3.3V, 24:12 Mux/DeMux *NanoSwitch*™

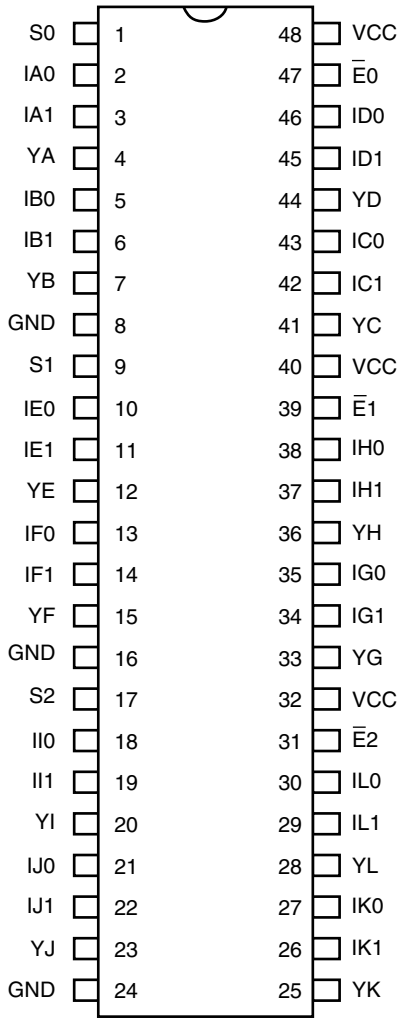
Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2µA Typical)
  – Ideally suited for notebook applications
- TTL - compatible control of input levels
- Fast switching speed - 4.5ns max.
- Packaging (Pb-free & Green available):
  - 48-pin 150-mil wide BQSOP (B)

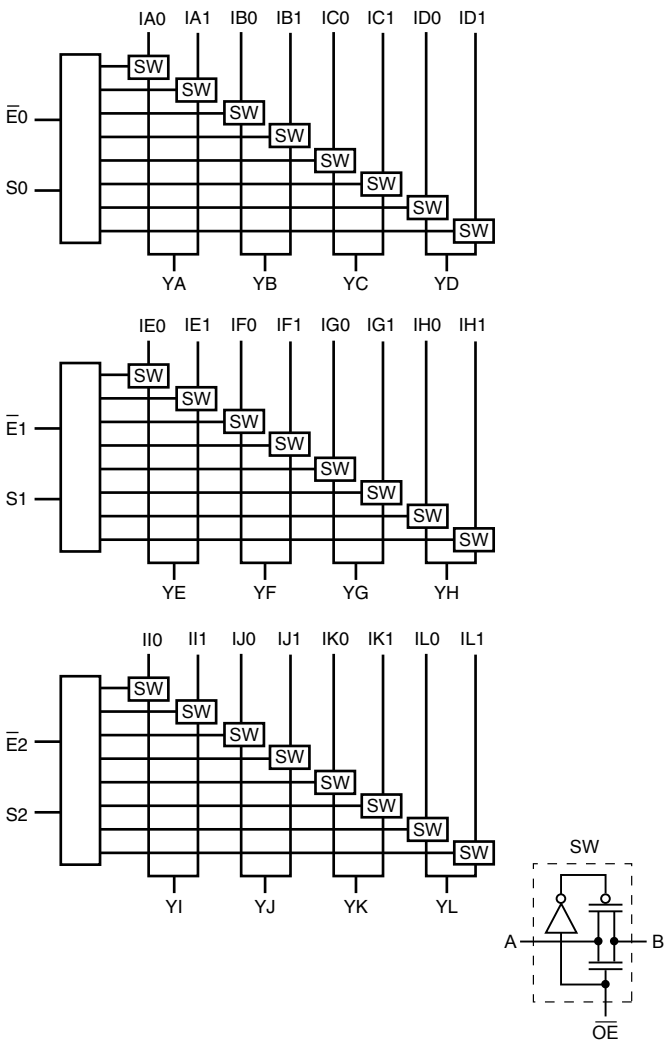
Description

Pericom Semiconductor's PI3B33X257 is a 3.3V, 24:12 multiplexer/demultiplexer with three-state outputs. Inputs can be connected to outputs with low on resistance (5Ω) with no additional ground bounce noise or propagation delay.

Pin Configuration



Block Diagram



Pin Description

Pin Name	Description
IA_n-IL_n	Data Inputs
S	Select Inputs
$\overline{E}n$	Enable
Y_A-Y_L	Data Outputs
GND	Ground
V_{CC}	Power
NC	No Connect

Truth Table(1)

$\overline{E}n$	Sn	YA(2)	YB(2)	YC(2)	YD(2)	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	$_IA_0$	$_IB_0$	$_IC_0$	$_ID_0$	S = 0
L	H	$_IA_1$	$_IB_1$	$_IC_1$	$_ID_1$	S = 1

Notes:
1. H = High Voltage Level,
   L = Low Voltage Level
2. n = 0 YA, YB, YC, YD,
   n = 1 YE, YF, YG, YH,
   n = 2 YI, YJ, YK, YL

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 +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.

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 3.3V ±5%)

Parameters	Description	Test Conditions(1)	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}			±50	µA
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND			±1	
I_{OZH}	High Impedance Output Current	0 ≤ I, Y ≤ V_{CC}			±50	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA			–1.2	V
R_{ON}	Switch On-Resistance(3)	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA or 64mA		5	7	Ω
		V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA		10	15	

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ.	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3.0		pF
C_{OFF}	In/Yn Capacitance, Switch Off		17.0		
C_{ON}	In/Yn Capacitance, Switch On		25.0		

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, T_A = 25°C ambient and maximum loading.
3. Measured by the voltage drop between I and Y pin at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (I,Y) pins.
4. 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} = Max.	V_{IN} = GND or V_{CC}		0.1	9.0	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.0V[3]			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_{CC} = 3.3V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, control inputs only); I and Y pins do not contribute to I_{CC}.

Switching Characteristics over Operating Range

Parameters	Description	Test Conditions[1]	Com.		Units
			Min.	Max.	
t_{IY}	Propagation Delay[2,3] In to Yn	C_L = 50pF R_L = 500Ω		0.25	ns
t_{SY}	Bus Select Time Sn to Yn		1	4.5	
t_{PZH} t_{PZL}	Bus Disable Time $\overline{E}$ to Yn		1	4.5	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{E}$ to Yn		1	4.8	

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.

Applications Information

Logic Inputs

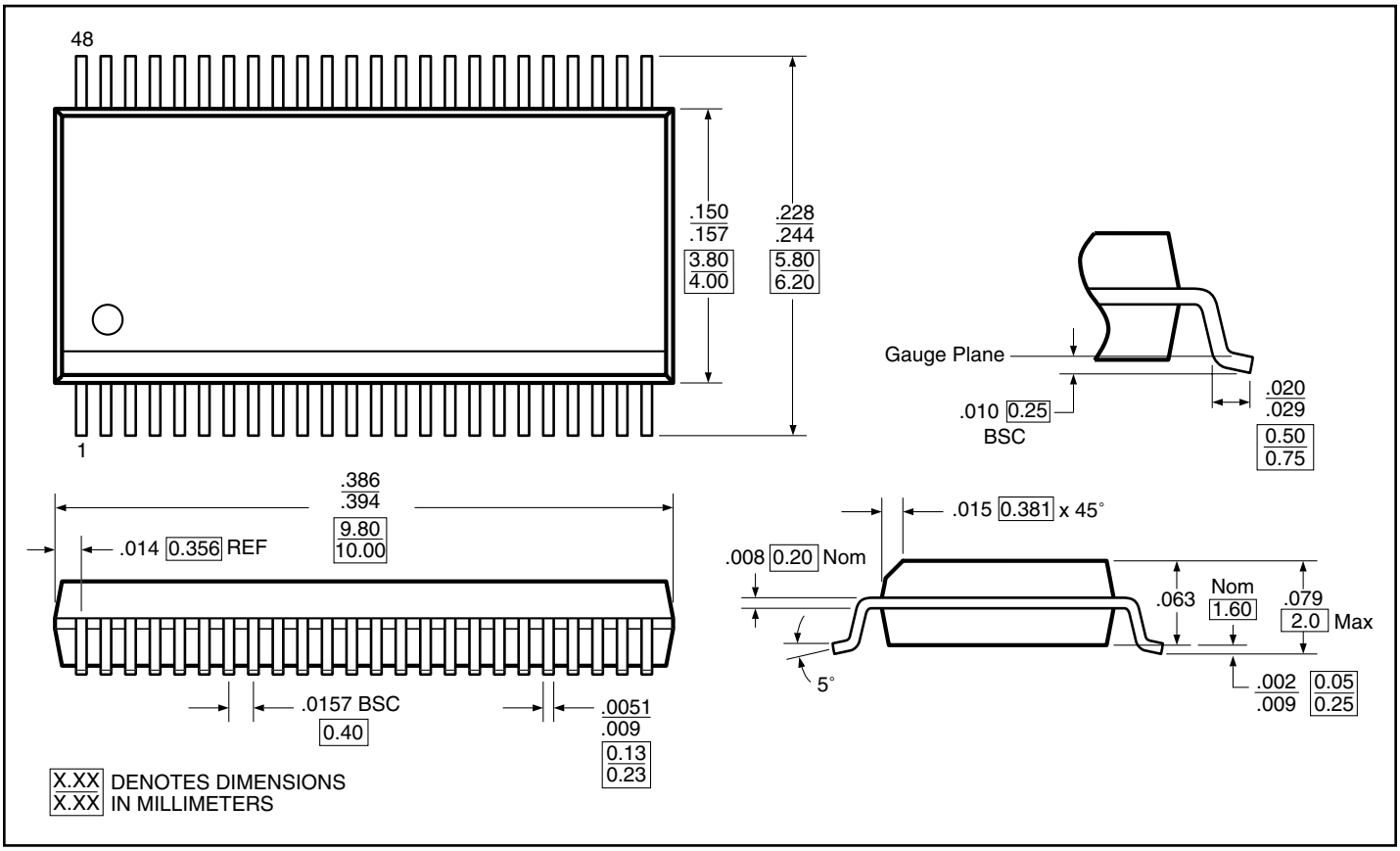
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a + 3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

Power-Supply Sequencing and Hot-Plug Information

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

Rail-to-Rail is a registeredtrademark of Nippon Motorola, Ltd.

Packaging Mechanical: 48-pin BQSOP (B)



Ordering Information

Ordering Code	Packaging Code	Package Description
PI3B33X257B	B	48-pin BQSOP
PI3B33X257BE	B	Pb-free & Green, 48-pin BQSOP

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. X = Tape and Reel

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