

**PI3B3245**

**3.3V, Hot Insertion, 8-Bit, 2-Port NanoSwitch™**

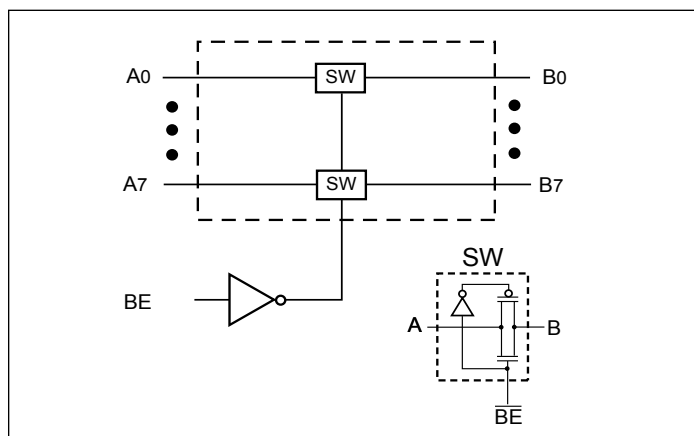
**Features**

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- Fast Switching Speed: 4.5ns (max.)
- Ultra-Low Quiescent Power (0.2µA Typical)
  - Ideally suited for notebook applications
- TTL-compatible control of inputs levels
- ESD protection (2kV Human Body Model and 200V Machine Model)
- 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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.
   
<https://www.diodes.com/quality/product-definitions/>
- Packaging (Pb-free & Green):
  - 20-pin SOIC (S)
  - 20-pin QSOP (Q)
  - 20-pin TSSOP (L)

**Description**

The PI3B3245 is a 3.3V 8-bit, 2-port bus switch designed with a low On-Resistance (5-ohm) allowing inputs to be connected directly to outputs. The bus switch creates no additional propagational delay or additional ground bounce noise. The switches are turned ON by the Bus Enable ( $\overline{BE}$ ) input signal.

**Block Diagram**



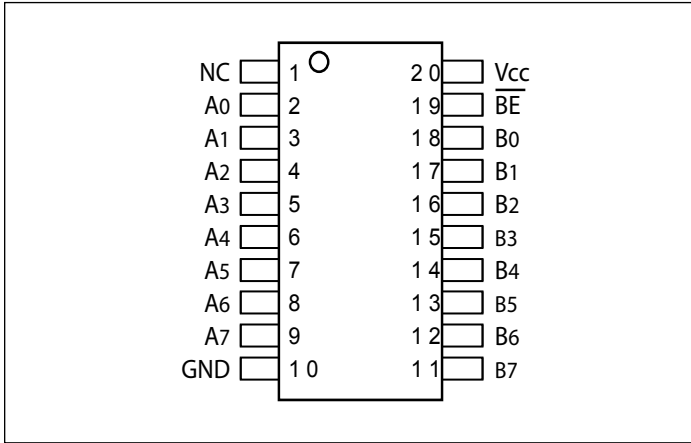
**Truth Table**

Function	$\overline{BE}$	A0-7
Disconnect	H	Hi-Z
Connect	L	B0-7

Note:  
H = High Voltage Level, L = Low Voltage Level, Hi-Z = High Impedance

**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 (SOIC, QSOP, TSSOP)**



**Pin Description**

Pin#	Pin Name	Description
19	$\overline{BE}$	Bus Enable Input (Active LOW)
2, 3, 4, 5, 6, 7, 8, 9	A0-7	Bus A
18, 17, 16, 15, 14, 13, 12, 11	B0-7	Bus B
10	GND	Ground <sup>(1)</sup>
20	V <sub>CC</sub>	Power
1	NC	Not Connected

Note 1: UQFN20 package die supply ground is connected to both GND pin and exposed center pad. GND pin must be connected to supply ground for proper device operation. For enhanced thermal, electrical, and board level performance, the exposed pad needs to be soldered to the board using a corresponding thermal pad on the board and for proper heat conduction through the board, thermal vias need to be incorporated in the PCB in the thermal pad region.

### Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-65	150	°C
Ambient Temperature with Power Applied	-40	85	°C
Supply Voltage to Ground Potential	-0.5	4.6	V
DC Input Voltage	-0.5	4.6	V
DC Output Current	-	120	mA
Power Dissipation	-	0.5	W

Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

### 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 <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	V
$I_{IH}$	Input HIGH Current	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			$\pm 1$	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			$\pm 1$	$\mu\text{A}$
$I_{OZH}$	High Impedance Output Current	$0 \leq A_N, B_N \leq V_{CC}$			$\pm 1$	$\mu\text{A}$
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18 \text{ mA}$			-1.2	V
$R_{ON}$	Switch On Resistance <sup>(3)</sup>	$V_{CC} = \text{Min.}, V_{IN} = 0.0\text{V}, I_{ON} = 48\text{mA}$ or 64mA		5	8	$\Omega$
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		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 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	$V_{IN} = 0\text{V}$	3.0	pF
$C_{OFF}$	A/B Capacitance, Switch Off	$V_{IN} = 0\text{V}$	8.0	pF
$C_{ON}$	A/B Capacitance, Switch On	$V_{IN} = 0\text{V}$	16.0	pF

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 HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = 3.0\text{V}^{(3)}$			750	$\mu\text{A}$

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 input only); A and B pins do not contribute to  $I_{CC}$ .

## Switching Characteristics over Operating Range

Parameters	Description	Test Conditions	Com.		Units
			Min.	Max.	
$t_{PLH}$ $t_{PHL}$	Propagation Delay <sup>(1,2)</sup> Ax to Bx, Bx to Ax	CL = 50 pF RL = 500 $\Omega$		0.25	ns
$t_{PZH}$ $t_{PZL}$	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx		1.0	4.0	
$t_{PHZ}$ $t_{PLZ}$	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx		1.0	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 0.25 ns for 50 pF 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,  $A_N$  may be driven low to 0V and high to 3.6V. Driving  $B_N$  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.*

**PI3B3245**

**Part Marking**

S Package



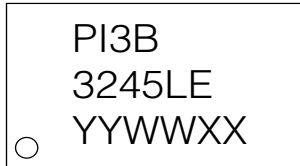
YY: Year  
WW: Workweek  
1st X: Assembly Site Code  
2nd X: Wafer Fab Site Code

Q Package



YY: Year  
WW: Workweek  
1st X: Assembly Site Code  
2nd X: Fab Site Code  
Bar above fab code means Cu wire  
Without bar above fab code means Au wire

L Package



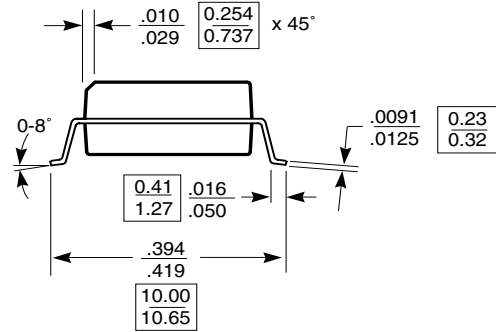
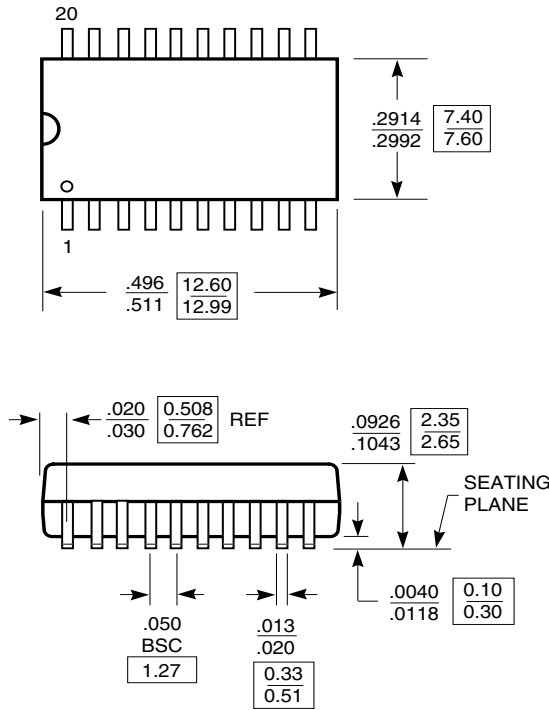
YY: Year  
WW: Workweek  
1st X: Assembly Code  
2nd X: Fab Code

**PI3B3245**

**Packaging Mechanical: 20-SOIC (S)**

DOCUMENT CONTROL NO.  
PD - 1006

REVISION: D  
DATE: 03/09/05



X.XX DENOTES CONTROLLING  
X.XX DIMENSIONS IN MILLIMETERS

Notes:  
 1) Controlling dimensions in millimeters.  
 2) Ref: JEDEC MS-013D/AC



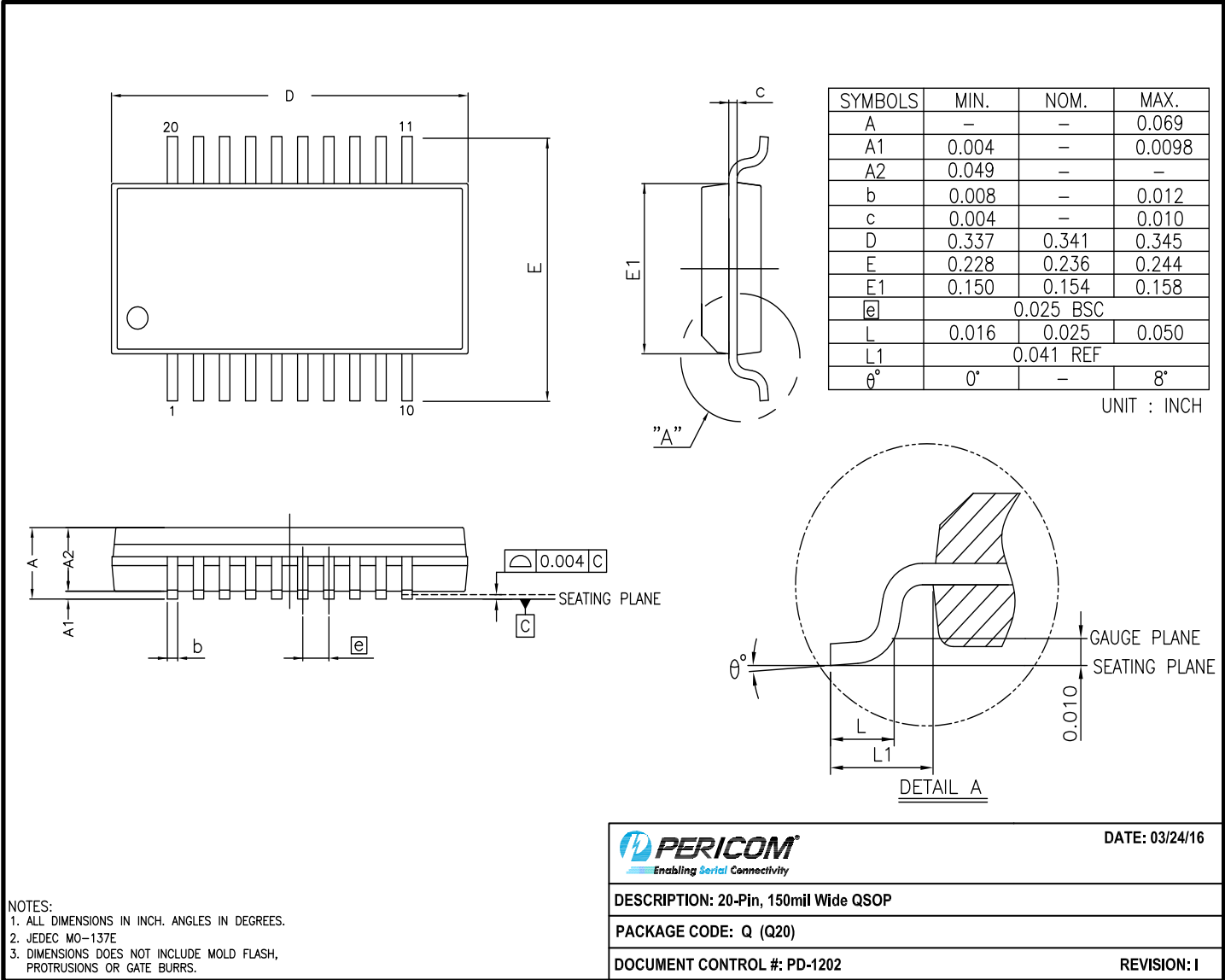
Pericom Semiconductor Corporation  
 3545 N. 1st Street, San Jose, CA 95134  
 1-800-435-2335 • www.pericom.com

DESCRIPTION: 20-Pin, 300-Mil Wide, SOIC

PACKAGE CODE: S

**PI3B3245**

**Packaging Mechanical: 20-QSOP (Q)**



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

<b>PERICOM</b> Enabling Serial Connectivity	DATE: 03/24/16
DESCRIPTION: 20-Pin, 150mil Wide QSOP	
PACKAGE CODE: Q (Q20)	
DOCUMENT CONTROL #: PD-1202	REVISION: I

16-0057

**PI3B3245**

**Packaging Mechanical: 20-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	6.40	6.50	6.60
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	—	—
$\theta$	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.

		DATE: 03/31/16
DESCRIPTION: 20-Pin, 173mil Wide TSSOP		
PACKAGE CODE: L (L20)		
DOCUMENT CONTROL #: PD-1311	REVISION: G	

16-0074

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 Type
PI3B3245SEX	S	20-pin, 300Mil Wide (SOIC)
PI3B3245QEX	Q	20-pin, 150mil Wide (QSOP)
PI3B3245LEX	L	20-pin, 173mil Wide (TSSOP)

**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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