

PI5C3303

SOTiny™ 2:1 Mux/DeMux Bus Switch

Features

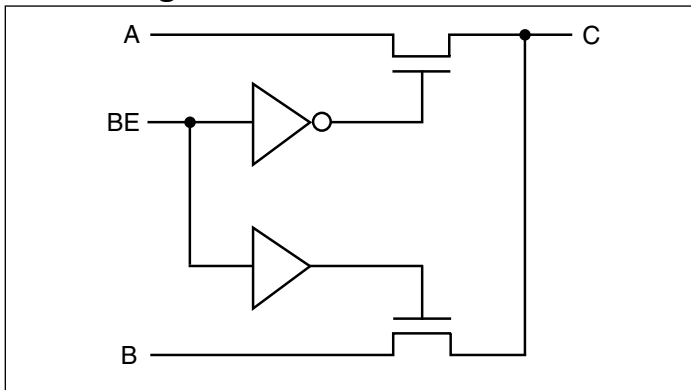
- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.1μA typical)
 - Ideally suited for notebook applications
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device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

Description

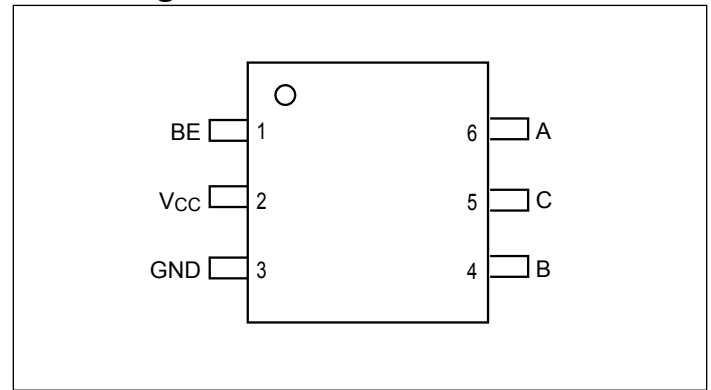
PI5C3303 is a single 2:1 Mux/DeMux digital switch designed with a fast enable. When enabled using the Bus Enable (BE) pin, the “A” or “B” pin is directly connected to the “C” pin. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI5C3303 device has an active HIGH enable.

Block Diagram



Pin Configuration



Truth Table^(1, 2)

| 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 _{CC} | 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°C to +85°C, V_{CC} = 5V ± 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 _{IOZ} | High Impedence Output Current | V _{CC} = Max., V _{OUT} = 0V or V _{CC} | | | ±1 | |
| R _{ON} | Switch On-Resistance ⁽³⁾ | V _{CC} = 4V, V _{IN} = 2.4V, I _{ON} = -15mA | | 10 | 20 | Ω |
| | | V _{CC} = 4.5V, V _{IN} = 0V, I _{ON} = 30mA or 64mA | | 4 | 7 | |
| | | V _{CC} = 4.5V, V _{IN} = 2.4V, I _{ON} = -15mA | | 7 | 15 | |

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} = 5.0V, T_A = 25°C ambient and maximum loading.
3. 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°C, f = 1 MHz)

| Parameters ⁽¹⁾ | Description | Test Conditions | Typ. ⁽⁴⁾ | 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:

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 | $V_{CC} = \text{Max.}$ | $V_{IN} = \text{GND or } V_{CC}$ | | 0.1 | 3.0 | μA |
| ΔI_{CC} | Supply Current per Input @ TTL HIGH | $V_{CC} = \text{Max.}$ | $V_{IN} = 3.4\text{V}^{(3)}$ | | | 2.5 | mA |

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at $V_{CC} = 5.0\text{V}$, $+25^\circ\text{C}$ ambient.
3. Per TTL driven input ($V_{IN} = 3.4\text{V}$, control inputs only); A and B pins do not contribute to I_{CC} .

Switching Characteristics over Operating Range

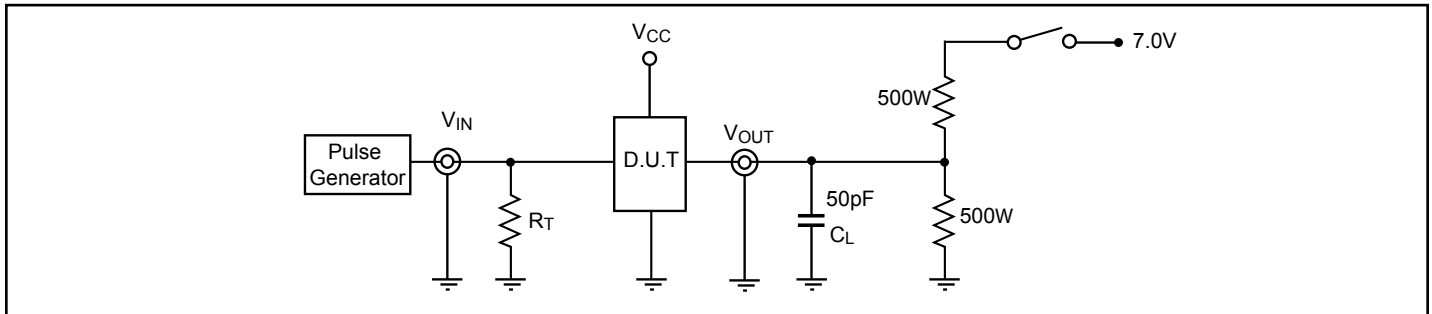
| Parameters | Description | Test Conditions ⁽³⁾ | $V_{CC} = 4.5\text{V}$ | | $V_{CC} = 4\text{V}$ | | Units |
|------------------------|-------------------------------------------------------|------------------------------------------|------------------------|------|----------------------|------|-------|
| | | | Min. | Max. | Min. | Max. | |
| t_{PLH} t_{PHL} | Propagation Delay ^(1, 2) A to B, B to A | $C_L = 50\text{pF}$ $R_L = 500\Omega$ | | 0.25 | | 0.25 | ns |
| t_{PZH} t_{PZL} | Bus Enable Time | | 1.0 | 4.9 | | 5.5 | |
| t_{PHZ} t_{PLZ} | Bus Disable Time | | 1.0 | 4.2 | | 4.5 | |

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 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.
3. See test circuit and waveforms.

PI5C3303

Test Circuit



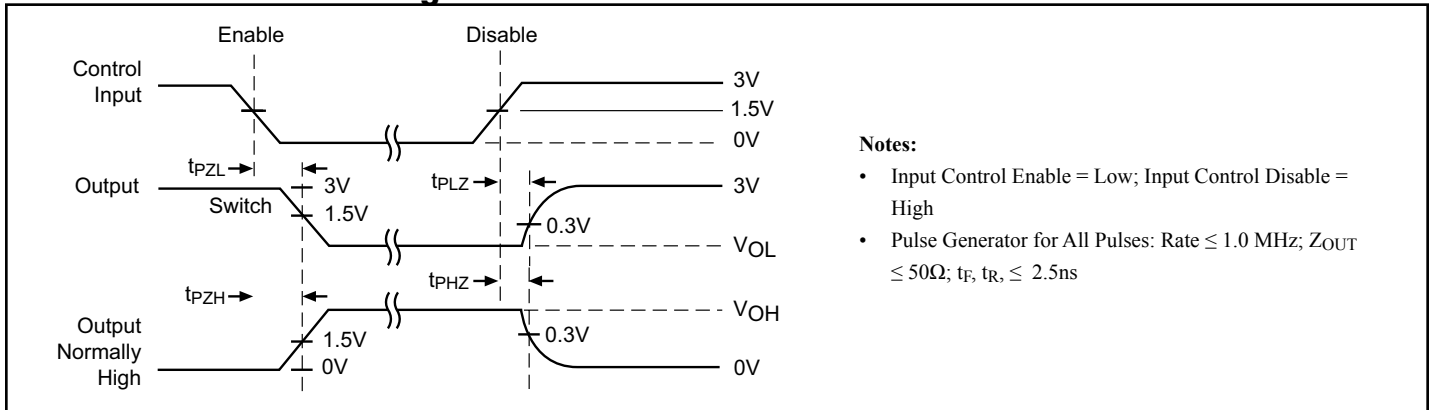
Switch Positions⁽¹⁾

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

Notes:

1. 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



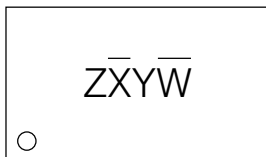
Notes:

- 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

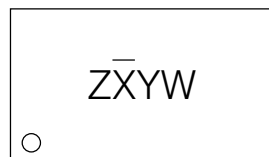
ZX = PI5C3303TE



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 |
| θ | 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.

PERICOM
Enabling Serial Connectivity

DATE: 03/30/16

DESCRIPTION: 6-Pin, Small Outline Transistor Plastic Package (SOT23)
 PACKAGE CODE: T (T6)
 DOCUMENT CONTROL #: PD-1912 REVISION: D

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:

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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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