

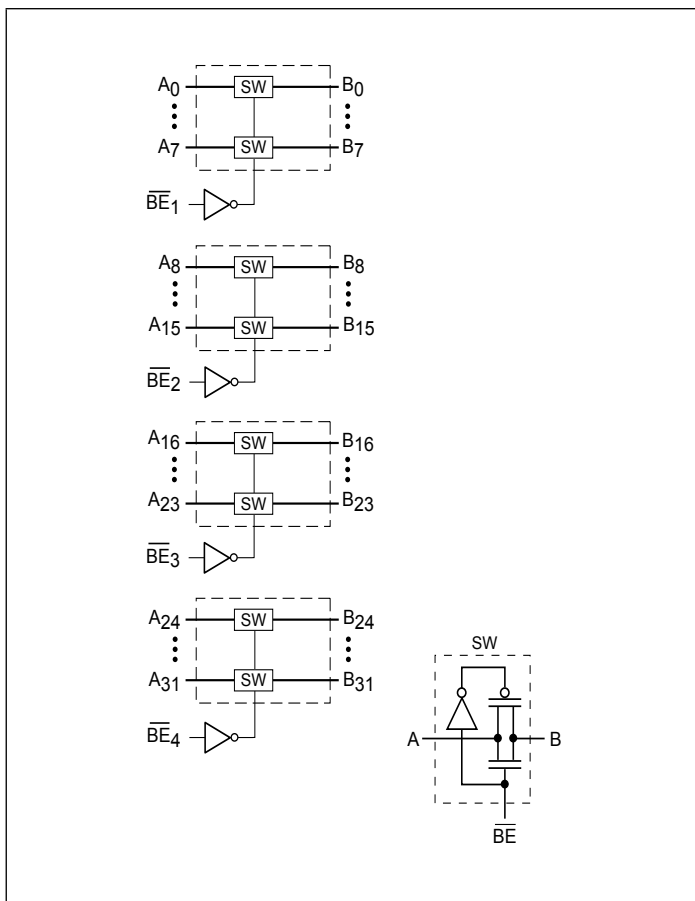
Features

- 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 ($\overline{BE}n$) 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	$\overline{BE}1$
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	$\overline{BE}2$
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	$\overline{BE}3$
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	$\overline{BE}4$
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	$\overline{\text{B}}\text{En}$	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
$\overline{\text{B}}\text{En}$	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

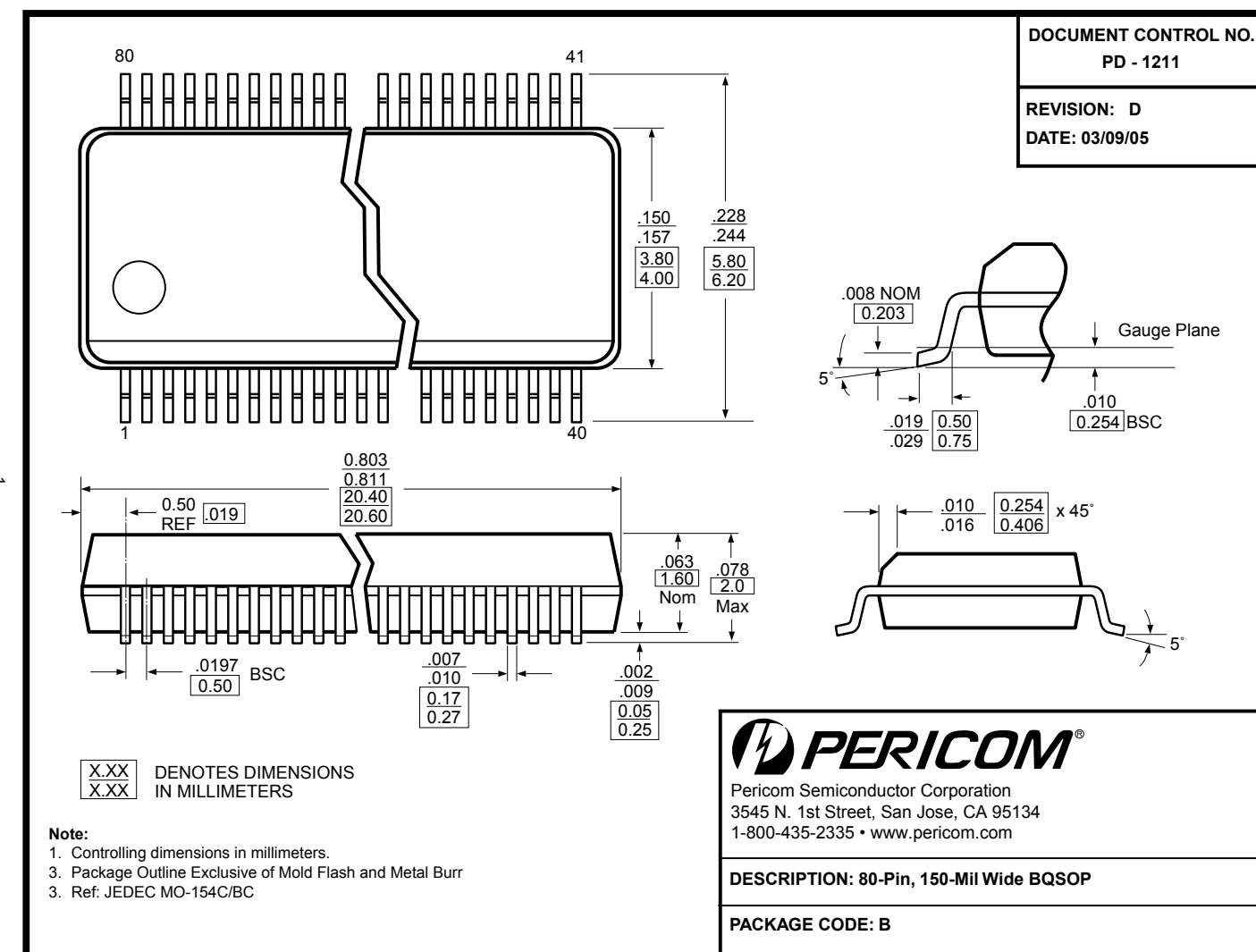
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a + 3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

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 www.pericom.com/packaging/