

**PI5C3303**

**SOTiny™ 2:1 Mux/DeMux Bus Switch**

**Features**

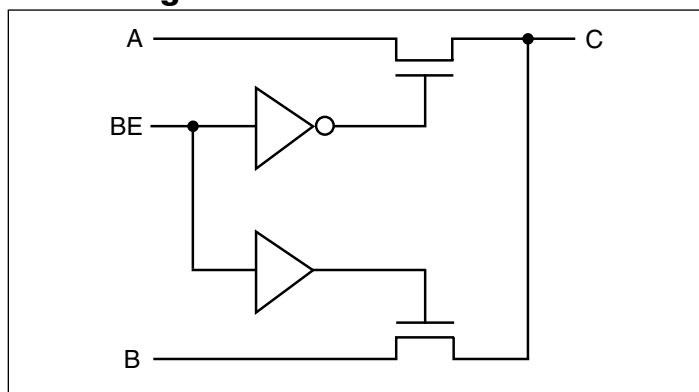
- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.1µA typical)
  - Ideally suited for notebook applications
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- Packaging (Pb-free & Green available):
  - 6-pin plastic SOT23 (T)

**Description**

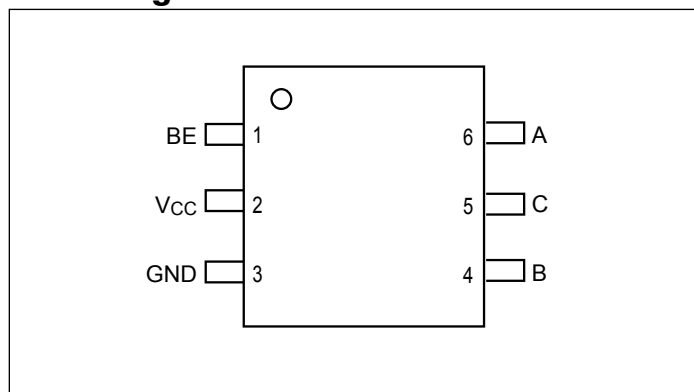
PI5C3303 is a single 2:1 Mux/DeMux digital switch designed with a fast enable. When enabled using the Bus Enable (BE) pin, the “A” or “B” pin is directly connected to the “C” pin. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI5C3303 device has an active HIGH enable.

**Block Diagram**



**Pin Configuration**



**Truth Table**<sup>(1, 2)</sup>

BE	A	B	C	Function
L	C	X	A	Connect A & C
H	X	C	B	Connect B & C

**Notes:**

1. H = High Voltage Level  
L = Low Voltage Level  
X = Don't Care
2. A = I/O at pin 6  
B = I/O at pin 4  
C = I/O at pin 5

**Pin Description**

Pin Name	Description
BE	Switch Enable
A	Bus A at pin 6
B	Bus B at pin 4
C	Bus C at pin 5
V <sub>CC</sub>	Power
GND	Ground

**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.

**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 +7.0V
DC Input Voltage .....	-0.5V to +7.0V
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  $+85^\circ\text{C}$ ,  $V_{CC} = 5V \pm 10\%$ )

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	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	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			$\pm 1$	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	
$I_{OZ}$	High Impedence Output Current	$V_{CC} = \text{Max.}, V_{OUT} = 0V \text{ or } V_{CC}$			$\pm 1$	
$R_{ON}$	Switch On-Resistance <sup>(3)</sup>	$V_{CC} = 4V, V_{IN} = 2.4V,$ $I_{ON} = -15mA$		10	20	$\Omega$
		$V_{CC} = 4.5V, V_{IN} = 0V,$ $I_{ON} = 30mA \text{ or } 64mA$		4	7	
		$V_{CC} = 4.5V, V_{IN} = 2.4V, I_{ON} = -15mA$		7	15	

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at  $V_{CC} = 5.0V, T_A = 25^\circ\text{C}$  ambient and maximum loading.
- Measured by the voltage drop between A and B pin at indicated current through the switch. On-Resistance is determined by the lower of the voltages on the two (A, B) pins.

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

Parameters <sup>(1)</sup>	Description	Test Conditions	Typ. <sup>(4)</sup>	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0V$	3	pF
$C_{OFF}$	A/B Capacitance, Switch Off		5	
$C_{ON}$	A/B Capacitance, Switch On		12	

**Notes:**

- 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 <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>		0.1	3.0	μA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.4V <sup>(3)</sup>			2.5	mA

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V<sub>CC</sub> = 5.0V, +25°C ambient.
- Per TTL driven input (V<sub>IN</sub> = 3.4V, control inputs only); A and B pins do not contribute to I<sub>CC</sub>.

### Switching Characteristics over Operating Range

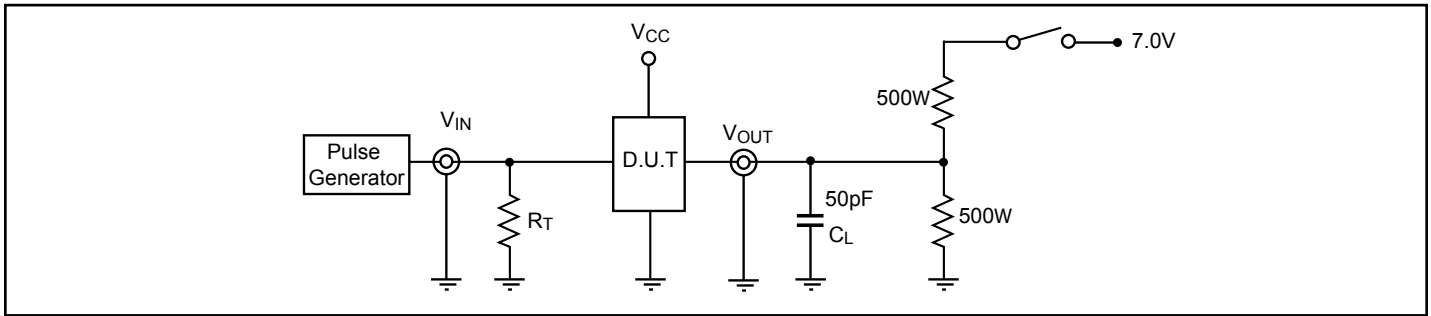
Parameters	Description	Test Conditions <sup>(3)</sup>	V <sub>CC</sub> = 4.5V		V <sub>CC</sub> = 4V		Units
			Min.	Max.	Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(1, 2)</sup> A to B, B to A	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω		0.25		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time		1.0	4.9		5.5	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time		1.0	4.2		4.5	

**Notes:**

- 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 his 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.
- See test circuit and waveforms.

**PI5C3303**

**Test Circuit**



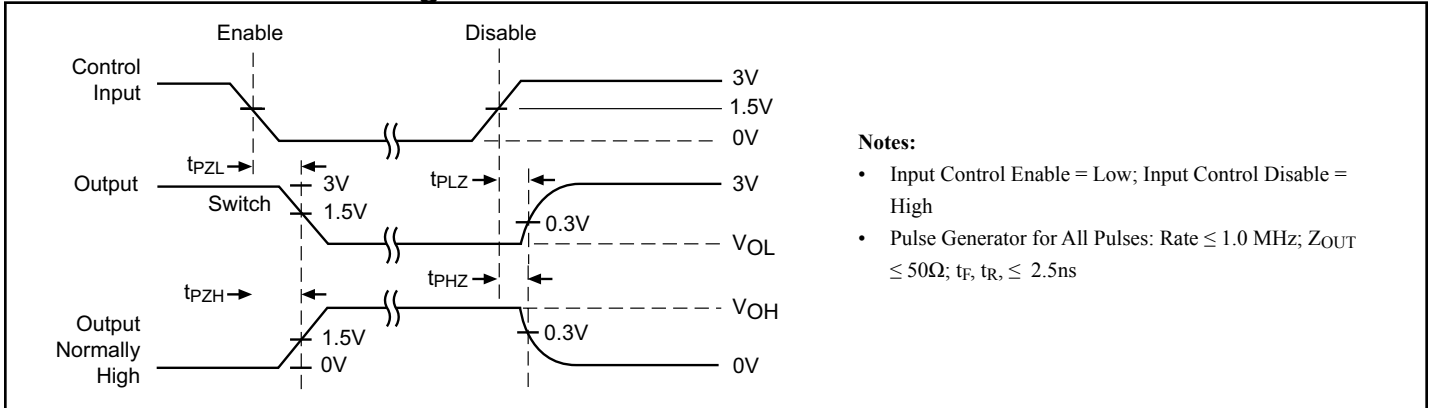
**Switch Positions<sup>(1)</sup>**

Test	Switch
Open Drain Disable LOW Enable LOW	7V
All Other Inputs	Open

**Notes:**

- $C_L$  = Load Capacitance: includes jig and probe capacitance.  
 $R_T$  = Termination Resistance: should be equal to the  $Z_{OUT}$  of the Pulse Generator.

**Enable and Disable Timing**



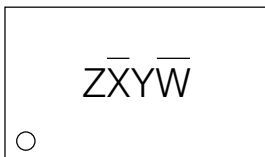
**Notes:**

- Input Control Enable = Low; Input Control Disable = High
- Pulse Generator for All Pulses: Rate  $\leq$  1.0 MHz;  $Z_{OUT} \leq 50\Omega$ ;  $t_f, t_r \leq 2.5ns$

**Part Marking**

ZX Package - Cu

ZX = PI5C3303TE



Y: Year

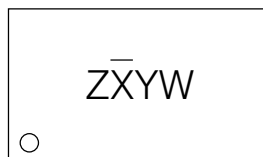
W: Workweek

Bar above X means Fab3 of MGN

Bar above W means Cu wire

ZX Package

ZX = PI5C3303TE



Y: Year

W: Workweek

Bar above X means Fab3 of MGN

**PI5C3303**

**Packaging Mechanical:**

6-SOT23 (T)

SYMBOLS	MIN.	NOM.	MAX.
A	—	—	1.45
A1	0.00	—	0.15
A2	0.90	1.15	1.30
b	0.35	—	0.50
c	0.08	—	0.22
D	2.75	2.90	3.05
E	2.60	2.80	3.00
E1	1.45	1.60	1.75
L	0.30	0.45	0.60
L1	0.60 REF		
R	0.10	—	—
R1	0.10	—	0.25
$\theta$	0°	4°	8°
e	0.95 BSC		
e1	1.90 BSC		

**NOTE :**  
 1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.  
 2. DIMENSIONS EXCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.  
 3. REFER EIAJ SC74A AND JEDEC MO-178C.

16-0064

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
PI5C3303TEX	T	6-Pin, Small Outline Transistor Plastic Package (SOT23)

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
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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

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