



PI3C16215C

3.3V, High Bandwidth, 20-Bit, PCI Hot-Plug Bus Switch w/-2V Undershoot Protection

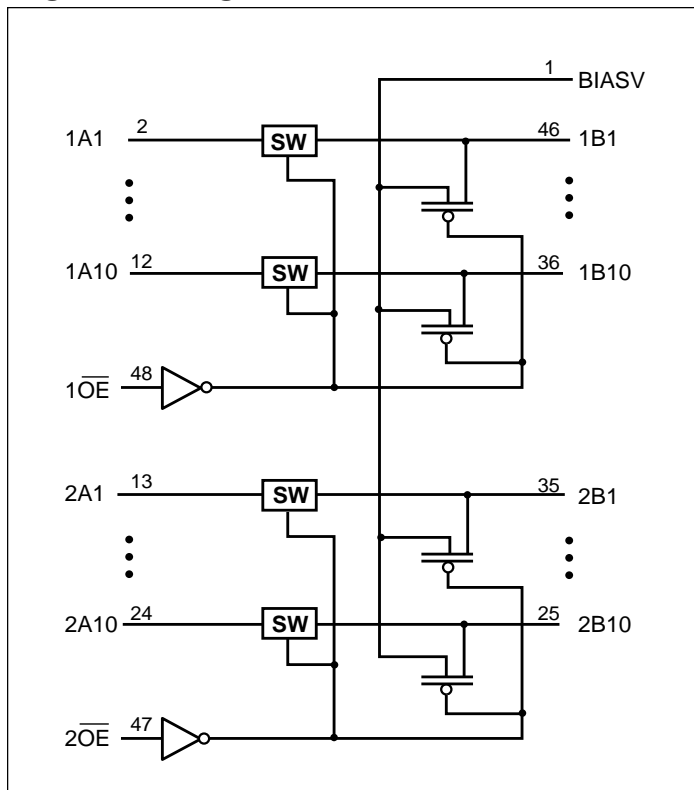
Product Features

- RON is 50ohm typical
- Precharge on B1 and B2 ports minimizes line insertion noise
- Undershoot protection on A port only: -2V
- Industrial Operation Temperature: -40°C to +85°C
- Near Zero propagation delay
- Low Channel ON Capacitance: 15pF max.
- VCC Operating Range: +3.0V to +3.6V
- >100 MHz switching (enable clock rate) at 20pF load capacitance
- Package options include:
 - 48-pin plastic TSSOP (A)
 - 48-pin plastic BQSOP (B)

Applications

- PCI Hot Plugging for live insertion
- Memory bank Sharing

Logic Block Diagram



Product Description

Pericom Semiconductor's PI3C series of logic circuits are produced using the company's advanced submicron CMOS technology.

The PI3C16215C is a 3.3V, 20-bit, 2-port bus switch. It is intended for PCI Hot-Plug applications. Industry leading advantages include a propagation delay of 250ps, resulting from its 50ohm-channel resistance, and low I/O capacitance. The A-port switches data to B outputs and is bidirectional. A pre-charge bias voltage pin (VBIAS) is provided on B ports to minimize live insertion noise.

To prevent false enabling of the device, the A-port can take up to -2V of undershoot when the switch is disabled.

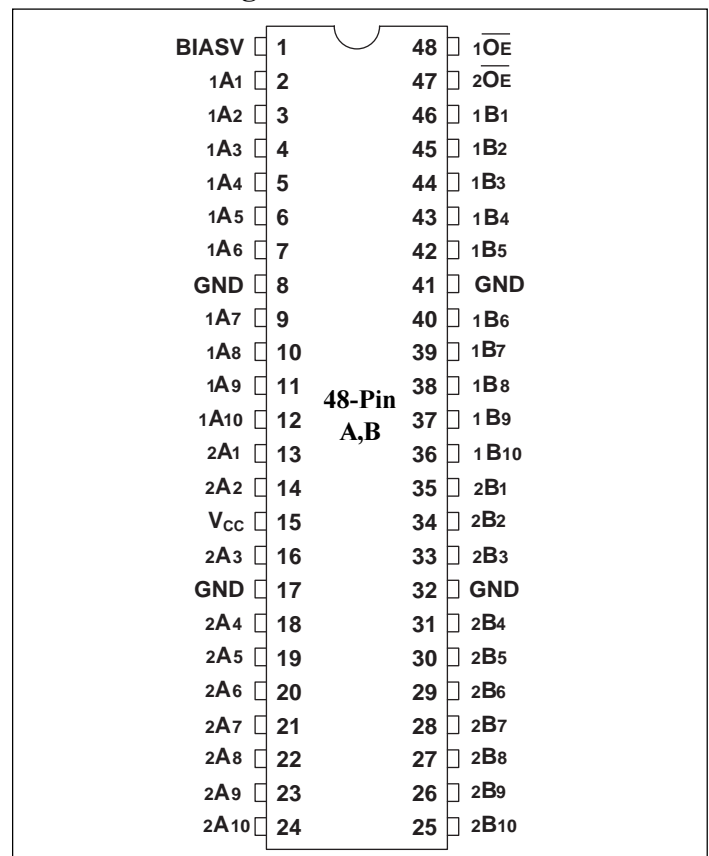
Truth Table

OE	Function
L	A port = B port
H	A port = Z, A port = BIASV

Note:

1. H=High Voltage Level 2. L=Low Voltage level

Product Pin Configuration





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 (Inputs & V _{CC} Only)	-0.5V to +4.6V
Supply Voltage to Ground Potential (Outputs & D/O Only)	-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 the Operating Range, T_A = -40°C to +85°C, V_{CC} = 3.3V ± 10%, V_{BIAS} = 1.3V to V_{CC})

Parameter	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	
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 _{OZA}	High Impedance Output Current	A = 0V or V _{CC} max., V _{BIAS1} = V _{BIAS2} = V _{CC} max.	—	—	±1	
I _{OZB}	High Impedance Output Current	B = 0V or V _{CC} max., V _{BIAS1} = V _{BIAS2} = V _{CC} max.	-0.2	—	-2	mA
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = -18mA	—	-0.7	-1.8	V
r _{ON}	Switch On Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = 48mA	—	5	8	Ω
		V _{CC} = Min., V _{IN} = 2.4V, I _{ON} = 15mA	—	10	15	
V _{UP}	Undershoot Protection Voltage ⁽³⁾	Max Inputs, Undershoot Pulse Duration < 25ns	—	—	-2.0	V

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters	Description	Test Conditions	Typ	Max.	Units
C _{IN}	Input Capacitance	V _{IN} = 0V	3.5	—	pF
C _{OFF}	A/B Capacitance, Switch Off	V _{IN} = 0V	4.5	—	
C _{ON}	A/B Capacitance, Switch On	V _{IN} = 0V	13.5	—	

Note:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device types.
2. Typical values are at V_{CC} = 3.3V, T_A = 25°C ambient and maximum loading.
3. On 1AN (Data Input) pins only.
4. Measured by the voltage drop between A and B pins at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (A and 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	$V_{CC} = \text{Max.}, V_{IN} = \text{GND or } V_{CC}$	—	260	500	μA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}, V_{IN} = 3.0\text{V}^{(3)}$	—	—	750	
I_{CCD}	Supply Current per Input per MHz ⁽⁴⁾	$V_{CC} = \text{Max.},$ A and B Pins Open 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 $V_{CC} = 3.3\text{V}, +25^\circ\text{C}$ ambient.
3. Per TTL driven input (control inputs only); A and B pins do not contribute to I_{CC} .

Switching Characteristics (Over Recommended Operating Free-air Temperature Range, $C_L = 50\text{pF}$)

Parameter	Test Conditions	Conditions ⁽¹⁾	PI3C16215C			Units
			Min.	Typ.	Max.	
t_{PLH} t_{PHL}	Propagation Delay ^(2,3) A to B	$C_L = 50\text{pF}$ $R_L = 500\text{Ohm}$	—	0.25	—	ns
t_{PZH} t_{PZL}	Bus Enable Time SEL to A,B		1.5	—	6.5	
t_{PHZ} t_{PLZ}	Bus Disable Time SEL to A,B		1.5	—	5.5	

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 0.25ns for 50pF load. Since this time constant is much smaller than the rise/fall times of your 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

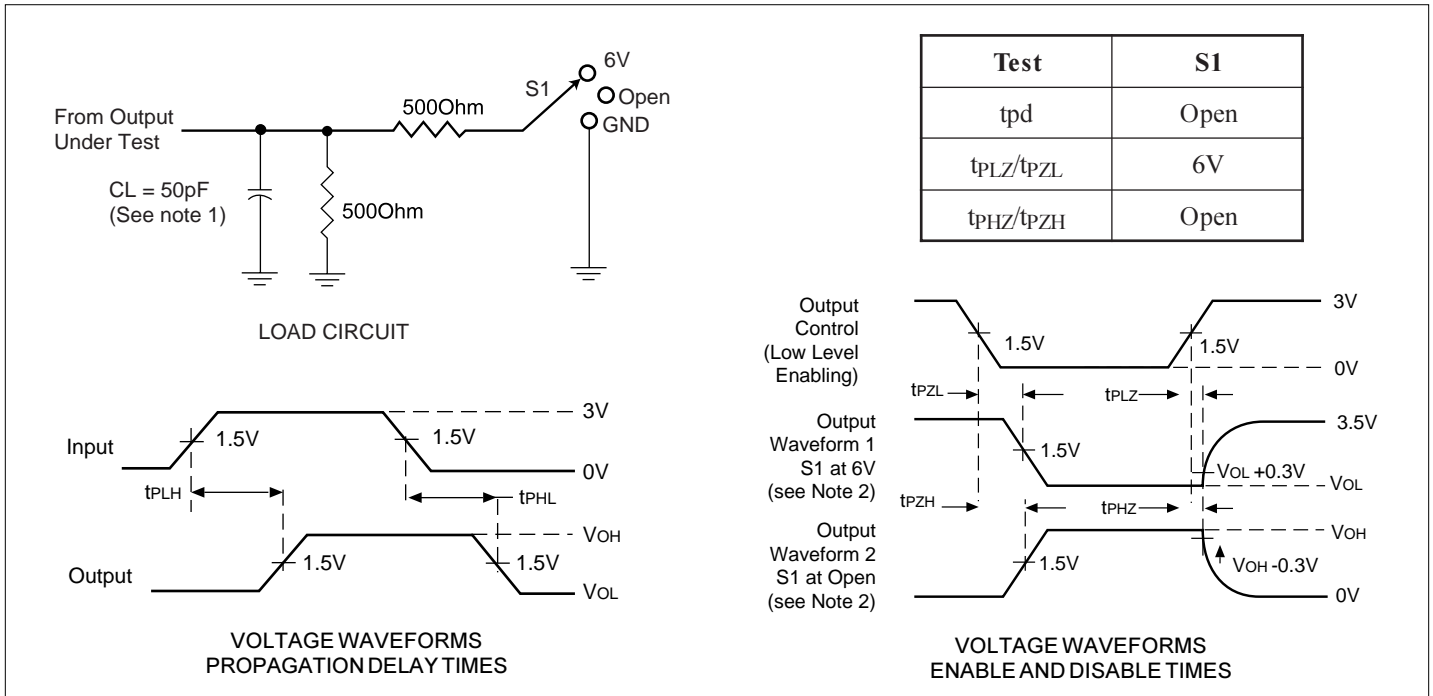
Logic Inputs

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

Power Supply Sequencing

Proper power-supply sequencing is advised for all CMOS devices. It is recommended to always apply V_{CC} before applying V_{BIAS} and signals to the input/output or control pins.

Parameter Measurements



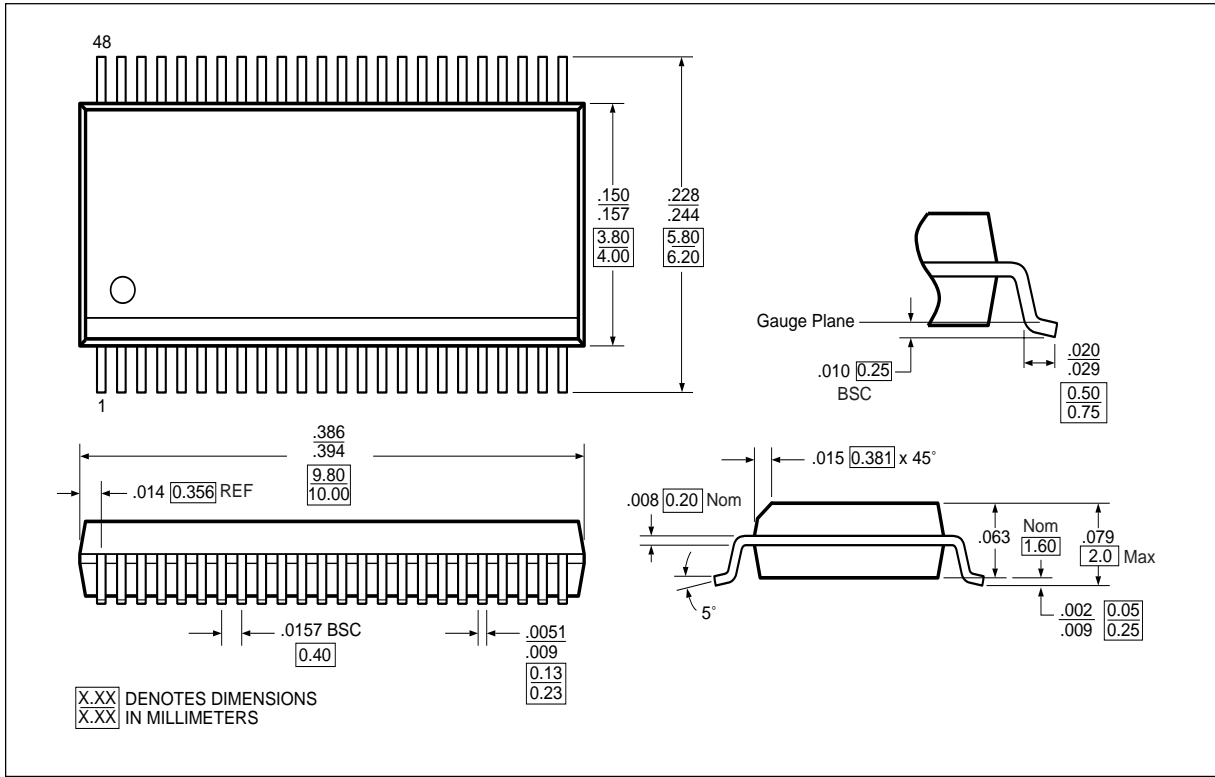
Notes:

1. C_L includes probe and jig capacitance.
2. Waveform 1 is for an output with internal conditions such that the output is LOW except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is HIGH except when disabled by the output control.
3. All input pulses are supplied by generators having the following characteristics: PRR<10MHz, $Z_O = 50\Omega$, $t_r \leq 2.5ns$, $t_f \leq 2.5ns$.
4. The outputs are measured one at a time with one transition per measurement.
5. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
6. t_{PZL} and t_{PZH} are the same as t_{en} .
7. t_{PLH} and t_{PHL} are the same as t_{pd} .

Ordering Information

Ordering Code	Pin-Package	Temperature
PI3C16215CA	48-TSSOP	-40°C to +85°C
PI3C16215CB	48-BQSOP	

48-pin BQSOP (B)



48-pin TSSOP (A)

