

3.3V, Hot Insertion, 20-Bit FET BusSwitch w/Precharged Outputs

Product Features

- Near Zero Propagation Delay
- 5Ω Switches Connect Between Two Ports
- Fast Switching Speed: 4.5ns max.
- Permits Hot Insertion
- Isolation during Power-Off conditions
- B-Port Outputs are precharged by Bias Voltage to minimize signal distortion during live insertion.
- Package options include:
 - 48-pin 150-mil wide plastic BQSOP (B48)
 - 48-pin 240-mil wide plastic TSSOP (A48)
 - 48-pin 300-mil wide plastic SSOP (V48)

Product Description

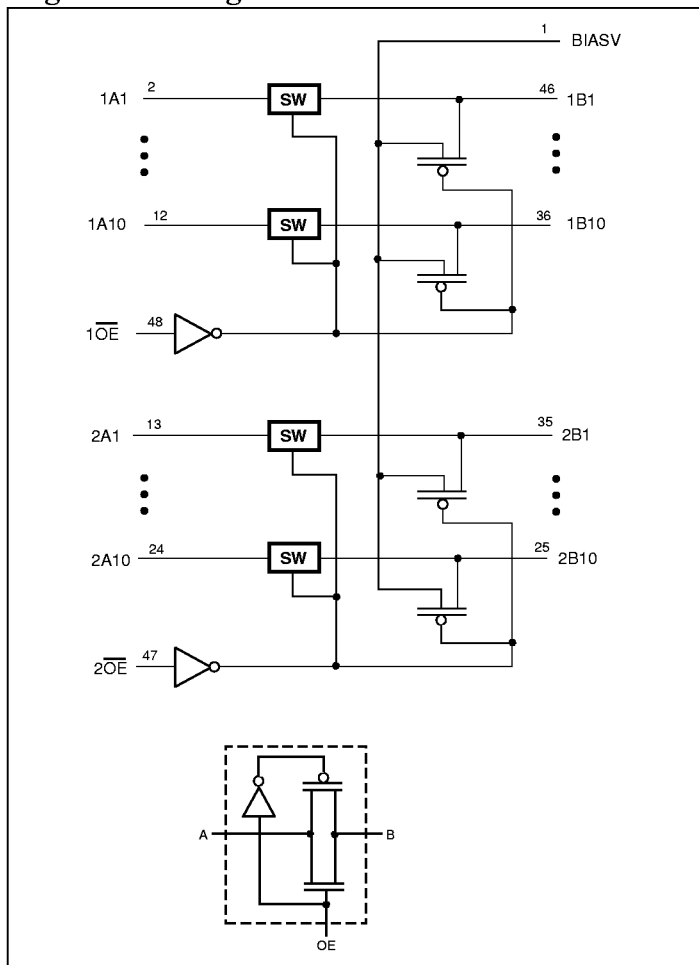
Pericom Semiconductor's PI3B series of logic circuits are produced in the company's advanced 0.35 micron CMOS Technology.

The PI3B16215 provides 20-bits of high-speed bus switching. The low on-state resistance of the switch allows connections to be made with minimal propagation delay. The device also precharges the B-port to a user-selectable bias voltage (BIASV) to minimize live-insertion noise.

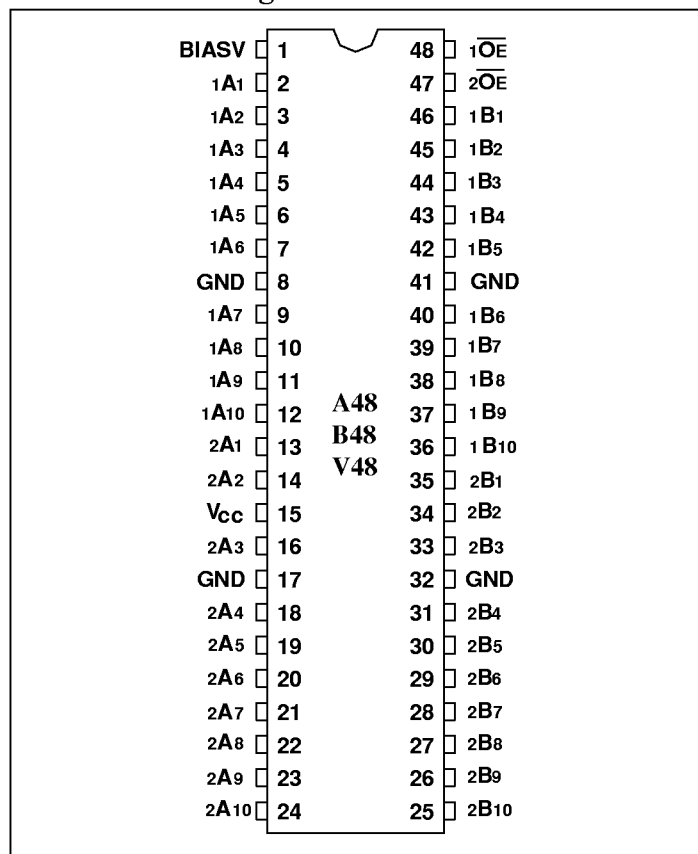
The device is organized as dual 10-bit bus switches with individual output-enable (OE) inputs. When OE is low, the corresponding 10-bit bus switch is on and port A is connected to port B. When OE is high, the switch is open, a high-impedance state exists between the two ports, and port B is precharged to BIASV through the equivalent of a 10-kΩ resistor.

To ensure the high-impedance state on power up or power down, OE should be tied to Vcc through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver connected to OE.

Logic Block Diagram



Product Pin Configuration



Truth Table

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



Maximum Ratings

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

Storage Temperature Range, Tstg	-65°C to 150°C
Supply Voltage Range, Vcc	-0.5V to 4.6V
Bias Voltage Range, BIASV	-0.5V to 4.6V
Input Voltage Range	-0.5V to +4.6V
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.

Electrical Characteristics (Over the Operating Range, TA = -40°C to +85°C, Vcc = 3.0V to 3.6V)

Parameter	Description	Test Conditions		Min.	Typ.	Max.	Units
BIASV	Bias Voltage			0		Vcc	
VIH	High-Level Control Input Voltage	Vcc = 2.3V to 2.7V		1.7			V
		Vcc = 2.7V to 3.6V		2			
VIL	Low-Level Control Input Voltage	Vcc = 2.3V to 2.7V				0.7	
		Vcc = 2.7V to 3.6V				0.8	
VIK	Clamp Diode Voltage	Vcc = 3.0V	Ii = -18mA			-1.2	
Ii	Input Current	Vcc = 3.6V	VI = Vcc or GND			±5	µA
IOZH	High Impedance Output Current	Vcc = 0	VI = Vo = 0 to 3.6V			10	
Io	Output Current	Vcc = 3.0V	BIASV = 2.4V, Vo = 0	0.25			mA
ICC	Quiescent Power Supply Current	Vcc = 3.6V	Io = 0, VI = Vcc or GND			500	µA
ΔICC [§]	Supply Current	Vcc = 3.6V	One Input at 3V, Other Inputs at Vcc or GND			500	
CIN	Input Capacitance	VI = 3.0V or 0		3.0			pF
COFF	A/B Capacitance Switch Off	Vo = 3.0V or 0	Switch Off	8.5			
RON [¶]	Switch On Resistance	VI = 0	Ii = 64mA		5	8	Ω
			Ii = 24mA		5	8	
		VI = 2.4V	Ii = 15mA		10	15	

‡ All typical values are at Vcc = 3.3V (Unless otherwise noted) TA = 25°C.

§ This is the increase in supply current for each input (OE only) that is at the specified voltage level rather than Vcc or GND.

¶ 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.

Switching Characteristics over Operating Range

Switching characteristics over recommended operating free-air temperature range, (unless otherwise noted) (see Figures 1 and 2).

Parameter	Test Conditions	From (Input)	To (Output)	$V_{CC} = 2.5 \pm 0.2V$		$V_{CC} = 2.7V$		$V_{CC} = 3.3V \pm 0.3V$		Units
				Min.	Max.	Min.	Max.	Min.	Max.	
$t_{pd}^{(1)}$		A or B	B or A						0.25	ns
t_{PZH}	BIASV = GND	\overline{OE}	A or B						4.5	
t_{PZL}	BIASV = 3V								4.5	
t_{PHZ}	BIASV = GND								5.0	
t_{PLZ}	BIASV = 3V								5.0	

Note

1. The propagation delay is the calculated RC time of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

Parameter Measurements ($V_{CC} = 2.5 \pm 0.2V$)

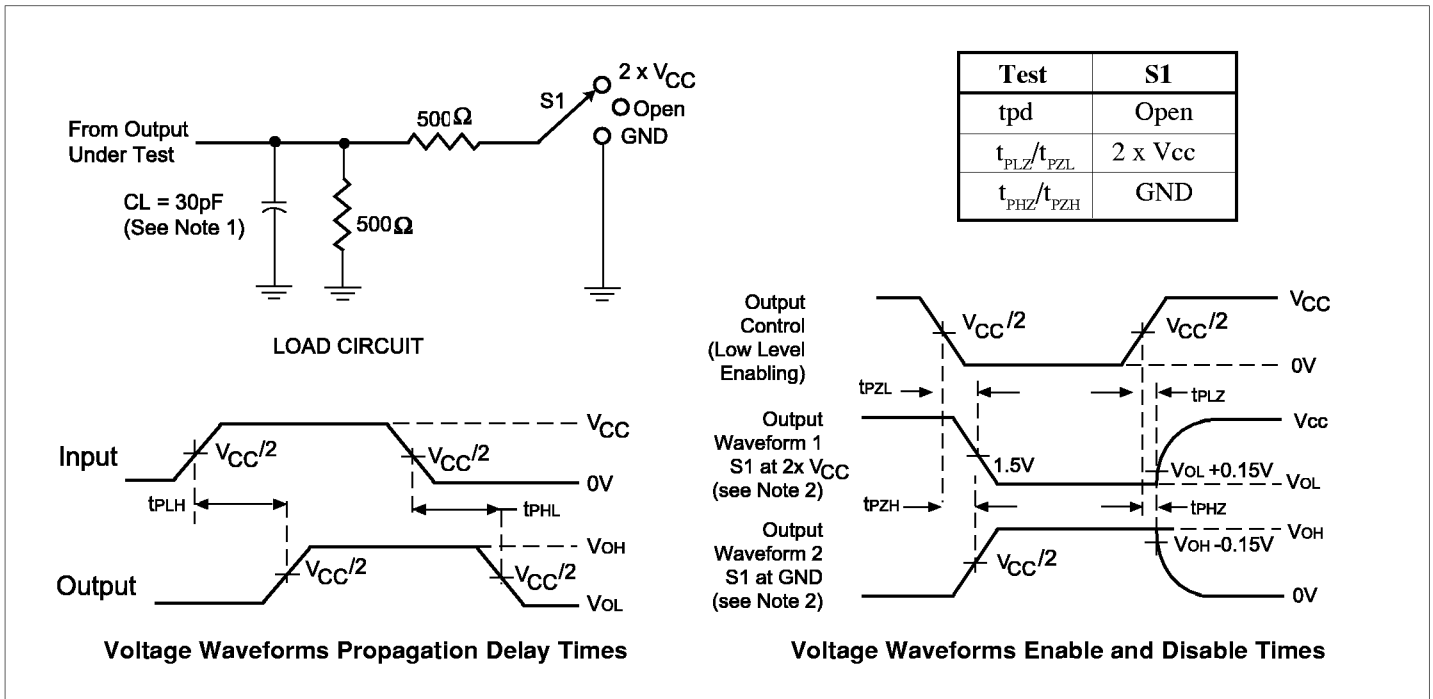


Figure 1. Load Circuit and Voltage Waveforms

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 impulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50\Omega$, $t_r \leq 2ns$, $t_f \leq 2ns$.
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}

Parameter Measurements ($V_{CC} = 2.7$ AND $3.3V \pm 0.3V$)

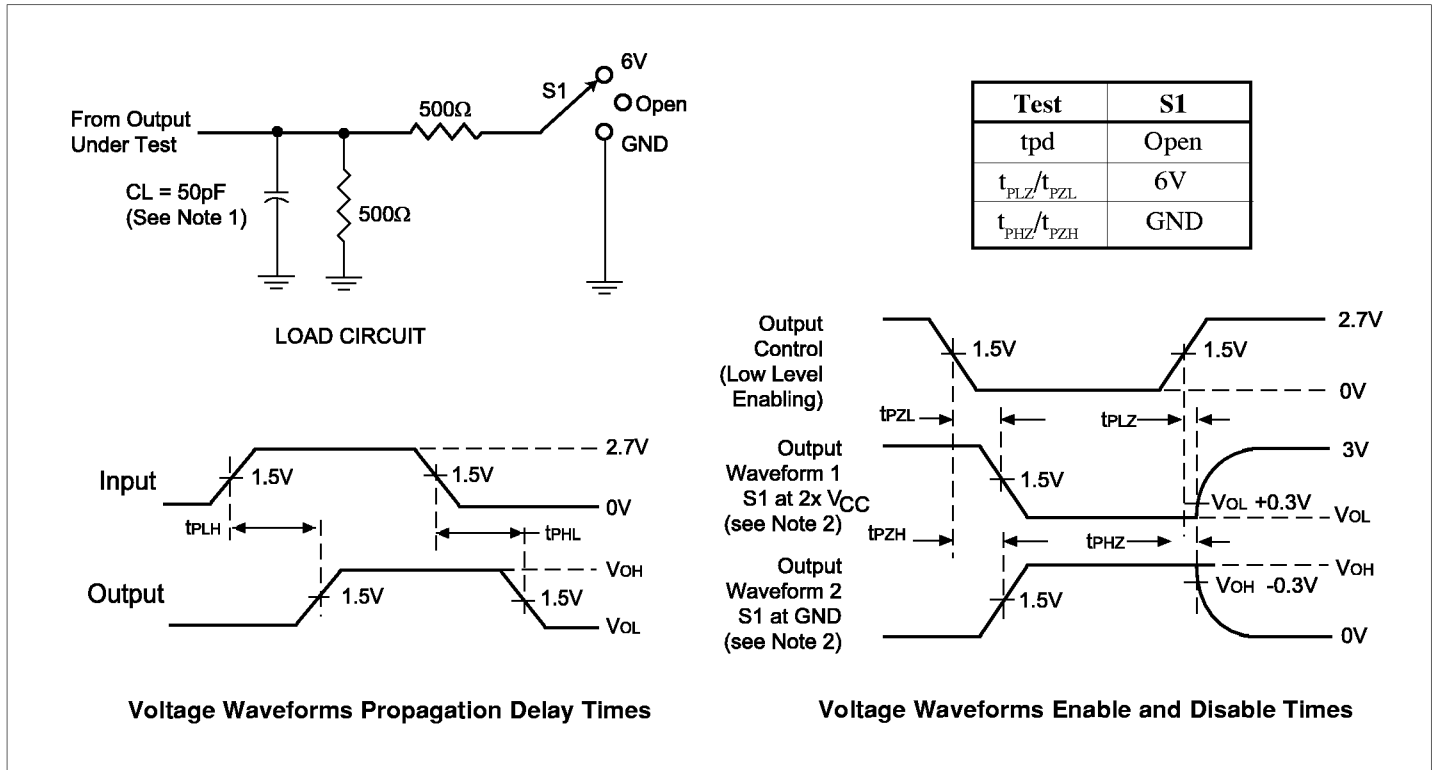


Figure 2. Load Circuit and Voltage Waveforms

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 impulses are supplied by generators having the following characteristics: $PRR \leq MHz$, $Z_o = 50\Omega$, $t_r \leq 2.5ns$, $t_f \leq 2.5ns$.
4. The outputs are measured one at a time with one transition per measurement.
5. t_{TPZ} 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}