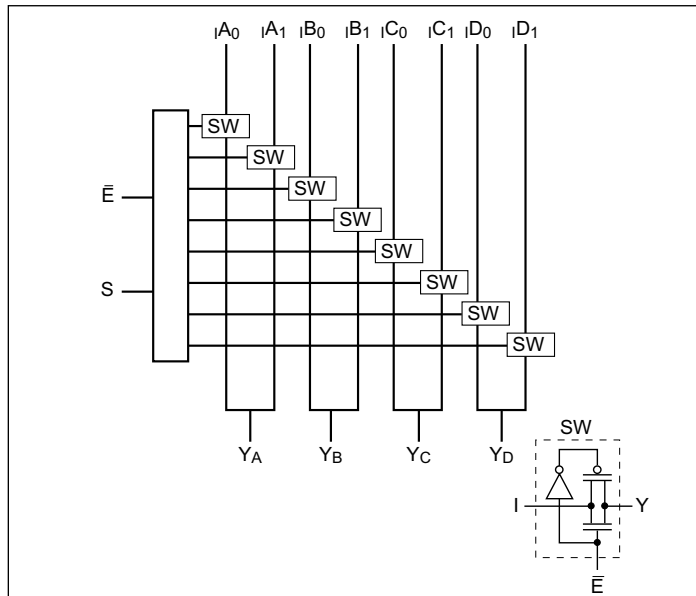


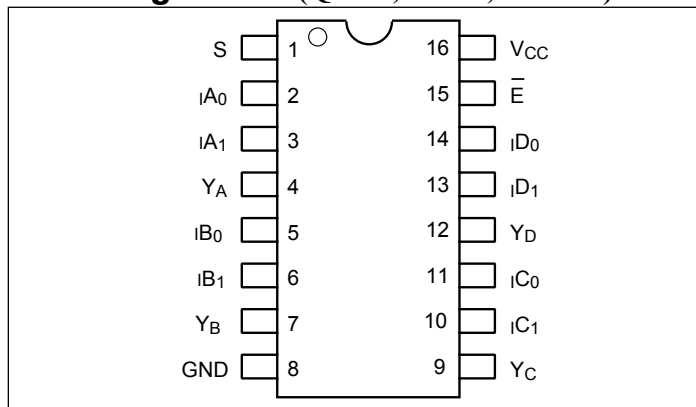
## Features

- 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



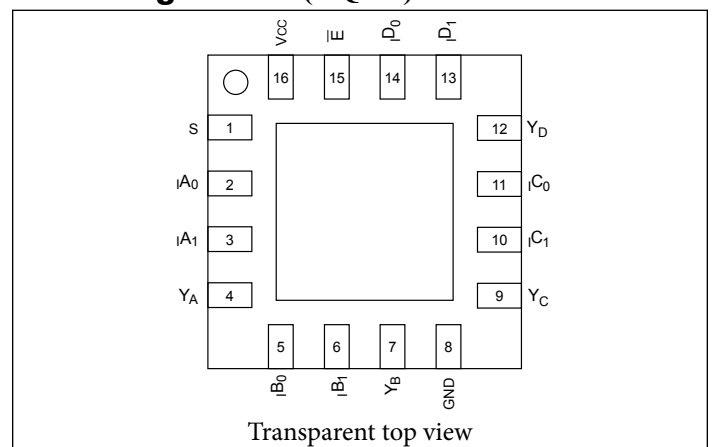
## Pin Configuration (QSOP, SOIC, TSSOP)



## 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<sup>(1)</sup>

$\bar{E}$	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 <sup>(1)</sup>
VCC	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 <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	Max.	Units
V <sub>IH</sub>	Input HIGH Voltage	Guaranteed Logic HIGH Level	2			V
V <sub>IL</sub>	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5		0.8	
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			±1	µA
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND			±1	
I <sub>OZH</sub>	High Impedance Output Current	0 ≤ I <sub>n</sub> , Y <sub>n</sub> ≤ V <sub>CC</sub>			±1	
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18mA			-1.2	V
R <sub>ON</sub>	Switch On-Resistance <sup>(3)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V, I <sub>ON</sub> = 48mA or 64mA		5	8	Ω
		V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 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<sub>CC</sub> = 3.3V, T<sub>A</sub> = 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<sub>A</sub> = 25°C, f = 1 MHz)

Parameters <sup>(1)</sup>	Description	Test Conditions	Typ.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	3.0	pF
C <sub>OFFYN</sub>	Y <sub>N</sub> Capacitance, Switch OFF		17.0	
C <sub>OFFIN</sub>	I <sub>N</sub> Capacitance, Switch OFF		8.5	
C <sub>ON</sub>	I <sub>N</sub> /Y <sub>N</sub> Capacitance, Switch ON		25	

**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 <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>		0.1	3.0	µA
ΔI <sub>CC</sub>	Supply Current per Input @ TTL HIGH <sup>(3, 4)</sup>	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 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<sub>CC</sub> = 3.3V, +25°C ambient.
- Per TTL driven input (control inputs only); I and Y pins do not contribute to I<sub>CC</sub>.
- 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 <sub>IY</sub>	Propagation Delay In to Y <sub>n</sub> <sup>(1,2)</sup>	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>SY</sub>	Bus Select Time, S <sub>n</sub> to Y <sub>n</sub>		1	4.5	
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time, E to Y <sub>n</sub>		1	4.5	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time, E to Y <sub>n</sub>		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.

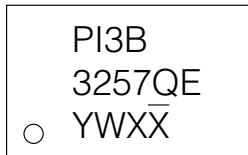
**Power-Supply Sequencing and Hot-Plug Information**

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V<sub>CC</sub> 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**



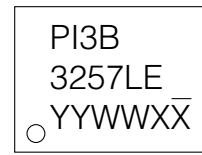
- Y: Year
- W: Workweek
- 1st X: Assembly Site Code
- 2nd X: Fab Site Code

**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

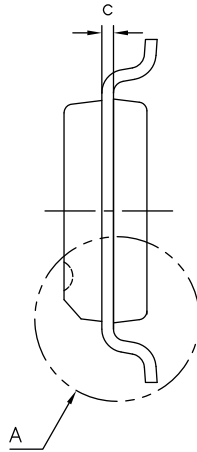
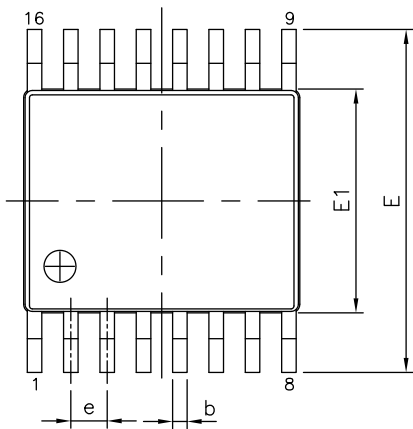
**ZHD Package**



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

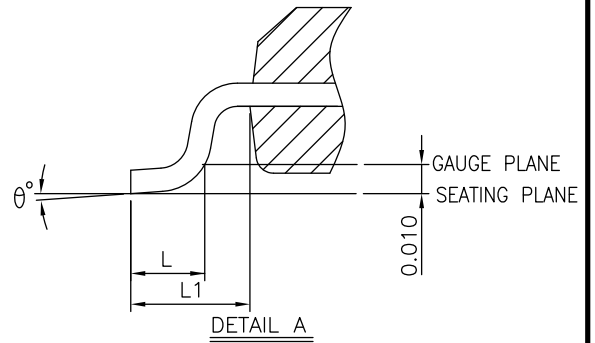
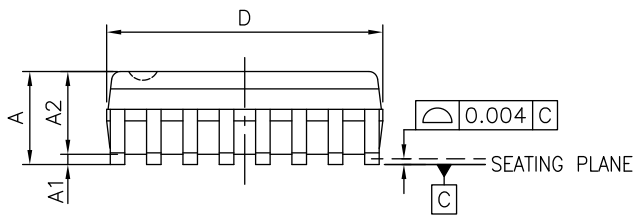
**PI3B3257**

**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.		
$\theta^\circ$	0	—	8

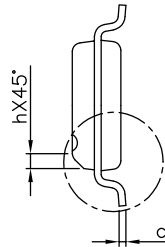
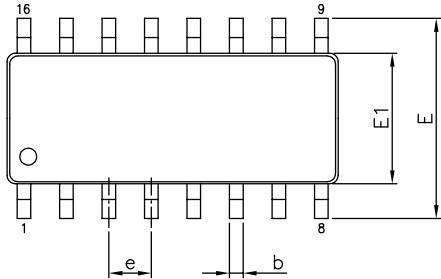
UNIT : INCH



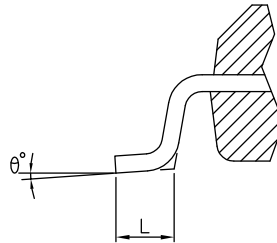
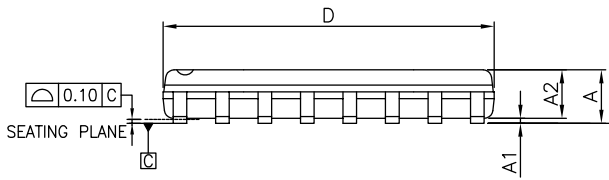
- NOTES:  
 1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.  
 2. JEDEC MO-137E.  
 3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

**PI3B3257**

**Packaging Mechanical: 16-SOIC (W)**



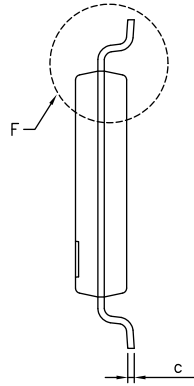
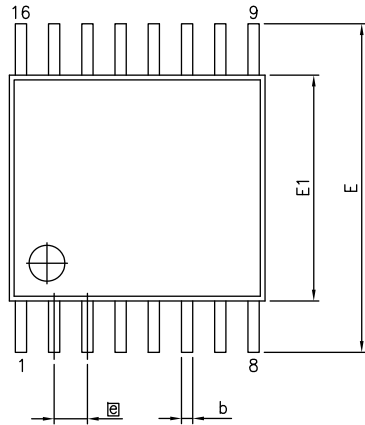
SYMBOLS	MIN.	NOM.	MAX.
A	—	—	1.75
A1	0.10	—	0.25
A2	1.00	—	—
b	0.31	—	0.51
c	0.10	—	0.25
D	9.80	9.90	10.0
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
L	0.40	—	1.27
h	0.15	—	0.50
$\theta^\circ$	0	—	8



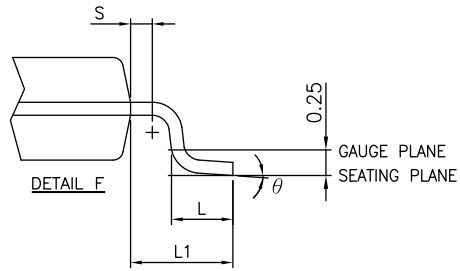
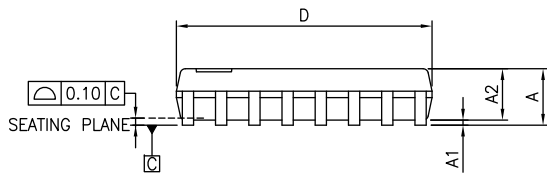
- NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
  2. JEDEC OUTLINE : MS-012 AC
  3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
  4. THE MIN. DIMENSION OF A2 AND h ARE OUT OF JEDEC SPEC.

**PI3B3257**

**Packaging Mechanical: 16-TSSOP (L)**



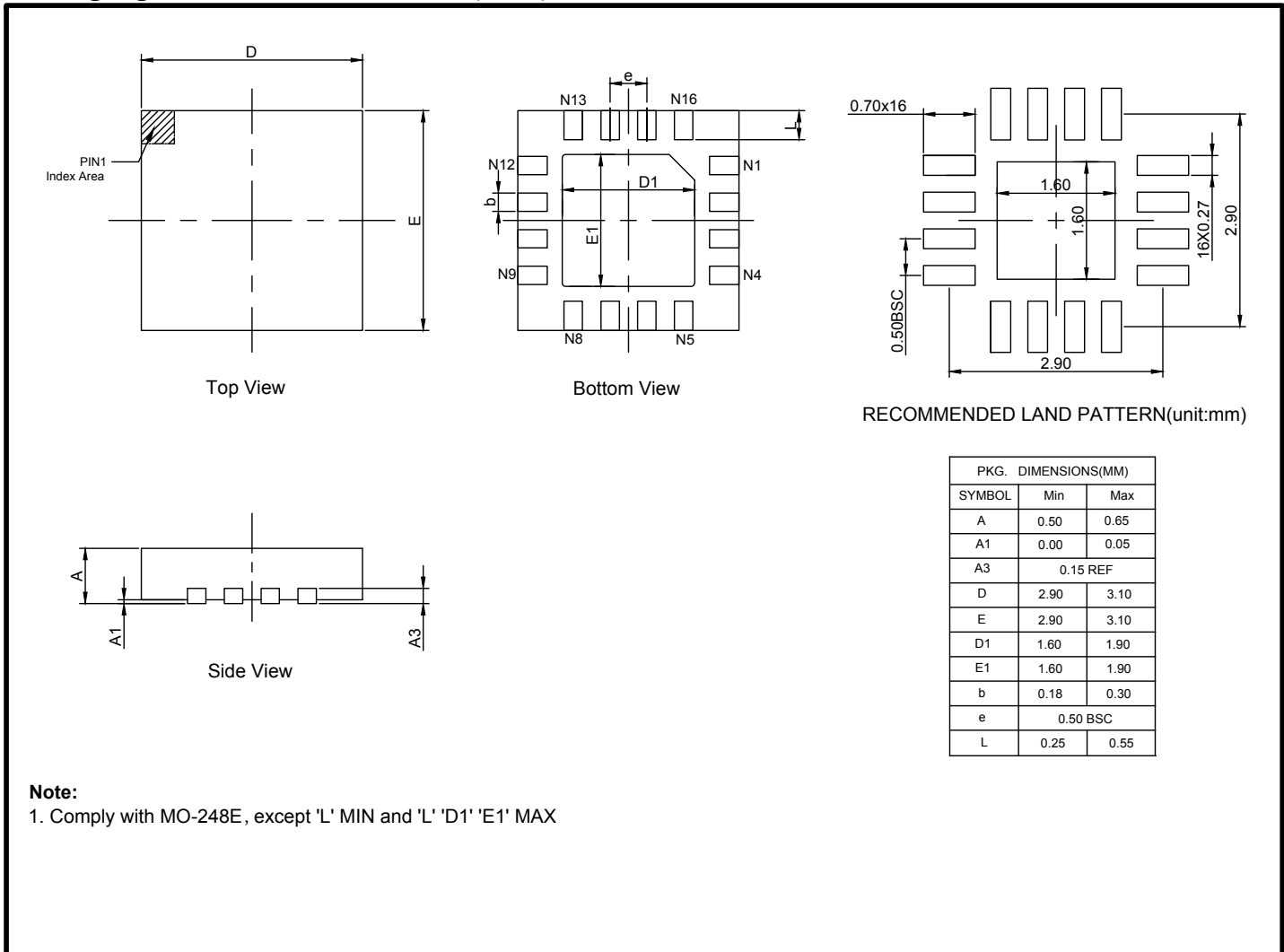
SYMBOLS	MIN.	NOM.	MAX.
A	—	—	1.20
A1	0.05	—	0.15
A2	0.80	1.00	1.05
b	0.19	—	0.30
c	0.09	—	0.20
D	4.90	5.00	5.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
$\square$	0.65 BSC		
L1	1.00 REF		
L	0.45	0.60	0.75
S	0.20	—	—
$\theta$	0°	—	8°



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

**PI3B3257**

**Packaging Mechanical: 16-UQFN (ZHD)**



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:**

1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. 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/](http://www.diodes.com/design/support/packaging/)
3. E = Pb-free and Green
4. X suffix = Tape/Reel