

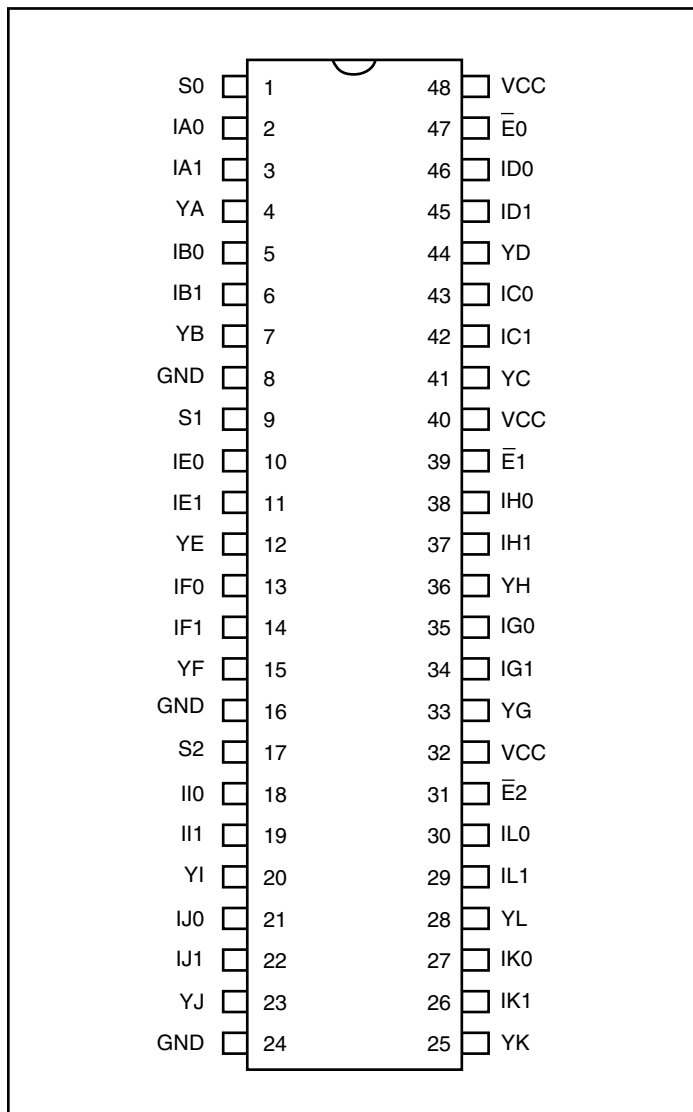
#### Features

- 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)

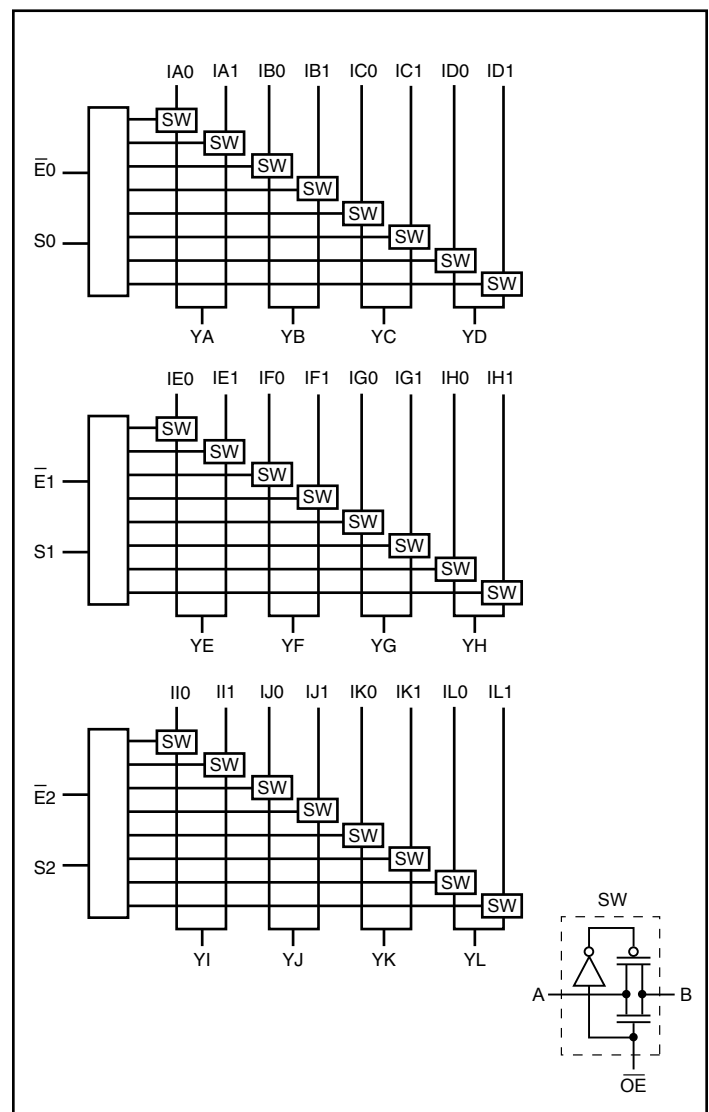
#### Description

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 <sub>n</sub> -IL <sub>n</sub>	Data Inputs
S	Select Inputs
$\bar{E}_n$	Enable
YA-YL	Data Outputs
GND	Ground
V <sub>CC</sub>	Power
NC	No Connect

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

$\bar{E}_n$	Sn	YA <sup>(2)</sup>	YB <sup>(2)</sup>	YC <sup>(2)</sup>	YD <sup>(2)</sup>	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	I <sub>A0</sub>	I <sub>B0</sub>	I <sub>C0</sub>	I <sub>D0</sub>	S = 0
L	H	I <sub>A1</sub>	I <sub>B1</sub>	I <sub>C1</sub>	I <sub>D1</sub>	S = 1

**Notes:**

- H = High Voltage Level,  
L = Low Voltage Level
- 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<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 3.3V ±5%)

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	Max.	Units
V <sub>IH</sub>	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0			V
V <sub>IL</sub>	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5		0.8	
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			±50	μA
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND			±1	
I <sub>OZH</sub>	High Impedance Output Current	0 ≤ I, Y ≤ V <sub>CC</sub>			±50	
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18mA			-1.2	V
R <sub>ON</sub>	Switch On-Resistance <sup>(3)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V, I <sub>ON</sub> = 48mA or 64mA		5	7	Ω
		V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 15mA		10	15	

**Capacitance** ( $T_A = 25^\circ\text{C}$ ,  $f = 1\text{ MHz}$ )

Parameters <sup>(4)</sup>	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:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at  $V_{CC} = 3.3V$ ,  $T_A = 25^\circ\text{C}$  ambient and maximum loading.
- 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.
- This parameter is determined by device characterization but is not production tested.

**Power Supply Characteristics**

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$		0.1	9.0	$\mu\text{A}$
$\Delta I_{CC}$	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.0V^{(3)}$			750	

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at  $V_{CC} = 3.3V$ ,  $+25^\circ\text{C}$  ambient.
- 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 <sup>(1)</sup>	Com.		Units
			Min.	Max.	
$t_{1Y}$	Propagation Delay <sup>(2,3)</sup> In to Yn	$C_L = 50\text{pF}$ $R_L = 500\Omega$		0.25	ns
$t_{SY}$	Bus Select Time Sn to Yn		1	4.5	
$t_{PZH}$ $t_{PZL}$	Bus Disable Time $\bar{E}$ to Yn		1	4.5	
$t_{PHZ}$ $t_{PLZ}$	Bus Disable Time $\bar{E}$ to Yn		1	4.8	

**Notes:**

- See test circuit and waveforms.
- This parameter is guaranteed but not tested on Propagation Delays.
- 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

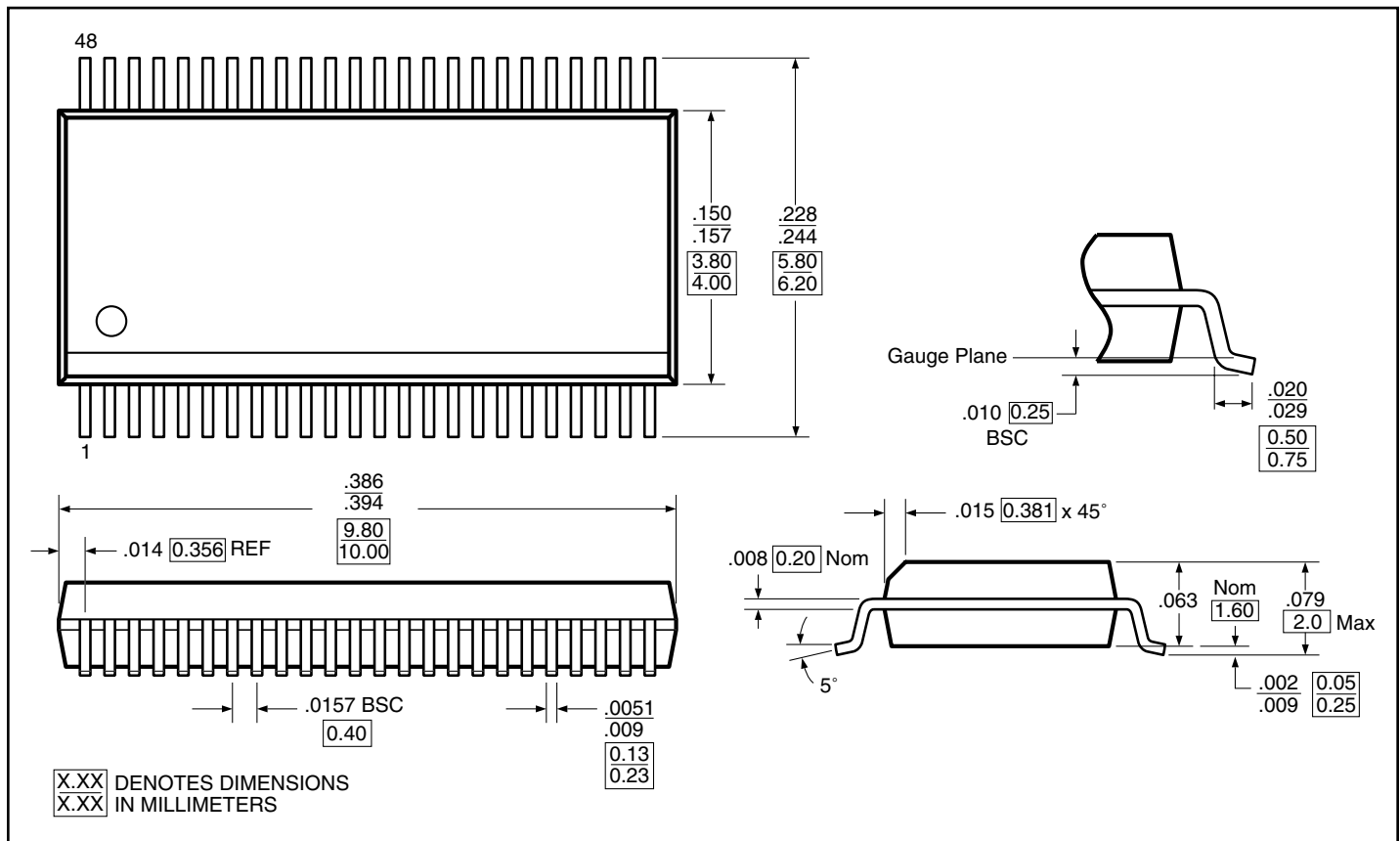
The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a + 3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

### Power-Supply Sequencing and Hot-Plug Information

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V<sub>CC</sub> and GND before applying signals to input/output or control pins.

*Rail-to-Rail is a registered trademark 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/](http://www.pericom.com/packaging/)
2. X = Tape and Reel