

**Fast CMOS 3.3V 16-Bit Bidirectional Transceiver**

**Product Features**

- Functionally compatible with FCT3, LVT, and 74 series 16245 families of products
- Tri-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
- Packages available:
  - 48-pin 240-mil wide plastic TSSOP (A)
  - 48-pin 300-mil wide plastic SSOP (V)

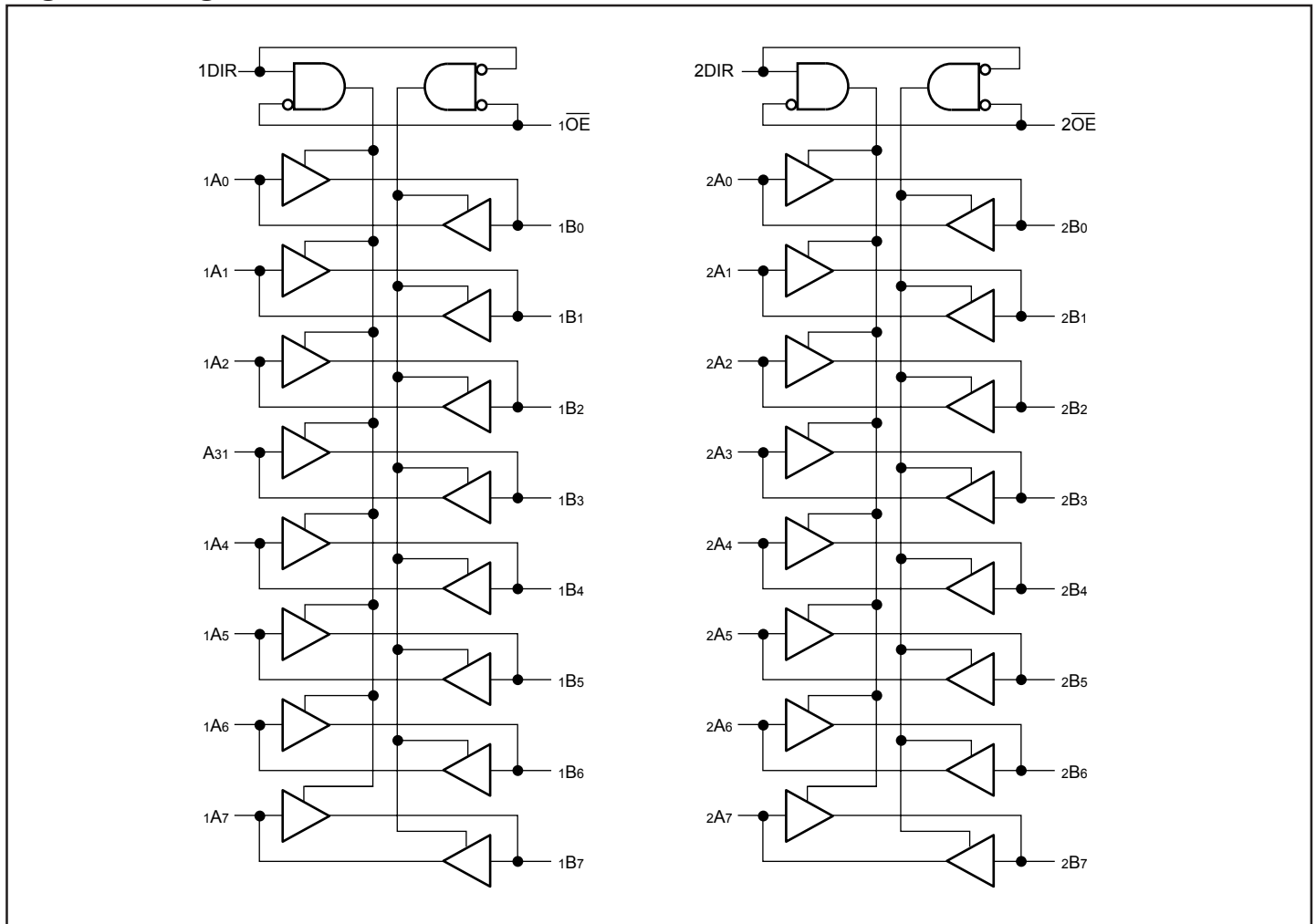
**Product Description**

Pericom Semiconductor's PI74LCX series of logic circuits are produced in the Company's advanced 0.6 micron CMOS technology, achieving industry leading speed grades.

The PI74LCX16245 is a 16-bit bidirectional transceiver designed for asynchronous two-way communication between data buses. The direction control input pin (xDIR) determines the direction of data flow through the bidirectional transceiver. The Direction and Output Enable controls are designed to operate this device as either two independent 8-bit transceivers or one 16-bit transceiver. The output enable ( $\overline{OE}$ ) input, when HIGH, disables both A and B ports by placing them in HIGH Z condition.

The PI74LCX16245 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
$\overline{xOE}$	3-State Output Enable Inputs (Active LOW)
xDIR	Direction Control Input
xAx	Side A Inputs or 3-State Inputs
xBx	Side B Outputs or 3-State Outputs
GND	Ground
V <sub>CC</sub>	Power

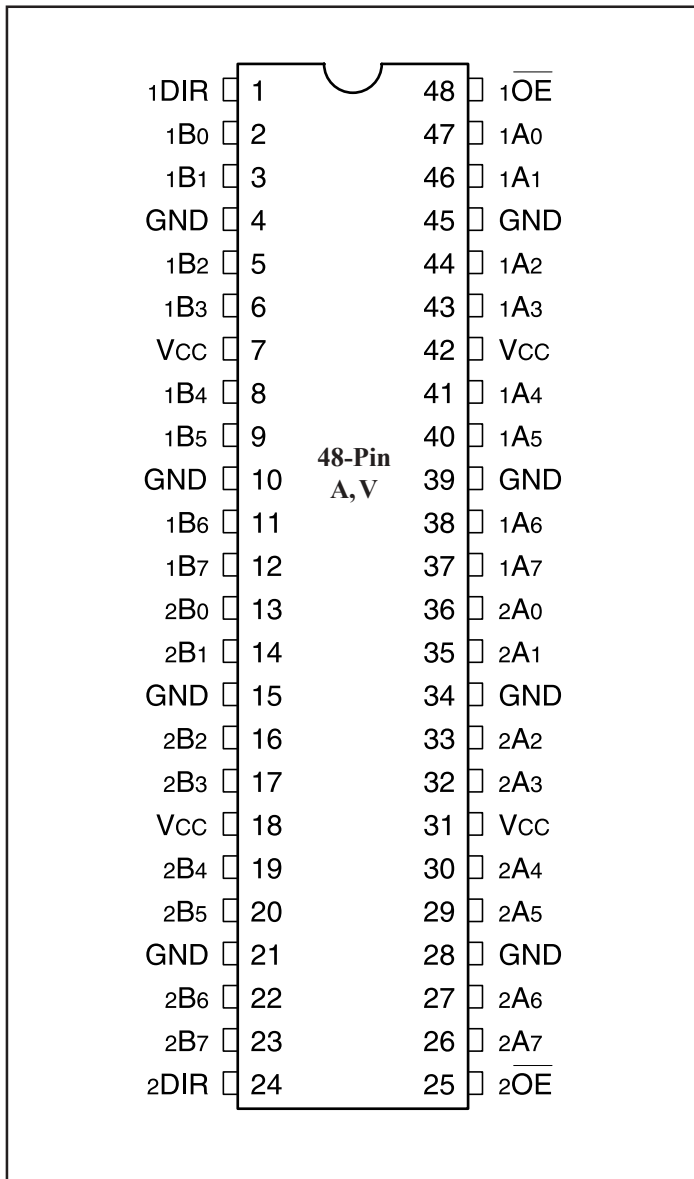
### Truth Table<sup>(1)</sup>

Inputs <sup>(1)</sup>		Outputs <sup>(1)</sup>
$\overline{xOE}$	xDIR	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	Z

**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 <sub>CC</sub> 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 <sub>CC</sub>	Supply Voltage	Operating	2.0	3.6	V	
		Data Retention	1.5	3.6		
V <sub>I</sub>	Input Voltage	0	5.5			
V <sub>O</sub>	Output Voltage	HIGH or LOW State	0	V <sub>CC</sub>		
		3-State	0	5.5		
I <sub>OH</sub> /I <sub>OL</sub>	Output Current	V <sub>CC</sub> = 3.0V-3.6V	—	±24		mA
		V <sub>CC</sub> = 2.7V	—	±12		
T <sub>A</sub>	Free-Air Operating Temperature	-40	+85	°C		
Δt/ΔV	Input Edge Rate	V = 0.8V-2.0V, V <sub>CC</sub> = 3.0V		0	10	ns/V

**DC Electrical Characteristics** (Over the Operating Range,  $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{CC} = 2.7\text{V}$  to  $3.6\text{V}$ )

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ <sup>(2)</sup>	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	$V_{CC} = 2.7-3.6$	$I_{OH} = -0.1\text{mA}$	$V_{CC}-0.2$	—	—	
		$V_{CC} = 2.7$	$I_{OH} = -12\text{mA}$	2.2	—	—	
		$V_{CC} = 3.0$	$I_{OH} = -18\text{mA}$	2.4	—	—	
			$I_{OH} = -24\text{mA}$	2.2	—	—	
$V_{OL}$	Output LOW Voltage	$V_{CC} = 2.7-3.6$	$I_{OL} = 0.1\text{mA}$	—	—	0.2	
		$V_{CC} = 2.7$	$I_{OL} = 12\text{mA}$	—	—	0.4	
		$V_{CC} = 3.0$	$I_{OL} = 16\text{mA}$	—	—	0.4	
			$I_{OL} = 24\text{mA}$	—	—	0.55	
$V_{IK}$	Clamp Diode Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18\text{mA}$		—	-0.7	-1.2	
$I_I$	Input Leakage Current	$0 \leq V_I \leq 5.5\text{V}$	$V_{CC} = 2.7-3.6$	—	—	$\pm 5$	$\mu\text{A}$
$I_{OZ}$	3-State Output Leakage	$0 \leq V_O \leq 5.5\text{V}$ $V_I = V_{IH}$ or $V_{IL}$	$V_{CC} = 2.7-3.6$	—	—	$\pm 5$	
$I_{OFF}$	Power Down Disable	$V_{CC} = 0\text{V}, V_{IN}$ or $V_{OUT} \leq 5.5\text{V}$		—	—	$\pm 10$	
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max.}$	$V_{IN} = \text{GND}$ or $V_{CC}$	—	0.1	10	
$\Delta I_{CC}$	Quiescent Power Supply Current TTL Inputs HIGH	$V_{CC} = \text{Max.}$	$V_{IN} = V_{CC} - 0.6\text{V}^{(3)}$	—	—	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  $V_{CC} = 3.3\text{V}$ ,  $+25^{\circ}\text{C}$  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	$V_{CC} = \text{Open}, V_I = 0\text{V}$ or $V_{CC}$	7	pF
$C_{OUT}$	Output Capacitance	$V_{CC} = 3.3\text{V}, V_I = 0\text{V}$ or $V_{CC}$	8	
$C_{PD}$	Power Dissipation Capacitance	$V_{CC} = 3.3\text{V}, V_I = 0\text{V}$ or $V_{CC}, F = 10\text{MHz}$	20	

**Switching Characteristics over Operating Range**

Parameters	Description	Conditions	V <sub>CC</sub> = 3.3V ± 0.3V		V <sub>CC</sub> = 2.7V		Units
			Min.	Max.	Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D <sub>XX</sub> to O <sub>XX</sub>	C <sub>L</sub> = 50pF R <sub>L</sub> = 500Ω	1.5	4.5	1.5	5.2	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable time		1.5	6.5	1.5	7.2	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output Disable Time		1.5	6.4	1.5	6.9	
t <sub>SK(O)</sub>	Output Skew <sup>(1)</sup>		—	1.0	—	—	

**Notes:**

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

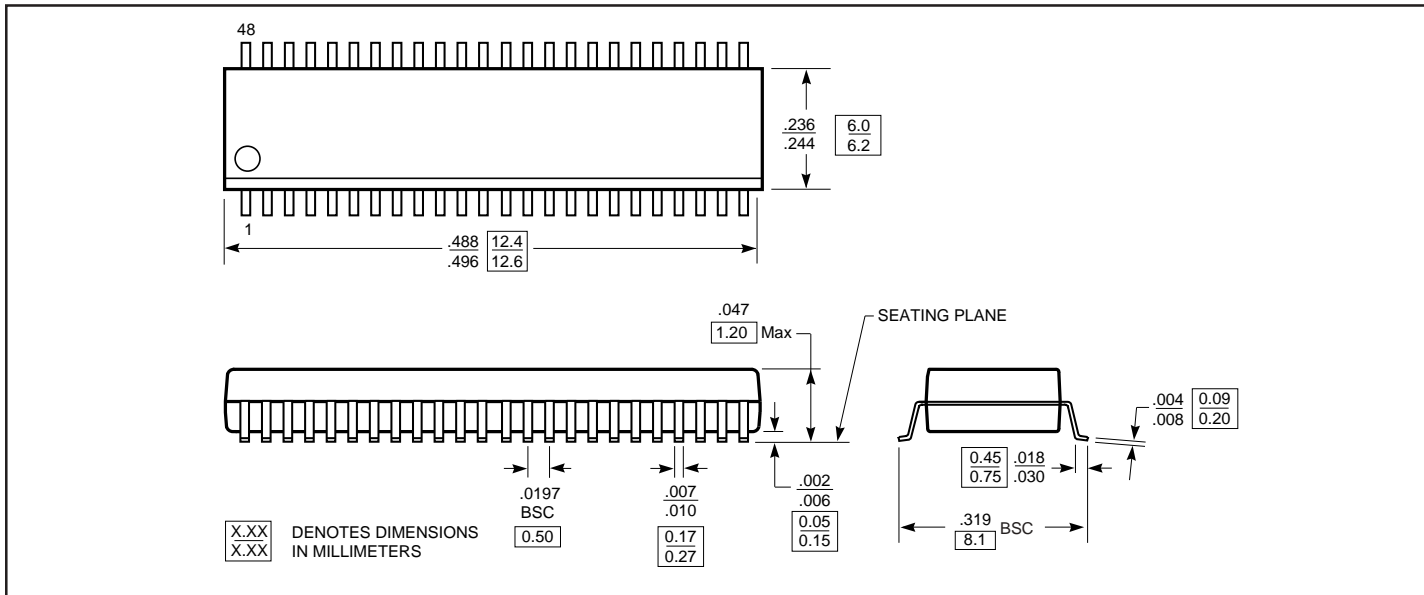
**Dynamic Switching Characteristics (T<sub>A</sub> = +25°C)**

Parameters	Description	Test Conditions <sup>(1)</sup>	Typ.	Units
V <sub>OLP</sub>	Dynamic LOW Peak Voltage	V <sub>CC</sub> = 3.3V, C <sub>L</sub> = 50pF V <sub>IH</sub> = 3.3V, V <sub>IL</sub> = 0V	0.8	V
V <sub>OLV</sub>	Dynamic LOW Valley Voltage			

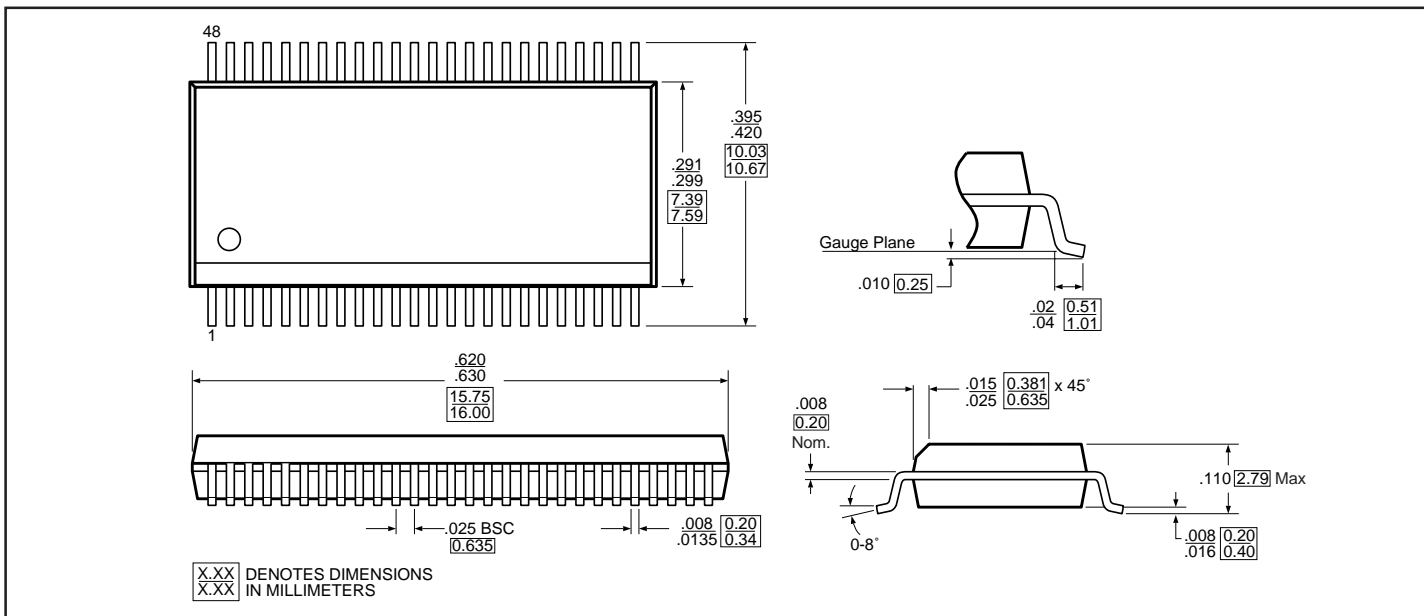
**Note:**

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

### Packaging Mechanical: 48-Pin TSSOP (A) Package



### Packaging Mechanical: 48-Pin SSOP (V) Package



### Ordering Information

Ordering Code	Description
PI74LCX16245A	48-Pin 240-mil wide Plastic TSSOP (A)
PI74LCX16245V	48-Pin 300-mil wide Plastic SSOP (V)