

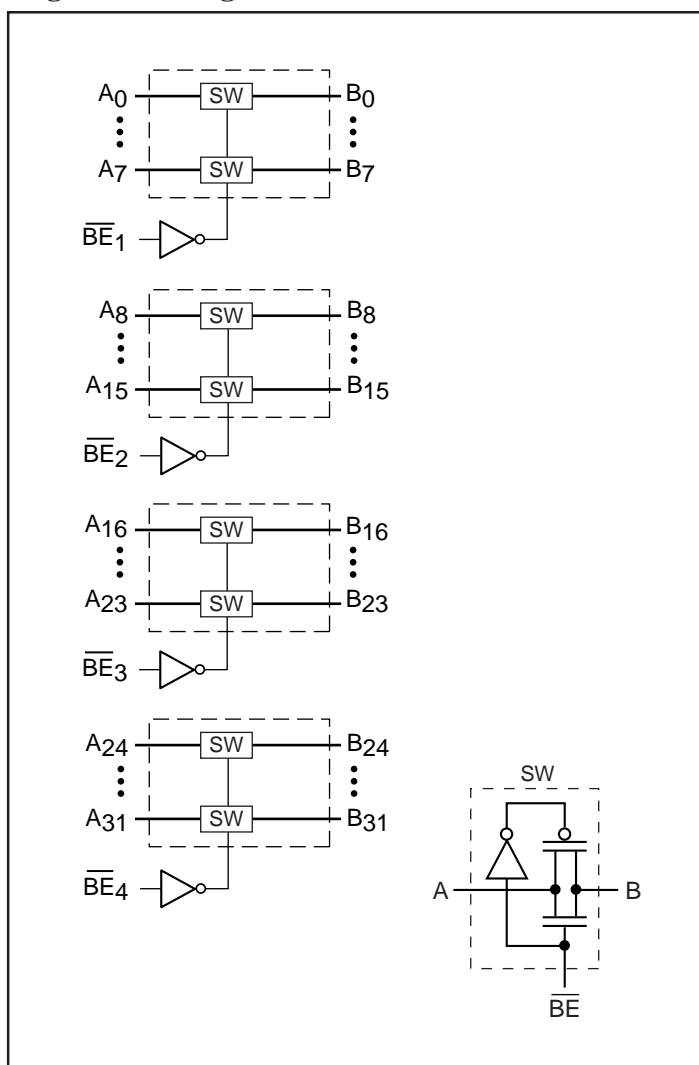
#### Product Features

- Fast Switching Speed - 4.5ns max.
- Near-zero propagation delay
- 5-Ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra-low quiescent power (1.0μA typical)
  - Ideally suited for notebook applications
- Industrial operating temperature: -40°C to +85°C
- TTL - compatible control of input levels
- Packaging (Pb-free & Green available):
  - 80-pin, 150-mil wide plastic BQSOP (B)

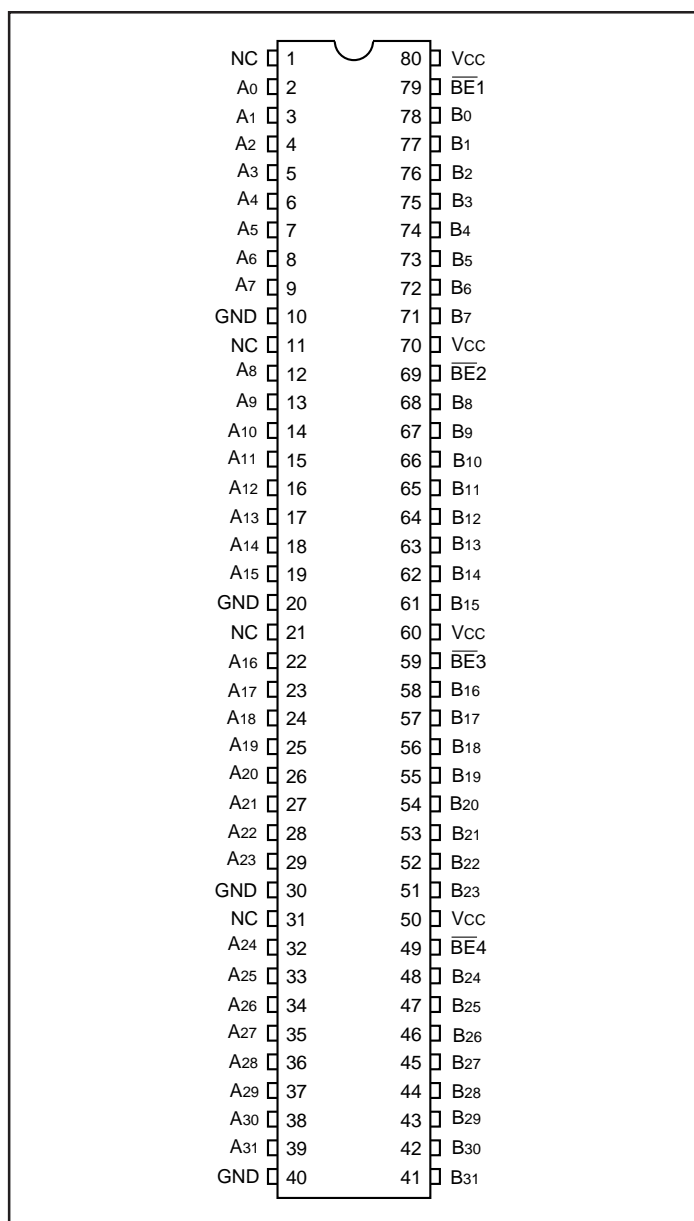
#### Product Description

The PI3B34X245 is a 3.3V, 32-bit, 2-port bus switch. Four enable signals ( $\overline{BEn}$ ) turn the switches on. The bus switch creates no additional propagational delay or additional ground bounce noise.

#### Logic Block Diagram



#### Product Pin Configuration



### Truth Table<sup>(1)</sup>

Function	$\overline{\text{BEn}}$	A0–31
Disconnect	H	Hi-Z
Connect	L	B0–31

**Notes:**

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

### Product Pin Description

Pin Name	I/O	Description
$\overline{\text{BEn}}$	I	Bus Enable Input (Active LOW)
A0-A31	I/O	Bus A
B0-B31	I/O	Bus B

### 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 +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, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ , $V_{CC} = 3.3\text{V} \pm 10\%$ )

Parameters	Description	Test Conditions	Min.	Typ.	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	
$I_{IH}$	Input HIGH Current	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$	—	—	±1	μA
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$	—	—		
$I_{OZH}$	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$	—	—		
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{NN} = -18\text{mA}$	—	—	–0.8	V
$R_{ON}$	Switch On Resistance	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$	—	5	8	Ω
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$	—	10	17	

### Capacitance ( $T_A = 25^\circ\text{C}, f = 1\text{MHz}$ )

Parameters <sup>(5)</sup>	Description	Test Conditions	Typ.	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	3.5	pF
$C_{OFF}$	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	8.0	pF
$C_{ON}$	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	16.0	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  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^\circ\text{C}$  ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. 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.
5. This parameter is determined by device characterization but is not production tested.

### Power Supply Characteristics

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
I <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>	—	1.0	10	μA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.0V <sup>(3)</sup>	—	—	750	

**Notes:**

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V<sub>CC</sub> = 3.3V, +25°C ambient.
3. Per TTL driven input (control input only); A and B pins do not contribute to I<sub>CC</sub>.
4. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A and B inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

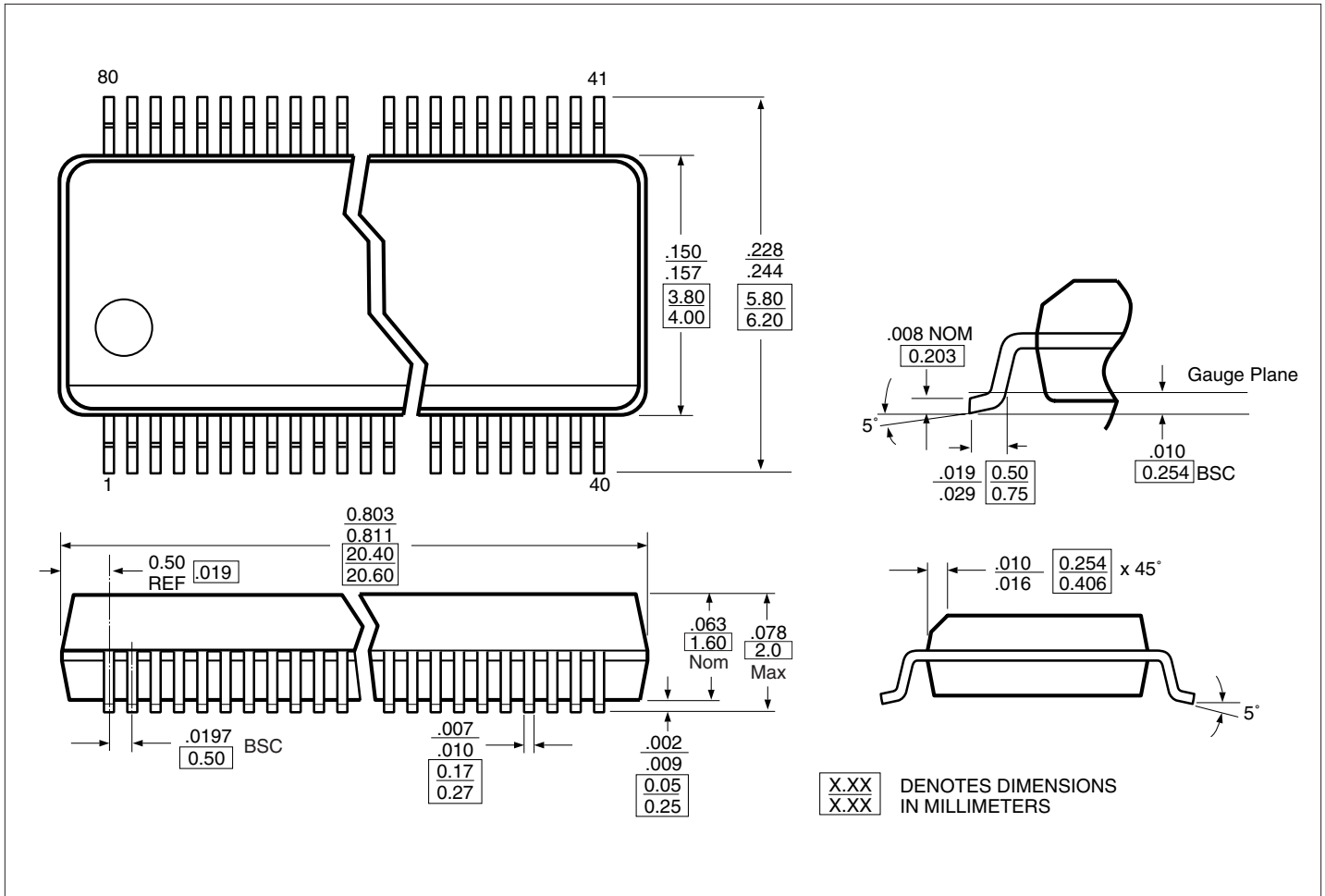
### Switching Characteristics over Operating Range

Parameters	Description	Conditions <sup>(1)</sup>	PI3B34X245		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx, Bx to Ax	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω	—	0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time BE to Ax or Bx	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω	1.0	4.0	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time BE to Ax or Bx	R = 500Ω	1.0	4.5	

**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.

**Packaging Mechanical: 80-pin BQSOP (B)**



**Ordering Information**

Ordering Code	Package Type
PI3B34X245B	80-pin, 150-mil wide plastic BQSOP
PI3B34X245BE	Pb-free & Green, 80-pin, 150-mil wide plastic BQSOP

**Applications Information**

**Logic Inputs**

The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a +3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

**Power-Supply Sequencing and Hot-Plug Information**

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V<sub>CC</sub> and GND before applying signals to input/output or control pins.

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