

2.5V/3.3V, High Bandwidth, Hot Insertion 8-Bit, 2-Port, Bus Switch

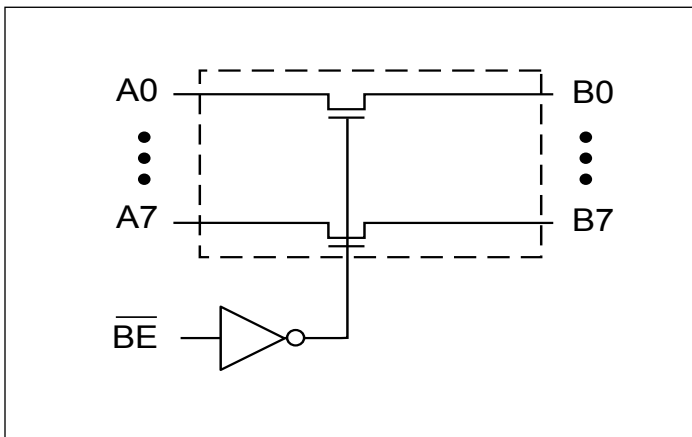
Features

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- High Bandwidth Operation (>400 MHz)
- Permits Hot Insertion
- 5V I/O Tolerant
- Rail-to-Rail 3.3V or 2.5V Switching
- 2.5V Supply Voltage Operation
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- Packaging (Pb-free & Green):
 - 20-pin 173 mil wide plastic TSSOP (L)
 - 20-pin 150mil Wide plastic QSOP (Q)

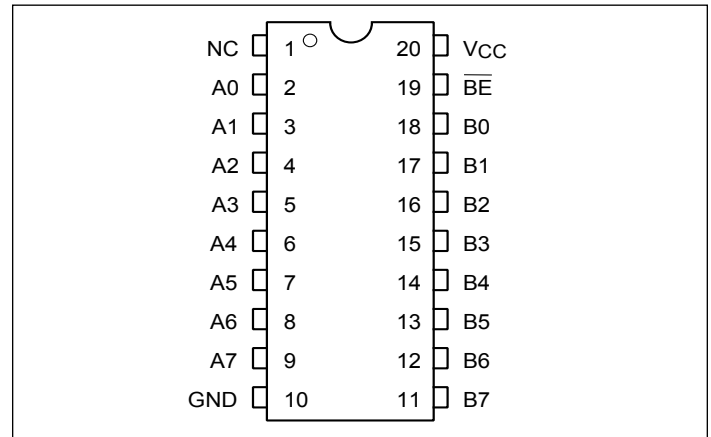
Description

Diodes' PI3C3245 is a 2.5 volt or 3.3 volt 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. It is very useful in switching signals that have high bandwidth (>400 MHz).

Block Diagram



Pin Configuration



Truth Table⁽¹⁾

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 Description

Pin Name	Description
\overline{BE}	Bus Enable Input (Active LOW)
A0-7	Bus A
B0-7	Bus B
GND	Ground
V _{CC}	Power

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 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 (Inputs&V _{CC} Only) ..	-0.5V to 4.6V
Supply Voltage to Ground Potential (Outputs&D/O Only)	-0.5V to 4.6V
DC Input Voltage	-0.5V to 5.5V
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} = 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	
I _{OZH} ⁽³⁾	High Impedance Output Current	0 ≤ A, B ≤ V _{CC}			±1	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = -18 mA		-0.73	-1.2	V
R _{ON}	Switch On Resistance ⁽⁴⁾	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = 48mA		5	7	Ω
		V _{CC} = Min, V _{IN} = 2.4V, I _{ON} = 15mA		8	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} = 3.3V, T_A = 25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. 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	3.5	pF
C _{OFF}	A/B Capacitance, Switch Off	V _{IN} = 0V	5.0	pF
C _{ON}	A/B Capacitance, Switch On	V _{IN} = 0V	10.0	pF

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} = Max.	V _{IN} = GND or V _{CC}		260	500	μA
ΔI _{CC}	Supply Current per Input HIGH	V _{CC} = Max.	V _{IN} = 3.0V ⁽³⁾			750	

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at V_{CC} = 3.3V, +25°C ambient.
- Per TTL driven input (control input only); A and B pins do not contribute to ΔI_{CC}.

Switching Characteristics over 3.3V Operating Range

Parameters	Description	Test Conditions ⁽¹⁾	PI3C3245		Units
			Com.		
			Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay ^(1,2) Ax to Bx	C _L = 50 pF R _L = 500Ω		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx	C _L = 50 pF R _L = 500Ω	1.5	6.5	
t _{PHZ} t _{PLZ}	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx	R = 500Ω	1.5	5.5	

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 0.25 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.

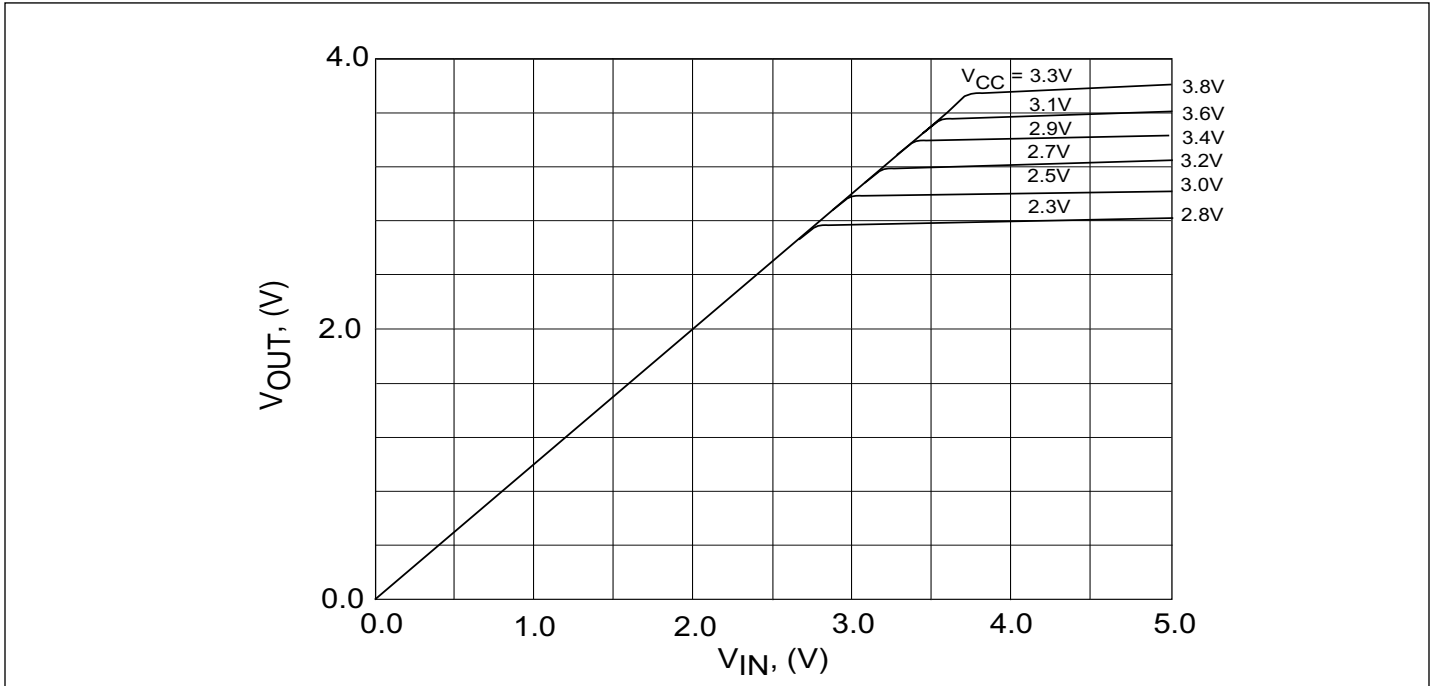
Switching Characteristics over 2.5V Operating Range

Parameters	Description	Test Conditions ⁽¹⁾	PI3C3245		Units
			Com.		
			Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay ^(1,2) Ax to Bx	C _L = 50 pF R _L = 500Ω		0.25	ns
t _{PZH} t _{PZL}	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx	C _L = 50 pF R _L = 500Ω	1.5	9.8	
t _{PHZ} t _{PLZ}	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx	R = 500Ω	1.5	8.3	

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 0.25 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.

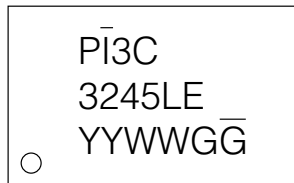
PI3C3245



Output Voltage vs. Input Voltage over Various Supply Voltages

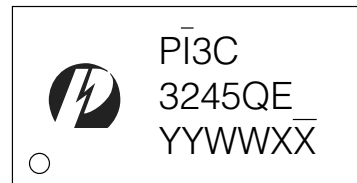
Part Marking

L Package



YYWW: Date Code (Year & Workweek)
 1st G: Assembly Site Code
 2nd G: Wafer Fab Site Code
 The Bar above 2nd "G" means Cu wire
 The Bar above "I" means Fab3 of MGN

Q Package



YY: Year
 WW: Workweek
 1st X: Assembly Site Code
 2nd X: Fab Site Code
 The Bar above "I" means Fab3 of MGN
 The Bar above fab code means Cu wire

PI3C3245

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.

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

16-0074

PI3C3245

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

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

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

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
PI3C3245LEX	L	20-Pin, 173mil Wide (TSSOP)
PI3C3245QEX	Q	20-Pin, 150mil Wide (QSOP)

- 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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