A product Line of
Diodes Incorporated

# PI5C3245

**8-Bit, 2-Port Bus Switch**

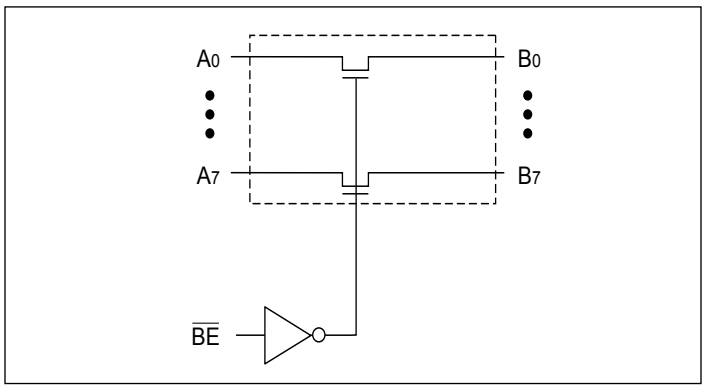
## Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are on
- Ultra Low Quiescent Power (0.2µA typical)
  - Ideally suited for notebook applications
- Pin compatible with 74 Series 245 logic devices
- -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 150-mil wide plastic QSOP (Q)

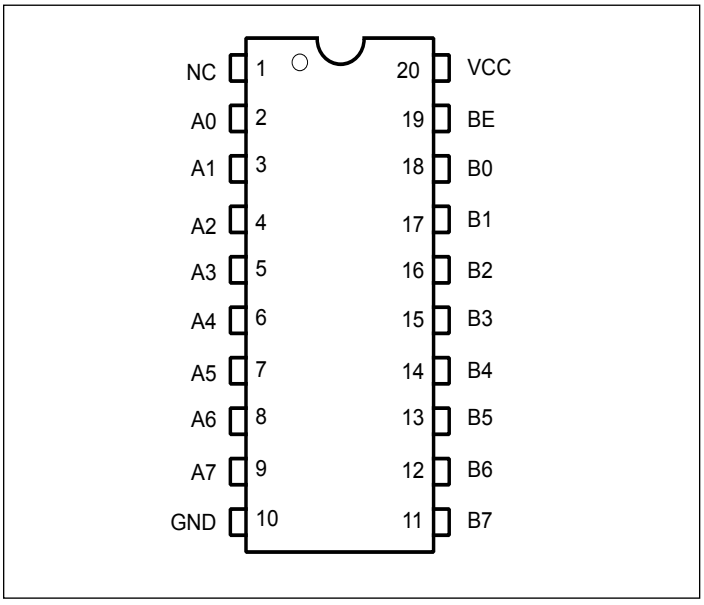
## Description

Diodes' PI5C3245 is a 8-bit, 2-port bus switch designed with a low On-Resistance (5Ω) 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. The pinout is compatible with PI74FCT245T (Octal Bidirectional Transceiver).

## Block Diagram




## Pin Configuration




## Truth Table[1]

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

Note: 1. 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.

## Absolute 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&Vcc Only) | –0.5V to 7V |
| Supply Voltage to Ground Potential (Outputs&D/O Only) | –0.5V to 7V |
| DC Input Voltage | –0.5V to 7V |
| 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 ±5%)

| 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 ≤ A, B ≤ $V_{CC}$ | | | ±1 | µA |
| $V_{IK}$ | Clamp Diode Voltage | $V_{CC}$ = Min, $I_{IN}$ = -18mA | -0.7 | -1.2 | | V |
| $I_{OS}$ | Short Circuit Current[3] | A (B) = 0V, B (A) = $V_{CC}$ | 100 | | | mA |
| $V_H$ | Input Hysteresis at Control Pins | | | 150 | | mV |
| $R_{ON}$ | Switch On Resistance[4] | $V_{CC}$ = Min, $V_{IN}$ = 0.0V, $I_{ON}$ = 48 mA | | 5 | 7 | Ω |
| | | $V_{CC}$ = Min, $V_{IN}$ = 2.4V, $I_{ON}$ = 15 mA | | 10 | 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. 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 | 6 | pF |
| $C_{OFF}$ | A/B Capacitance, Switch Off | $V_{IN}$ = 0V | 6 | pF |
| $C_{ON}$ | A/B Capacitance, Switch On | $V_{IN}$ = 0V | 8 | 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 $V_{CC}$ | | 0.1 | 3.0 | µA |
| $\Delta I_{CC}$ | Supply Current @ Input HIGH | $V_{CC}$ = Max. | $V_{IN}$ = 3.4V[3] | | | 2.5 | mA |
| $I_{CCD}$ | Supply Current per Input per MHz[4] | $V_{CC}$ = Max.<br>A and B Pins Open<br>$\overline{BE}$ = GND<br>Control Input Toggling<br>50% Duty Cycle | | | | 0.25 | mA/ MHz |

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at $V_{CC}$ = 5.0V, +25°C ambient.
3. Per TTL driven input ($V_{IN}$ = 3.4V, control inputs only); A and B pins do not contribute to Icc.
4. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A and B inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

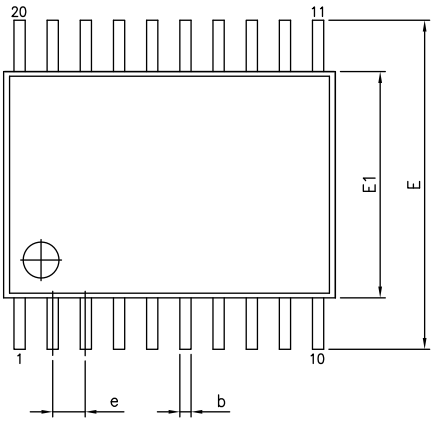
## Switching Characteristics over Operating Range

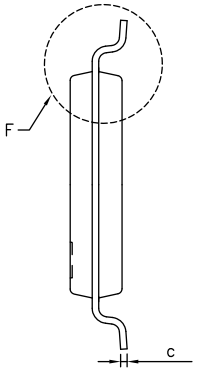
| Parameters | Description | Test Conditions | Com. | | Units |
|---|---|---|---|---|---|
| | | | Min | Max | |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay[1,2]<br>Ax to Bx, Bx to Ax | $C_L$ = 50 pF<br>$R_L$ = 500Ω | | 0.25 | ns |
| $t_{PZH}$<br>$t_{PZL}$ | Bus Enable Time<br>$\overline{BE}$ to Ax or Bx | | 1.5 | 6.5 | |
| $t_{PHZ}$<br>$t_{PLZ}$ | Bus Disable Time<br>$\overline{BE}$ to Ax or Bx | | 1.5 | 5.5 | |

Notes:

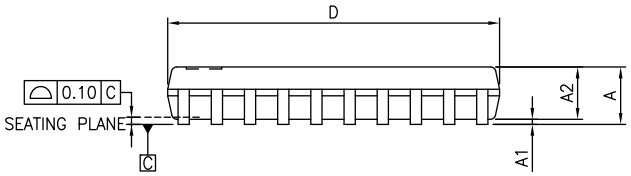
1. This parameter is guaranteed but not tested on Propagation Delays.
2. The bus switch contributes no propagational delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25 ns for 50 pF load. Since this 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.

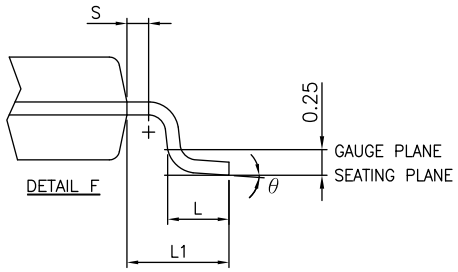
## Packaging Mechanical: 20-TSSOP (L20)




| 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° |



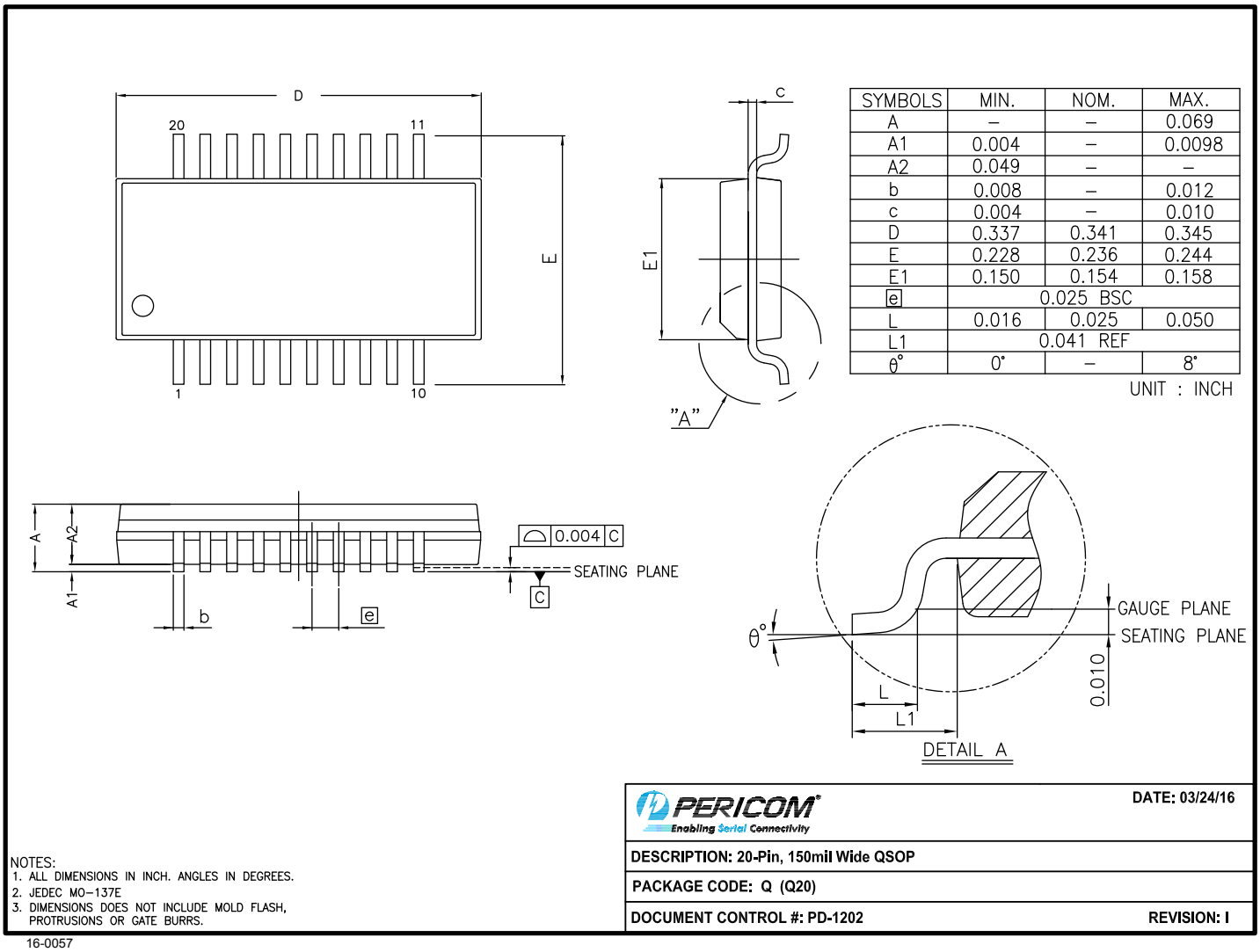




NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
2. JEDEC MO–153F
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

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

16-0074

## Packaging Mechanical: 20-QSOP (Q20)




| 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.

PERICOM 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

**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 |
|---|---|---|
| PI5C3245LEX | L | 20-pin 173mil Wide (TSSOP) |
| PI5C3245QEX | 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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