

**2.5V/3.3V, 2-Port, 10-Bit Bus Switch  
with Precharged Outputs  
for Live Insertion**

**Product Features**

- Near zero propagation delay
- 5Ω switch connection between two ports
- High Bandwidth (>400 MHz)
- Rail-to-Rail 3.3V or 2.5V Switching
- Outputs are precharged by bias voltage to minimize signal distortion during live insertion
- 5V I/O Tolerant
- 2.5V Supply Voltage Operation
- Package options:
  - 24-pin 150 mil wide plastic QSOP (Q)
  - 24-pin 173 mil wide TSSOP (L)

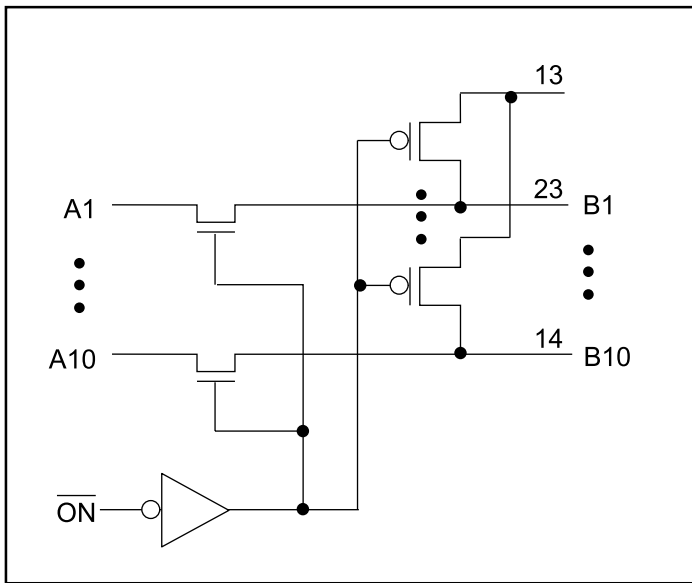
**Product Description**

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

The PI3C6800 is a 10-bit bus switch with low on-state resistance. The bus switch creates no additional propagation delay. To minimize live-insertion noise, the device also precharges the B port to a user-selectable bias voltage (BIASV).

The switch is turned on by a single enable ( $\overline{ON}$ ) input. When  $\overline{ON}$  is LOW, the switch is on and port A is connected to port B. When  $\overline{ON}$  is HIGH, the switch between port A and port B is open and the B port is precharged to BIASV through the equivalent of a 10-kΩ resistor.

**Logic Diagram**



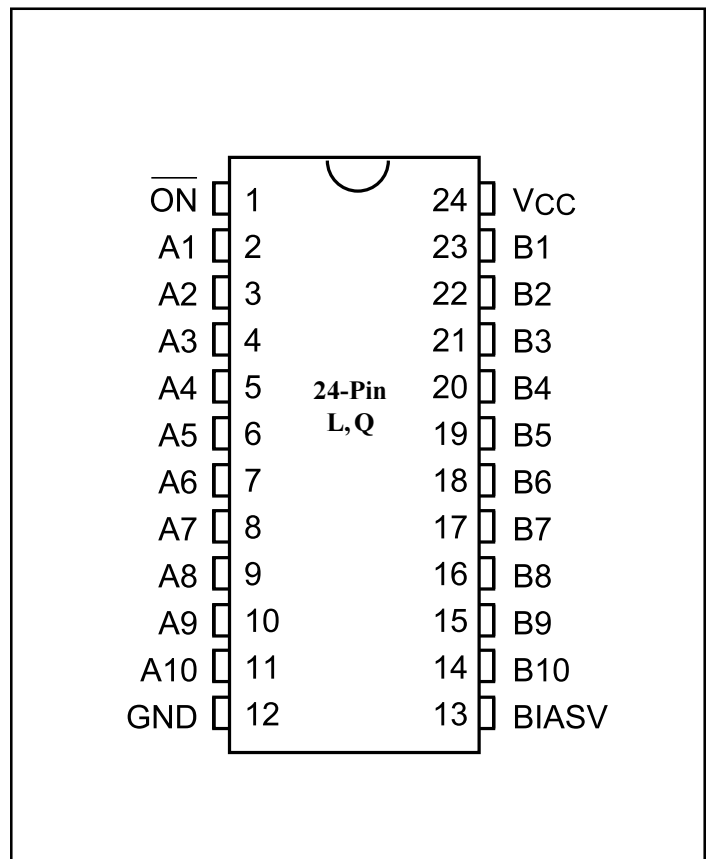
**Truth Table<sup>(1)</sup>**

Function	$\overline{ON}$	B1 - B10
Connect	L	A1 - A10
Precharge	H	BIASV

**Note:**

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

**Product Pin Configuration**



**Absolute Maximum Ratings Over Free-Air Temperature Range\***

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

Storage Temperature .....	-65°C to +150°C
Supply Voltage Range .....	-0.5V to 4.6V
DC Input Voltage <sup>(1)</sup> .....	-0.5V to +7V
Input Clamp Current, I <sub>IK</sub> (V <sub>I</sub> < 0) .....	-50mA
DC Output Current .....	120mA
Power Dissipation <sup>(2)</sup> .....	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.

**Notes:**

1. Input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. Maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils.

**Recommended Operating Conditions**

		Min.	Typ.	Units
V <sub>CC</sub>	Supply voltage	2.3	3.3	V
BIASV	Supply voltage	1.3	V <sub>CC</sub>	
V <sub>IH</sub>	High-level input voltage	2		
V <sub>IL</sub>	Low-level input voltage		0.8	
T <sub>A</sub>	Operating free-air temperature	-40	85	°C

**Electrical Characteristics** (Over Recommended Operating Free-air Temperature Range)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = 3.0V, I <sub>IN</sub> = -18mA			-1.2	V
I <sub>I</sub>	Input Current	V <sub>CC</sub> = 3.6V, V <sub>IN</sub> = V <sub>CC</sub> or GND			±5	µA
I <sub>O</sub>	Output Current	V <sub>CC</sub> = 3.0V, BIASV = 2.4V, V <sub>O</sub> = 0	0.25			mA
I <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = 3.6V, I <sub>O</sub> = 0, V <sub>IN</sub> = V <sub>CC</sub> or GND		260	500	µA
ΔI <sub>CC</sub>	Power Supply Current per Input	V <sub>CC</sub> = 3.6V, One input at 2.7V Other at V <sub>CC</sub> or GND			2.5	mA
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 0V		3.5		pF
C <sub>OFF</sub>	A/B Capacitance	V <sub>CC</sub> = 0V, Switch Off		5.0		
R <sub>ON</sub> *	Switch ON Resistance	V <sub>CC</sub> = 3.0V	V <sub>IN</sub> = 0, I <sub>IN</sub> = 64mA	5	7	Ω
			V <sub>IN</sub> = 2.4V, I <sub>IN</sub> = 30mA	8.0	15	
			V <sub>IN</sub> = 2.4V, I <sub>IN</sub> = 15mA	8.0	15	

**Notes:**

- \* Measured by the voltage drop between the A and B terminals at the indicated current through the switch. On-state resistance is determined by the lower of the voltages of the two (A or B) terminals.
  - ‡ This is the increase in supply current for control input.
- All typical values are at V<sub>CC</sub> = 3.3V, T<sub>A</sub> = 25°C.

**3.3V Switching Characteristics** (Over Recommended Operating Free-air Temperature Range,  $C_L = 50\text{pF}$ )

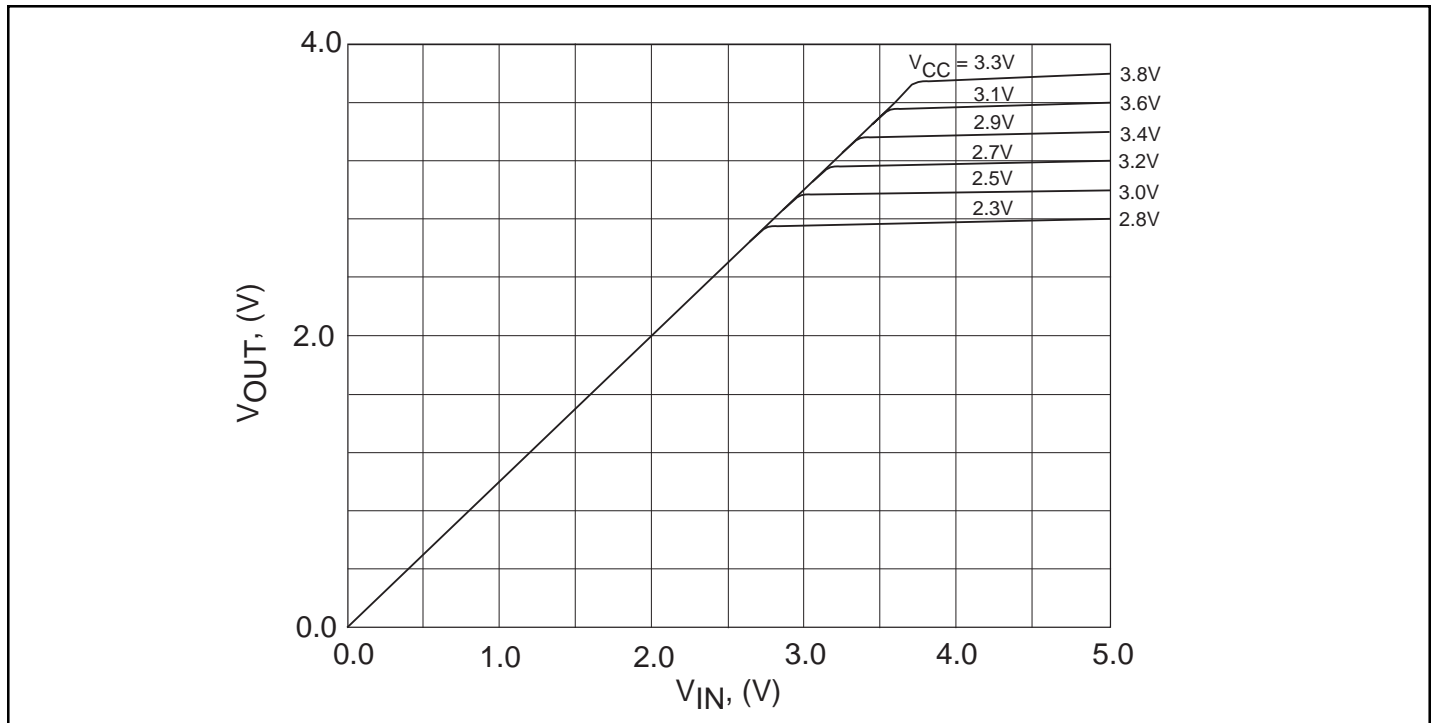
Parameter	Test Conditions	From (Input)	To (Output)	Min.	Max.	Units
$t_{PD}^{(1)}$		A or B	B or A		0.25	ns
$t_{PZH}$	BIASV = GND	ON	A or B	1.5	6.5	
$t_{PZL}$	BIASV = 3V			1.5	6.5	
$t_{PHZ}$	BIASV = GND	ON	A or B	1.5	5.5	
$t_{PLZ}$	BIASV = 3V			1.5	5.5	

**2.5V Switching Characteristics** (Over Recommended Operating Free-air Temperature Range,  $C_L = 50\text{pF}$ )

Parameter	Test Conditions	From (Input)	To (Output)	Min.	Max.	Units
$t_{PD}^{(1)}$		A or B	B or A		0.25	ns
$t_{PZH}$	BIASV = GND	ON	A or B	1.5	9.8	
$t_{PZL}$	BIASV = 3V			1.5	9.8	
$t_{PHZ}$	BIASV = GND	ON	A or B	1.5	8.3	
$t_{PLZ}$	BIASV = 3V			1.5	8.3	

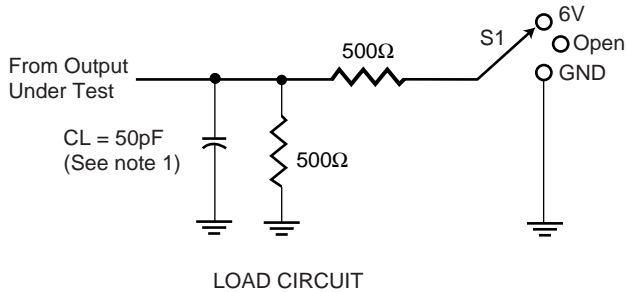
**Note:**

1. This parameter is warranted but not production tested. The propagation delay is based on the RC time constant of the typical on state resistance of the switch and a load capacitance of 50pF, when driven by an ideal voltage source (zero output impedance).

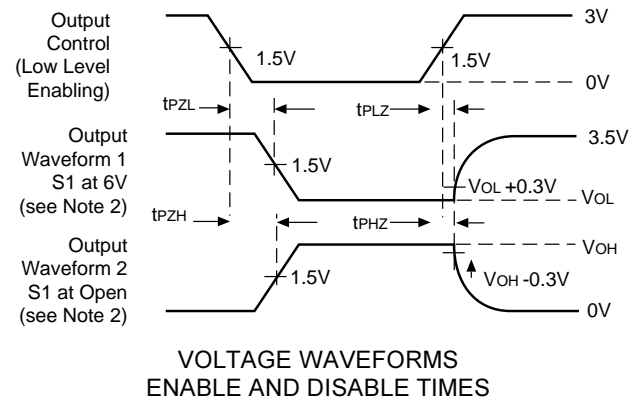
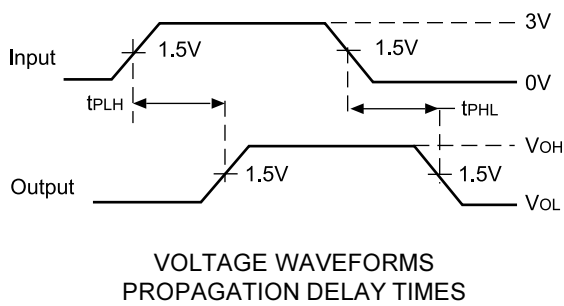


**Output Voltage vs. Input Voltage over Various Supply Voltages**

### Parameter Measurements



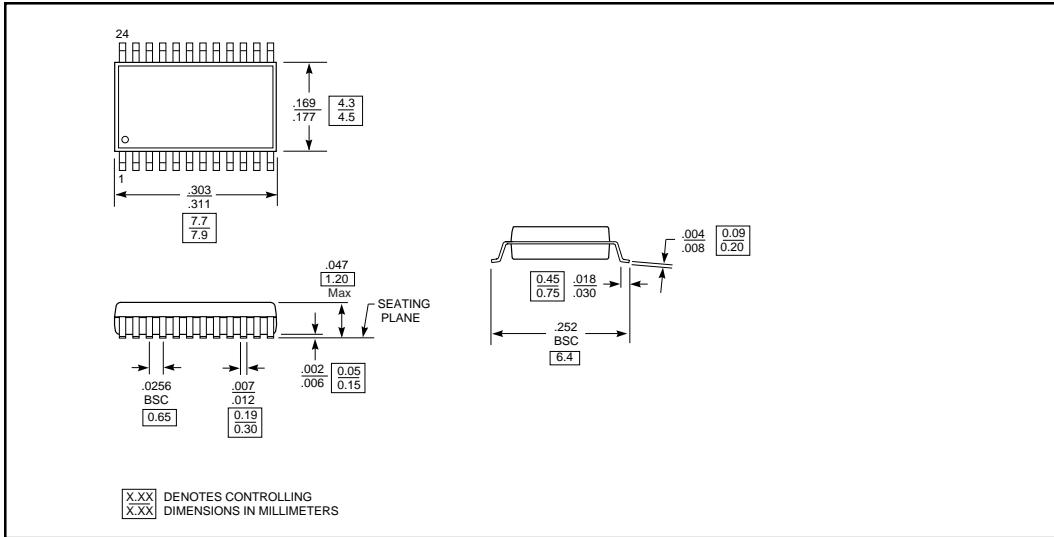
Test	S1
$t_{PD}$	Open
$t_{PLZ}/t_{PZL}$	6V
$t_{PHZ}/t_{PZH}$	GND



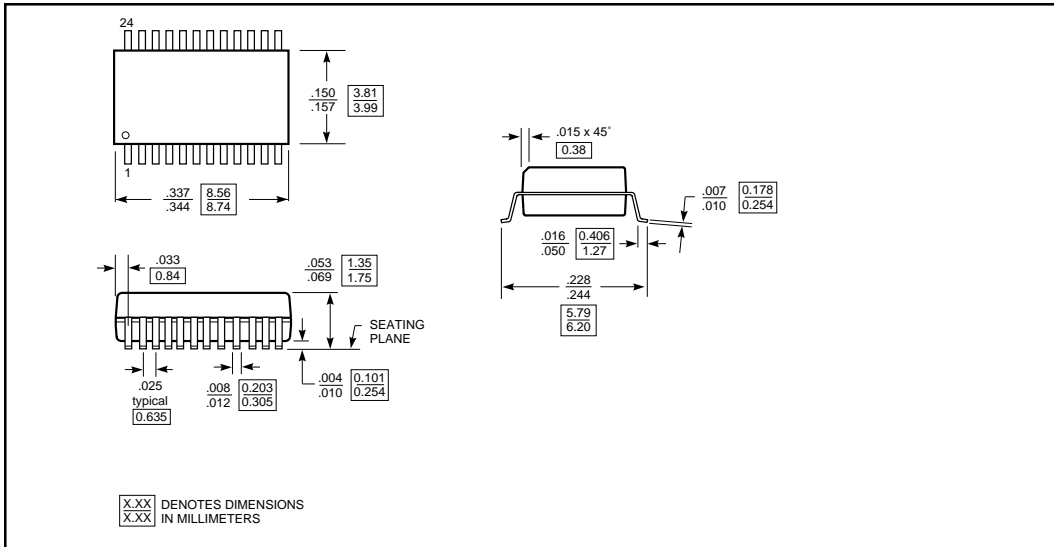
**Notes:**

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:  $PRR < 10\text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_R \leq 2.5\text{ns}$ ,  $t_F \leq 2.5\text{ns}$ .
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  $t_{PD}$ .

### 24-Pin TSSOP (L) Package



### 24-Pin QSOP (Q) Package



### Ordering Information

Part	Pin - Package	Temperature
PI3C6800L	24 - TSSOP (L)	-40°C to 85°C
PI3C6800Q	24 - QSOP (Q)	-40°C to 85°C

### 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, IN 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 recommended for all CMOS devices. Always apply V<sub>CC</sub> before applying V<sub>BIAS</sub> and signals to input/output or control pins.

*Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd*