



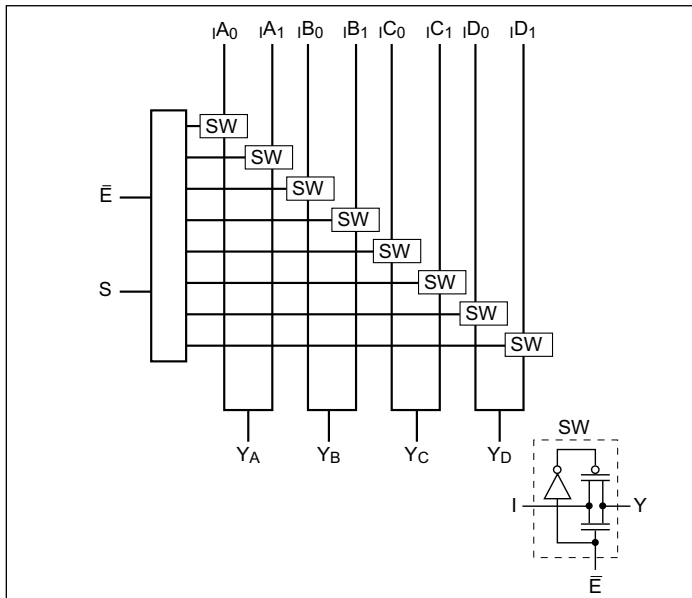
**THE DATASHEET OF
PI3B3257WE**



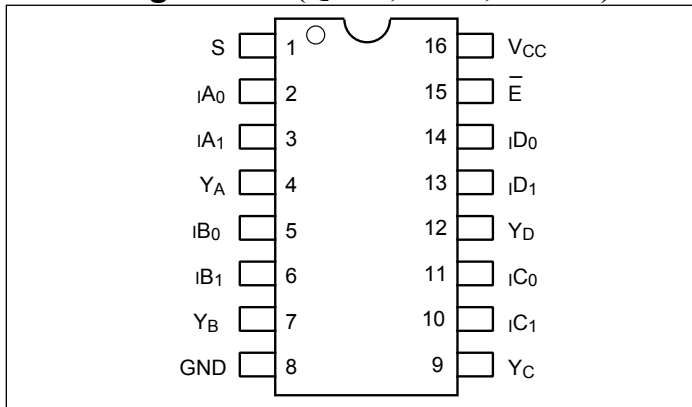
Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Fast Switching Speed: 4.8ns max.
- Ultra-Low Quiescent Power: 0.1μA typical
 - Ideally suited for notebook applications
- Pin compatible with 74 series 257 logic devices
- Packaging (Pb-free & Green available):
 - 16-pin, QSOP (Q)
 - 16-pin, SOIC (W)
 - 16-pin, TSSOP (L)
 - 16-pin, UQFN (ZHD)

Block Diagram



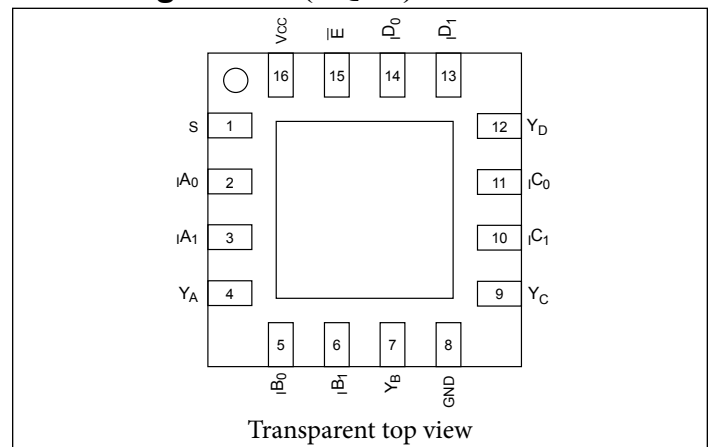
Pin Configuration (QSOP, SOIC, TSSOP)



Description

The PI3B3257 is a 3.3 Volt, Quad 2:1 multiplexer/demultiplexer with three-state outputs that is pinout and function compatible with the PI74FCT257T, 74F257, and 74ALS/AS/LS257. Inputs can be connected to outputs with low On-Resistance (5Ω) with no additional ground bounce noise or propagation delay.

Pin Configuration (UQFN)



Truth Table⁽¹⁾

| \bar{E} | S | Y _A | Y _B | Y _C | Y _D | Function |
|-----------|---|-----------------|-----------------|-----------------|-----------------|----------|
| H | X | Hi-Z | Hi-Z | Hi-Z | Hi-Z | Disable |
| L | L | iA ₀ | iB ₀ | iC ₀ | iD ₀ | S = 0 |
| L | H | iA ₁ | iB ₁ | iC ₁ | iD ₁ | S = 1 |

Note:

1. H = High Voltage Level
L = Low Voltage Level

Pin Description

| Pin Name | Description |
|----------------------------------|-----------------------|
| iA _N -iD _N | Data Inputs |
| S | Select Inputs |
| \bar{E} | Enable |
| Y _A -Y _D | Data Outputs |
| GND | Ground ⁽¹⁾ |
| V _{CC} | Power |
| NC | No Connect |

Note 1: UQFN16 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.

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 +4.6V |
| DC Input Voltage | -0.5V to +4.6V |
| 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 $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$)

| Parameters | Description | Test Conditions ⁽¹⁾ | Min. | Typ. ⁽²⁾ | Max. | Units |
|------------------|-------------------------------------|---|------|---------------------|------|-------|
| V _{IH} | Input HIGH Voltage | Guaranteed Logic HIGH Level | 2 | | | V |
| V _{IL} | Input LOW Voltage | Guaranteed Logic LOW Level | -0.5 | | 0.8 | |
| 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} | High Impedance Output Current | 0 ≤ I _n , Y _n ≤ V _{CC} | | | ±1 | |
| V _{IK} | Clamp Diode Voltage | V _{CC} = Min., I _{IN} = -18mA | | | -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 | | 8 | 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} = 3.3V, T_A = 25°C ambient and maximum loading.
- Measured by the voltage drop between I and Y pin at indicated current through the switch. On-Resistance is determined by the lower of the voltages on the two (I,Y) 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 _{OFFYN} | Y _N Capacitance, Switch OFF | | 17.0 | |
| C _{OFFIN} | I _N Capacitance, Switch OFF | | 8.5 | |
| C _{ON} | I _N /Y _N Capacitance, Switch ON | | 25 | |

Notes:

- 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 |
| ΔI _{CC} | Supply Current per Input @ TTL HIGH ^(3, 4) | V _{CC} = Max. | V _{IN} = 3.0 | | | 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 inputs only); I and Y pins do not contribute to I_{CC}.
- This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The I and Y inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

PI3B3257

Switching Characteristics Over Operating Range

| Parameters | Description | Conditions | PI3B3257 | | Units |
|--------------------------------------|---|--|----------|------|-------|
| | | | Com. | | |
| | | | Min. | Max. | |
| t _{IY} | Propagation Delay In to Y _n ^(1,2) | C _L = 50pF R _L = 500Ω | | 0.25 | ns |
| t _{SY} | Bus Select Time, S _n to Y _n | | 1 | 4.5 | |
| t _{PZH} t _{PZL} | Bus Enable Time, E to Y _n | | 1 | 4.5 | |
| t _{PHZ} t _{PLZ} | Bus Disable Time, E to Y _n | | 1 | 4.8 | |

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 switch's time constant 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.

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, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

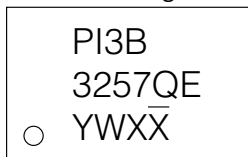
Power-Supply Sequencing and Hot-Plug Information

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

Q Package



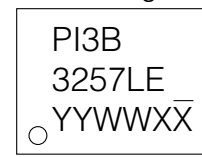
Y: Year
W: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code

W Package



YY: Date Code (Year)
WW: Date Code (Workweek)
1st X: Assembly Site Code
2nd X: Fab Site Code

L Package



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

ZHD Package



Y: Year
W: Workweek
1st X: Assembly Site Code
2nd X: Fab Site Code

PI3B3257

Packaging Mechanical: 16-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 | 0.189 | 0.193 | 0.197 |
| E1 | 0.150 | 0.154 | 0.158 |
| E | 0.228 | 0.236 | 0.244 |
| L | 0.016 | — | 0.050 |
| L1 | 0.041 REF. | | |
| e | 0.025 BSC. | | |
| 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.

| | | |
|---------------------------------------|-------------|----------------|
| | | DATE: 04/08/16 |
| DESCRIPTION: 16-Pin, 150mil Wide QSOP | | |
| PACKAGE CODE: Q (Q16) | | |
| DOCUMENT CONTROL #: PD-1201 | REVISION: H | |

16-0056

PI3B3257

Packaging Mechanical: 16-SOIC (W)

| SYMBOLS | MIN. | NOM. | MAX. |
|----------------|----------|------|------|
| A | — | — | 1.75 |
| A1 | 0.10 | — | 0.25 |
| A2 | 1.00 | — | — |
| b | 0.31 | — | 0.51 |
| c | 0.10 | — | 0.25 |
| D | 9.80 | 9.90 | 10.0 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27 BSC | | |
| L | 0.40 | — | 1.27 |
| h | 0.15 | — | 0.50 |
| θ° | 0 | — | 8 |

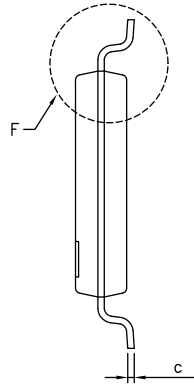
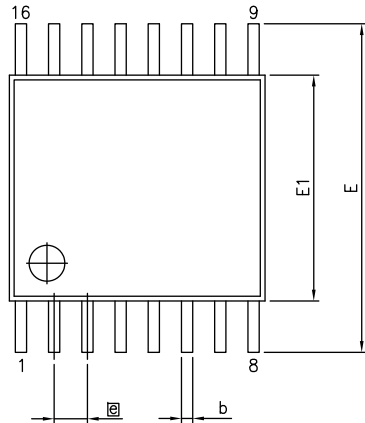
NOTES:
 1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
 2. JEDEC OUTLINE : MS-012 AC
 3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
 4. THE MIN. DIMENSION OF A2 AND h ARE OUT OF JEDEC SPEC.

DATE: 06/30/16
 DESCRIPTION: 16-Pin, 150mil Wide SOIC
 PACKAGE CODE: W
 DOCUMENT CONTROL #: PD-1004
 REVISION: G

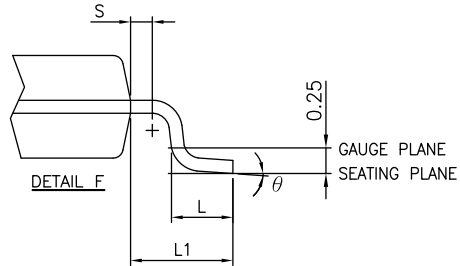
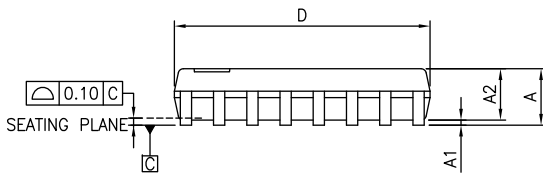
16-0145

PI3B3257

Packaging Mechanical: 16-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 | 4.90 | 5.00 | 5.10 |
| E1 | 4.30 | 4.40 | 4.50 |
| E | 6.20 | 6.40 | 6.60 |
| \square 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: 03/24/16 |
| DESCRIPTION: 16-Pin, 173mil Wide TSSOP | | |
| PACKAGE CODE: L (L16) | | |
| DOCUMENT CONTROL #: PD-1310 | REVISION: G | |

16-0061

PI3B3257

Packaging Mechanical: 16-UQFN (ZHD)

Top View

Bottom View

Side View

RECOMMENDED LAND PATTERN(unit:mm)

| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | 0.50 | 0.65 |
| A1 | 0.00 | 0.05 |
| A3 | 0.15 REF | |
| D | 2.90 | 3.10 |
| E | 2.90 | 3.10 |
| D1 | 1.60 | 1.90 |
| E1 | 1.60 | 1.90 |
| b | 0.18 | 0.30 |
| e | 0.50 BSC | |
| L | 0.25 | 0.55 |

Note:
1. Comply with MO-248E, except 'L' MIN and 'L' 'D1' 'E1' MAX

| | |
|--|----------------|
| DIODES PERICOM INCORPORATED | DATE: 07/27/16 |
| DESCRIPTION: 16-Pin, UQFN, 3X3 | |
| PACKAGE CODE: ZHD(ZHD16) | |
| DOCUMENT CONTROL#: PD-2209 | REVISION: -- |

16-0092

For latest package info.

please check: <http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/>

Ordering Information

| Ordering Code | Packaging Code | Package Description |
|---------------|----------------|------------------------------|
| PI3B3257QEX | Q | 16-pin, 150 mil wide (QSOP) |
| PI3B3257WEX | W | 16-pin, 150-mil wide (SOIC) |
| PI3B3257LEX | L | 16-pin, 173 mil wide (TSSOP) |
| PI3B3257ZHDEX | ZHD | 16-pin, 3x3 (UQFN) |

Notes:

- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- See <http://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free. Thermal characteristics can be found on the company web site at www.diodes.com/design/support/packaging/
- E = Pb-free and Green
- X suffix = Tape/Reel

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