PERICOM

Fast CMOS 3.3V 16-Bit Buffer/Line Driver

Product Features

- Compatible with LCX™ and LVT™ families of products
- Supports 5V Tolerant Mixed Signal Mode Operation
  - Input can be 3V or 5V
  - Output can be 3V or connected to 5V bus
- Advanced Low Power CMOS Operation
- Excellent output drive capability:
  Balanced drives (24mA sink and source)
- Pin compatible with industry standard double-density pinouts
- Low ground bounce outputs
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Multiple center pins and distributed Vcc/GND pins minimize switching noise
- Packages available:
  - 48-pin 240 mil wide thin plastic TSSOP (A48)
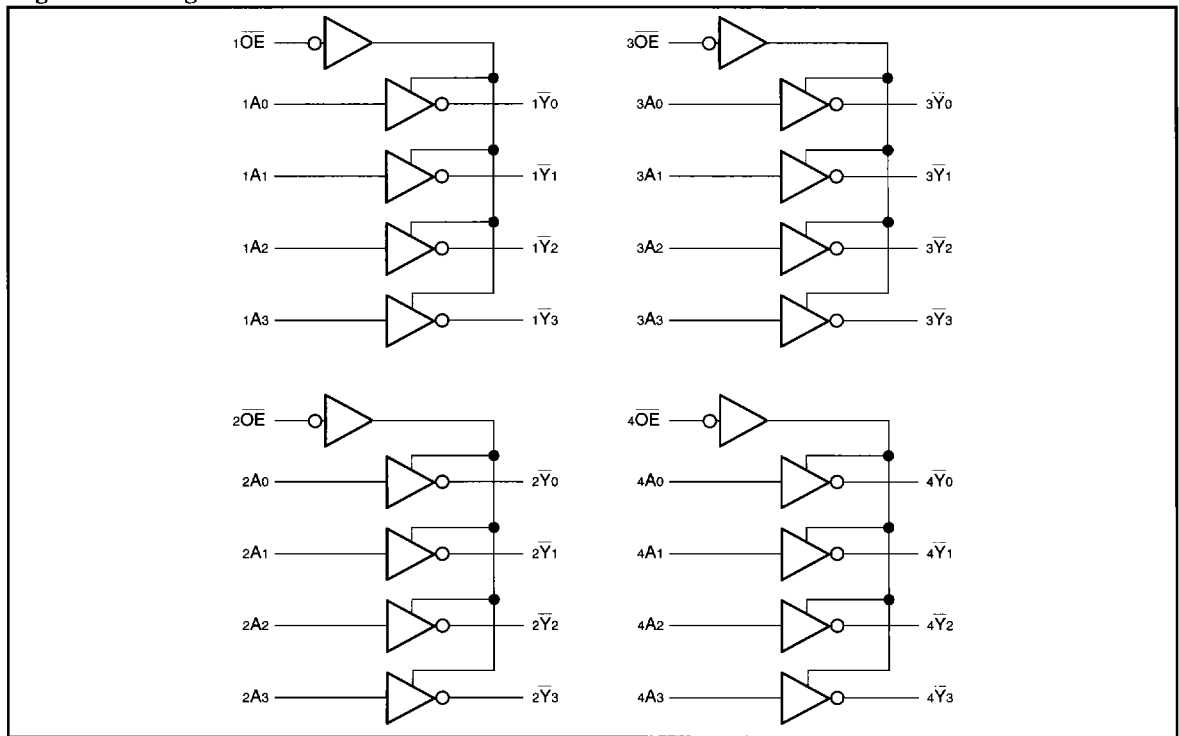 - 48-pin 300 mil wide plastic SSOP (V48)

Product Description

Pericom Semiconductor's PI74LPT series of logic circuits are produced using the Company's advanced 0.6 micron CMOS technology, achieving industry leading speed grades.

The PI74LPT16240 is an inverting 16-bit buffer/line driver designed for applications driving high-capacitance loads and low impedance backplanes. This high-speed, low power device offers bus/backplane interface capability and a flow-through organization for ease of board layout. This device is designed with three-state controls to operate in a Quad-Nibble, Dual-Byte, or a single 16-bit word mode.

The PI74LPT16240 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.
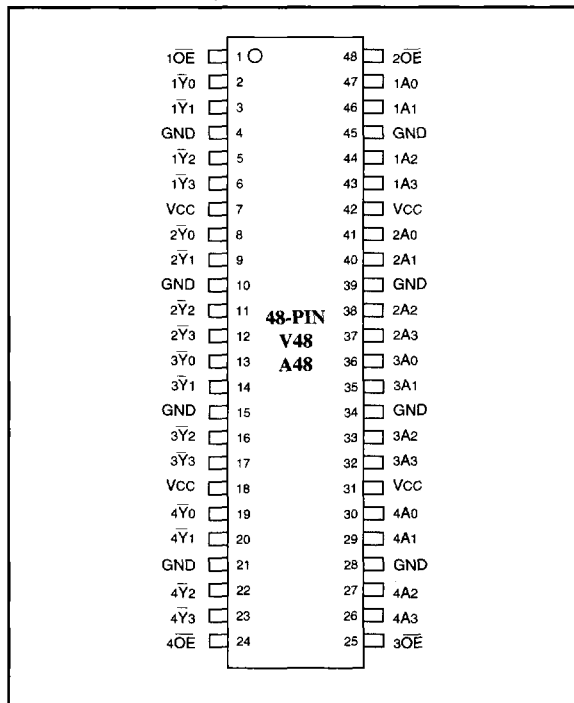
Logic Block Diagram

Product Pin Description

Pin Name	Description
x$\overline{\text{OE}}$	3-State Output Enable Inputs (Active LOW)
xAx	Inputs
x$\overline{\text{Y}}$x	3-State Outputs
GND	Ground
Vcc	Power

Truth Table

Inputs[1]		Outputs[1]
x$\overline{\text{OE}}$	xAx	x$\overline{\text{Y}}$x
L	L	H
L	H	L
H	X	Z

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

Product Pin Configuration

1$\overline{\text{OE}}$	1	48	2$\overline{\text{OE}}$
1$\overline{\text{Y}}$0	2	47	1A0
1$\overline{\text{Y}}$1	3	46	1A1
GND	4	45	GND
1$\overline{\text{Y}}$2	5	44	1A2
1$\overline{\text{Y}}$3	6	43	1A3
VCC	7	42	VCC
2$\overline{\text{Y}}$0	8	41	2A0
2$\overline{\text{Y}}$1	9	40	2A1
GND	10	39	GND
2$\overline{\text{Y}}$2	11	38	2A2
2$\overline{\text{Y}}$3	12	37	2A3
3$\overline{\text{Y}}$0	13	36	3A0
3$\overline{\text{Y}}$1	14	35	3A1
GND	15	34	GND
3$\overline{\text{Y}}$2	16	33	3A2
3$\overline{\text{Y}}$3	17	32	3A3
VCC	18	31	VCC
4$\overline{\text{Y}}$0	19	30	4A0
4$\overline{\text{Y}}$1	20	29	4A1
GND	21	28	GND
4$\overline{\text{Y}}$2	22	27	4A2
4$\overline{\text{Y}}$3	23	26	4A3
4$\overline{\text{OE}}$	24	25	3$\overline{\text{OE}}$

48-PIN
V48
A48

Capacitance (T$_A$ = 25°C, f = 1 MHz)

Parameters[1]	Description	Test Conditions	Typ	Max.	Units
C$_{IN}$	Input Capacitance	V$_{IN}$ = 0V	4.5	6	pF
C$_{OUT}$	Output Capacitance	V$_{OUT}$ = 0V	5.5	8	pF

Note:
1. This parameter is determined by device characterization but is not production tested.

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.

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 (Input pins)	Guaranteed Logic HIGH Level		2.2	—	5.5	V
	Input HIGH Voltage (I/O pins)			2.0	—	5.5	V
V_{IL}	Input LOW Voltage (Input and I/O pins)	Guaranteed Logic LOW Level		–0.5	—	0.8	V
I_{IH}	Input HIGH Current (Input pins)	V_{CC} = Max.	V_{IN} = 5.5V	—	—	±1	µA
	Input HIGH Current (I/O pins)	V_{CC} = Max.	V_{IN} = V_{CC}	—	—	±1	µA
I_{IL}	Input LOW Current (Input pins)	V_{CC} = Max.	V_{IN} = GND	—	—	±1	µA
	Input LOW Current (I/O pins)	V_{CC} = Max.	V_{IN} = GND	—	—	±1	µA
I_{OZH}	High Impedance Output Current	V_{CC} = Max.	V_{OUT} = 5.5V	—	—	±1	µA
I_{OZL}	(3-State Output pins)	V_{CC} = Max.	V_{OUT} = GND	—	—	±1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18 mA		—	–0.7	–1.2	V
I_{ODH}	Output HIGH Current	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V[3]		–36	–60	–110	mA
I_{ODL}	Output LOW Current	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V[3]		50	90	200	mA
V_{OH}	Output HIGH Voltage	V_{CC} = Min.	I_{OH} = –0.1 mA	Vcc-0.2	—	—	V
		V_{IN} = V_{IH} or V_{IL}	I_{OH} = –3 mA	2.4	3.0	—	V
		V_{CC} = 3.0V,	I_{OH} = –8 mA	2.4[5]	3.0	—	V
		V_{IN} = V_{IH} or V_{IL}	I_{OH} = –24 mA	2.0	—	—	
V_{OL}	Output LOW Voltage	V_{CC} = Min.	I_{OL} = 0.1 mA	—	—	0.2	V
		V_{IN} = V_{IH} or V_{IL}	I_{OL} = 16 mA	—	0.2	0.4	V
			I_{OL} = 24 mA	—	0.3	0.5	V
I_{OS}	Short Circuit Current[4]	V_{CC} = Max.[3], V_{OUT} = GND		–60	–85	–240	mA
I_{OFF}	Power Down Disable	V_{CC} = 0V, V_{IN} or V_{OUT} ≤ 4.5V		—	—	±100	µA
V_H	Input Hysteresis			—	150	—	mV

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 3.3V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. This parameter is guaranteed but not tested.
5. V_{OH} = V_{CC} – 0.6V at rated current.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		0.1	10	μA
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max.	$V_{IN} = V_{CC} - 0.6V^{(3)}$		2.0	30	μA
I_{CCD}	Dynamic Power Supply[4]	V_{CC} = Max., Outputs Open $x\overline{OE}$ = GND One Bit Toggling 50% Duty Cycle	$V_{IN} = V_{CC}$ V_{IN} = GND		50	75	$\mu A/$ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_I = 10 MHz 50% Duty Cycle $x\overline{OE}$ = GND One Bit Toggling	$V_{IN} = V_{CC} - 0.6V$ V_{IN} = GND		0.6	2.3	mA
		V_{CC} = Max., Outputs Open f_I = 2.5 MHz 50% Duty Cycle $x\overline{OE}$ = GND 16 Bits Toggling	$V_{IN} = V_{CC} - 0.6V$ V_{IN} = GND		2.1	$4.7^{(5)}$	

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
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.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_I N_I)$
   I_{CC} = Quiescent Current (I_{CCL}, I_{CCH} and I_{CCZ})
   ΔI_{CC} = Power Supply Current for a TTL High Input
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   N_{CP} = Number of Clock Inputs at f_{CP}
   f_I = Input Frequency
   N_I = Number of Inputs at f_I
   All currents are in milliamps and all frequencies are in megahertz.

Switching Characteristics over Operating Range[1]

Parameters	Description	Conditions[2]	LPT16240 Com.		LPT16240A Com.		LPT16240C Com.		Unit
			Min[3]	Max	Min[3]	Max	Min[3]	Max	
tPLH tPHL	Propagation Delay xAx to xȲx	C_L = 50 pF R_L = 500Ω	1.5	4.9	1.5	4.8	1.5	4.3	ns
tPZH tPZL	Output Enable Time xOE to xȲx		1.5	7.0	1.5	6.2	1.5	5.8	ns
tPHZ tPLZ	Output Disable Time[4] xOE to xȲx		1.5	7.0	1.5	5.6	1.5	5.2	ns
tSK(o)	Output Skew[5]			0.5		0.5		0.5	ns

Notes:
1. Propagation Delays and Enable/Disable times are with Vcc = 3.3V ±0.3V, normal range. For Vcc = 2.7V, extended range, all Propagation Delays and Enable/Disable times should be degraded by 20%.
2. See test circuit and wave forms.
3. Minimum limits are guaranteed but not tested on Propagation Delays.
4. This parameter is guaranteed but not production tested.
5. Skew between any two outputs, of the same package, switching in the same direction. This parameter is guaranteed by design.