A Product Line of
Diodes Incorporated

PI3B3251

3.3V, 8:1 Mux/DeMux NanoSwitch™

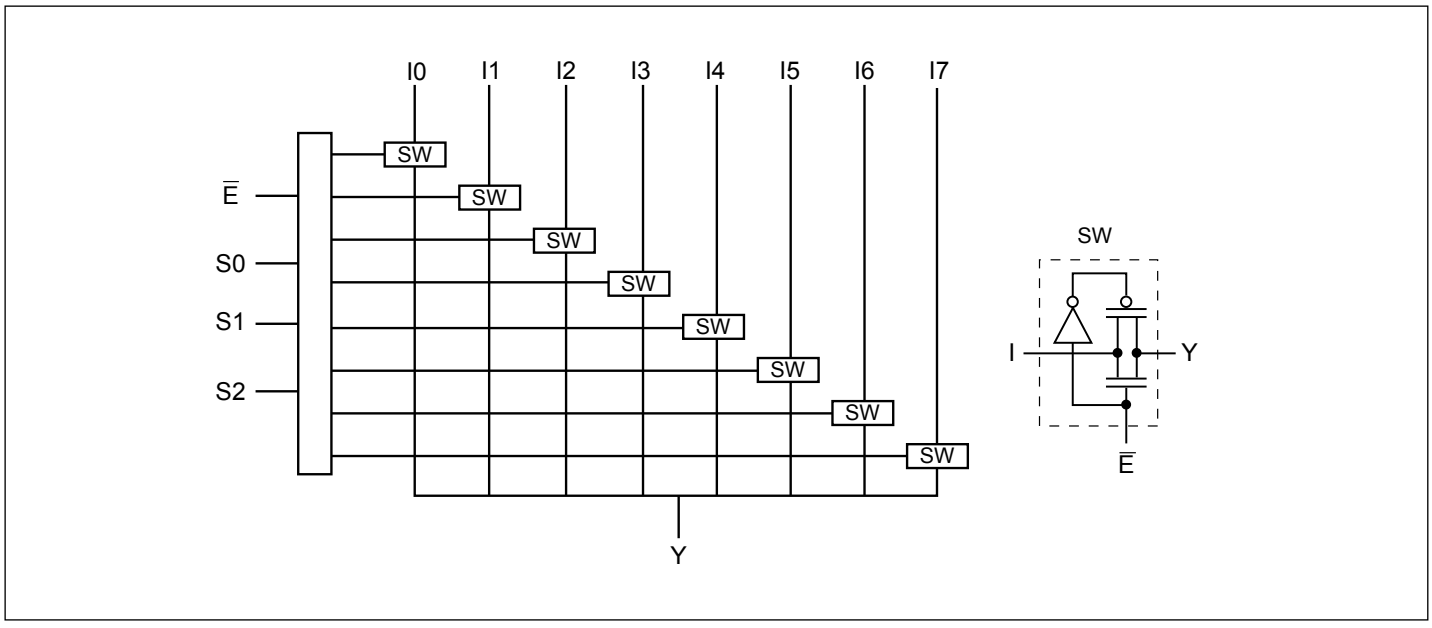
Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Ultra Low Quiescent Power (0.1µA typical)
  - Ideally suited for notebook applications
- Pin compatible with 74 series 251 logic devices
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.
  https://www.diodes.com/quality/product-definitions/
- Packaging (Pb-free & Green available):
  - 16-pin 173-mil Wide (TSSOP)

Description

Diodes' PI3B3251 is a 3.3V Dual 8:1 Multiplexer/Demultiplexer with three-state outputs that is pinout compatible with the PI74FCT251T, 74F251, and 74ALS/AS/LS 251. Inputs can be connected to outputs with low On-Resistance (5Ω) with no additional ground bounce noise or propagation delay.

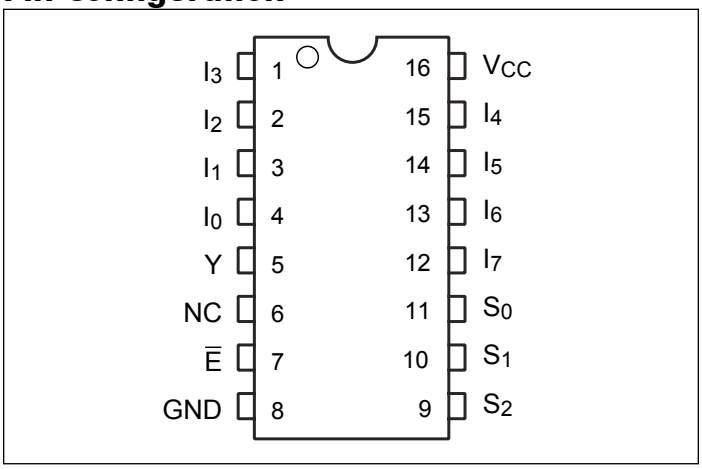
Block Diagram



Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Pin Configuration



Pin Description

Pin#	Pin Name	Description
4, 3, 2, 1, 15, 14, 13, 12	I_{0-7}	Data Inputs
11, 10, 9	S_{0-2}	Select Inputs
7	$\overline{E}$	Enable
5	Y	Data Outputs
8	GND	Ground
16	V_{CC}	Power
6	NC	No Connect

Truth Table(1)

$\overline{E}$	Select			Y	Function
	S2	S1	S0		
H	X	X	X	Hi-Z	Disable
L	L	L	L	I_0	S2-0 = 0
L	L	L	H	I_1	S2-0 = 1
L	L	H	L	I_2	S2-0 = 2
L	L	H	H	I_3	S2-0 = 3
L	H	L	L	I_4	S2-0 = 4
L	H	L	H	I_5	S2-0 = 5
L	H	H	L	I_6	S2-0 = 6
L	H	H	H	I_7	S2-0 = 7

Note:
1. 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°C to +85°C, V_{CC} =3.3V ±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} = Max., V_{IN} = V_{CC}			±1	µA
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND			±1	
I_{OZH}	High Impedance Output Current	0 ≤ I_N, Y ≤ V_{CC}			±1	
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	8	Ω
		V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA		10	17	

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.

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters(1)	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3.0	pF
$C_{I(OFF)}$	I_0 - I_7 Capacitance, Switch Off		8.0	
$C_{Y(OFF)}$	Y Capacitance, Switch Off		64.0	
$C_{I(ON)}$	I_0 - I_7 Capacitance, Switch On		72.0	

Note:

1. 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	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 input only); I and Y pins do not contribute to I_{CC}.

Switching Characteristics over Operating Range

Parameters	Description	Conditions	Com.		Units
			Min.	Max.	
t_{PD}	Propagation Delay[1,2], In to Y	C_L = 50pF R_L = 500Ω		0.25	ns
t_{SY}	Bus Enable Time, Sn to Y		1	4.5	
t_{PZH} t_{PZL}	Bus Enable Time, $\overline{E}$ to Y		1	3.5	
t_{PHZ} t_{PLZ}	Bus Disable Time, $\overline{E}$ to Y		1	5.5	

Notes:

1. This parameter is guaranteed but not tested on Propagation Delays.
2. 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.

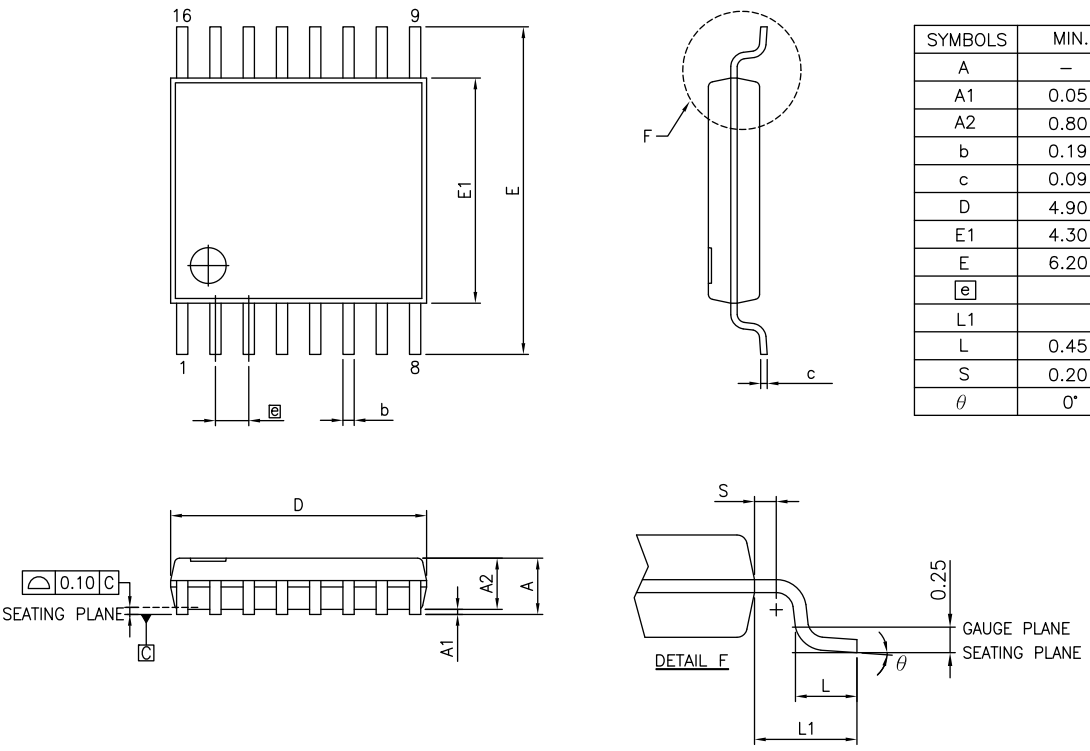
Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd.

Part Marking

PI3B
3251LE
YYWWGG

YYWW: Date Code (Year & Workweek)
1st G: Assembly Site Code
2nd G: Wafer Fab Site Code

Packaging Mechanical: 16-TSSOP (L)



SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.20
A1	0.05	–	0.15
A2	0.80	1.00	1.05
b	0.19	–	0.30
c	0.09	–	0.20
D	4.90	5.00	5.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65 BSC		
L1	1.00 REF		
L	0.45	0.60	0.75
S	0.20	–	–
θ	0°	–	8°

NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
2. JEDEC MO–153F
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity — DATE: 03/24/16

DESCRIPTION: 16-PIn, 173mll Wlde TSSOP

PACKAGE CODE: L (L16)

DOCUMENT CONTROL #: PD-1310 REVISION: G

16-0061

For latest package info.
please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Package Code	Package Description
PI3B3251LEX	L	16-pin, 173-mil Wide (TSSOP)

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3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. E = Pb-free and Green
5. X suffix = Tape/Reel