

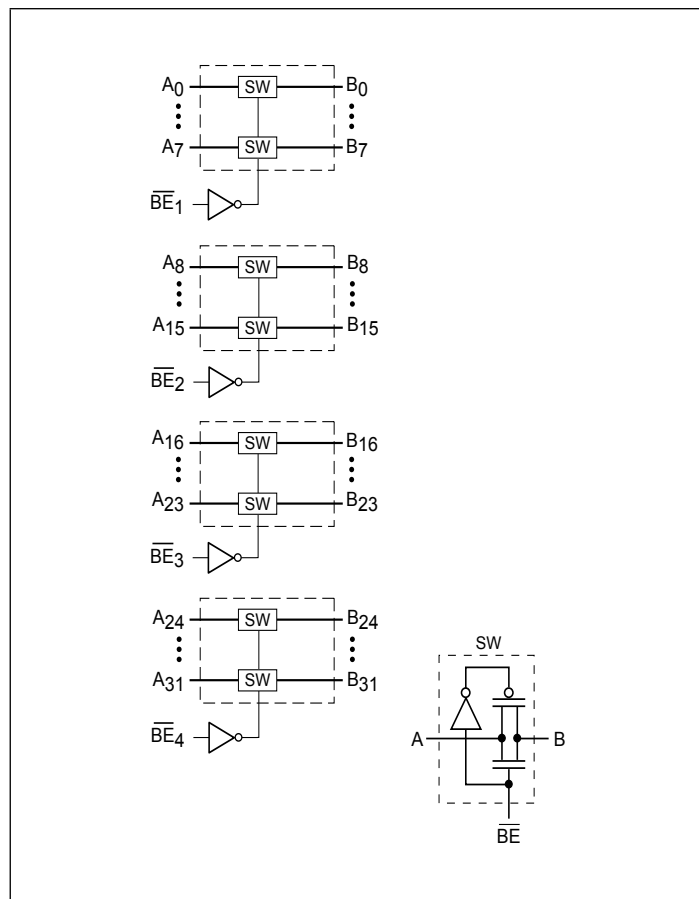
Features

- 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):
 - 80-pin 150-mil wide plastic BQSOP (B)

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.

Block Diagram



Pin Configuration

| | | | |
|-----|----|----|------------------|
| NC | 1 | 80 | VCC |
| A0 | 2 | 79 | $\overline{BE1}$ |
| A1 | 3 | 78 | B0 |
| A2 | 4 | 77 | B1 |
| A3 | 5 | 76 | B2 |
| A4 | 6 | 75 | B3 |
| A5 | 7 | 74 | B4 |
| A6 | 8 | 73 | B5 |
| A7 | 9 | 72 | B6 |
| GND | 10 | 71 | B7 |
| NC | 11 | 70 | VCC |
| A8 | 12 | 69 | $\overline{BE2}$ |
| A9 | 13 | 68 | B8 |
| A10 | 14 | 67 | B9 |
| A11 | 15 | 66 | B10 |
| A12 | 16 | 65 | B11 |
| A13 | 17 | 64 | B12 |
| A14 | 18 | 63 | B13 |
| A15 | 19 | 62 | B14 |
| GND | 20 | 61 | B15 |
| NC | 21 | 60 | VCC |
| A16 | 22 | 59 | $\overline{BE3}$ |
| A17 | 23 | 58 | B16 |
| A18 | 24 | 57 | B17 |
| A19 | 25 | 56 | B18 |
| A20 | 26 | 55 | B19 |
| A21 | 27 | 54 | B20 |
| A22 | 28 | 53 | B21 |
| A23 | 29 | 52 | B22 |
| GND | 30 | 51 | B23 |
| NC | 31 | 50 | VCC |
| A24 | 32 | 49 | $\overline{BE4}$ |
| A25 | 33 | 48 | B24 |
| A26 | 34 | 47 | B25 |
| A27 | 35 | 46 | B26 |
| A28 | 36 | 45 | B27 |
| A29 | 37 | 44 | B28 |
| A30 | 38 | 43 | B29 |
| A31 | 39 | 42 | B30 |
| GND | 40 | 41 | B31 |

Truth Table⁽¹⁾

| 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

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 |

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 | 7.0 | V |
| DC Input Voltage | -0.5 | 7.0 | 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, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$)

| Parameters | Description | Test Conditions | 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 | $V_{CC} = \text{Max.}, V_{IN} = V_{CC}$ | | | ± 1 | μA |
| I_{IL} | Input LOW Current | $V_{CC} = \text{Max.}, V_{IN} = \text{GND}$ | | | ± 1 | |
| I_{OZH} | High Impedance Output Current | $0 \leq A, B \leq V_{CC}$ | | | ± 1 | |
| V_{IK} | Clamp Diode Voltage | $V_{CC} = \text{Min.}, I_{IN} = -18\text{ mA}$ | | | -1.2 | 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 ⁽⁵⁾ | Description | Test Conditions | Typ | Units |
|---------------------------|-----------------------------|----------------------|------|-------|
| C_{IN} | Input Capacitance | $V_{IN} = 0\text{V}$ | 3.5 | pF |
| C_{OFF} | A/B Capacitance, Switch Off | | 8.0 | pF |
| C_{ON} | A/B Capacitance, Switch On | | 16.0 | pF |

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ ambient and maximum loading.
- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- 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.
- 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} | | 1.0 | 10 | μA |
| ΔI _{CC} | Supply Current per Input @ TTL HIGH | | V _{IN} = 3.0V ⁽³⁾ | | | 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_{CC} = 3.3V, +25°C ambient.
3. Per driven input (control input only); A and B pins do not contribute to I_{CC}.
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 | 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 $\overline{\text{BE}}$ to Ax or Bx | C _L = 50 pF R _L = 500Ω | 1.0 | 4.0 | |
| t _{PHZ} t _{PLZ} | Bus Disable Time $\overline{\text{BE}}$ 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 0.25 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.

Applications Information

Logic Inputs

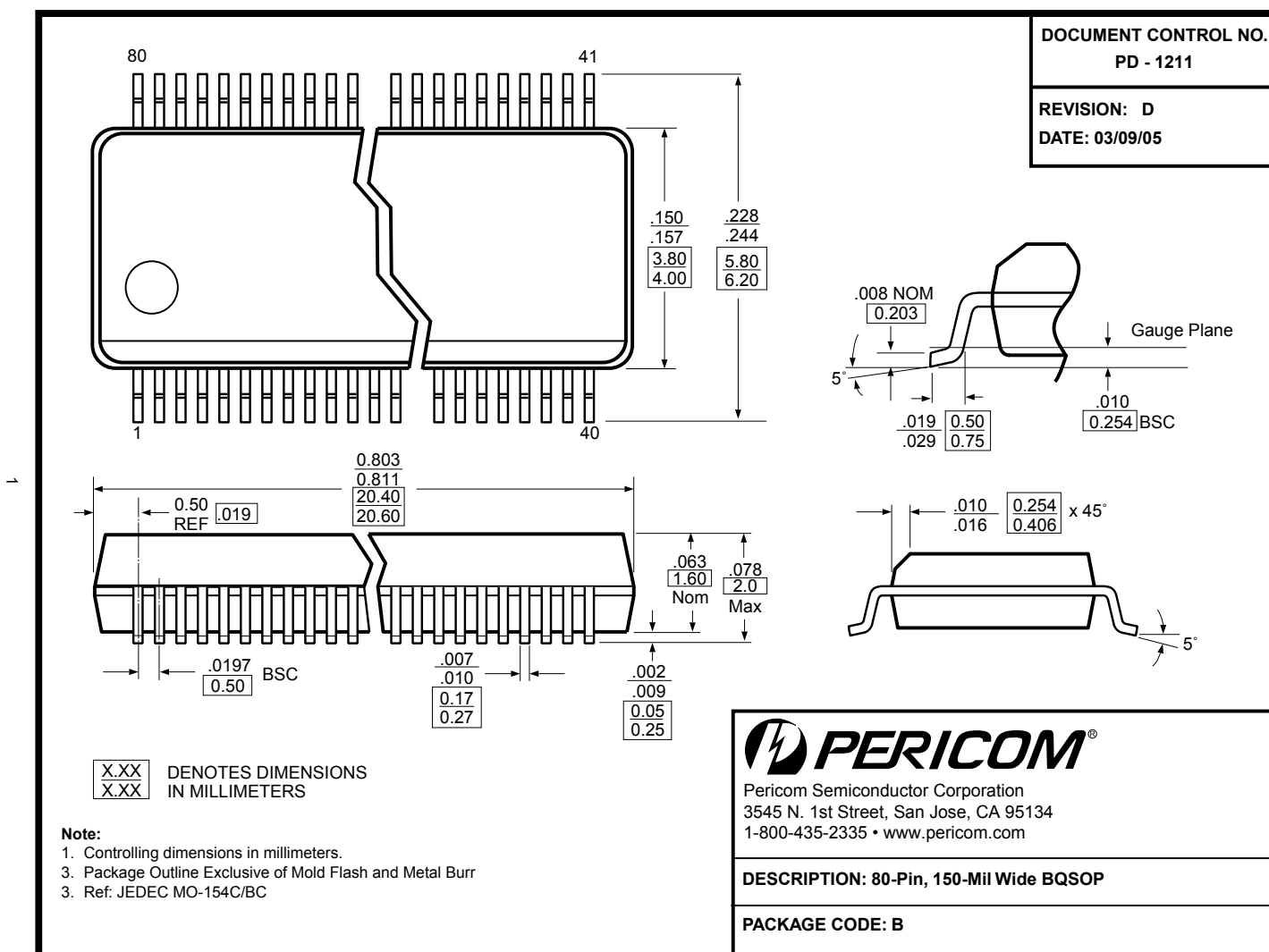
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a + 3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

Power-Supply Sequencing and Hot-Plug Information

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

Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd.

Packaging Mechanical: 80-pin BQSOP (B)



Ordering Information

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

1. Thermal characteristics can be found on the company web site at : <http://www.pericom.com/support/packaging/packaging-mechanicals-and-thermal-characteristics/>
2. "E" denotes Pb-free and Green
3. Adding an "X" at the end of the ordering code denotes tape and reel packaging