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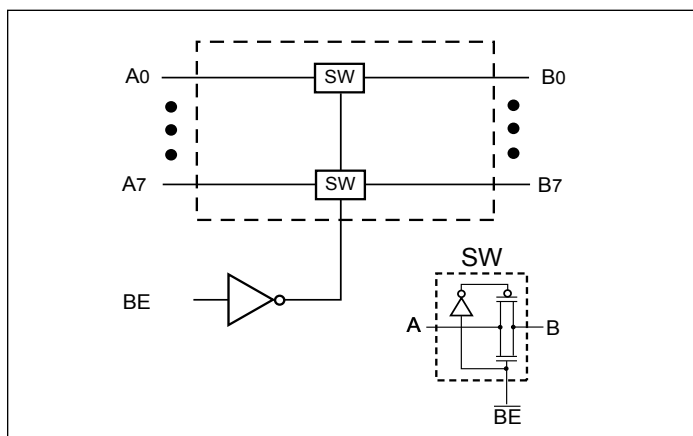
Features

➔ 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 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.
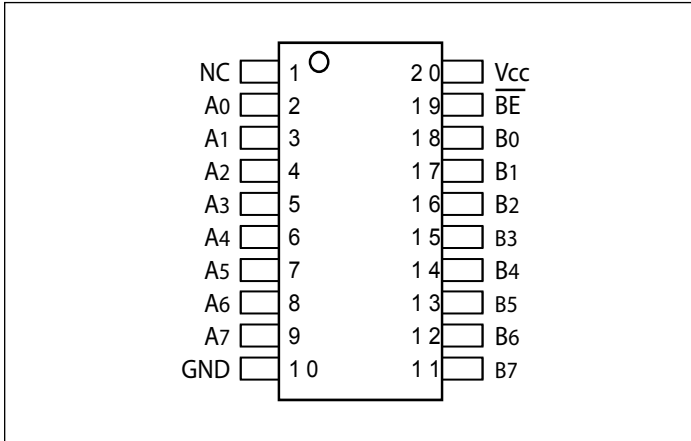
Block Diagram

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

Pin Configuration (SOIC, QSOP, TSSOP)

```
        ┌───────────┐
NC  ─┤ 1  ○     20 ├─ Vcc
A0  ─┤ 2        19 ├─ B̄Ē
A1  ─┤ 3        18 ├─ B0
A2  ─┤ 4        17 ├─ B1
A3  ─┤ 5        16 ├─ B2
A4  ─┤ 6        15 ├─ B3
A5  ─┤ 7        14 ├─ B4
A6  ─┤ 8        13 ├─ B5
A7  ─┤ 9        12 ├─ B6
GND ─┤ 10       11 ├─ B7
        └───────────┘
```

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 [1]
20	V_{CC}	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	ºC
Ambient Temperature with Power Applied	-40	85	ºC
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°C to +85°C, V_{CC} = 3.3V ±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	V
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	µA
I_{OZH}	High Impedance Output Current	$0 \leq A_N, B_N \leq V_{CC}$			±1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18 mA			-1.2	V
R_{ON}	Switch On Resistance[3]	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA or 64mA		5	8	Ω
		V_{CC} = Min, V_{IN} = 2.4V, I_{ON} = 15mA		10	17	

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} = 3.3V, 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.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3.0	pF
C_{OFF}	A/B Capacitance, Switch Off	V_{IN} = 0V	8.0	pF
C_{ON}	A/B Capacitance, Switch On	V_{IN} = 0V	16.0	pF

Notes:

1. This parameter is determined by device characterization but is not production tested.

A product Line of
Diodes Incorporated

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ.[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		0.1	3.0	µA
ΔI_{CC}	Supply Current per Input HIGH	V_{CC} = Max.	V_{IN} = 3.0V[3]			750	µA

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} = 3.3V, +25°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[1,2] Ax to Bx, Bx to Ax	CL = 50 pF RL = 500Ω		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time $\overline{BE}$ to Ax or Bx		1.0	4.0	
t_{PHZ} t_{PLZ}	Bus Disable Time $\overline{BE}$ 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.
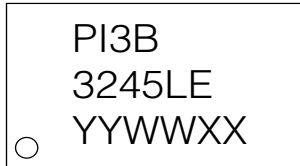
Part Marking

S Package

```
 ⚡   PI3B
     3245SE
○    YYWWXX
```

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

Q Package

```
 ⚡   PI3B
     3245QE_
○    YYWWXX
```

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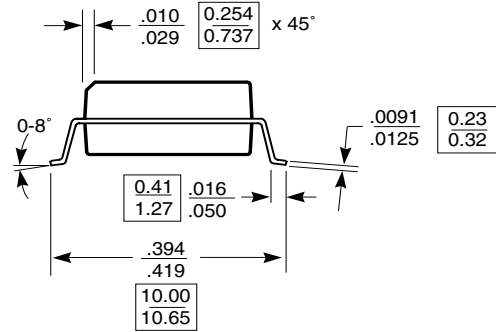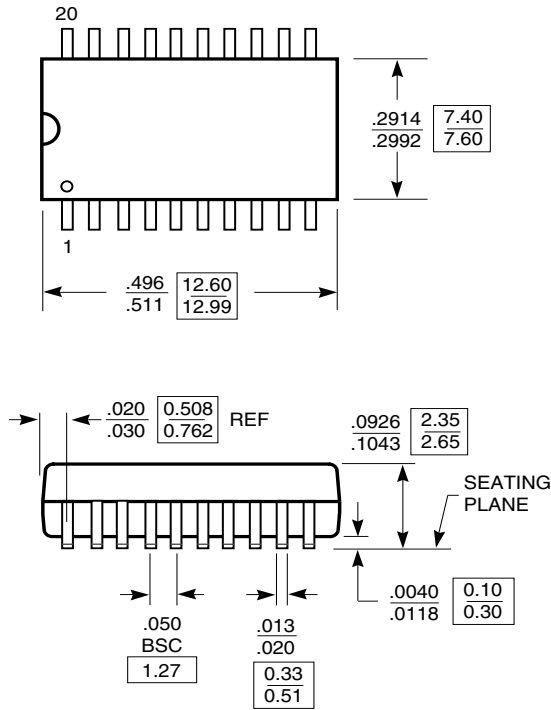Without bar above fab code means Au wire

L Package

```
     PI3B
     3245LE
○    YYWWXX
```

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

Packaging Mechanical: 20-SOIC (S)

| .2914 / .2992 | 7.40 / 7.60 |
| .496 / .511 | 12.60 / 12.99 |

| .020 / .030 | 0.508 / 0.762 | REF |
| .0926 / .1043 | 2.35 / 2.65 |

SEATING
PLANE

.0040 / .0118 | 0.10 / 0.30

.050
BSC
1.27

.013 / .020 | 0.33 / 0.51

| .010 / .029 | 0.254 / 0.737 | x 45° |

0-8°

| .0091 / .0125 | 0.23 / 0.32 |

| 0.41 / 1.27 | .016 / .050 |

.394 / .419

10.00 / 10.65

| X.XX / X.XX | DENOTES CONTROLLING DIMENSIONS IN MILLIMETERS |

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

PERICOM®

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

Packaging Mechanical: 20-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	0.337	0.341	0.345
E	0.228	0.236	0.244
E1	0.150	0.154	0.158
e	0.025 BSC		
L	0.016	0.025	0.050
L1	0.041 REF		
θ°	0°	–	8°

UNIT : INCH

"A"

SEATING PLANE

0.004 C

C

b

e

A

A2

A1

DETAIL A

GAUGE PLANE
SEATING PLANE
0.010
θ°
L
L1

PERICOM®
Enabling Serial Connectivity

DATE: 03/24/16

DESCRIPTION: 20-Pin, 150mil Wide QSOP

PACKAGE CODE: Q (Q20)

DOCUMENT CONTROL #: PD-1202

REVISION: I

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

16-0057

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	–	–
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.

16-0074

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

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