Fast CMOS 3.3V 16-Bit Register (3-State)

Product Features

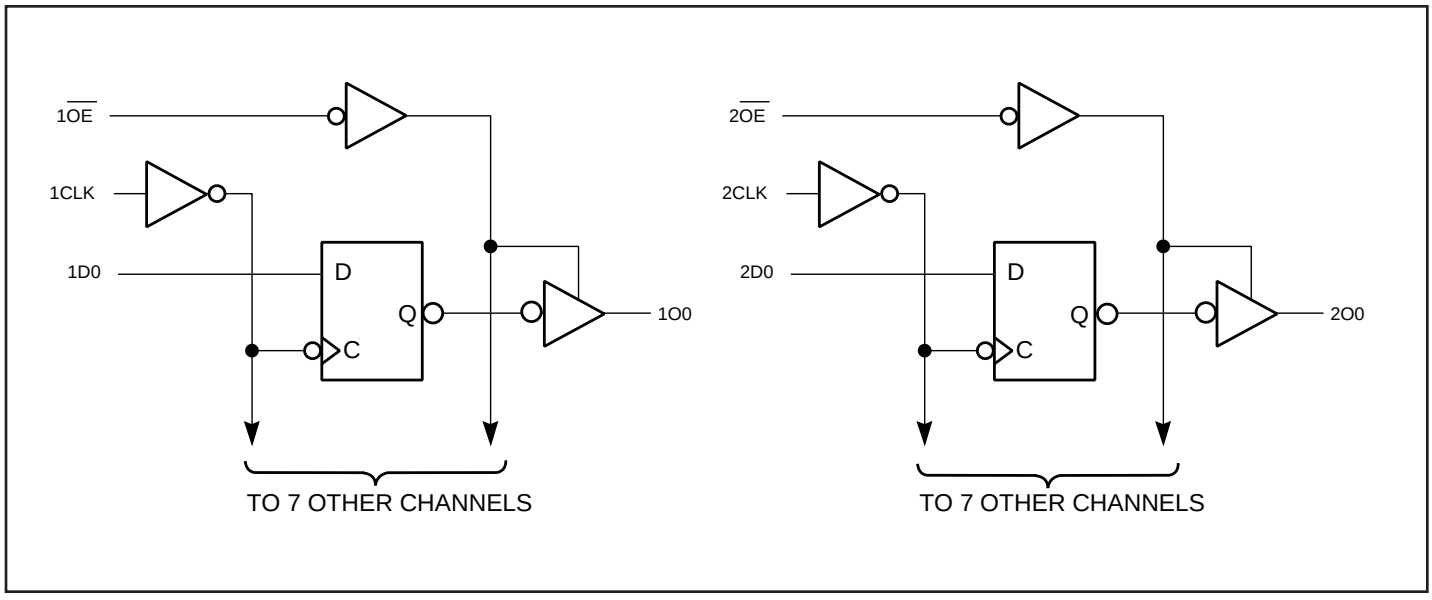
- Functionally compatible with FCT3, LVT, and 74 series 16374 families of products
- 3-state outputs
- 5V Tolerant inputs and outputs
- 2.0V-3.6V V_{DD} supply operation
- Balanced sink and source output drives (24mA)
- Low ground bounce outputs
- Power down High Impedance inputs and outputs
- Supports live insertion
- ESD Protection exceeds 2000V, Human Body Model
  200V, Machine Model
- Packaging (Pb-free & Green available):
  – 48-pin 240-mil wide plastic TSSOP (A)
  – 48-pin 300-mil wide plastic SSOP (V)

Product Description

The PI74LCX16374 is a 16-bit octal register designed with 16 D-type flip-flops with a buffered common clock and 3-state outputs. The Output Enable ($x\overline{OE}$) and clock (xCLK) controls are organized to operate as two 8-bit registers or one 16-bit register. When $\overline{OE}$ is HIGH, the outputs are in the high impedance state. Input data meeting the setup and hold time requirements of the D inputs is transferred to the O outputs on the LOW-to-HIGH transition of the clock input.

The PI74LCX16374 can be driven from either 3.3V or 5.0V devices allowing this device to be used as a translator in a mixed 3.3/5.0V system.

Logic Block Diagram



Product Pin Description

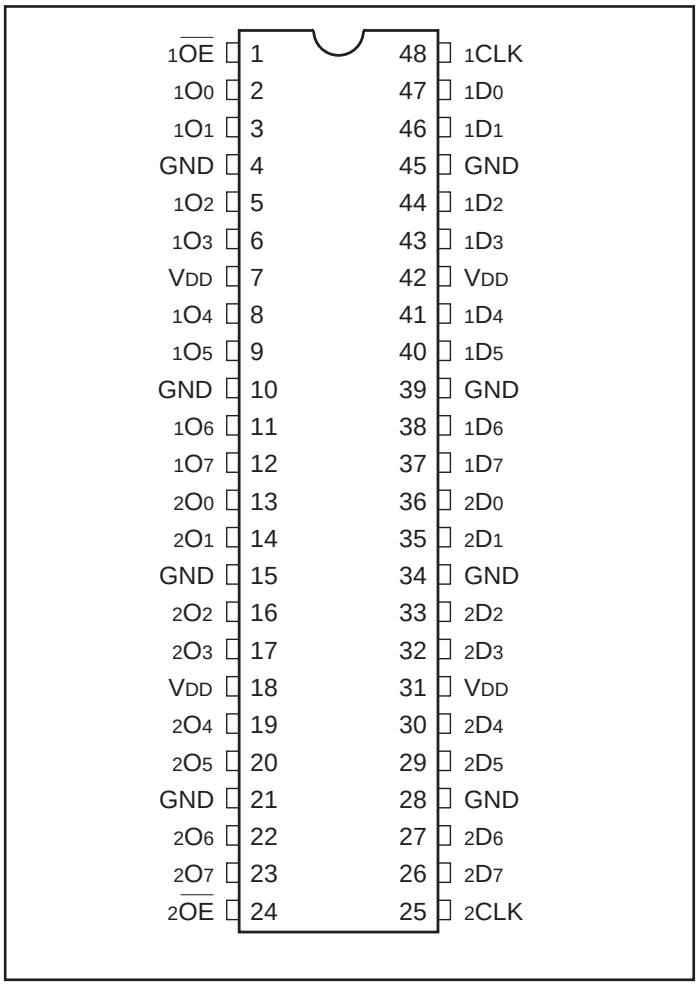
Pin Name	Description
x$\overline{OE}$	3-State Output Enable Inputs (Active LOW)
xCLK	Clock Inputs
xDx	Data Inputs
xOx	3-State Outputs
GND	Ground
V_{DD}	Power

Truth Table

Function	Inputs[1]			Outputs[1]
	xDx	xCLK	x$\overline{OE}$	xOx
High - Z	X	L	H	Z
	X	H	H	Z
Load Register	L	↑	L	L
	H	↑	L	H
	L	↑	H	Z
	H	↑	H	Z
	X	H or L	L	O_0

Note:
1. H = High Voltage Level, X = Don't Care,
   L = Low Voltage Level, Z = High Impedance

Product Pin Configuration



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_{DD} Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120 mA
Power Dissipation	1.0W

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.

Recommended Operating Conditions

Parameter	Description		Min.	Max.	Units
V_{DD}	Supply Voltage	Operating	2.0	3.6	V
		Data Retention	1.5	3.6	
V_I	Input Voltage		0	5.5	
V_O	Output Voltage	HIGH or LOW state	0	V_{DD}	
		3-state	0	5.5	
I_{OH}/I_{OH}	Output Current	V_{DD} = 3.0V - 3.6V		±24	mA
		V_{DD} = 2.7V		±12	
T_A	Operating Temperature		-40	85	°C
$\Delta t/\Delta V$	Input Edge Rate	V = 0.8V - 2.0V, V_{DD} = 3.0V	0	10	ns/V

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{DD} = 2.7V to 3.6V)

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 LOWLevel				0.8	
V_{OH}	Output HIGH Voltage	V_{DD} = 2.7 - 3.6	I_{OH} = -0.1mA	V_{DD} -0.2			
		V_{DD} = 2.7	I_{OH} = -12mA	2.2			
		V_{DD} = 3.0	I_{OH} = -18mA	2.4			
			I_{OH} = -24mA	2.2			
V_{OL}	Output LOW Voltage	V_{DD} =2.7 - 3.6	I_{OL} = 0.1mA			0.2	
		V_{DD} = 2.7	I_{OL} = 12mA			0.4	
		V_{DD} = 3.0	I_{OL} = 16mA			0.4	
			I_{OL} = 24mA			0.55	
V_{IK}	Clamp Dioide Voltage	V_{DD} = Min., I_{IN} = -18mA			-0.7	-1.2	
I_I	Input Leakage Current	0 ≤ V_I ≤ 5.5V	V_{DD} = 2.7 -3.6			±5	µA
I_{OZ}	Tri-State Output Leakage	0 ≤ V_O ≤ 5.5V V_I = V_{IH} or V_{IL}	V_{DD} = 2.7 -3.6			±5	
I_{OFF}	Power Down Disable	V_{DD} = 0V, V_{IN} or V_{OUT} ≤ 5.5V				10	
I_{DD}	Quiescent Power supply current	V_{DD} = Max.	V_{IN} = GND or V_{DD}		0.1	10	
ΔI_{DD}	Quiescent Power supply current TTL Inputs High	V_{DD} = Max.	V_{IN} = V_{DD} =0.6V[3]			500	

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_{DD} = 3.3V, +25°C ambient.
3. Per TTL driven input; all other inputs at V_{DD} or GND.

Capacitance

Parameters	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{DD} = Open, V_I = 0V or V_{DD}	3	pF
C_{OUT}	Output Capacitance	V_{DD} = 3.3V, V_I = 0V or V_{DD}	3	
C_{PD}	Power Dissipation Capacitance	V_{DD} = 3.3V, V_I = 0V or V_{DD}, F = 10 MHz	20	

Switching Characteristics over Operating Range

Parameters	Description	Test Conditions	V_{DD} = 3.3V±0.3		V_{DD} = 2.7V		Units
			Min.	Max.	Min.	Max.	
f_{MAX}	Maximum Clock Frequency	CL = 50pF RL = 500Ω	170				MHz
t_{PHL} t_{PLH}	Propagation Delay CP to On		1.5	6.2	1.5	6.5	ns
t_{PZL} t_{PZH}	Output Enable time		1.5	6.1	1.5	6.3	
t_{PLZ} t_{PHZ}	Output Disable time		1.5	6.0	1.5	6.2	
t_S	Setup Time		2.5		2.5		
t_H	Hold Time		1.5		1.5		
t_W	Pulse Width		3.0		3.0		
$t_{sk(0)}$	Output to Output Skew[1]			1.0			

Notes:

1. Skew between any two outputs, of the same package, switching in the same direction.

Dynamic Switching Characteristics (T_A = +25°C)

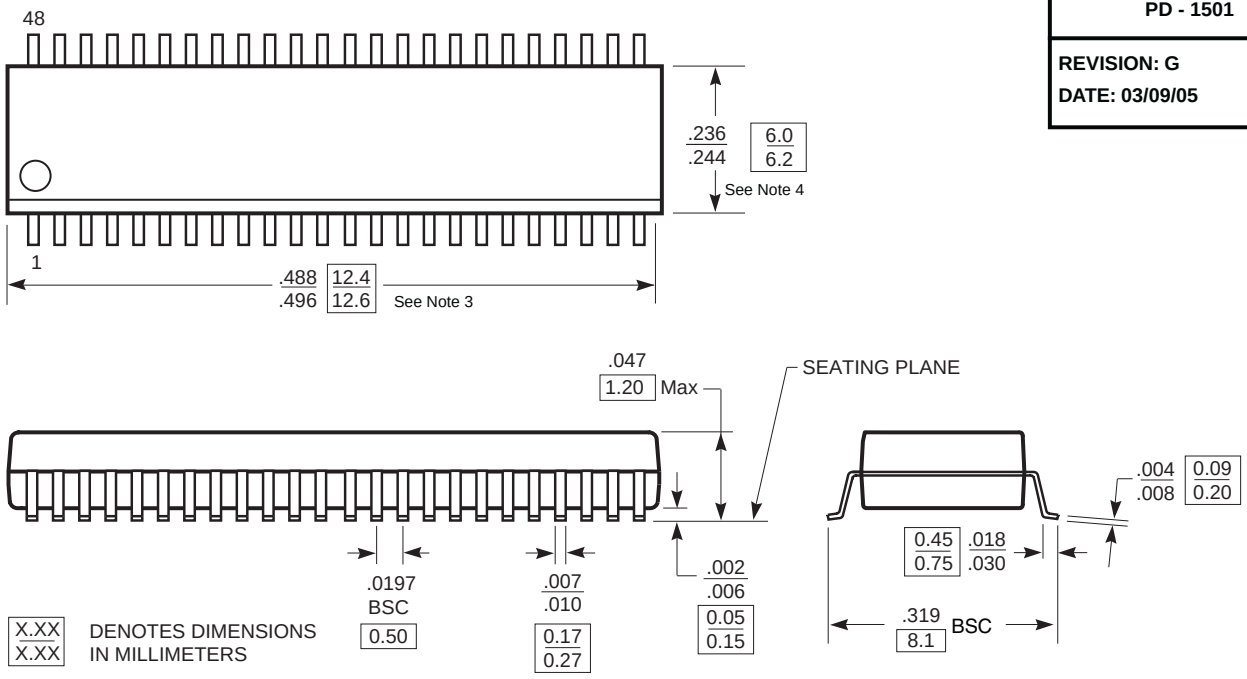
Parameters	Description	Test Conditions[1]	Typ.	Units
V_{OLP}	Dynamic LOW peak voltage	V_{DD} = 3.3V, C_L = 50pF, V_{IH} = 3.3V, V_{IL} = 0V	0.8	V
V_{OLV}	Dynamic LOW valley voltage			

Note:

1. Measured with n-1 outputs switching from High-to-Low or Low-to-High. The remaining output is measured in the LOW state.

DOCUMENT CONTROL NO.
PD - 1501

REVISION: G
DATE: 03/09/05

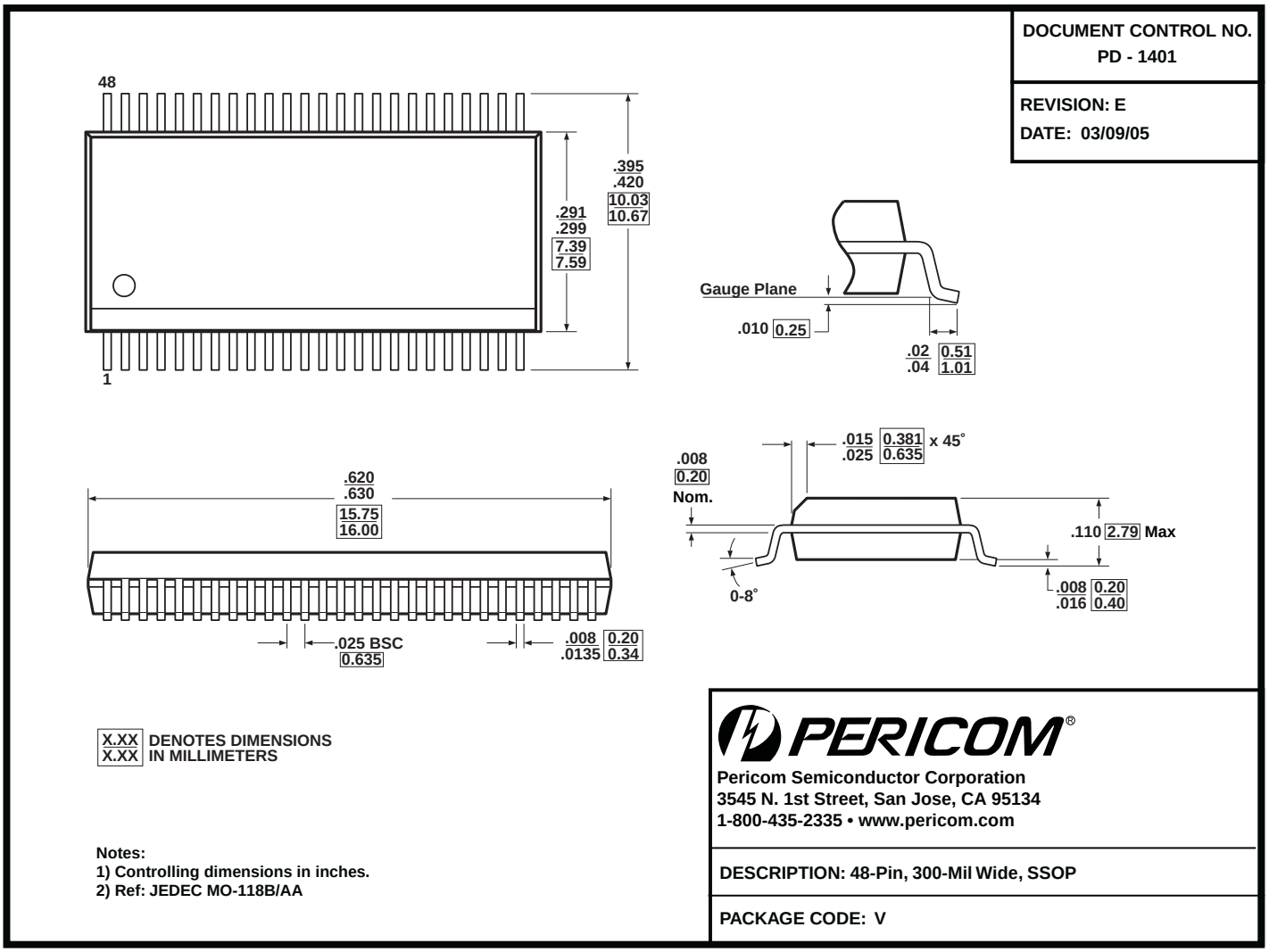


Note:
1. Controlling dimensions in millimeters.
2. Ref: JEDEC MO-153F/ED
3. Dimension does not include mold flash, protrusions or gate burrs. Mold flash, protrusions and gate burrs shall not exceed 0.15mm per side.
4. Dimension does not include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.25mm per side.

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

DESCRIPTION: 48-Pin 240-Mil Wide TSSOP

PACKAGE CODE: A



Notes:

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

Ordering Information

Ordering Code	Package Code	Package Description
PI74LPT16374AAEX	A	Pb-free & Green, 48-Pin 240-mil wide Plastic TSSOP (A)
PI74LPT16374AEX	A	Pb-free & Green, 48-Pin 240-mil wide Plastic TSSOP (A)
PI74LPT16374CAEX	A	Pb-free & Green, 48-Pin 240-mil wide Plastic TSSOP (A)
PI74LPT16374CVEX	V	Pb-free & Green, 48-Pin 300-mil wide Plastic SSOP (V)
PI74LPT16374VEX	V	Pb-free & Green, 48-Pin 300-mil wide Plastic SSOP (V)

Notes:

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