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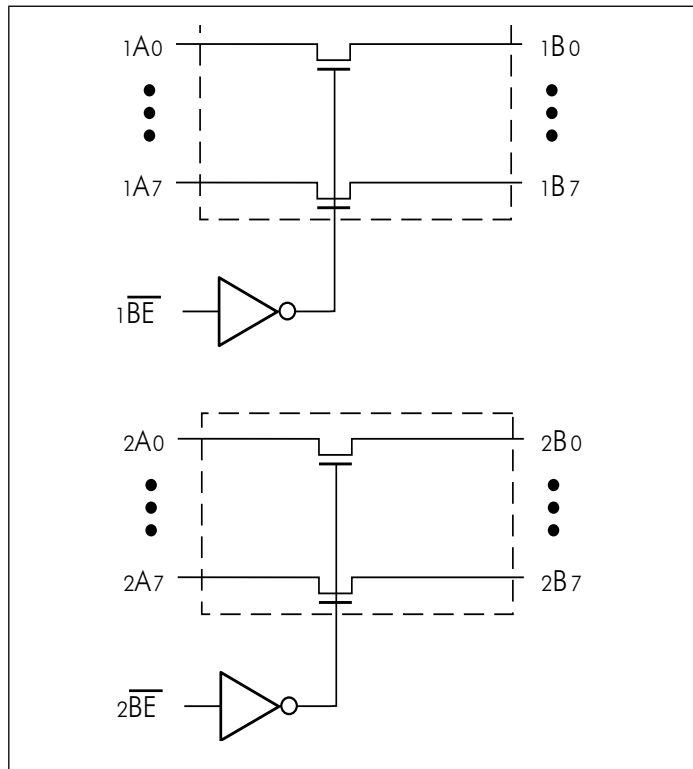


16-Bit, 2-Port Bus Switch

Features

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2 μ A typical) – Ideally suited for notebook applications
- Pin compatible with 74 series 16245
- Industrial operating temperature: -40°C to +85°C
- Packaging (Pb-free & Green):
 - 48-pin 240-mil wide thin plastic TSSOP (A)

Block Diagram



Truth Table⁽¹⁾

Function	nBE	nA0-7
Disconnect	H	Hi-Z
Connect	L	nB0-7

Note: H = High Voltage Level
 L = Low Voltage Level
 Hi-Z = High Impedance

Description

Pericom Semiconductor's PI5C16245 is a 16-bit, 2-port bus switch that is pin compatible with the 74 series 16245 16-bit transceiver. Two enable signals (nBE) turn the switches on similar to the enable signals of the 16245. The bus switch creates no additional propagation delay or additional ground bounce noise.

Pin Configuration

NC	1	48	1BE
1B0	2	47	1A0
1B1	3	46	1A1
GND	4	45	GND
1B2	5	44	1A2
1B3	6	43	1A3
VCC	7	42	VCC
1B4	8	41	1A4
1B5	9	40	1A5
GND	10	39	GND
1B6	11	38	1A6
1B7	12	37	1A7
2B0	13	36	2A0
2B1	14	35	2A1
GND	15	34	GND
2B2	16	33	2A2
2B3	17	32	2A3
VCC	18	31	VCC
2B4	19	30	2A4
2B5	20	29	2A5
GND	21	28	GND
2B6	22	27	2A6
2B7	23	26	2A7
NC	24	25	2BE

Pin Description

Pin Name	I/O	Description
nBE	I	Bus Enable Input (Active LOW)
nA0-nA7	I/O	Bus A
nB0-nB7	I/O	Bus B

Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-55	125	°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 $+85^{\circ}\text{C}$, $V_{CC} = 5\text{V} \pm 10\%$)

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	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	μA
I_{OZH}	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			± 1	μA
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{ mA}$		-0.7	-1.2	V
I_{OS}	Short Circuit Current ⁽³⁾	$A (B) = 0\text{V}, B (A) = V_{CC}$	100			mA
V_H	Input Hysteresis at Control Pins			150		mV
R_{ON}	Switch On Resistance ⁽⁴⁾	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{ mA}$		5	7	ohm
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{ mA}$		10	5	

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

Parameters ⁽⁵⁾	Description	Test Conditions	Typ	Max	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	6		pF
C_{OFF}	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	6		pF
C_{ON}	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	9		pF

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 5.0\text{V}$, $T_A = 25^{\circ}\text{C}$ 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}		0.1	3.0	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} = Max.	V _{IN} = 3.4V ⁽³⁾			2.5	mA
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	V _{CC} = Max., A and B Pins Open n $\overline{\text{BE}}$ = GND Control Input Toggling 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} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, 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.

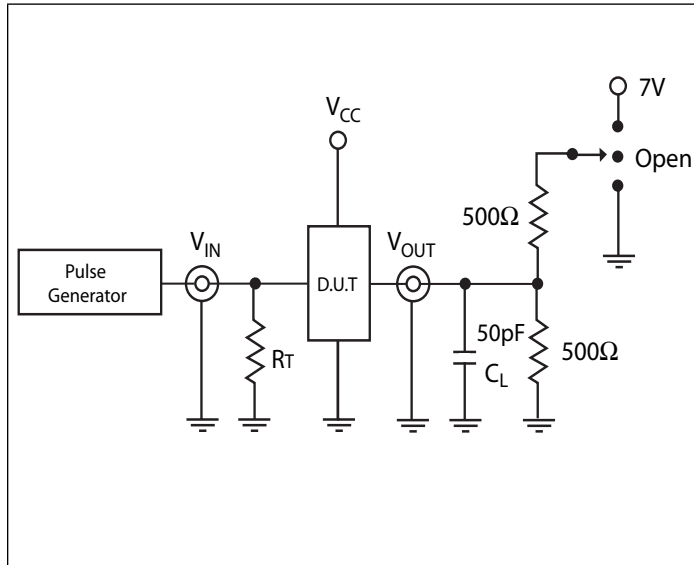
PI5C16245 Switching Characteristics over Operating Range

Parameters	Description	Test Conditions ⁽¹⁾	PI5C16245		Units
			Com.		
			Min	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) xAx to xBx, xBx to xAx	CL = 50 pF RL = 500-ohm		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time xBE to xAx or xBx		1.5	6.5	ns
t _{PHZ} t _{PLZ}	Bus Disable Time xBE to xAx or xBx		1.5	5.5	ns

Notes:

1. See test circuit and wave forms.
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.

Test Circuits



Switch Position

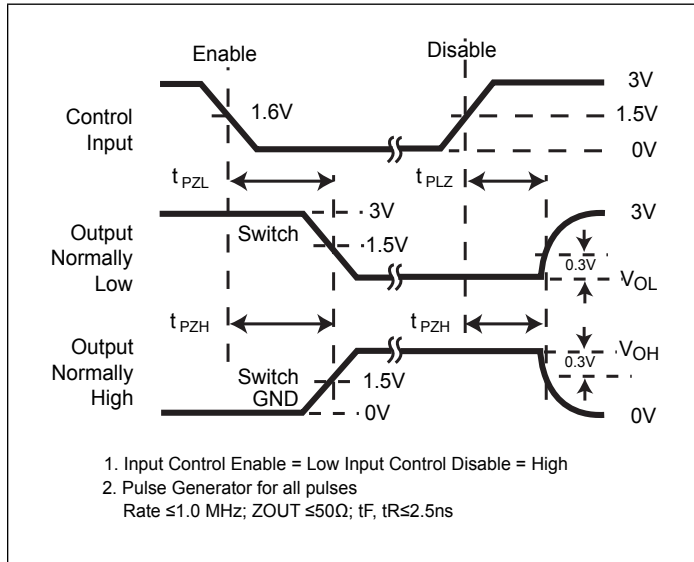
Test	Switch
Disable LOW	Closed
Enable LOW	Closed
t_{PD}	Open

Definitions:

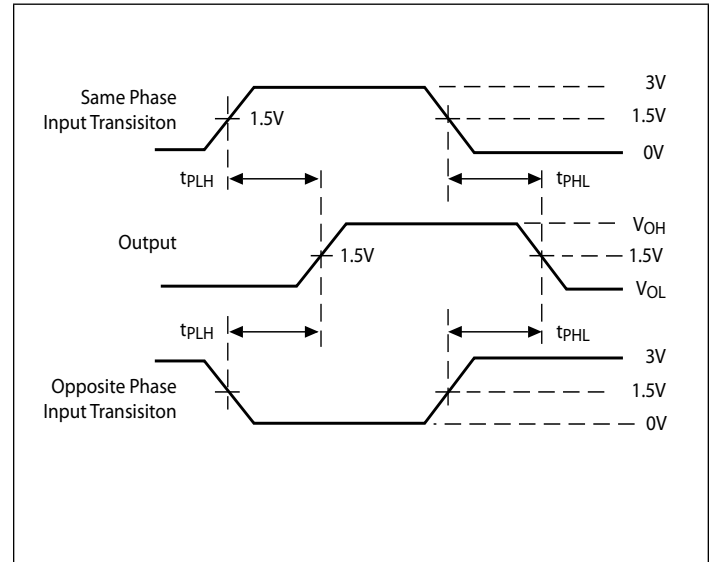
C_L = Load capacitance (includes jig and probe capacitance)

R_T = Termination resistance (should be equal to Z_{OUT} of the pulse generator)

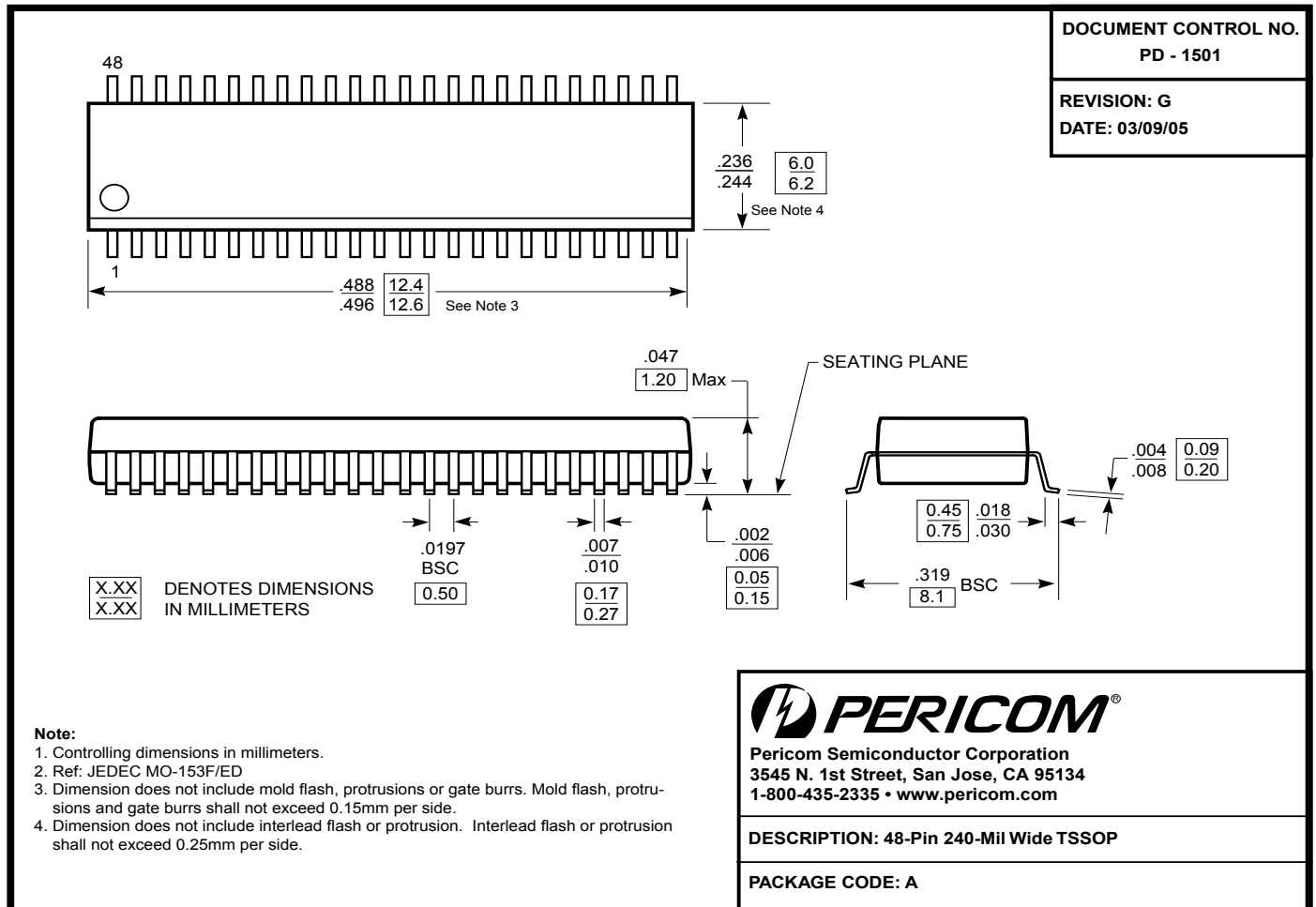
Enable and Disable Timing



Propagation Delay



Packaging Mechanical: 48-Pin TSSOP (A)



Ordering Information

Ordering Code	Package Code	Package Type	Operating Temperature
PI5C16245AE	A	Pb-free & Green, 48-pin TSSOP	Commercial

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/