Fast CMOS 3.3V 16-Bit Transparent Latch

Product Features

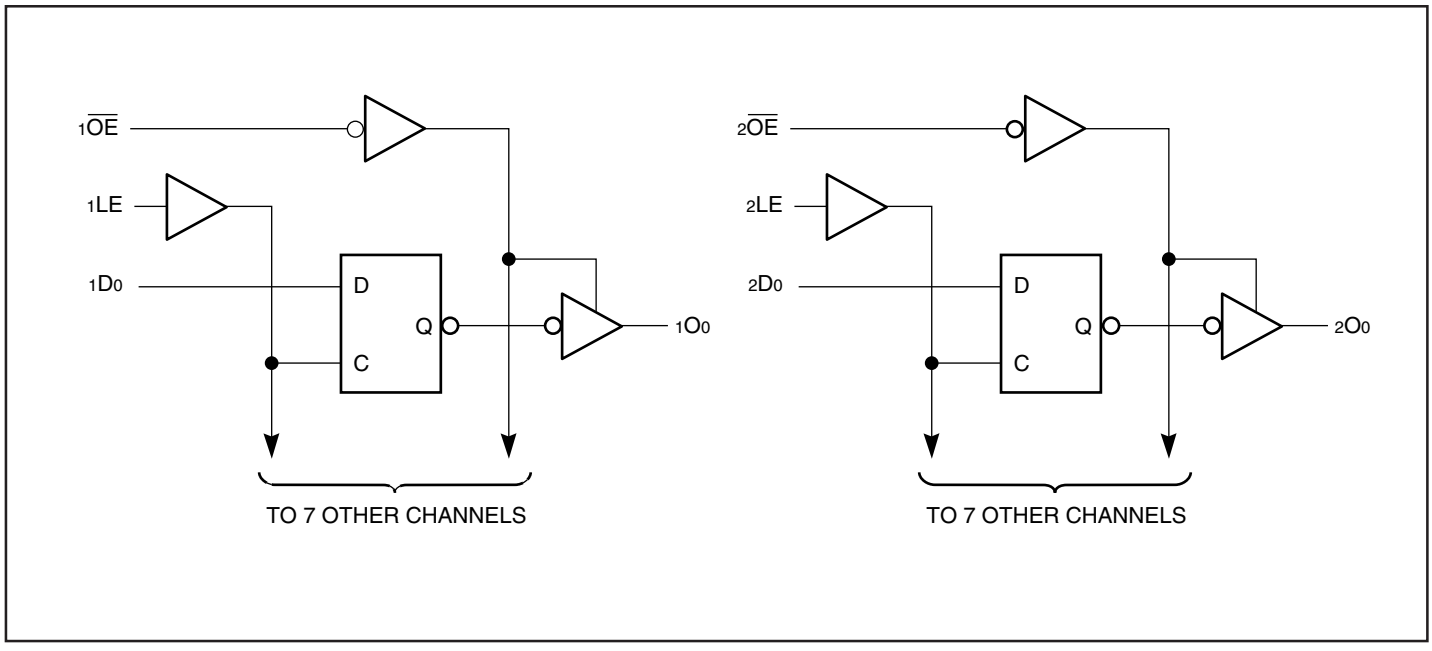
- Functionally compatible with FCT3, LVT, and 74 series 16373 families of products
- 3-State outputs
- 5V Tolerant inputs and outputs
- 2.0V-3.6V V_{CC} supply operation
- Balanced sink and source output drives (24mA)
- Low ground bounce outputs
- Power down High Impedance inputs and outputs
- Supports 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)
  – 48-pin 150-mil wide plastic BQSOP (B)

Product Description

The PI74LCX16373 is a 16-bit transparent latch designed with 3-state outputs and are intended for bus oriented applications. The Output Enable and Latch Enable controls are organized to operate as two 8-bit latches or one 16-bit latch. When Latch Enable (LE) is HIGH, the flip-flops appear transparent to the data. The data that meets the set-up time when LE is LOW is latched. When $\overline{OE}$ is HIGH, the bus output is in the high impedance state.

The PI74LCX16373 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.

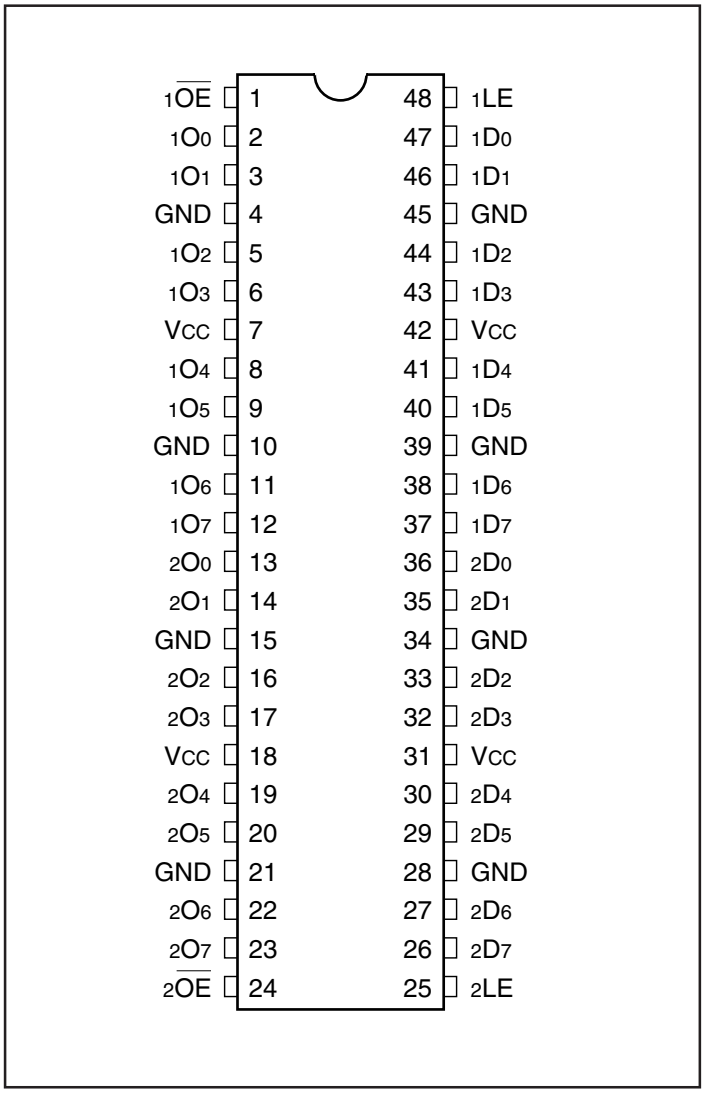
Logic Block Diagram



Product Pin Description

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

Product Pin Configuration



Truth Table[1]

Inputs			Outputs
x$\overline{OE}$	xLE	**xDx**	**xOx**
L	H	H	H
L	H	L	L
H	X	X	Z
L	L	X	O_0

Notes:
1. H = High Voltage Level
   X = Don't Care
   L = Low Voltage Level
   Z = High Impedance
   O_0 = Previous O_0 before HIGH-to-LOW transition of Latch Enable

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 & Vcc 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	120mA
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

Symbol	Parameter		Min.	Max.	Units
V_{CC}	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_{CC}	
		3-State	0	5.5	
I_{OH}/I_{OL}	Output Current	V_{CC} = 3.0V-3.6V		±24	mA
		V_{CC} = 2.7V		±12	
T_A	Free-Air Operating Temperature		–40	+85	°C
$\Delta t/\Delta V$	Input Edge Rate	V = 0.8V-2.0V, V_{CC} = 3.0V	0	10	ns/V

DC Electrical Characteristics (Over the Operating Range, T_A = -40°C to +85°C, V_{CC} = 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 LOW Level				0.8	
V_{OH}	Output HIGH Voltage	V_{CC} = 2.7-3.6	I_{OH} = –0.1mA	V_{CC}-0.2			
		V_{CC} = 2.7	I_{OH} = –12 mA	2.2			
		V_{CC} = 3.0	I_{OH} = –16 mA	2.4			
			I_{OH} = –24 mA	2.2			
V_{OL}	Output LOW Voltage	V_{CC} = 2.7-3.6	I_{OL} = 0.1mA			0.2	
		V_{CC} = 2.7	I_{OL} = 12mA			0.4	
		V_{CC} = 3.0	I_{OL} = 16mA			0.4	
			I_{OL} = 24mA			0.55	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA			–0.7	–1.2	
I_I	Input Leakage Current	0 ≤ V_I ≤ 5.5V	V_{CC} = 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_{CC} = 2.7-3.6			±5	
I_{OFF}	Power Down Disable	V_{CC} = 0V, V_{IN} or V_{OUT} ≤ 5.5V				±10	
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		0.1	10	
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max.	V_{IN} = V_{CC} – 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_{CC} = 3.3V, +25°C ambient.
3. Per TTL driven input; all other inputs at V_{CC} or GND.

Capacitance

Parameters	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{CC} = Open, V_I = 0V or V_{CC}	7	pF
C_{OUT}	Output Capacitance	V_{CC} = 3.3V, V_I = 0V or V_{CC}	8	
C_{PD}	Power Dissipation Capacitance	V_{CC} = 3.3V, V_I = 0V or V_{CC}, F = 10 MHz	20	

Switching Characteristics over Operating Range

Parameters	Description	Conditions	V_{CC} = 3.3V ±0.3V		V_{CC} =2.7V		Units
			Min.	Max.	Min.	Max.	
t_{PHL} t_{PLH}	Propagation Delay Dn to On	C_L = 50pF R_L = 500Ω	1.5	5.4	1.5	5.9	ns
t_{PHL} t_{PLH}	Propagation Delay LE to On		1.5	5.5	1.5	6.4	
t_{PZL} t_{PZH}	Output Enable time		1.5	6.1	1.5	6.5	
t_{PLZ} t_{PHZ}	Output Disable Time		1.5	6.0	1.5	6.3	
t_S	Setup time, Dn to LE		2.5		2.5		
t_H	Hold time, Dn to LE		1.5		1.5		
t_W	LE Pulse Width		3.0		3.0		
$t_{SK(O)}$	Output Skew(1)			1.0			

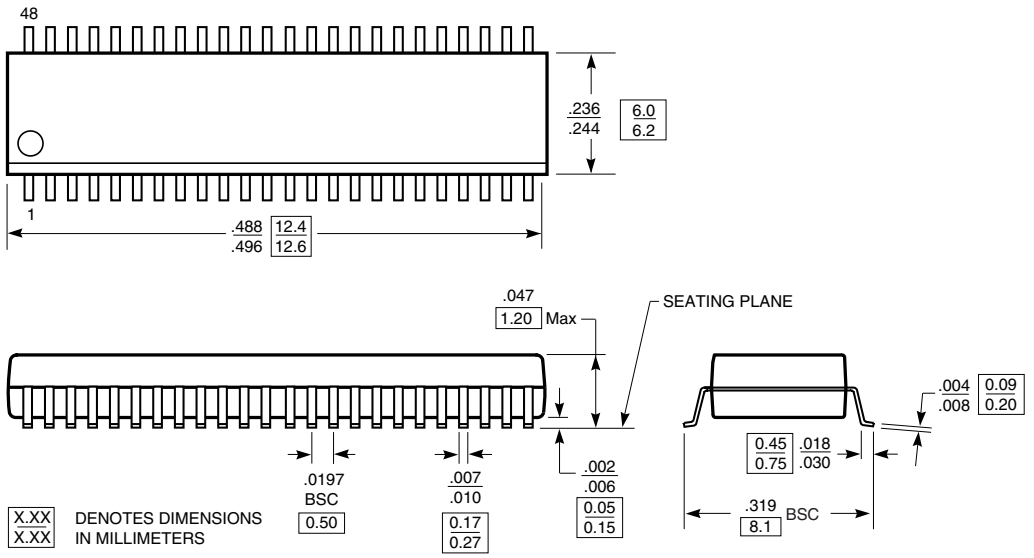
Notes:
1. Skew between any two outputs, of the same package, switching in the same direction.

Dynamic Switching Characteristics (T_A = +25°C)

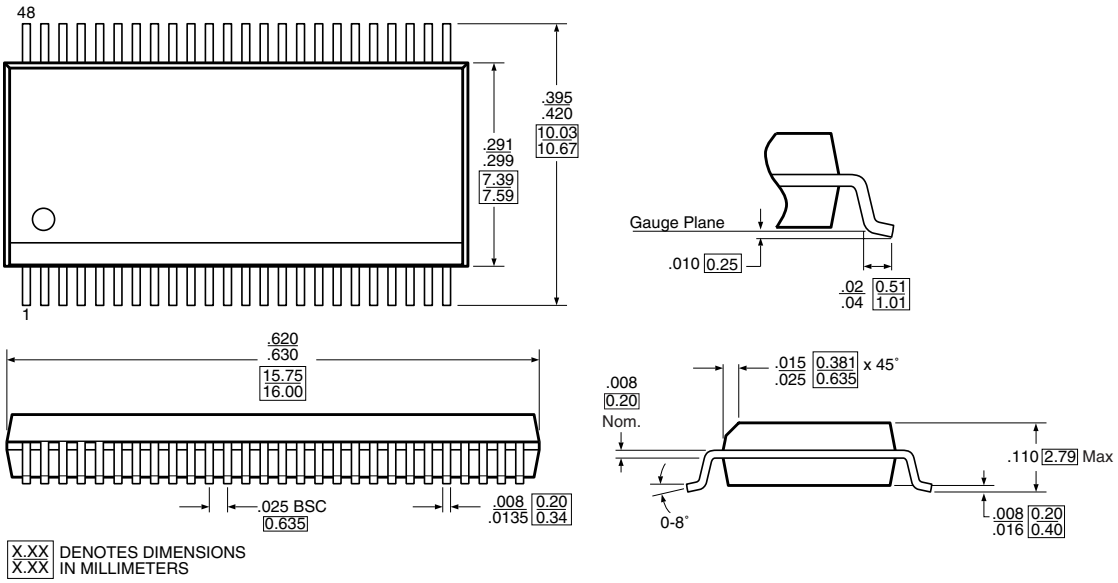
Parameters	Description	Test Conditions(1)	Typ.	Units
V_{OLP}	Dynamic LOW Peak Voltage	V_{CC} = 3.3V, C_L = 50pF V_{IH} = 3.3V, V_{IL} = 0V	0.8	V
V_{OLV}	Dynamic LOW Valley Voltage		0.8	

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

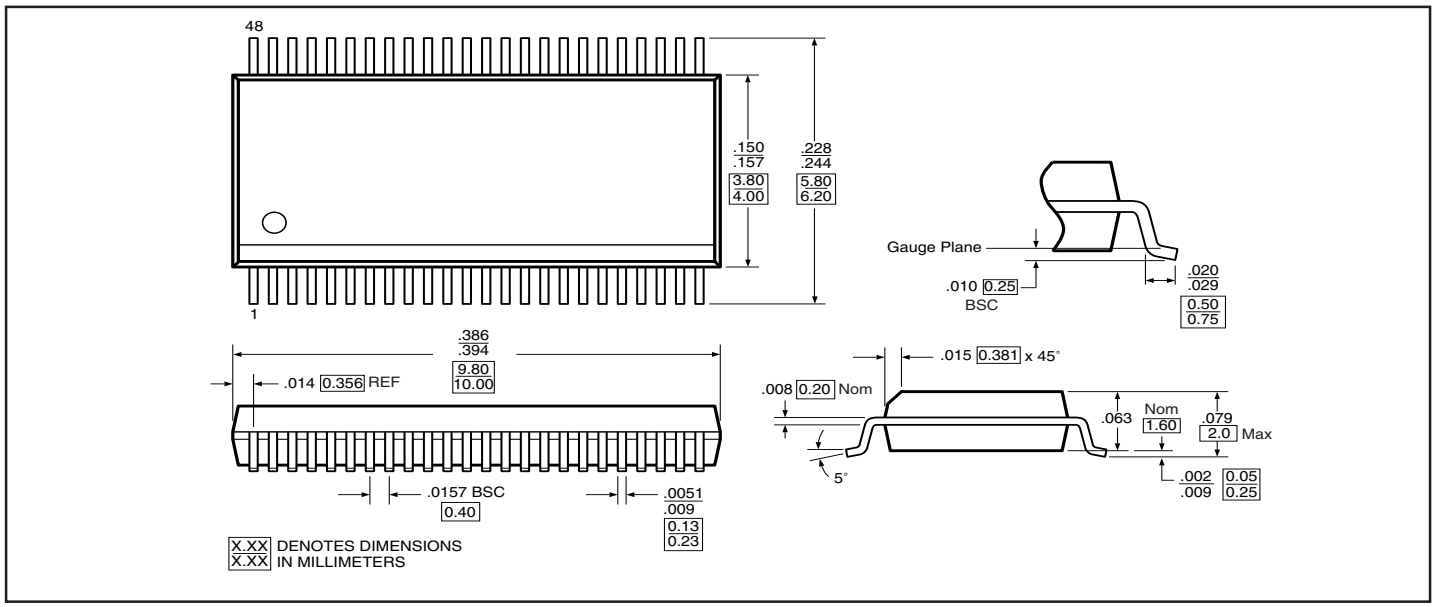
Packaging Mechanical: 48-Pin TSSOP (A) Package



Packaging Mechanical: 48-Pin SSOP (V) Package



Packaging Mechanical: 48-Pin BQSOP (B)



Ordering Information

Ordering Code	Package Type	Package Description
PI74LCX16373A	A	48-Pin 240-mil wide Plastic TSSOP (A)
PI74LCX16373AE	A	Pb-free & Green, 48-Pin 240-mil wide Plastic TSSOP (A)
PI74LCX16373V	V	48-Pin 300-mil wide Plastic TVSOP (V)
PI74LCX16373VE	V	Pb-free & Green, 48-Pin 300-mil wide Plastic TVSOP (A)
PI74LCX16373B	B	48-Pin 150-mil wide Plastic BQSOP (B)

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