



## PI3C3244

### 2.5V/3.3V, High Bandwidth, Hot Insertion, 8-Bit, 2-Port Bus Switch

#### Product Features

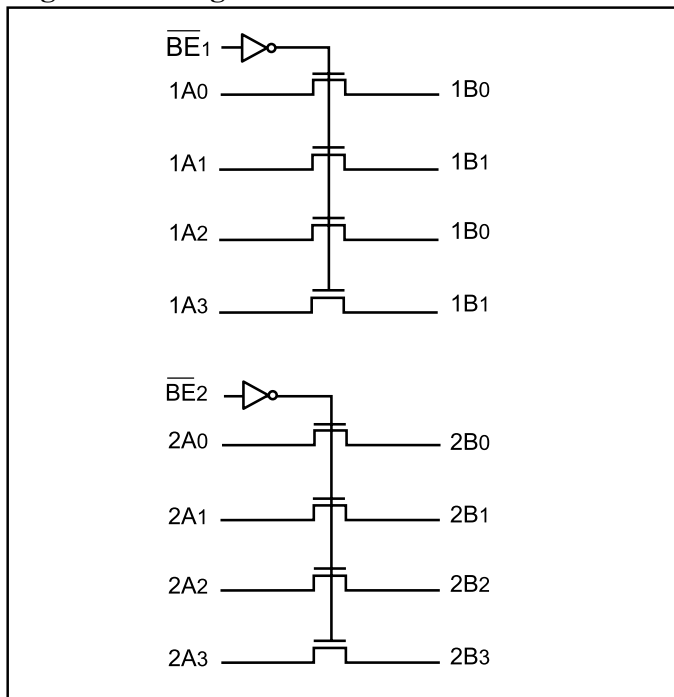
- Near zero propagation delay
- High Bandwidth (>400 MHz)
- Rail-to-Rail 3.3V or 2.5V Switching
- 5V I/O Tolerant
- 2.5V Supply Voltage Operation
- Permits Hot Insertion
- Pin compatible with 74 series 244 logic devices
- Packages available:
  - 20-pin 150 mil wide plastic QSOP (Q)
  - 20-pin 173 mil wide plastic TSSOP (L)

#### Product Description

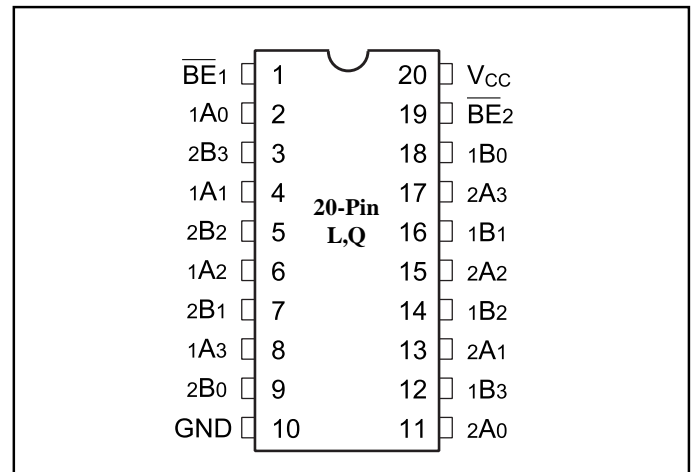
Pericom Semiconductor's PI3C series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

The PI3C3244 features a set of 2.5V or 3.3V 8-bit bus switches, which is a pinout and function compatible with the P74FCT244T, 74F244, and 74ALS/AS/LS2448-bit drivers. Two enable signals ( $\overline{BEn}$ ) turn the switches on similar to the enable signals of the 244. The bus switch create no additional propagation delay or ground bounce noise. It is very useful in switching signals that have high bandwidth (>400 MHz).

#### Logic Block Diagram



#### Product Pin Configuration



#### Product Pin Description

Pin Name	Description
$\overline{BEn}$	Bus Enable Input (Active LOW)
A0–7	Bus A
B0–7	Bus B
GND	Ground
VCC	Power

#### Truth Table<sup>(1)</sup>

$\overline{BE1}$	$\overline{BE2}$	1A, 1B	2A, 2B
H	H	Disconnect	Disconnect
L	H	1A = 1B	Disconnect
H	L	Disconnect	2A = 2B
L	L	1A = 1B	2A = 2B

#### Note:

1. H = High Voltage Level  
L = Low Voltage Level



### 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 +4.6V
DC Input Voltage .....	-0.5V to +5.5V
DC Output Current .....	120mA
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.

### DC Electrical Characteristics (Over 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 <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	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	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			$\pm 1$	
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	$\mu\text{A}$
$I_{OZH}$	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			$\pm 1$	
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$		-0.73	-1.2	V
$R_{ON}$	Switch On Resistance <sup>(4)</sup>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$ or $64\text{mA}$ $V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		5 8	7 15	$\Omega$

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

Parameters <sup>(5)</sup>	Description	Test Conditions	Typ.	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	3.5	pF
$C_{OFF}$	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	5.0	
$C_{ON}$	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	10.0	

**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 <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
I <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>		260	500	μA
ΔI <sub>CC</sub>	Supply Current per Input HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.0V <sup>(3)</sup>			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<sub>CC</sub> = 3.3V, +25°C ambient.
3. Per driven input (control input only); A and B pins do not contribute to ΔI<sub>CC</sub>.

### Switching Characteristics over 3.3V Operating Range

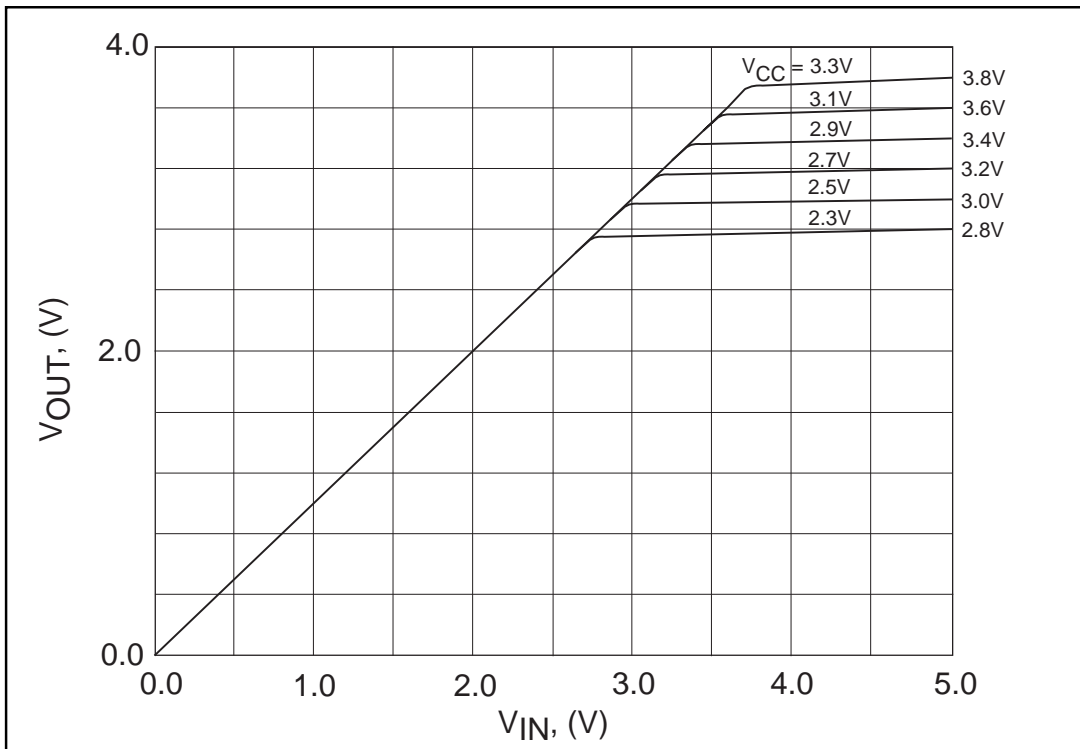
Parameters	Description	Conditions <sup>(1)</sup>	PI3C3244		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx	C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time BE to Ax or Bx	C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω	1.5	6.5	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time BE to Ax or Bx	R = 500Ω	1.5	5.5	

### Switching Characteristics over 2.5V Operating Range

Parameters	Description	Conditions <sup>(1)</sup>	PI3C3244		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(2,3)</sup> Ax to Bx	C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time BE to Ax or Bx	C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω	1.5	9.8	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time BE to Ax or Bx	R = 500Ω	1.5	8.3	

**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 0.25ns 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.



**Output Voltage vs. Input Voltage over Various Supply Voltages**

**Ordering Information**

Part	Pin-Package	Temperature
PI3C3244L	20-TSSOP (L)	-40°C to +85°C
PI3C3244Q	20-QSOP (Q)	-40°C to +85°C