

### Features

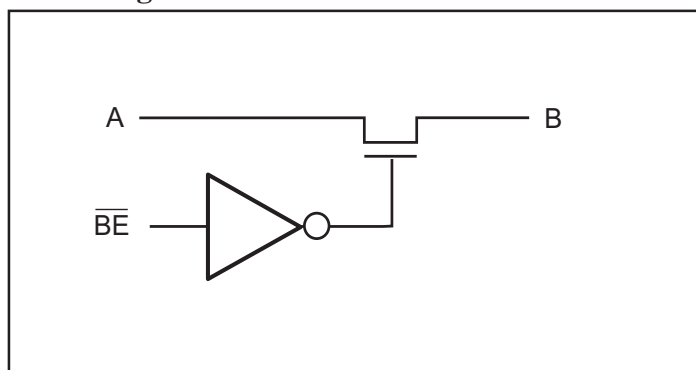
- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.1  $\mu$ A typical)
  - Ideally suited for notebook applications
- Packaging (Pb-free & Green available):
  - 5-pin plastic SOT23 (T)
  - 5-pin plastic SC70 (C)

### Description

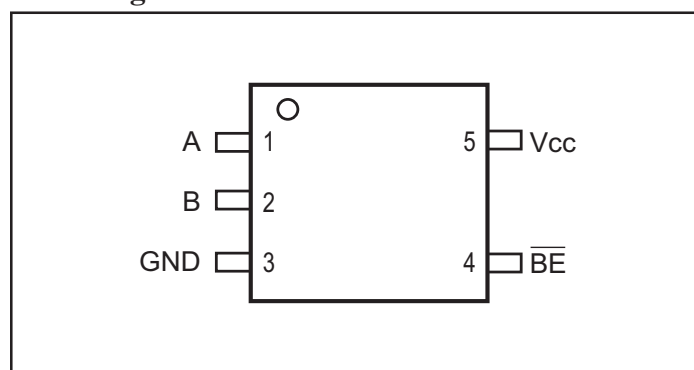
Pericom Semiconductor's PI5C3301 is a single digital switch designed with a fast enable. When enabled using the Bus Enable ( $\overline{BE}$ ) pin, the "A" pin is directly connected to the "B" pin. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI5C3301 device has an active LOW enable.

### Block Diagram



### Pin Configuration



### Truth Table<sup>(1)</sup>

$\overline{BE}$	A	B	V <sub>CC</sub>	Function
X*	Hi-Z	Hi-Z	GND	Disconnect
H	Hi-Z	Hi-Z	V <sub>CC</sub>	Disconnect
L	B	A	V <sub>CC</sub>	Connect

#### Notes:

1. H = High Voltage Level, L = Low Voltage Level  
 X = Don't Care, Hi-Z = High Impedance  
 A = I/O at pin 1, B = I/O at pin 2

\* A pull-up resistor should be used for power-up protection

### Pin Description

Pin Name	Description
$\overline{BE}$	Switch Enable
A	Bus A at pin 1
B	Bus B at pin 2
V <sub>CC</sub>	Power
GND	Ground

**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  $+85^\circ\text{C}$ ,  $V_{CC} = 5\text{V} \pm 10\%$ )

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	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	
$I_{OZH}$	High Impedance Output Current	$V_{CC} = \text{Max.}, V_{OUT} = 0\text{V}$ or $V_{CC}$			$\pm 1$	
$I_{OZL}$	Low Impedance Output Current	$V_{CC} = \text{Max.}, V_{OUT} = 0\text{V}$ or $V_{CC}$			$\pm 1$	
$R_{ON}$	Switch On Resistance <sup>(3)</sup>	$V_{CC} = 4.5\text{V}, V_{IN} = 0.0\text{V}, I_{ON} = 30\text{mA}$ or $64\text{mA}$		5	7	ohm
		$V_{CC} = 4.5\text{V}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	15	
		$V_{CC} = 4\text{V}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		14	20	

**Notes:**

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at  $V_{CC} = 5.0\text{V}$ ,  $T_A = 25^\circ\text{C}$  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	Units
$C_{IN}$	Input Capacitance	$V_{IN} = 0\text{V}$	3	pF
$C_{OFF}$	A/B Capacitance, Switch Off		5	
$C_{ON}$	A/B Capacitance, Switch On		10	

**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
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND or } V_{CC}$		0.1	3.0	$\mu\text{A}$
$\Delta I_{CC}$	Supply Current per Input @ TTL HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.4\text{V}^{(3)}$			2.5	mA

**Notes:**

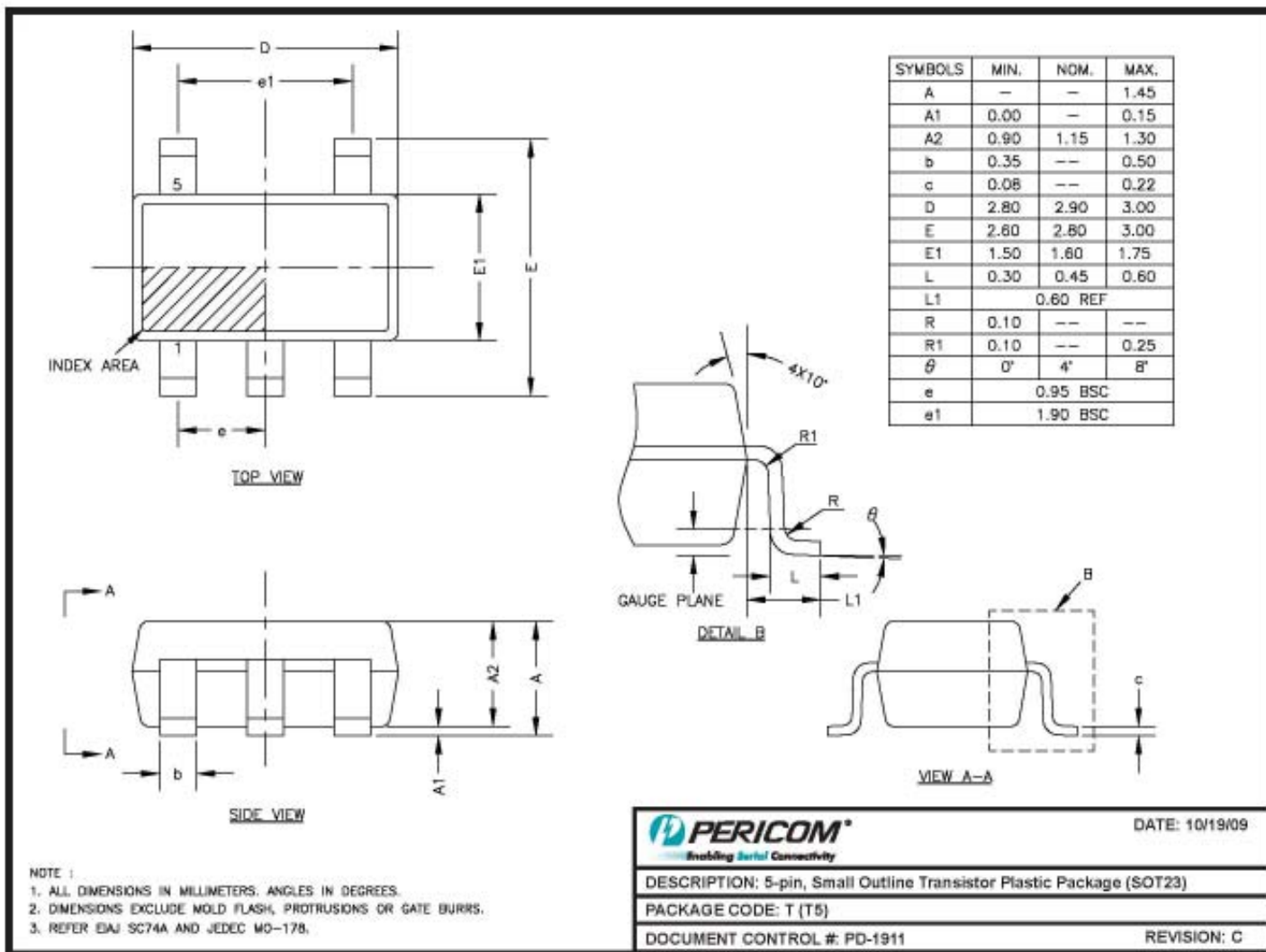
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at  $V_{CC} = 5.0\text{V}$ ,  $+25^\circ\text{C}$  ambient.
3. Per TTL driven input ( $V_{IN} = 3.4\text{V}$ , control inputs only); A and B pins do not contribute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

### Switching Characteristics over Operating Range

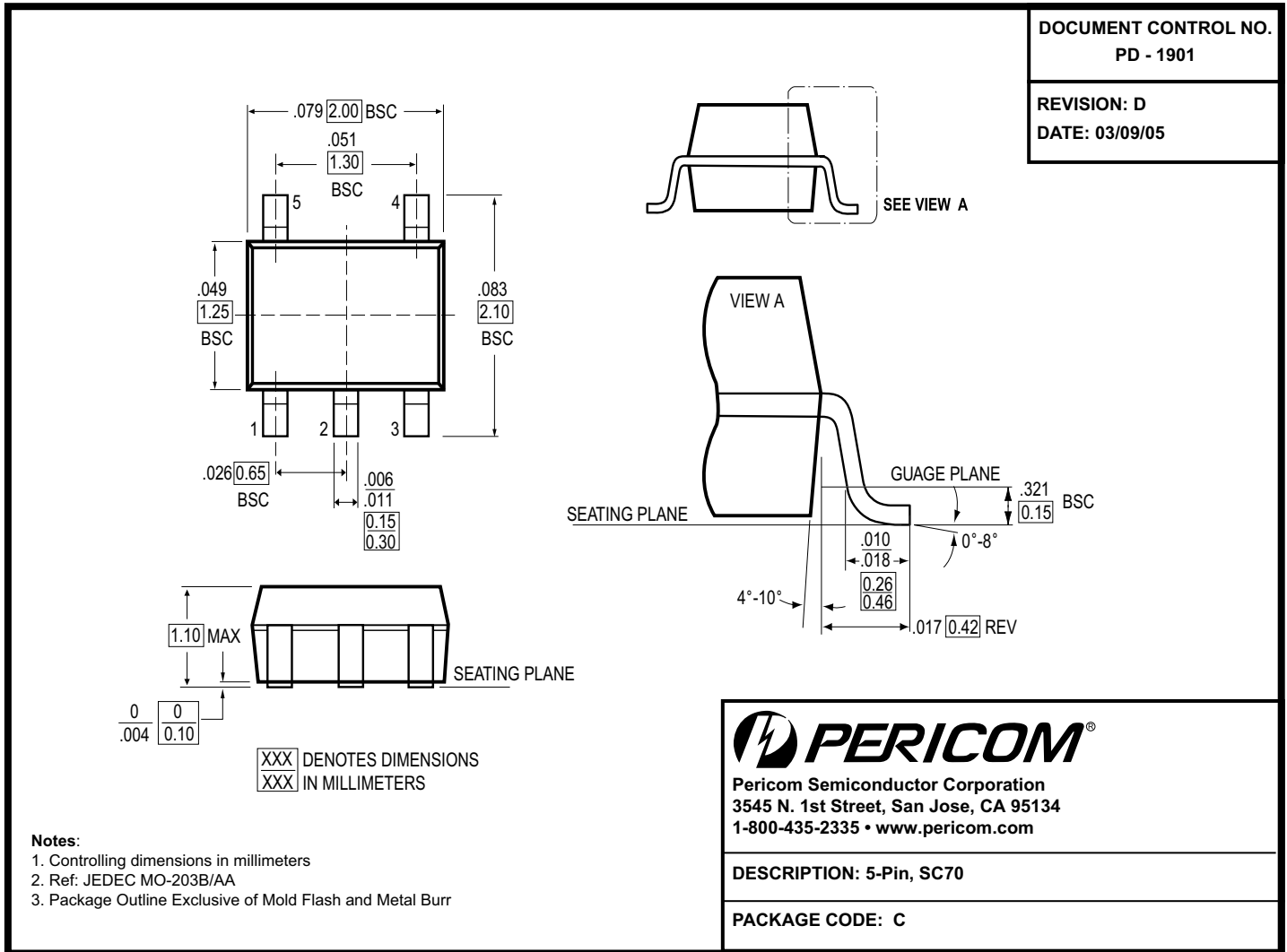
Parameters	Description	Conditions	PI5C3301				Units
			$V_{CC} = 4.5\text{V}$		$V_{CC} = 4\text{V}$		
			Min.	Max.	Min.	Max.	
$t_{PLH}$ $t_{PHL}$	Propagation Delay <sup>(1,2)</sup> A to B, B to A	$C_L = 50\text{pF}$ $R_L = 500\text{-ohm}$		0.25		0.25	ns
$t_{PZH}$ $t_{PZL}$	Bus Enable Time		1.0	4.9		5.5	
$t_{PHZ}$ $t_{PLZ}$	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 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.



09-0130



**Note:**

- For latest package info, please check: <http://www.pericom.com/products/packaging/mechanicals.php>

**Ordering Information**

Ordering Code	Package Code	Package Description
PI5C3301TEX	T	Pb-free & Green, 5-pin SOT23
PI5C3301CEX	C	Pb-free & Green, 5-pin SC70

**Notes:**

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
- E = Pb-free & Green
- X suffix = Tape/Reel