

32-Bit, 2-Port Bus Switch with 25Ω Series Resistor

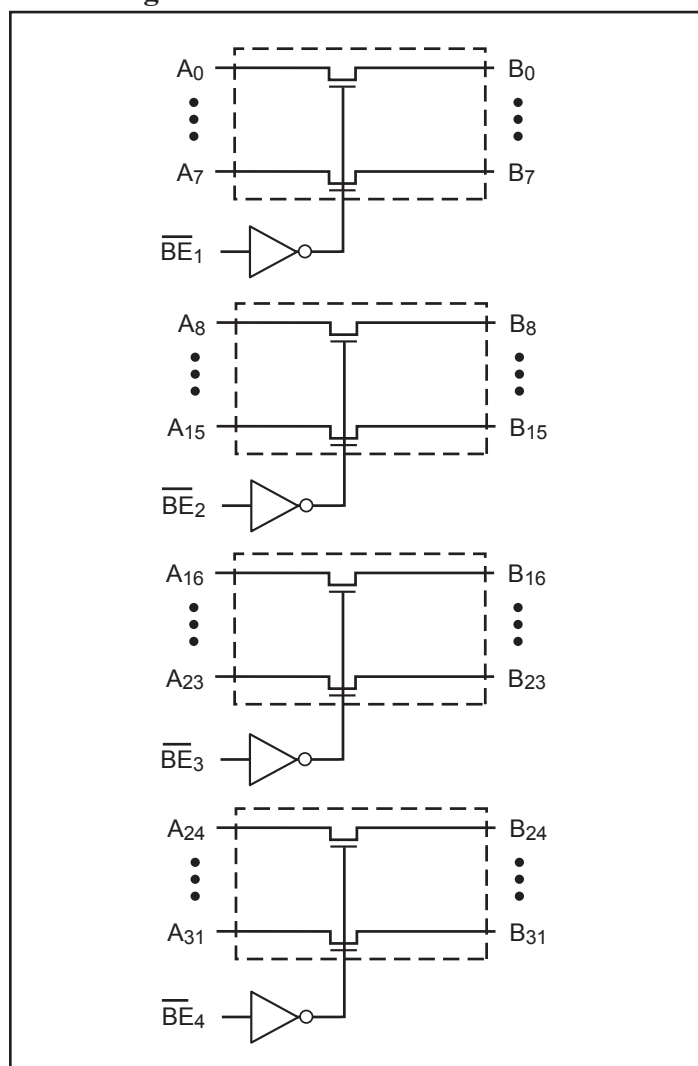
Features

- Near-Zero propagation delay
- 25Ω series resistor termination
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2μA typical)
– Ideally suited for notebook applications
- Pin compatible with QS34X245
- Industrial operating temperature: -40°C to +85°C
- Packaging (Pb-free & Green available):
– 80-pin 150 mil wide BQSOP (B)

Description

Pericom Semiconductor's PI5C34X2245 is a 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. The device has a built-in 25Ω resistor to reduce noise resulting from reflection, thus eliminating the need for an external terminating resistor.

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

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.....	120 mA
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.

Truth Table⁽¹⁾

Function	$\overline{\text{BEn}}$	A0 – 31
Disconnect	H	Hi-Z
Connect	L	B0 – 3

Notes:

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

Pin Description

Pin Name	I/O	Description
$\overline{\text{BEx}}$	I	Bus Enable Input (Active LOW)
A0-A ₃₁	I/O	Bus A
B0-B ₃₁	I/O	Bus B

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 5V ±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	
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 - A, B - V _{CC}			±1	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = –18mA		–0.7	–1.2	V
I _{OS}	Short Circuit Current ⁽³⁾	A (B) = 0V, B (A) = V _{CC}	100			mA
R _{ON}	Switch On-Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0V, I _{ON} = 48mA		28	40	Ω
		V _{CC} = Min., V _{IN} = 2.4V, I _{ON} = 15mA		35	48	

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} = 5.0V, T_A = 25°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.

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

Parameters ⁽¹⁾	Description	Test Conditions	Type	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	6	pF
C_{OFF}	A/B Capacitance, Switch Off		6	
C_{ON}	A/B Capacitance, Switch On		12	

Notes:

1. 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	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$		0.1	3.0	μA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.4\text{V}^{(3)}$			2.5	mA
I_{CCD}	Supply Current per Input per MHz ⁽⁴⁾	$V_{CC} = \text{Max.},$ A & B Pins Open $B_{EN} = \text{GND},$ Control Input Tog- gling 50% Duty Cycle				0.25	mA/ MHz

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at $V_{CC} = 5.0\text{V}$, $+25^\circ\text{C}$ ambient.
3. Per TTL driven input ($V_{IN} = 3.4\text{V}$, control inputs 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

Parameter	Description	Conditions	Com.		Units
			Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay ^(1,2) Ax to Bx, Bx to Ax	$C_L = 50\text{pF}$ $R_L = 500\Omega$		1.25	ns
t_{PZH} t_{PZL}	Bus Enable Time $\overline{B_{EN}}$ to Ax or Bx		1.5	7.5	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{B_{EN}}$ to Ax or Bx		1.5	5.5	

Notes:

1. This parameter is guaranteed but not tested on Propagation Delays.
2. 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.

Technical drawing of a 120-pin Quad Flat Pack (QFP) package. The drawing includes a top view showing the package body with a notch, pin 1 indicator, and pin counts (80, 41, 40, 1). It also includes a side view showing the package height and pin dimensions. Dimensions are provided in inches and millimeters. A detail view of the lead profile is shown with a 5-degree angle and a gauge plane. A legend indicates that dimensions in the format X.XX denote dimensions in millimeters.

Top View Dimensions:

- Pin 1 indicator
- Pin counts: 80, 41, 40, 1
- Package width: 0.803 (20.40)
- Package length: 0.811 (20.60)
- Pin pitch: 0.019 (0.50)
- Pin width: 0.017 (0.50) BSC
- Pin height: 0.007 (0.17) (0.010) (0.27)
- Package height: 0.063 (1.60) Nom, 0.078 (2.0) Max

Side View Dimensions:

- Package height: 0.150 (3.80) (0.157) (4.00)
- Pin height: 0.228 (5.80) (0.244) (6.20)

Lead Profile Detail:

- Lead thickness: 0.008 NOM (0.203)
- Lead angle: 5°
- Gauge Plane
- Lead width: 0.019 (0.50) (0.029) (0.75)
- Lead height: 0.010 (0.254) BSC

Legend:

X.XX DENOTES DIMENSIONS IN MILLIMETERS

Ordering Code	Package Code	Package Description
PI5C34X2245B	B	80-Pin 150 Mil Wide Plastic BQSOP
PI5C34X2245BE	B	Pb-free & Green, 80-Pin 150 Mil Wide Plastic BQSOP

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