



PI3B3253

3.3V, Dual 4:1 Mux/DeMux NanoSwitch™

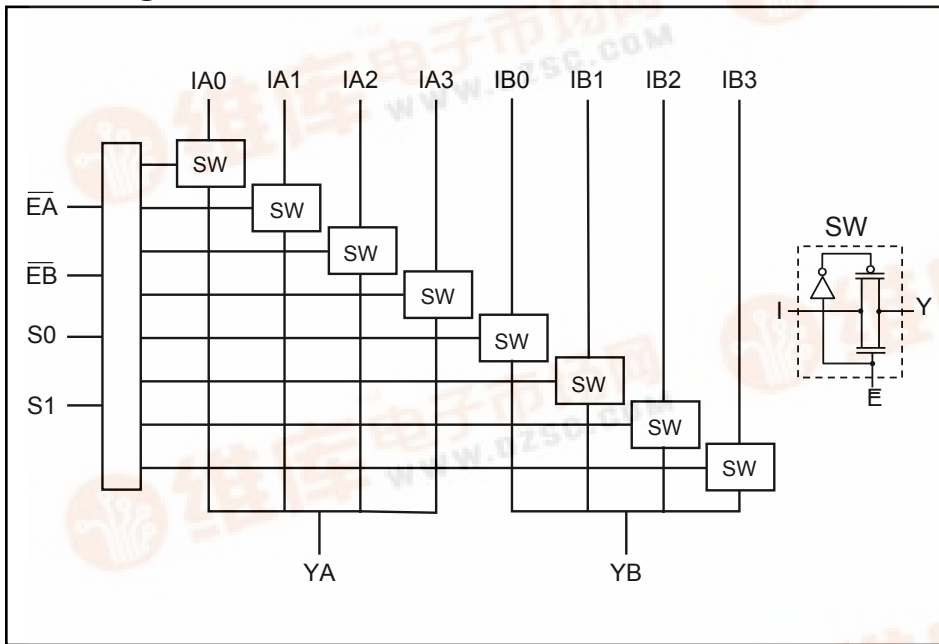
Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Fast Switching Speed: 5.2ns max.
- Ultra Low Quiescent Power (0.2μA typical)
 - Ideally suited for notebook applications
- Pin compatible with 74 series 253 logic devices
- Packaging (Pb-free & Green available):
 - 16-pin 150-mil wide plastic QSOP (Q)
 - 16-pin 150-mil wide plastic SOIC (W)
 - 16-pin 173-mil wide plastic TSSOP (L)

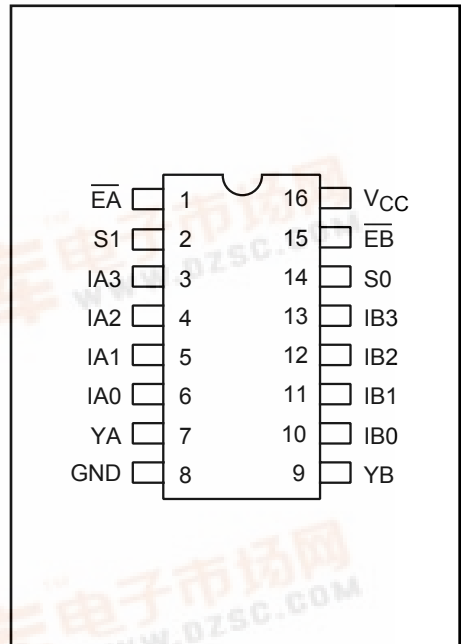
Description

Pericom Semiconductor's PI3B3253 is a 3.3V, Dual4:1 Multiplexer/ Demultiplexer with Hi-Z outputs that is pinout compatible with the PI74FCT253T, 74F253, and 74ALS/AS/LS 253. Inputs can be connected to outputs with low On-Resistance (5Ω) with no additional ground bounce noise or propagation delay.

Block Diagram



Pin Configuration



Truth Table⁽¹⁾

Enable		Select		Y _A	Y _B	Function
\overline{E}_A	\overline{E}_B	S ₁	S ₀			
H	X	X	X	Hi-Z	X	Disable A
X	H	X	X	X	Hi-Z	Disable B
L	L	L	L	I _{A0}	I _{B0}	S1-0 = 0
L	L	L	H	I _{A1}	I _{B1}	S1-0 = 1
L	L	H	L	I _{A2}	I _{B2}	S1-0 = 2
L	L	H	H	I _{A3}	I _{B3}	S1-0 = 3

Pin Description

Pin Name	Description
I _{AN} , I _{BN}	Data Inputs
S ₀₋₁	Select Inputs
\overline{E}_A , \overline{E}_B	Enable
Y _A , Y _B	Data Outputs
GND	Ground
V _{CC}	Power

H = High Voltage Level, L = Low Voltage Level



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, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$)

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	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			± 1	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			± 1	
I_{OZH}	High Impedance Output Current	$0 \leq I_N, Y_N \leq V_{CC}$			± 1	
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$			-1.2	V
R_{ON}	Switch On-Resistance ⁽³⁾	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$ or 64mA		5	8	Ω
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	17	

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

Parameters ⁽⁴⁾	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	3.0	pF
C_{OFF}	I_A/I_B Capacitance, Switch Off		8.0	
C_{ON}	I_A/I_B Capacitance, Switch On		36.0	

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ 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 ⁽¹⁾		Min.	Typ. ⁽²⁾	Max.	Units
I _{CC}	Quiescent Power Supply Current	V _{CC} = Max.	V _{IN} = GND or V _{CC}		0.1	3.0	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 (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 Y _n	C _L = 50pF R _L = 500Ω		0.25	ns
t _{SY}	Bus Select Time, S _n to Y _n		1	4.0	
t _{PZH}	Bus Enable Time, \bar{E} to Y _n		1	3.8	
t _{PHZ} t _{PLZ}	Bus Disable Time, \bar{E}_n to Y		1	5.2	

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

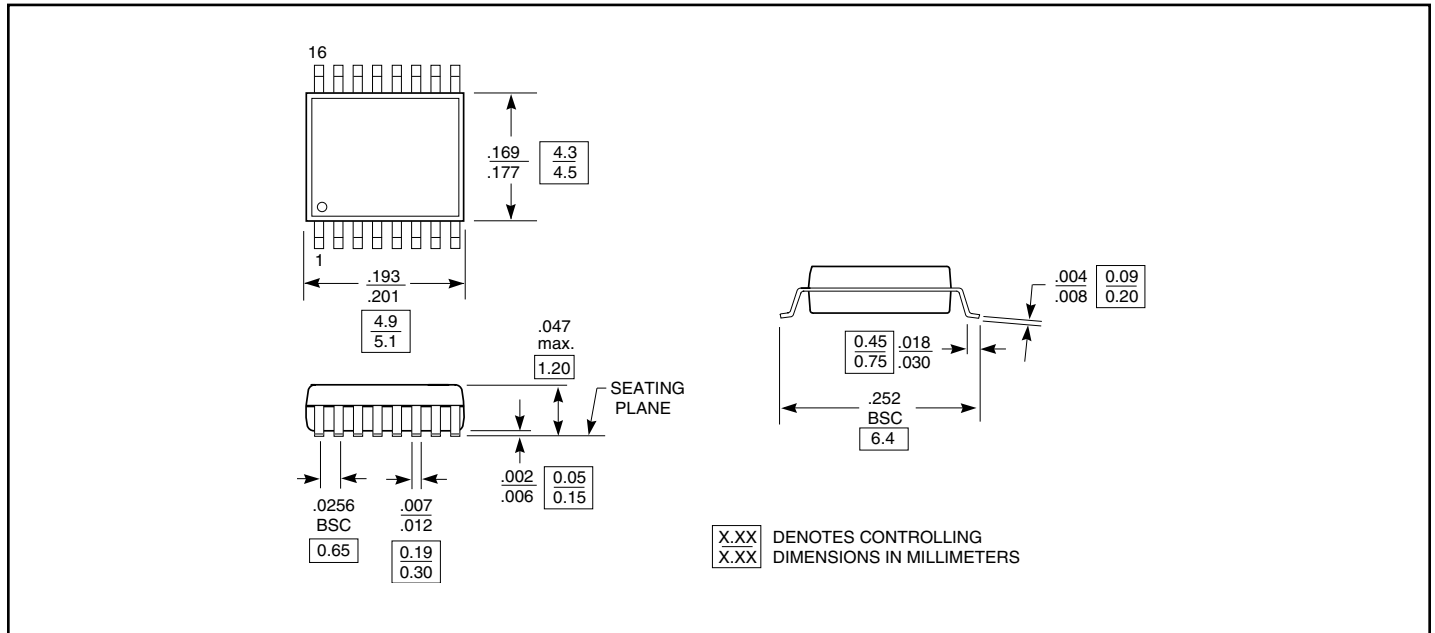
Logic Inputs

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 registered trademark of Nippon Motorola, Ltd

Packaging Mechanical: 16-Pin TSSOP (L)

Ordering Information

Ordering Code	Package Code	Package Description
PI3B3253Q	Q	16-pin QSOP
PI3B3253QE	Q	Pb-free & Green, 16-pin QSOP
PI3B3253W	W	16-pin SOIC
PI3B3253WE	W	Pb-free & Green, 16-pin SOIC
PI3B3253L	L	16-pin TSSOP
PI3B3253LE	L	Pb-free & Green, 16-pin TSSOP

Notes:

1. Thermal Characteristics can be found on the web at www.pericom.com/packaging/