code	Package Code	Package Type
PI3VT32X245-ABE	B	Pb-free & Green, 40-pin BQSOP

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free & Green
3. Adding an X suffix = Tape/Reel

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