

PI5C16244

16-Bit Bus Switch

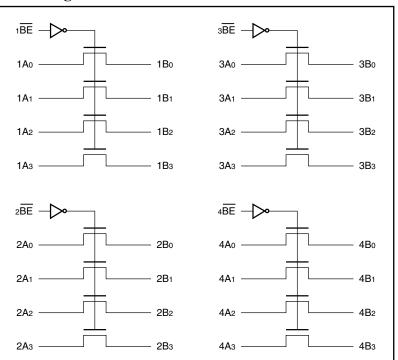
Features:

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra-low quiescent power (0.2 µA typical)
 Ideally suited for notebook applications
- Pin compatible with 74 series 16244
- Industrial operating temperature: -40° C to $+85^{\circ}$ C
- Packaging (Pb-free & Green Available):
 - 48-pin, 240 mil-wide plastic TSSOP (A)
 - 48-pin, 150 mil-wide plastic BQSOP (B)
 - 48-pin, 300 mil-wide plastic SSOP (V)

Block Diagram



Pericom Semiconductor's PI5C16244 is a 16-bit, 4-port bus switches that is pin compatible with the 74 series 1624416-bit driver. Four enable signals ($n\overline{BE}$) turn the switches on. The bus switch creates no additional propagation delay or additional ground bounce noise.



Truth Table⁽¹⁾

Function	nBE	_n A ₀₋₃
Disconnect	Н	Hi-Z
Connect	L	_n B ₀₋₃

Note:

 H = High Voltage Level; L = Low Voltage Level; Hi-Z = High Impedance

Pin Configuration

			_
1BE D	$1 \bigcirc$	48	28E
1B0 🛙	2	47	1 1A0
1B1 🛛	3	46] 1A1
GND E	4	45	GND GND
1B2 🛙	5	44] 1A2
1B3 🛙	6	43	1 1A3
Vcc E	7	42	
2B0 🛙	8	41	2 2A0
2B1 🕻	9	40] 2 A 1
GND [10	39	GND GND
2B2 🕻	11	38] 2A2
2B3 🕻	12	37] 2A3
зВо 🛙	13	36	🛛 зАо
3B1 🛛	14	35] 3A1
GND E	15	34	GND GND
зВ2 🛙	16	33] 3A2
зВз 🛛	17	32	🛛 зАз
Vcc E	18	31	
4B0 🛙	19	30	4 A0
4B1 🛙	20	29	4 A1
GND E	21	28	GND GND
4B2 🕻	22	27	4 A2
4B3 🛙	23	26	4 A3
4BE C	24	25] 3BE
			-

Pin Description

Pin Name	I/O	Description
nBE	Ι	Bus Enable Input (Active LOW)
nA0-nA3	I/O	Bus A
nB0-nB3	I/O	Bus B

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature
Ambient Temperature with Power Applied40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V_{CC} Only)0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)0.5V to +7.0V
DC Input Voltage0.5V to +7.0V
DC Output Current
Power Dissipation0.5W

Note: Stresses greater than those listed under MAX-IMUM 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, $TA = -40^{\circ}C$ to $+85^{\circ}C$, $VCC = 5V \pm 10\%$)

Parameters	Description	Test Conditions ⁽¹⁾		Min.	Typ ⁽²⁾	Max.	Units
V _{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Le	vel	2.0	_		v
V _{IL}	Input LOW Voltage	Guaranteed Logic LOW Lev	vel	-0.5	—	0.8	v
I _{IH}	Input HIGH Current	$V_{CC} = Max., V_{IN} = V_{CC}$				±1	
I _{IL}	Input LOW Current	$V_{CC} = Max., V_{IN} = GND$				±1	μA
I _{OZH}	High Impedance Output Current	$0 \le A, B \le V_{CC}$				±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
V _H	Input Hysteresis at Control Pins				150		mV
		$V_{CC} = Min., V_{IN} = 0.0V,$	16244		5	7	
D	Switch On-Resistance ⁽⁴⁾	$I_{ON} = 48 \text{ mA}$	162244	20	28	40	
R _{ON}	Switch On-Kesistance	$V_{CC} = Min., V_{IN} = 2.4V,$	16244		10	15	Ω
		$I_{ON} = 15 \text{ mA}$	162244	20	35	48	

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

Parameters ⁽⁵⁾	Description	Test Conditions	Тур	Max.	Units
C _{IN}	Input Capacitance		_	6	
C _{OFF}	A/B Capacitance, Switch Off	$V_{IN} = 0V$	_	6	pF
C _{ON}	A/B Capacitance, Switch On		_	8	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.

2. Typical values are at Vcc = 5.0V, TA = $25^{\circ}C$ 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 ⁽¹⁾		Min.	Typ ⁽²⁾	Max.	Units
I _{CC}	Quiescent Power Supply Current	Vcc = Max.	VIN = GND or Vcc		0.1	3.0	μΑ
ΔI _{CC}	Supply Current per	Vcc = Max.	$V_{IN} = 3.4 V^{(3)}$	—	—	2.5	mA
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	Vcc = Max., A and B Pins Open $n\overline{BE} = GND$ Control Input Toggling 50% Duty Cycle		_	_	0.25	mA/

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.

2. Typical values are at Vcc = 5.0V, $+25^{\circ}C$ ambient.

3. Per TTL driven input ($V_{IN} = 3.4V$, control inputs only); A and B pins do not contribute to Icc.

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

		Test Conditions ⁽¹⁾	PI5C	Unit	
Parameters	Description		Com.		
			Min	Max	
t _{PLH} t _{PHL}	Propagation Delay ^(2,3) xAx to xBx		_	0.25	
t _{PZH} t _{PZL}	Bus Enable Time xBE to xAx or xBx	$\begin{array}{l} C_L = 50 p F \\ R_L = 500 \Omega \end{array}$	1.5	5.6	ns
t _{PHZ} t _{PLZ}	Bus Disable Time xBE to xAx or xBx		1.5	5.2	

Notes:

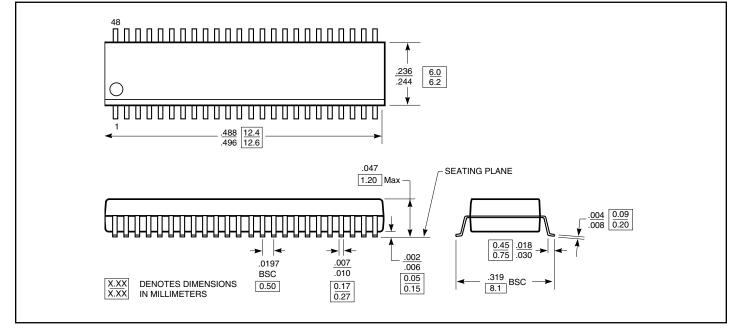
1. See test circuit and wave forms.

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

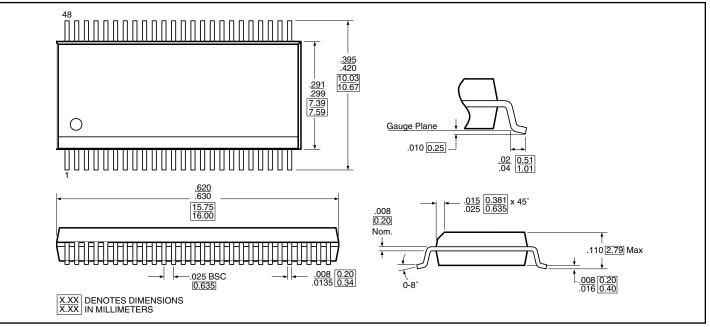
3. The bus switch contributes no propagational delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25 ns for 50 pF load. Since this time constant is much smaller than the rise/fall times of typical driving 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.



Packaging Mechanical: 48-pin TSSOP (A)

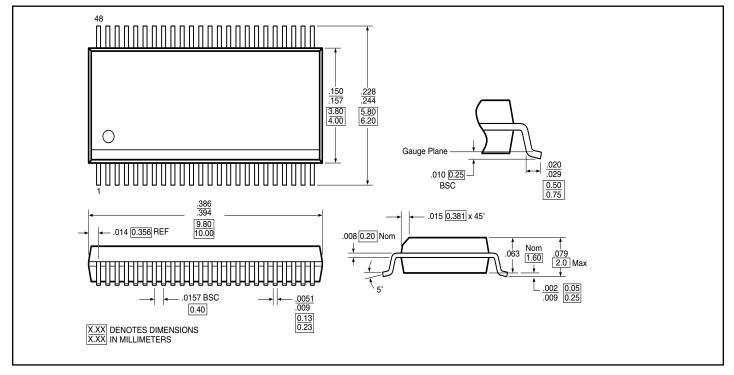


Packaging Mechanical: 48-pin SSOP (V)





Packaging Mechanical: 48-pin BQSOP (B)



Ordering Information

Ordering Code	Package Code	Package Description
PI5C16244A	А	48-pin TSSOP
PI5C16244AE	А	Pb-free & Green, 48-pin TSSOP
PI5C16244B	В	48-pin BQSOP
PI5C16244BE	В	Pb-free & Green, 48-pin BQSOP
PI5C16244V	V	48-pin SSOP
PI5C16244VE	V	Pb-free & Green, 48-pin SSOP

Notes:

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