



**THE DATASHEET OF
PI3B3253Q**



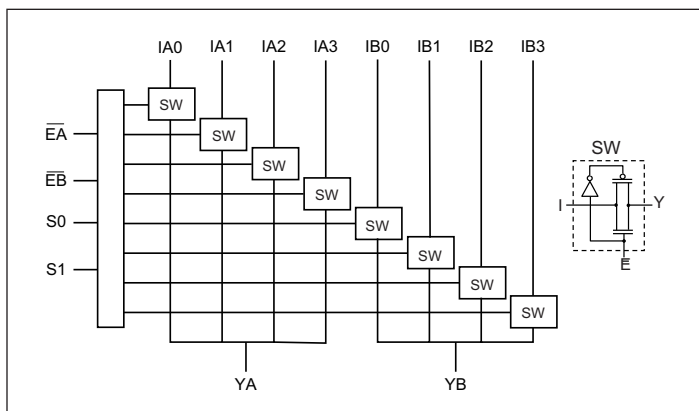
PI3B3253

3.3V, Dual 4:1 Mux/DeMux NanoSwitch™

Description

The DIODES PI3B3253 is a 3.3V, Dual 4:1 Multi-plexer/Demulti-plexer 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



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
- 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>
- Packaging (Pb-free & Green):
 - 16-pin, QSOP (Q)
 - 16-pin, TSSOP (L)
 - 16-pin, UQFN (ZHD)

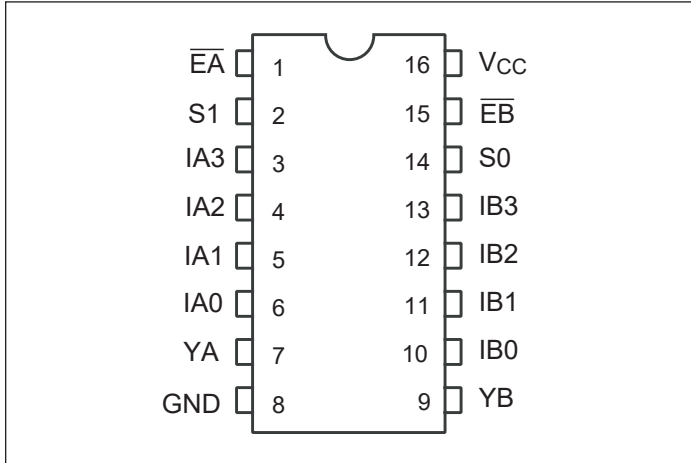
Truth Table⁽¹⁾

Enable		Select		YA	YB	Function
EA	EB	S1	S0			
H	X	X	X	Hi-Z	X	Disable A
X	H	X	X	X	Hi-Z	Disable B
L	L	L	L	IA0	IB0	S1-0 = 0
L	L	L	H	IA1	IB1	S1-0 = 1
L	L	H	L	IA2	IB2	S1-0 = 2
L	L	H	H	IA3	IB3	S1-0 = 3

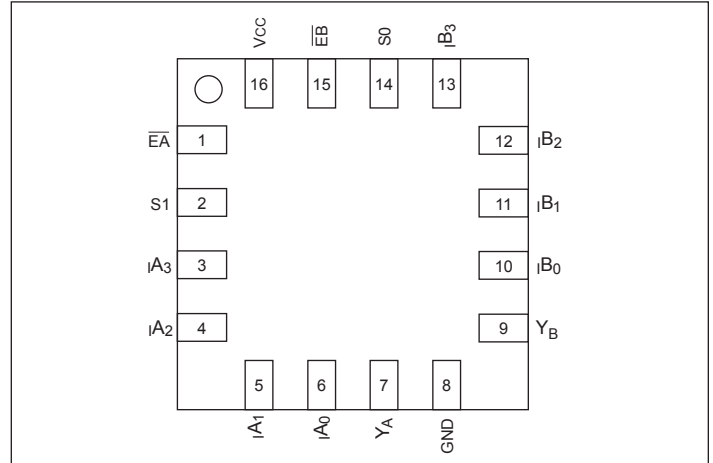
Note:
1. H = High Voltage Level, L = Low Voltage Level

- 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



QSOP, TSSOP Package



UQFN Package

Pin Configuration

Pin#	Pin Name	Description
6, 5, 4, 3 10, 11, 12, 13	I_{A_N} , I_{B_N}	Data Inputs
14, 2	S_{0-1}	Select Inputs
1, 15	$\overline{E_A}$, $\overline{E_B}$	Enable
7, 9	Y_A , Y_B	Data Outputs
8	GND	Ground
16	V_{CC}	Power

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	

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.

Capacitance

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

Parameters ⁽¹⁾	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:

- 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	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$		0.1	3.0	μA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.0\text{V}^{(3)}$			750	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at $V_{CC} = 3.3\text{V}$, $+25^\circ\text{C}$ 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	Com.		Units
			Min.	Max.	
t_{1Y}	Propagation Delay ^(1,2) In to Yn	$C_L = 50\text{pF}$ $R_L = 500\Omega$		0.25	ns
t_{SY}	Bus Select Time, Sn to Yn		1	4.0	
t_{PZH}	Bus Enable Time, \bar{E} to Yn		1	3.8	
t_{PHZ} t_{PLZ}	Bus Disable Time, \bar{E}_n to Y		1	5.2	

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

Q Package (PdCu)

PI3B
3253QE
YWX̄

○

Y: Year
W: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code
Bar above fab code means Cu wire

Q Package-2017 (Au)

PI3B
3253QE
YWX

○

Y: Year
W: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code

L Package

PI3B
3253LE
YYWXX

○

YY: Year
WW: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code
Bar above fab code means Cu wire

ZHD Package

wEZHDE
YWX

●

wEZHDE: PI3B3253ZHDE
Y: Year
W: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code
Bar above 2nd "X" means Cu wire

PI3B3253

Packaging Mechanical

16-QSOP (Q)

SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.069
A1	0.004	—	0.0098
A2	0.049	—	—
b	0.008	—	0.012
c	0.004	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.158
E	0.228	0.236	0.244
L	0.016	—	0.050
L1	0.041 REF.		
e	0.025 BSC.		
θ°	0	—	8

UNIT : INCH

NOTES:
 1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
 2. JEDEC MO-137E
 3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

		DATE: 04/08/16
DESCRIPTION: 16-Pin, 150mil Wide QSOP		
PACKAGE CODE: Q (Q16)		
DOCUMENT CONTROL #: PD-1201	REVISION: H	

16-0056

PI3B3253

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, 173mil Wide TSSOP

PACKAGE CODE: L (L16)

DOCUMENT CONTROL #: PD-1310

REVISION: G

16-0061

PI3B3253

16-UQFN (ZHD)

Top View

Bottom View

Side View

RECOMMENDED LAND PATTERN(unit:mm)

PKG. DIMENSIONS(MM)			
SYMBOL	Min	Nom	Max
A	0.55	0.60	0.65
A1	0.00	0.02	0.05
A3	0.15 REF		
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D1	1.60	1.75	1.90
E1	1.60	1.75	1.90
b	0.18	0.24	0.30
e	0.50 BSC		
L	0.25	0.40	0.55

Note:
1. All DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

DIODES INCORPORATED	PERICOM A PRODUCT LINE OF DIODES INCORPORATED ENABLING SERIAL CONNECTIVITY	DATE: 01/02/24
DESCRIPTION: U-QFN3030-16		
PACKAGE CODE: ZHD(ZHD16)		
DOCUMENT CONTROL#: PD-2209		REVISION: C

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
PI3B3253QEX	Q	16-pin, 150mil Wide (QSOP)
PI3B3253QEX-2017	Q	16-pin, 150mil Wide (QSOP). Au wire bounding.
PI3B3253LEX	L	16-pin, 173mil Wide (TSSOP)
PI3B3253ZHDEX	ZHD	16-pin, 3 x 3, UQFN3030-16 (UQFN)

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.
4. E = Pb-free and Green
5. X suffix = Tape/Reel

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