PERICOM

PI3C6800

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 connnected 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.
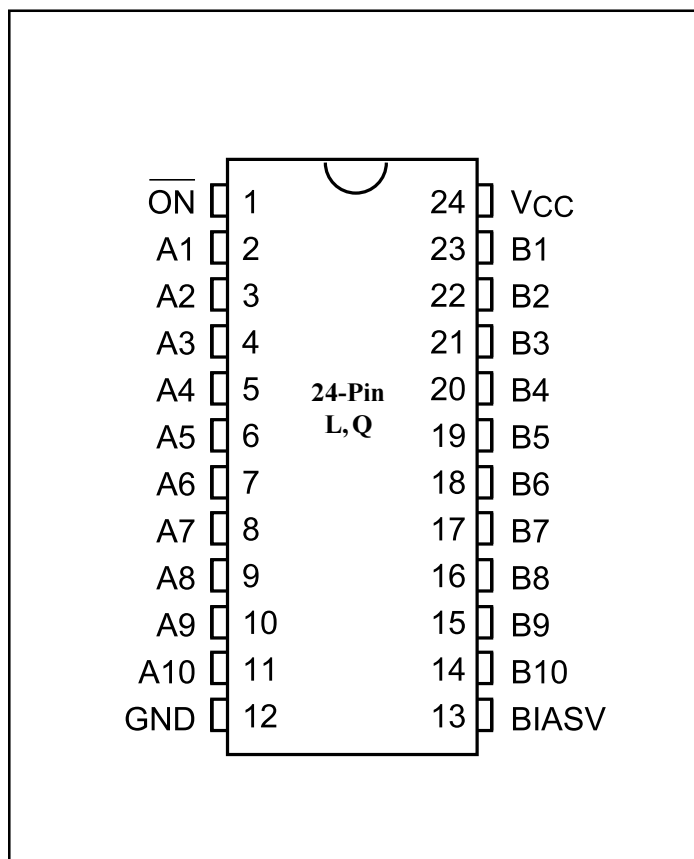
Logic Diagram

Product Pin Configuration
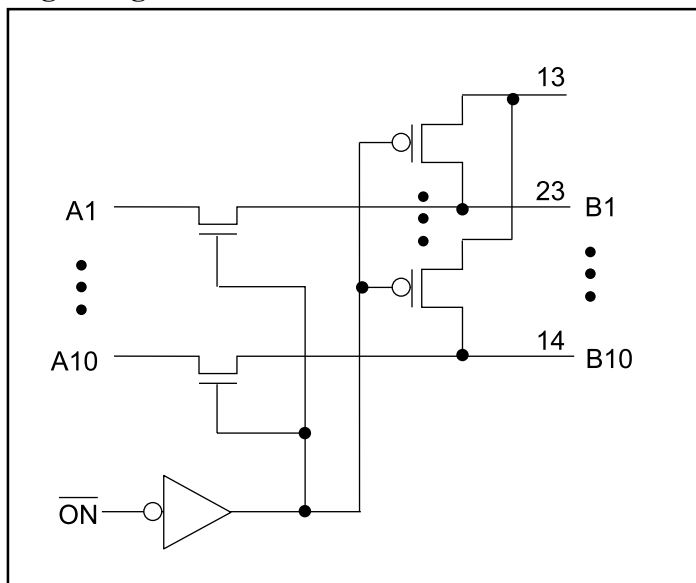
Truth Table[1]

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

Note:

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

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[(1)] .... –0.5V to +7V

Input Clamp Current, I_{IK} ($V_1 < 0$) .... –50mA

DC Output Current 120mA

Power Dissipation[(2)] 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 temperatue of 150°C and a board trace length of 750 mils.

Recommended Operating Conditions

		Min.	**Typ**.	**Units**
V_{CC}	Supply voltage	2.3	3.3	V
BIASV	Supply voltage	1.3	VCC	
V_{IH}	High-level input voltage	2		
V_{IL}	Low-level input voltage		0.8	
T_A	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_{IK}	Clamp Diode Voltage	V_{CC} = 3.0V, I_{IN} = –18mA				–1.2	V
I_I	Input Current	V_{CC} = 3.6V, V_{IN} = V_{CC} or GND				±5	µA
I_O	Output Current	V_{CC} = 3.0V, BIASV = 2.4V, V_O = 0		0.25			mA
I_{CC}	Quiescent Power Supply Current	V_{CC} = 3.6V, I_O = 0, V_{IN} = V_{CC} or GND			260	500	µA
ΔI_{CC}	Power Supply Current per Input	V_{CC} = 3.6V, One input at 2.7V Other at V_{CC} or GND				2.5	mA
C_{IN}	Input Capacitance	V_{CC} = 0V			3.5		pF
C_{OFF}	A/B Capacitance	V_{CC} = 0V, Switch Off			5.0		
R_{ON}[*]	Switch ON Resistance	V_{CC} = 3.0V	V_{IN} = 0, I_{IN} = 64mA		5	7	Ω
			V_{IN} = 2.4V, I_{IN} = 30mA		8.0	15	
			V_{IN} = 2.4V, I_{IN} = 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_{CC} = 3.3V, T_A = 25°C.

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

Parameter	Test Conditions	From (Input)	To (Output)	Min.	Max.	Units
t_{PD}[1]		A or B	B or A		0.25	
t_{PZH}	BIASV = GND	ON	A or B	1.5	6.5	
t_{PZL}	BIASV = 3V			1.5	6.5	ns
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, $C_L = 50pF$)

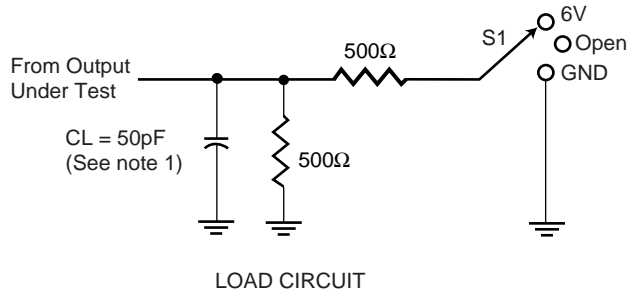| Parameter	Test Conditions	From (Input)	To (Output)	Min.	Max.	Units
t_{PD}[1]		A or B	B or A		0.25	
t_{PZH}	BIASV = GND	ON	A or B	1.5	9.8	
t_{PZL}	BIASV = 3V			1.5	9.8	ns
t_{PHZ}	BIASV = GND	ON	A or B	1.5	8.3	
t_{PLZ}	BIASV = 3V			1.5	8.3	

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).
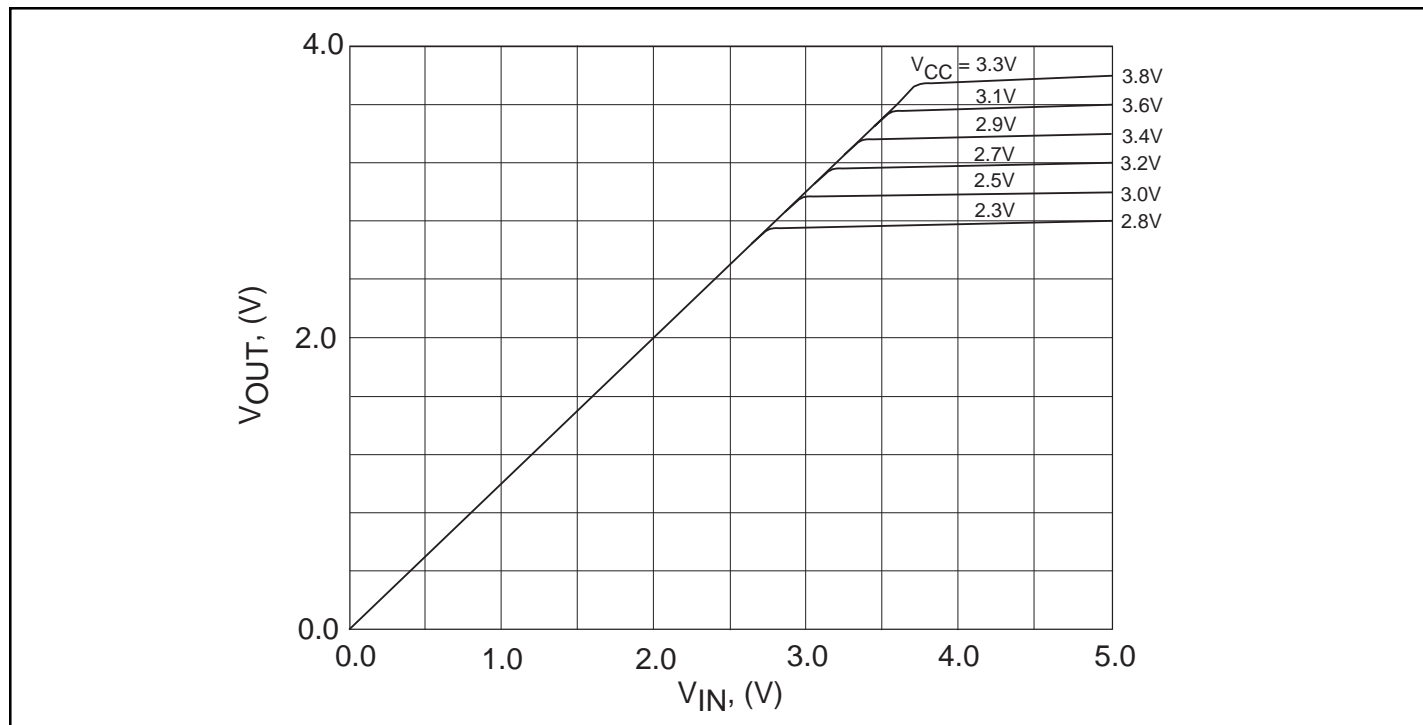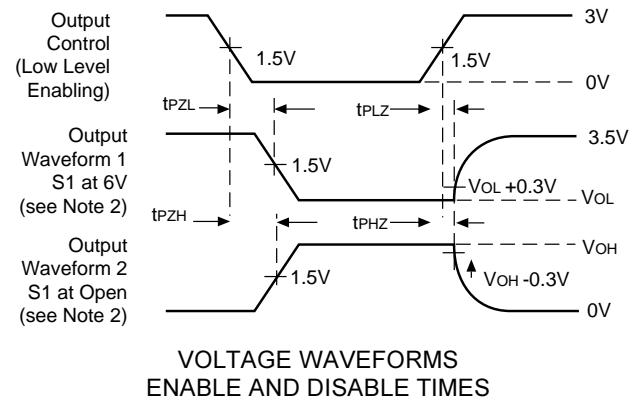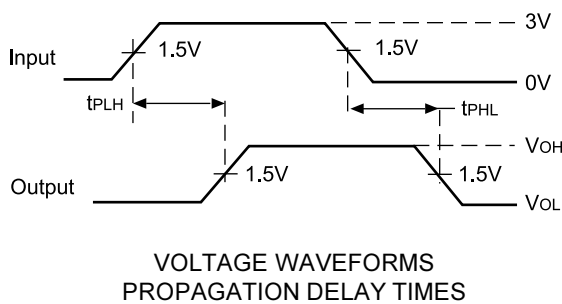

Output Voltage vs. Input Voltage over Various Supply Voltages
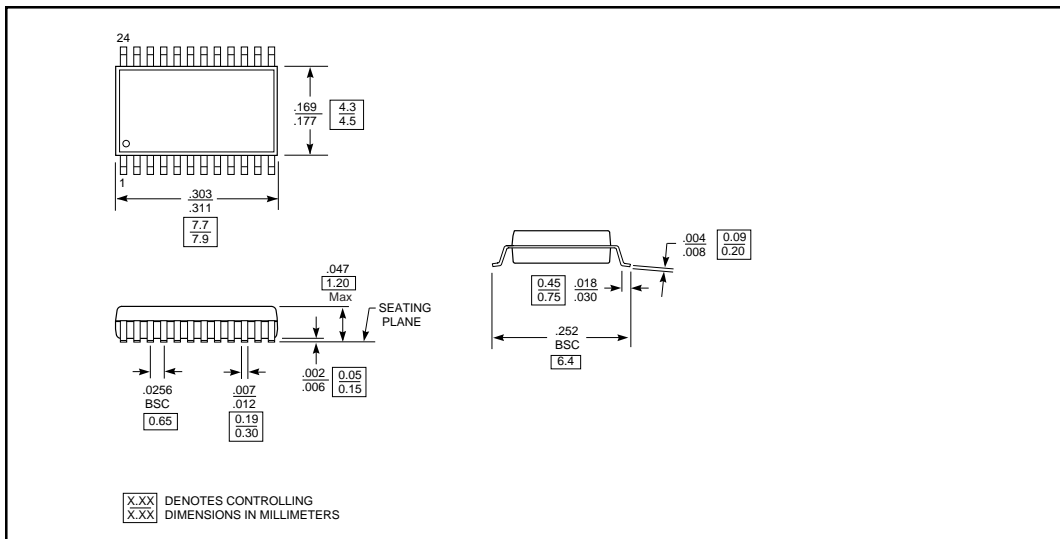
Parameter Measurements

LOAD CIRCUIT

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

VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
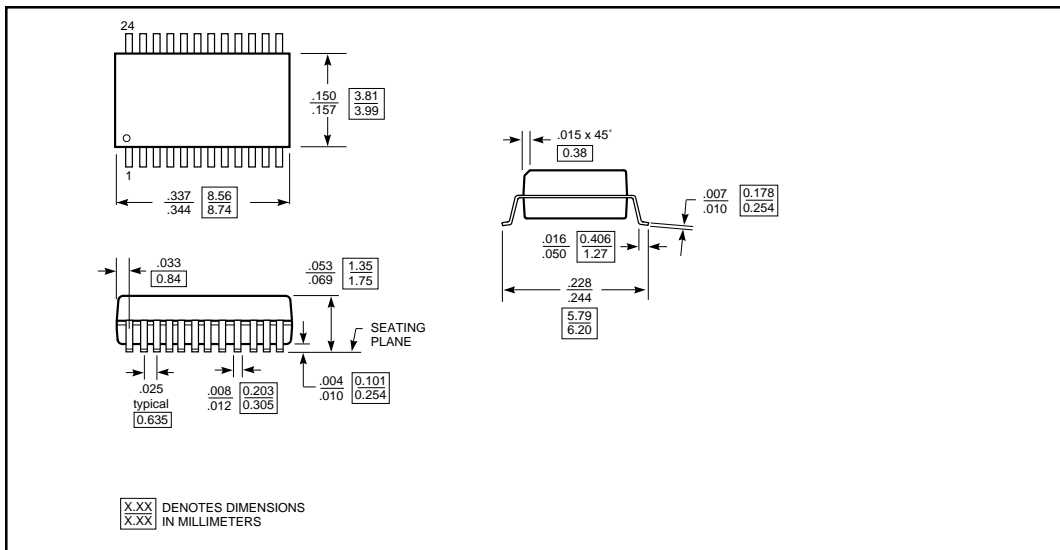

VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

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}.

24-Pin TSSOP (L) Package


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X.XX  DENOTES CONTROLLING
X.XX  DIMENSIONS IN MILLIMETERS
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24-Pin QSOP (Q) Package


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X.XX  DENOTES DIMENSIONS
X.XX  IN MILLIMETERS
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Ordering Information

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

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_{CC} before applying V_{BIAS} and signals to input/output or control pins.

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