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PI74AVC16245
PI74AVCH16245

16-Bit Bidirectional Transceiver with 3-State Outputs

Product Features

- Designed for low voltage operation, $V_{CC} = 1.65V$ to $3.6V$

- Sub 2.0ns delays at 2.5V and 3.3V

- Dynamic Impedance Control on outputs, current drive $>\pm24mA$ at $2.5V_{CC}$

- Patented noise reduction circuit

- I/O Tolerant to 3.6V, Inputs and Outputs for mixed voltage systems

- Supports live insertion

- Industrial operation at -40°C to +85°C

- Available Packages:
  - 48-pin 240 mil wide plastic TSSOP (A48)
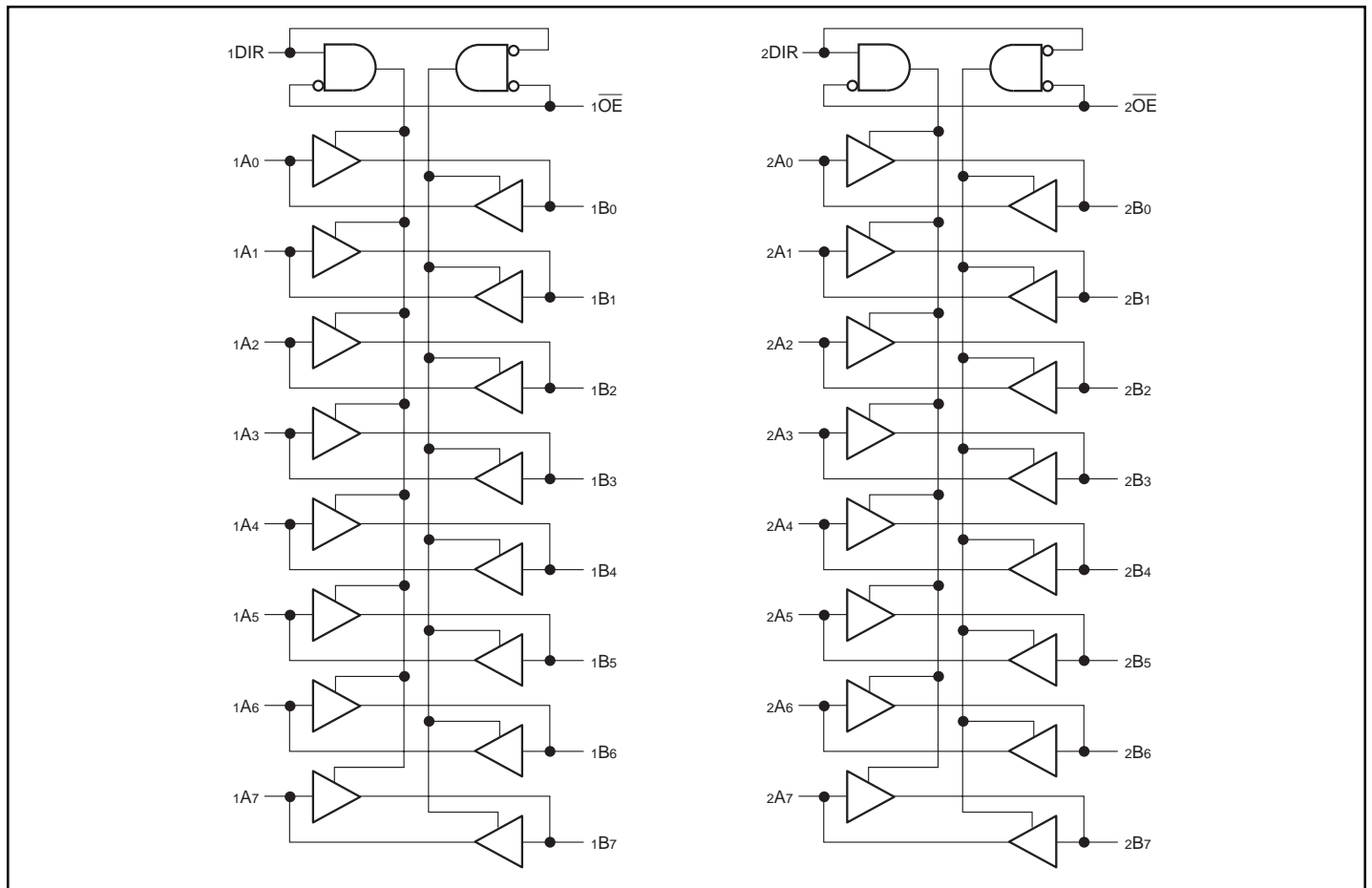 - 48-pin 173 mil wide plastic TVSOP (K48)

Product Description

Pericom Semiconductor's PI74AVC series of logic circuits are produced using the Company's advanced 0.35 micron CMOS technology, achieving industry leading speed grades.

The 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.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current sinking ability of the driver.

The PI74AVCH16245 has "Bus Hold" which retains the data input's last state whenever the data input goes to high-impedance preventing "floating" inputs and eliminating the need for pullup/down resistors.

Logic Block Diagram

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Product Pin Description

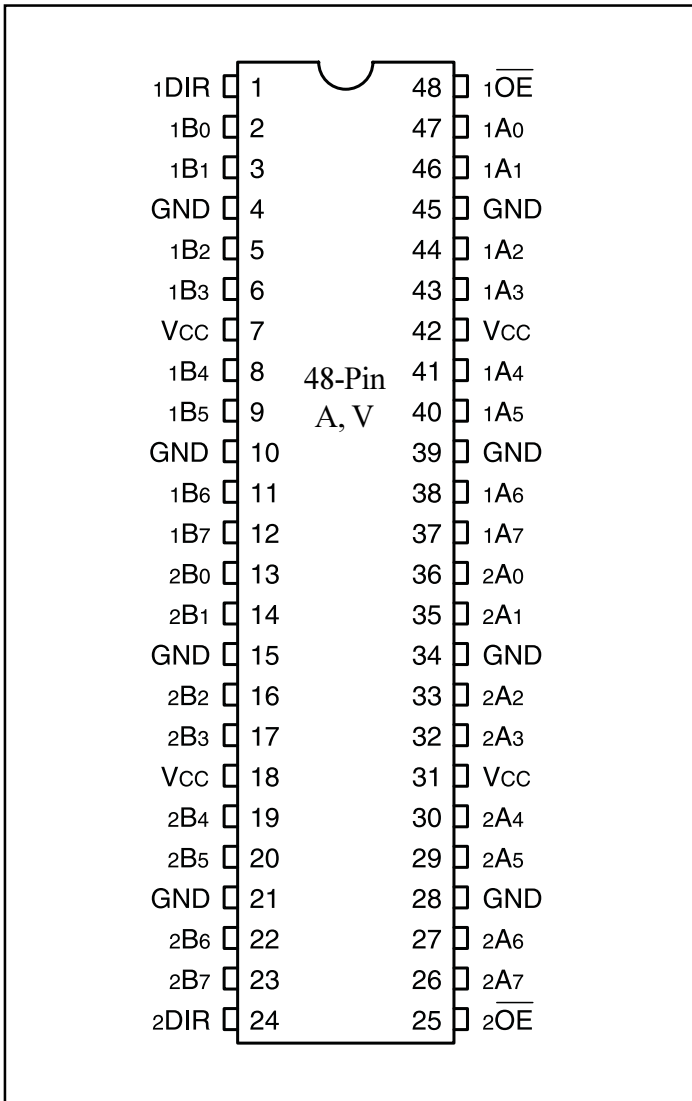| Pin Name	Description
x$\overline{\text{OE}}$	3-State Output Enable Inputs (Active LOW)
xDIR	Direction Control Input
xAx	Side A Inputs or 3-STATE Inputs
xBx	Side B Outputs or 3-STATE Outputs
GND	Ground
V$_{CC}$	Power

Truth Table[1]

Inputs[1]		Outputs[1]
x$\overline{\text{OE}}$	xDIR	
L	H	Bus B Data to Bus A
L	L	Bus A Data to Bus B
H	X	Z

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

Product Pin Configuration

1DIR	1	48	1$\overline{\text{OE}}$
1B0	2	47	1A0
1B1	3	46	1A1
GND	4	45	GND
1B2	5	44	1A2
1B3	6	43	1A3
VCC	7	42	VCC
1B4	8	41	1A4
1B5	9	40	1A5
GND	10	39	GND
1B6	11	38	1A6
1B7	12	37	1A7
2B0	13	36	2A0
2B1	14	35	2A1
GND	15	34	GND
2B2	16	33	2A2
2B3	17	32	2A3
VCC	18	31	VCC
2B4	19	30	2A4
2B5	20	29	2A5
GND	21	28	GND
2B6	22	27	2A6
2B7	23	26	2A7
2DIR	24	25	2$\overline{\text{OE}}$

48-Pin A, V

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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
Input Voltage Range, V_{IN}	−0.5V to V_{CC} +4.6V
Output Voltage Range, V_{OUT}	−0.5V to V_{CC} +0.5V
DC Input Voltage	−0.5V to +5.0V
DC Output Current	50mA
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.

DC Electrical Characteristics (Over the Operating Range, $T_A = -40°C$ to $+85°C$, $V_{CC} = 3.3V \pm 10\%$)

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
V_{CC}	Supply Voltage		2.3		3.6	
V_{IH}[3]	Input HIGH Voltage	V_{CC} = 2.3V to 2.7V	1.7			
		V_{CC} = 2.7V to 3.6V	2.0			
V_{IL}[3]	Input LOW Voltage	V_{CC} = 2.3V to 2.7V			0.7	
		V_{CC} = 2.7V to 3.6V			0.8	
V_{IN}[3]	Input Voltage		0		V_{CC}	
V_{OUT}[3]	Output Voltage		0		V_{CC}	
V_{OH}	Output HIGH Voltage	I_{OH} = -100µA, V_{CC} = Min. to Max.	V_{CC} -0.2			V
		V_{IH} = 1.7V, I_{OH} = -6mA, V_{CC} = 2.3V	2.0			
		V_{IH} = 1.7V, I_{OH} = -12mA, V_{CC} = 2.3V	1.7			
		V_{IH} = 2.0V, I_{OH} = -12mA, V_{CC} = 2.7V	2.2			
		V_{IH} = 2.0V, I_{OH} = -12mA, V_{CC} = 3.0V	2.4			
		V_{IH} = 2.0V, I_{OH} = -24mA, V_{CC} = 3.0V	2.0			
V_{OL}	Output LOW Voltage	I_{OL} = 100µA, V_{IL} = Min. to Max.			0.2	
		V_{IL} = 0.7V, I_{OL} = 6mA, V_{CC} = 2.3V			0.4	
		V_{IL} = 0.7V, I_{OL} = 12mA, V_{CC} = 2.3V			0.7	
		V_{IL} = 0.8V, I_{OL} = 12mA, V_{CC} = 2.7V			0.4	
		V_{IL} = 0.8V, I_{OL} = 24mA, V_{CC} = 3.0V			0.55	
I_{OH}[3]	Output HIGH Current	V_{CC} = 2.3V			-12	mA
		V_{CC} = 2.7V			-12	
		V_{CC} = 3.0V			-24	
I_{OL}[3]	Output LOW Current	V_{CC} = 2.3V			12	
		V_{CC} = 2.7V			12	
		V_{CC} = 3.0V			24	

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DC Electrical Characteristics-Continued (Over the Operating Range, $T_A = -40°C$ to $+85°C$, $V_{CC} = 3.3V \pm 10\%$)

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
I_{IN}	Input Current	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 3.6V$			± 5	
$I_{IN\ (HOLD)}$	Input Hold Current	$V_{IN} = 0.7V$, $V_{CC} = 2.3V$	45			
		$V_{IN} = 1.7V$, $V_{CC} = 2.3V$	-45			
		$V_{IN} = 0.8V$, $V_{CC} = 3.0V$	75			
		$V_{IN} = 2.0V$, $V_{CC} = 3.0V$	-75			
		$V_{IN} = 0$ to $3.6V$, $V_{CC} = 3.6V$			± 500	μA
I_{OZ}	Output Current (3-State Outputs)	$V_{OUT} = V_{CC}$ or GND, $V_{CC} = 3.6V$			± 10	
I_{CC}	Supply Current	$V_{CC} = 3.6V$, $I_{OUT} = 0\mu A$, $V_{IN} = $ GND or V_{CC}			40	
ΔI_{CC}	Supply Current per Input @ TTL HIGH	$V_{CC} = 3.0V$ to $3.6V$ One Input at $V_{CC} - 0.6V$ Other Inputs at V_{CC} or GND			750	
C_I	Control Inputs	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 3.3V$		4		pF
C_{IO}	A or B Ports	$V_O = V_{CC}$ or GND, $V_{CC} = 3.3V$		7		

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 and maximum loading.
3. Unused Control Inputs must be held HIGH or LOW to prevent them from floating.

Switching Characteristics over Operating Range[1]

Parameters	From (INPUT)	To (OUTPUT)	$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 2.7V$		$V_{CC} = 3.3V \pm 0.3V$		Units
			Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	
t_{PD}	A or B	B or A	1.0	3.7		3.6	1.0	3	
t_{EN}	$\overline{OE}$	B or A	1.0	5.7		5.4	1.0	4.4	ns
t_{DIS}	$\overline{OE}$	B or A	1.5	5.2		4.6	1.0	4.1	
	Description								
$\Delta t/\Delta v$[3]	Input Transition Rise or Fall		0	10	0	10	0	10	ns/V

Notes:
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Recommended operating condition.

Operating Characteristics, $T_A = 25°C$

Parameter		Test Conditions	$V_{CC} = 2.5V \pm 0.2V$	$V_{CC} = 3.3V \pm 0.3V$	Units
			Typical		
C_{PD} Power Dissipation Capacitance	Outputs Enabled	$C_L = 50pF$ $f = 10$ MHz	22	29	pF
	Outputs Disabled		4	5	