2.5V/3.3V, High Bandwidth, Hot Insertion,4-Bit, 2-Port Bus Switch with Individual Enables

Features

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- High Bandwidth (>400 MHz)
- 2.5V/3.3V Supply Voltage Operation
- Rail-to-Rail, or 2.5V or 3.3V Switching
- 5V I/O Tolerant
- Permits Hot Insertion
- Packaging (Pb-free & Green available):
  - 14-pin 150-mil wide plastic SOIC (W)
  - 14-pin 170-mil wide plastic TSSOP (L)
  - 16-pin 150-mil wide plastic QSOP (Q)
  - 16-contact TDFN (ZJ)

Applications

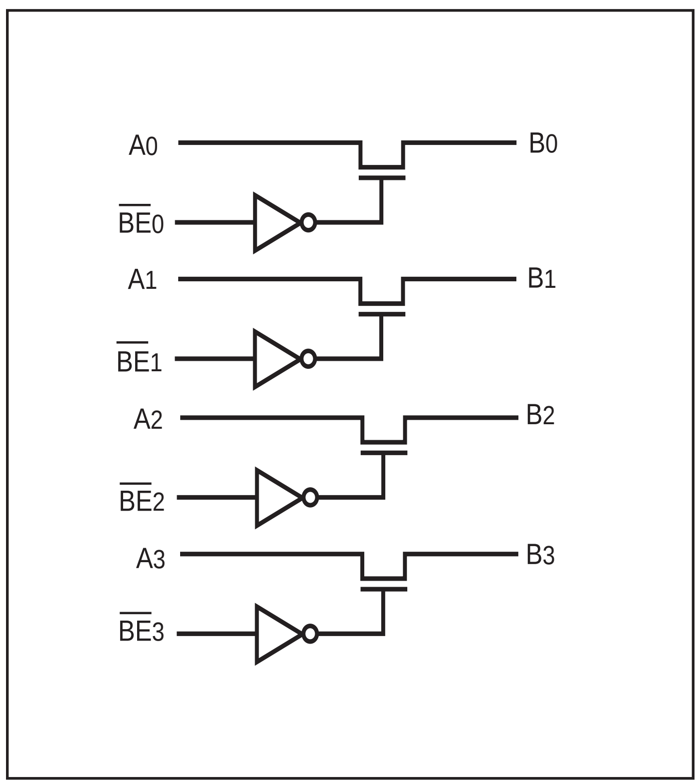
- High Bandwidth Data Switching
- Hot Docking

Description

Pericom Semiconductor's PI3C3125 IS A 2.5 volt or 3.3 volt, 4-bit bus switch designed with four individual 5-ohm bus switches with fast individual enables in an industry standard 74XX125/126 pinout. When enabled via the associated Bus Enable pin, the "A" pin is directly connected to the "B" pin for that particular gate. The bus switch introduces no additional propagation delay or additional ground bounce noise.

The PI3C3125 device has active LOW enables. It is very useful in switching signals that have high bandwidth (>400 MHz).

Block Diagram



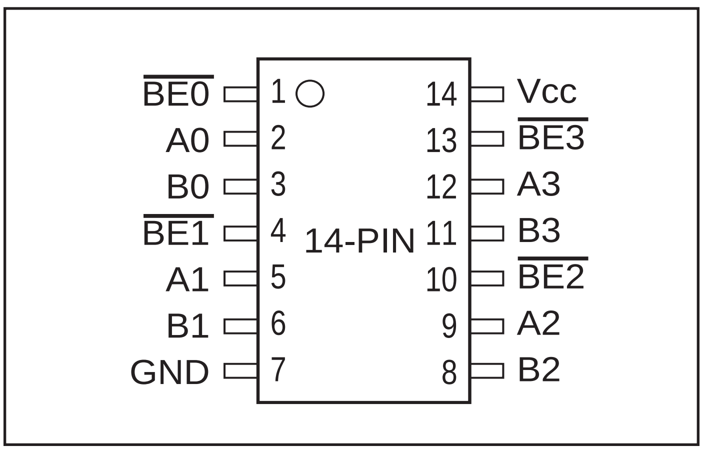
Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

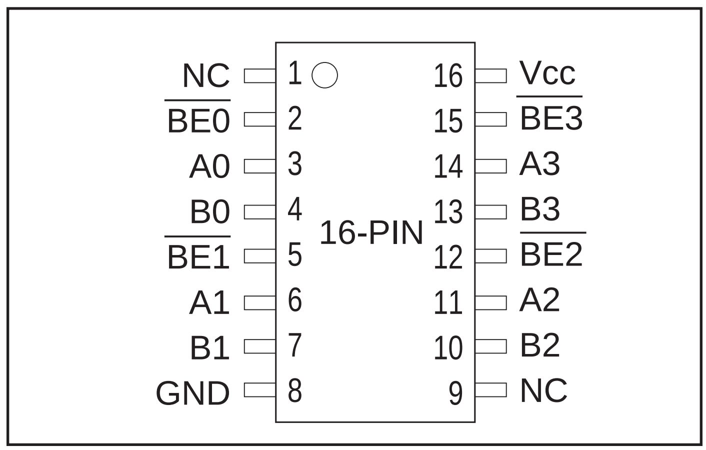
Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	–40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V_{CC} Only)	–0.5V to +4.6V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +4.6V
DC Input Voltage	–0.5V to +5.5V
DC Output Current	120mA
Power Dissipation	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.

14-Pin Configurations



16-Pin Configurations



Pin Description

Pin Name	Description
$\overline{BE}$n	Switch Enable
A3 - A0	Bus A
B3 - B0	Bus B
V_{CC}	Power
GND	Ground

Truth Table(1)

$\overline{BE}$n	An	Bn	V_{CC}	Function
X*	Hi-Z	Hi-Z	GND	Disconnect
H	Hi-Z	Hi-Z	V_{CC}	Disconnect
L	Bn	An	V_{CC}	Disconnect

Note:
1. H = High Voltage Level, L = Low Voltage Level
HI-Z = High Impedance, X = Don't Care
* A pull-up resistor should be provided for power-up protection.

DC Electrical Characteristics (Over 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	Guearanteed Logic HIGH Level	2.0			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}(3)	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		–0.73	–1.2	V
R_{ON}	Switch ON Resistance(4)	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA or 60mA V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA		5 8	7 15	-Ohm

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	
C_{ON}	A/B Capacitance, Switch On	V_{IN} = 0V	10.0	

Notes:

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

Power Supply Characteristics

Parameters	Description	Test Conditions		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:

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 driven input (control input only); A and B pins do not contribute to ΔI_{CC}.

Switching Characteristics over 3.3V Operating Range

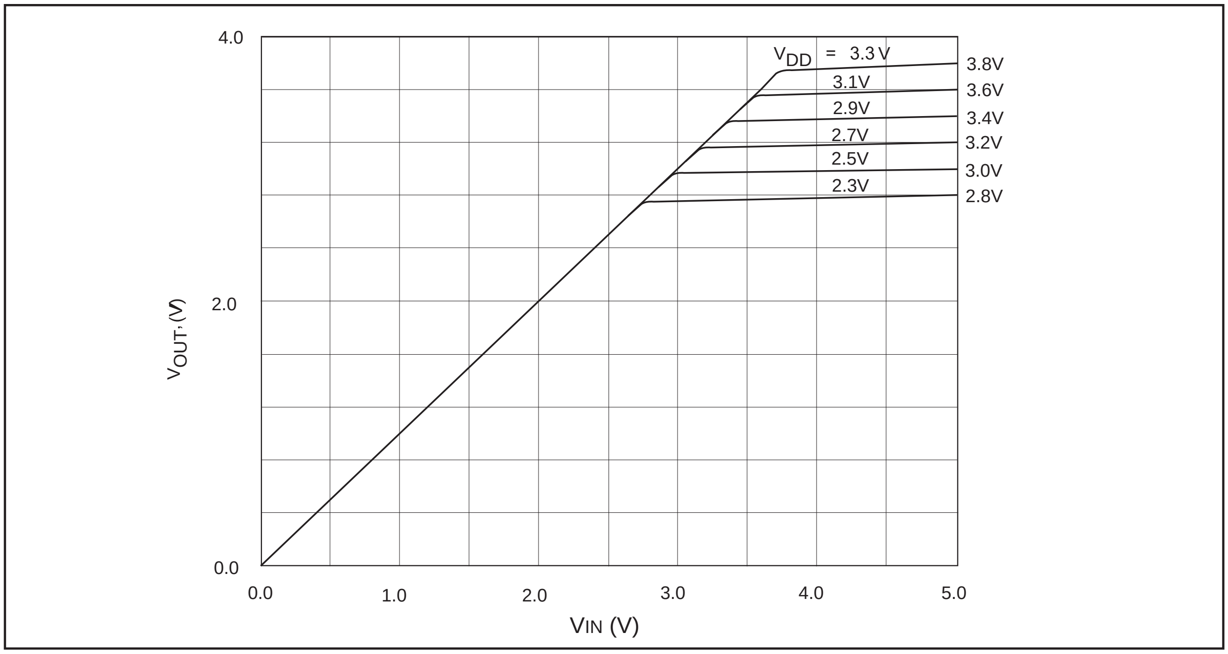
Parameters	Description	Conditions	Com. Min.	Com. Max.	Units
t_{PLH} t_{PHL}	Propogation Delay(1,2) A to B, B to A	C_L =50pF R_L = 500-Ohm		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time	C_L =50pF R_L = 500-Ohm R = 500-Ohm	1.5	6.5	
t_{PHZ} t_{PLZ}	Bus Disable Time		1.5	5.5	

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 0.25ns 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.

Switching Characteristics over 2.5V Operating Range

Parameters	Description	Conditions	Com. Min.	Com. Max.	Units
t_{PLH} t_{PHL}	Propogation Delay(1,2) A to B, B to A	C_L =50pF R_L = 500-Ohm		0.25	ns
t_{PZH} t_{PZL}	Bus Enable Time	C_L =50pF R_L = 500-Ohm R = 500-Ohm	1.5	9.8	
t_{PHZ} t_{PLZ}	Bus Disable Time		1.5	8.3	

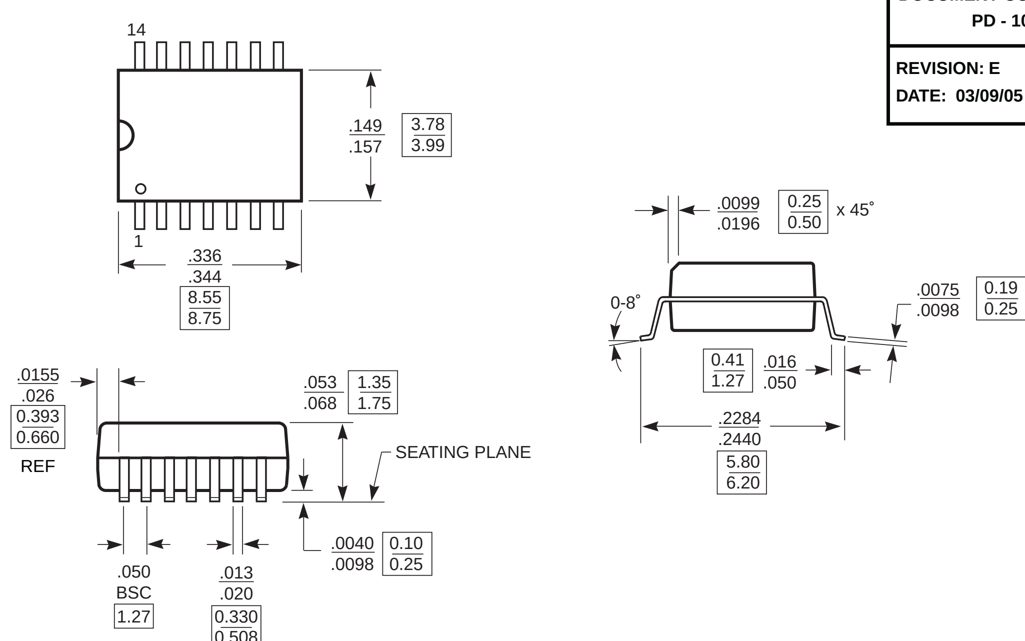
Notes:
1. This parameter is guaranteed but not tested on Propagation Delays.
2. The bus switch contributes no propagational delay other than the RC delay of the ON resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 50pF load. Since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



Switch Output Voltage vs. Input Voltage over Various Supply Voltages

DOCUMENT CONTROL NO.
PD - 1002

REVISION: E
DATE: 03/09/05



X.XX
X.XX DENOTES DIMENSIONS IN MILLIMETERS

Notes:
1) Controlling dimensions in millimeters.
2) Ref: JEDEC MS-012D/AB

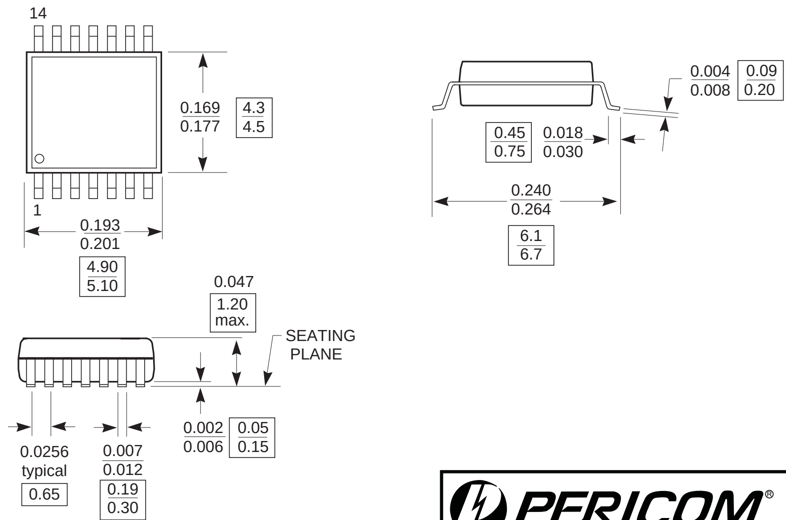
Pericom Semiconductor Corporation
3545 N. 1st Street, San Jose, CA 95134
1-800-435-2335 • www.pericom.com

DESCRIPTION: 14-Pin, 150-Mil Wide, SOIC

PACKAGE CODE: W

DOCUMENT CONTROL NO.
PD - 1309

REVISION: C
DATE: 03/09/05



Note:
1. Package Outline Exclusive of Mold Flash and Metal Burr
2. Controlling dimentions in millimeters
3. Ref: JEDEC MO-153F/AB-1

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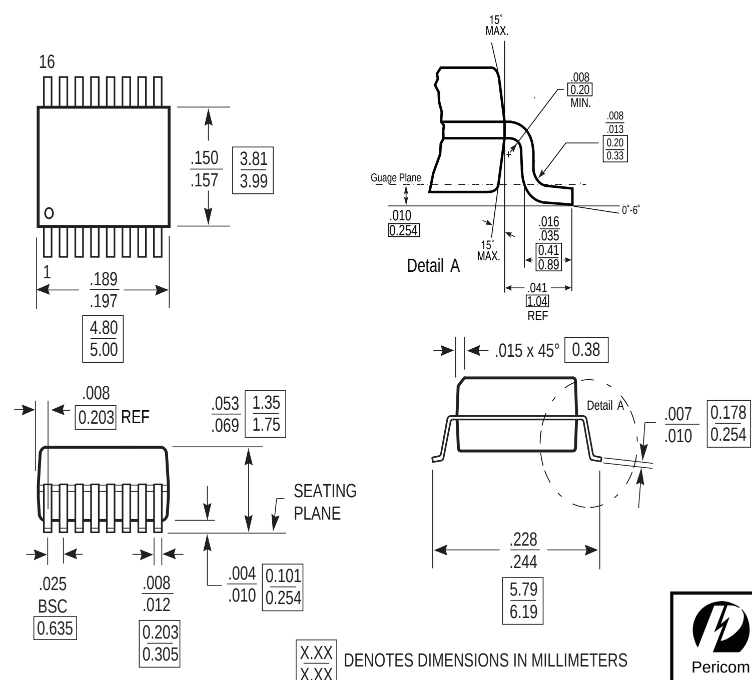
3545 N. 1st Street, San Jose, CA 95134
1-800-435-2335 • www.pericom.com

DESCRIPTION: 14-Pin, 44mm Wide, TSSOP

PACKAGE CODE: L

DOCUMENT CONTROL NO.
PD - 1201

REVISION: G
DATE: 11/07/07



Note:
1) Controlling dimensions in inches.
2) Ref: JEDEC MO-137B/AB.
3) Dimensions do not include mold flash, protrusions or gate burrs

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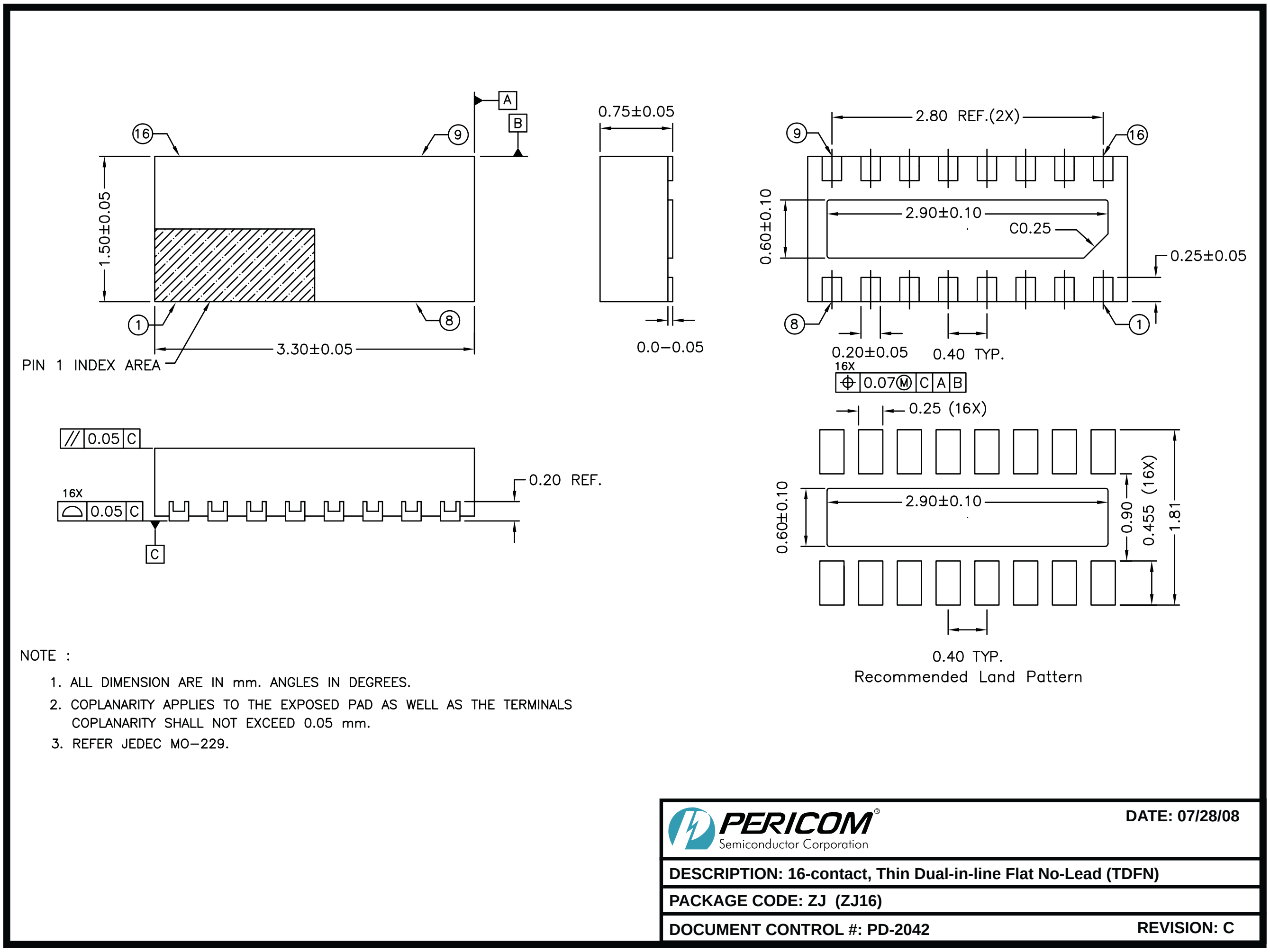
DESCRIPTION: 16-Pin 150-Mil Wide QSOP

PACKAGE CODE: Q



08-0339

Note:

- For latest package info, please check: http://www.pericom.com/products/packaging/mechanicals.php

Ordering Information

Ordering Code	Packaging Code	Package Type	Top Mark
PI3C3125LE	L	Pb-Free & Green, 14-Pin TSSOP	
PI3C3125WE	W	Pb-free & Green, 14-pin SOIC	
PI3C3125QE	Q	Pb-free & Green, 16-pin QSOP	
PI3C3125ZJE	ZJ	Pb-free & Green, 16-pin TDFN	TA

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel