Fast CMOS 3.3V 16-Bit Bi-directional Transceiver

Features

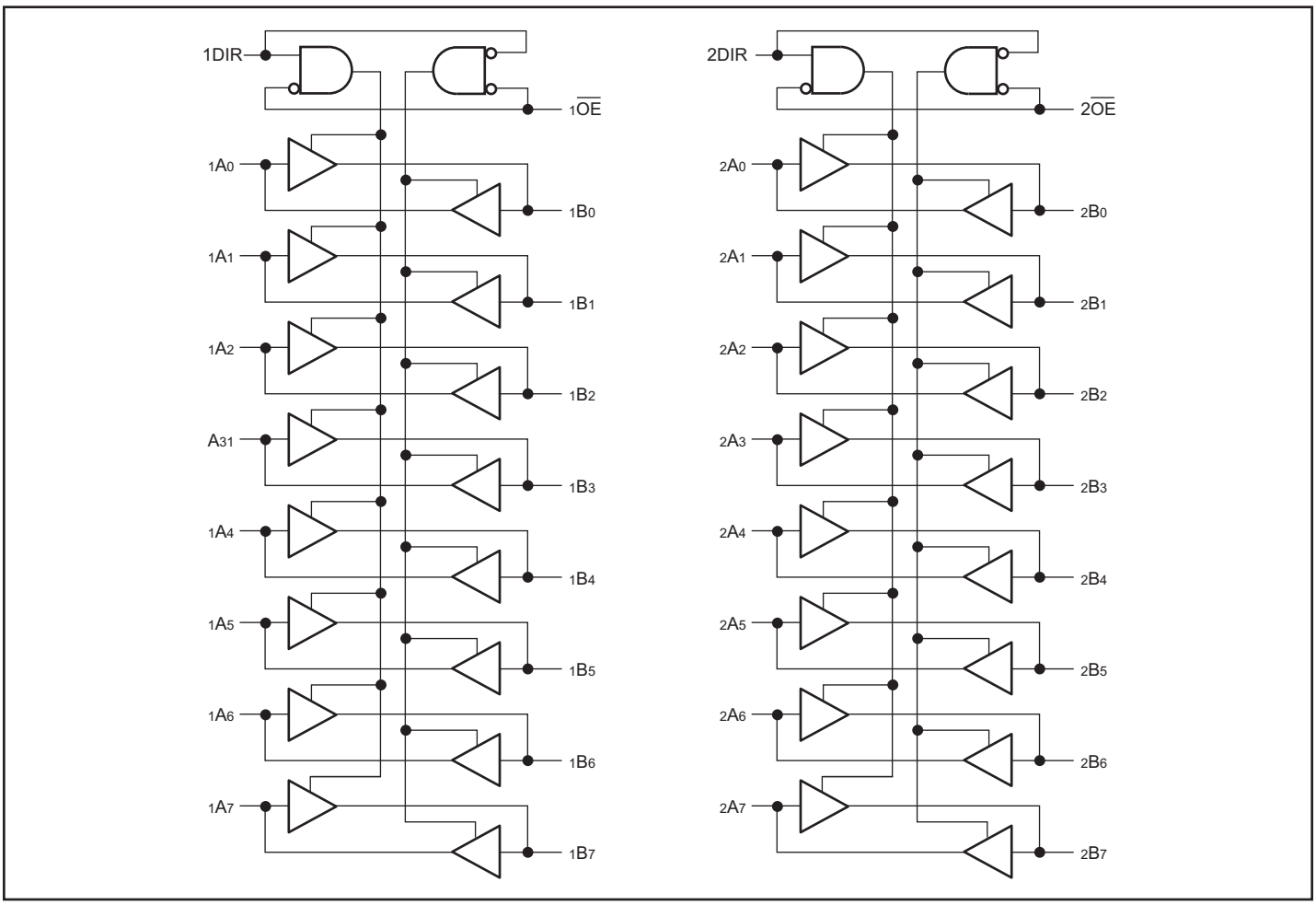
- Functionally compatible with FCT3, LVT, and 74 series 16245 families of products
- Tri-State outputs
- 5V Tolerant inputs and outputs
- 2.0V-3.6V V_{DD} supply operation
- Balanced sink and source output drives (24mA)
- Low ground bounce outputs
- Power down High Impedance inputs and outputs
- Supports 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)

Description

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



Downloaded from Arrow.com.

Product Pin Description

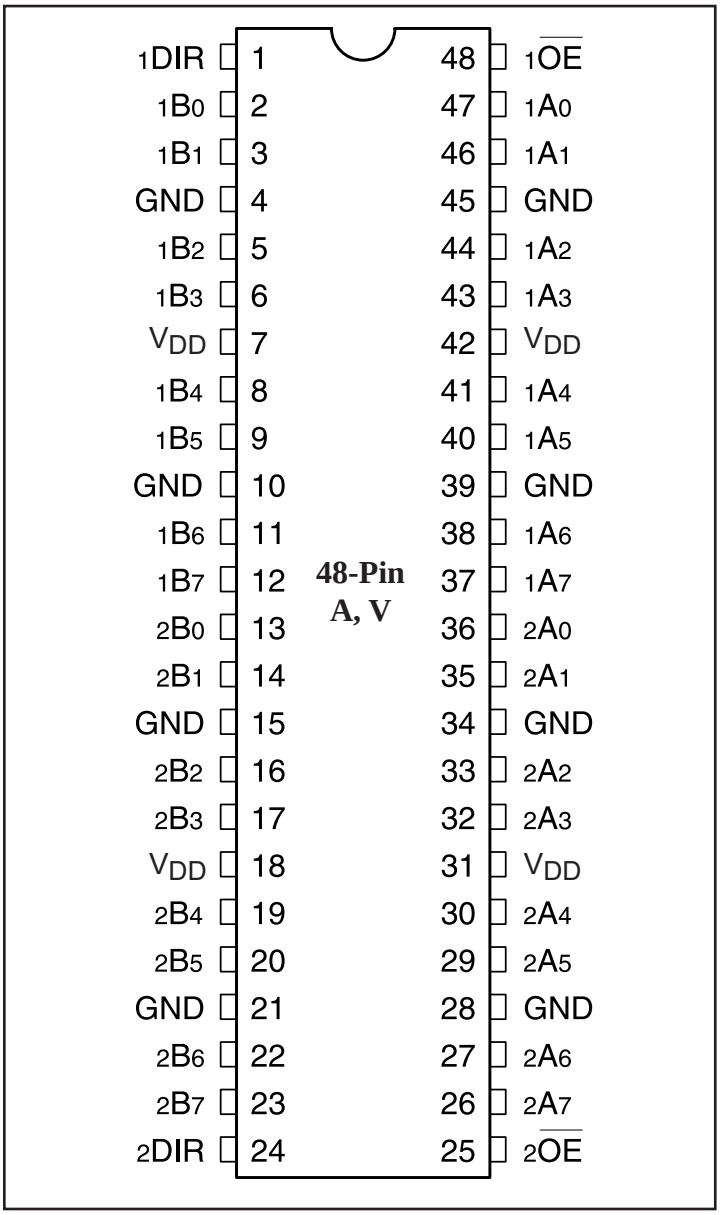
Pin Name	Description
x$\overline{OE}$	3-State Output Enable Inputs (Active LOW)
xDIR	Direction Control Input
xAx	Side A Inputs or 3-State Inputs
xBx	Side B Outputs or 3-State Outputs
GND	Ground
V_{DD}	Power

Truth Table[1]

Inputs		Outputs
x$\overline{OE}$	**xDIR**	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	Z

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

Product Pin Configuration



Downloaded from Arrow.com.

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..... 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_{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_{OL}	Output Current	V_{DD} = 3.0V - 3.6V	-	±24	mA
		V_{DD} = 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_{DD} = 3.0V	0	10	ns/V

Downloaded from Arrow.com.

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}	7	pF
C_{OUT}	Output Capacitance	V_{DD} = 3.3V, V_I = 0V or V_{DD}	8	
C_{PD}	Power Dissipation Capacitance	V_{DD} = 3.3V, V_I = 0V or V_{DD}, F = 10 MHz	20	

Downloaded from Arrow.com.

Switching Characteristics over Operating Range

Parameters	Description	Test Conditions	V_{DD} = 3.3V±0.3		V_{DD} = 2.7V		Units
			Min.	Max.	Min.	Max.	
t_{PHL}	Propagation Delay, D_{XX} to O_{XX}	C_L = 50pF R_L = 500Ω	1.5	4.5	1.5	5.2	ns
t_{PZH}	Output Enable time		1.5	6.5	1.5	7.2	
t_{PHZ}	Output Disable time		1.5	6.4	1.5	3.9	
$t_{sk(0)}$	Output Skew(1)			1.0			

Note:

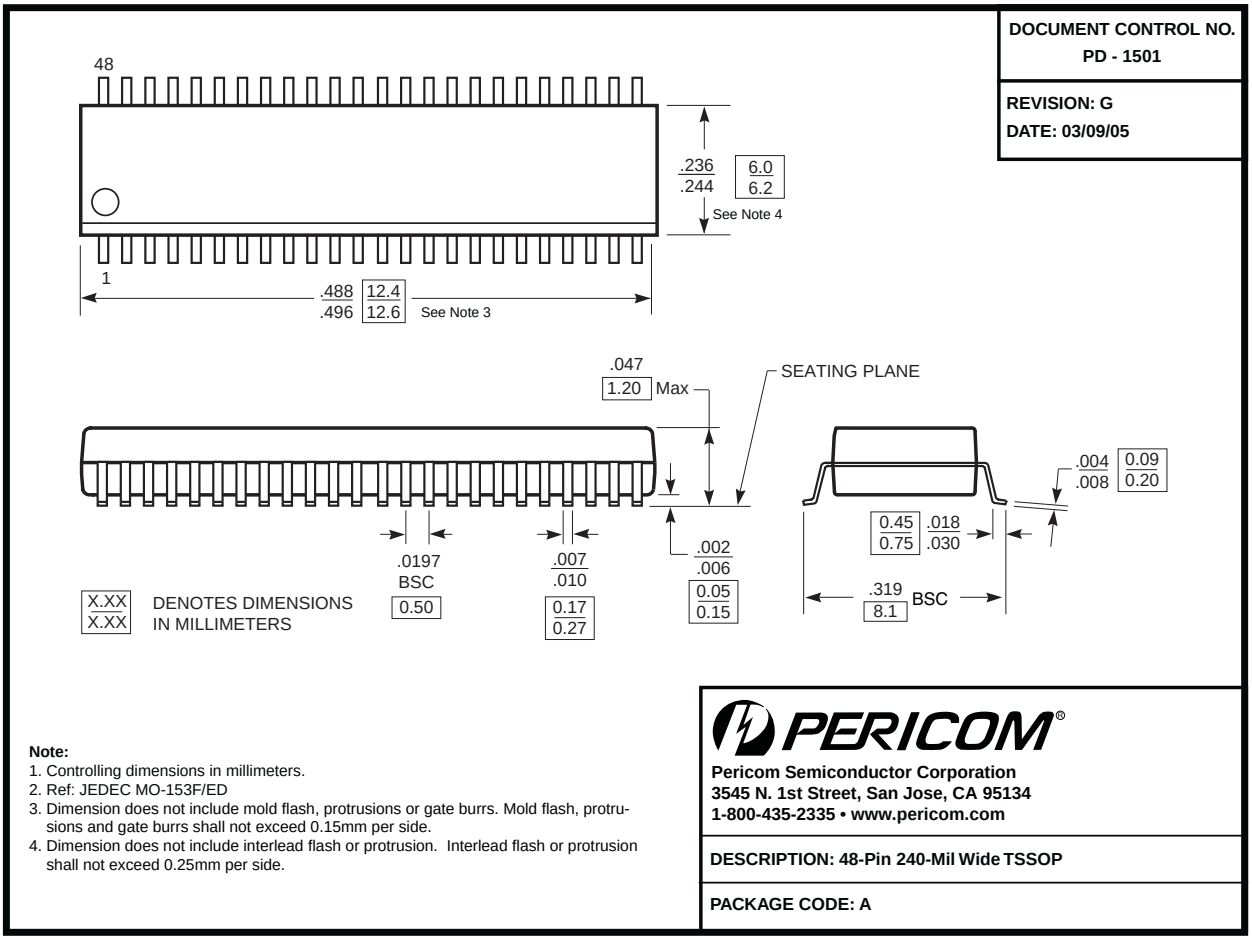
1. Skew between any two outputs, of the same package, switching in the same direction.

Dynamic Switching Characteristics (T_A = +25°C)

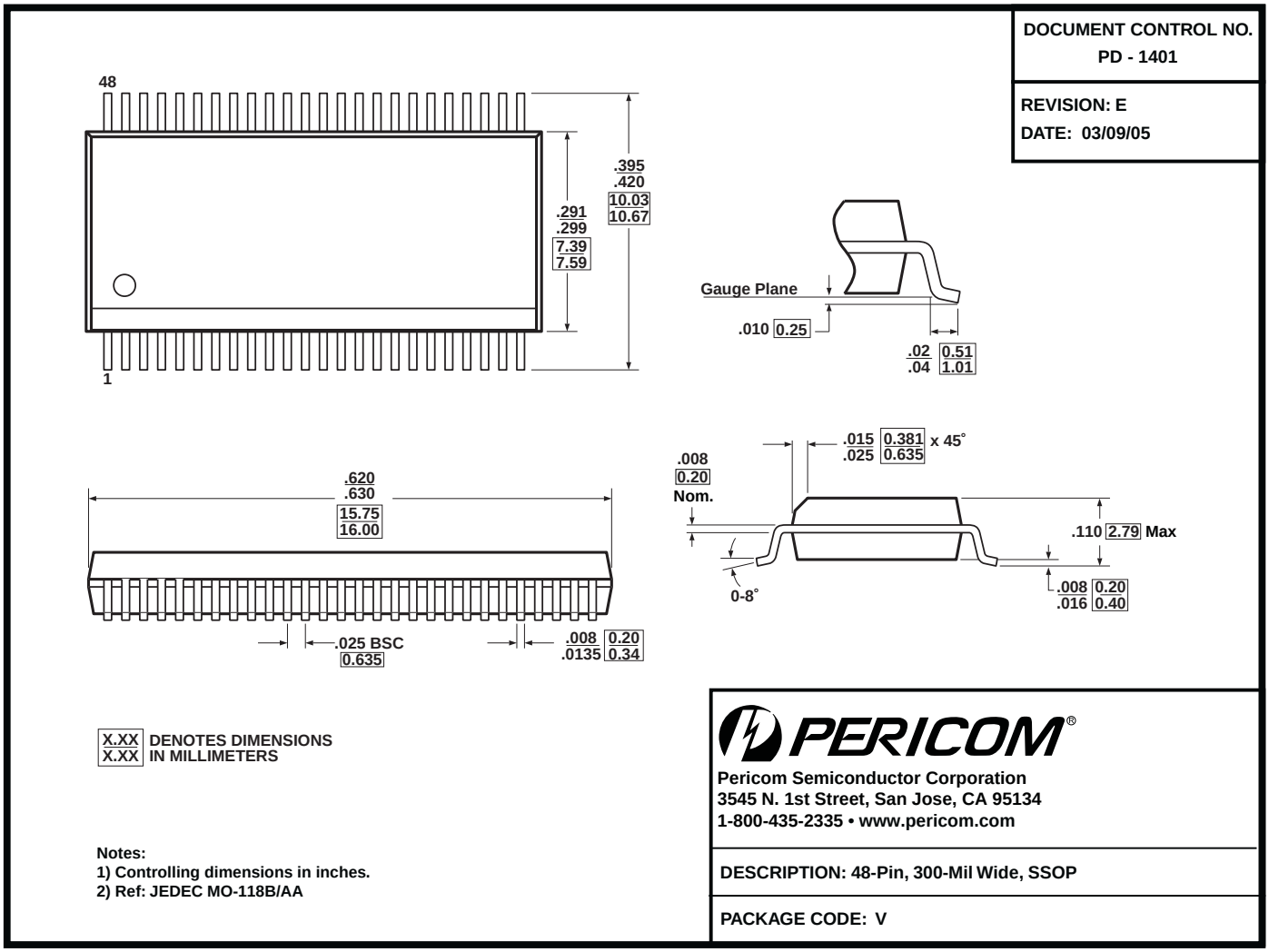
Parameters	Description	Test Conditions(1)	Typ.	Units
V_{OLP}	Dynamic LOW peak voltage	V_{DD} = 3.3V, C_L = 50pF, V_{IH} = 3.3V, V_{IL} = 0V	0.8	V
V_{OLV}	Dynamic LOW valley voltage			

Note:

1. Measured with 15 outputs switching from High-to-Low or Low-to-High. The remaining output is measured in the LOW state.



Downloaded from Arrow.com.



Note:

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

Ordering Information

Ordering Code	Package Type	Package Description
PI74LCX16245AEX	A	Pb-free & Green, 48-Pin 240-mil wide Plastic TSSOP (A)
PI74LCX16245VEX	V	Pb-free & Green, 48-Pin 300-mil wide Plastic TVSOP (A)

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

Downloaded from Arrow.com.