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PI74FCT163244T

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Fast CMOS 3.3V 16-Bit Octal Buffer/Line Drivers

Product Features:

- Supports Mixed Signal Mode Operation
  - 5 Volt Input.
  - 5 Volt Output (when connected to a 5 Volt Bus).
  - Can serve as a 5 volt to 3 volt translator.
- Advanced Low Power CMOS Operation.
- Low Standby Current (Low power CMOS, not Bi-CMOS, so output drive transistors do not require bipolar standby current levels). Typical standby power 1 mW.
- Excellent output drive capability: Balanced drives (24 mA sink and source). Compatible with LVC™ class of products.
- Pin and functional compatible: Industry standard double-density pinouts.
- Low ground bounce outputs, hysteresis on all inputs.
- ESD Protection exceeds 2000 volts.
- Packaged in 48-pin plastic TSSOP and SSOP

Product Description:

Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.8 micron CMOS technology, achieving industry leading speed grades.

The PI74FCT163244 is a 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 PI74FCT163244 can be driven from either 3.3 V or 5.0 V devices allowing this device to be used as a translator in a mixed 3.3/5.0 V system.

All products are available in 48-pin 240 mil wide plastic TSSOP and 300 mil wide plastic SSOP packages.

Logic Block Diagram

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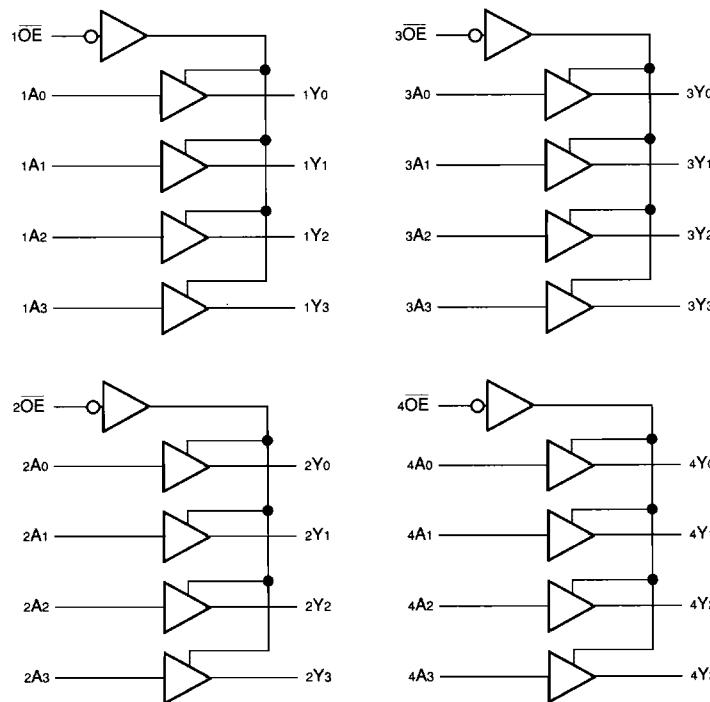
Product Pin Description

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

Truth Table

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

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

Product Pin Configuration

1$\overline{OE}$	1	48	2$\overline{OE}$

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1OE   [ 1        48 ]  2OE
1Y0   [ 2        47 ]  1A0
1Y1   [ 3        46 ]  1A1
GND   [ 4        45 ]  GND
1Y2   [ 5        44 ]  1A2
1Y3   [ 6        43 ]  1A3
Vcc   [ 7        42 ]  Vcc
2Y0   [ 8        41 ]  2A0
2Y1   [ 9        40 ]  2A1
GND   [ 10       39 ]  GND
2Y2   [ 11       38 ]  2A2
2Y3   [ 12       37 ]  2A3
3Y0   [ 13       36 ]  3A0
3Y1   [ 14       35 ]  3A1
GND   [ 15       34 ]  GND
3Y2   [ 16       33 ]  3A2
3Y3   [ 17       32 ]  3A3
Vcc   [ 18       31 ]  Vcc
4Y0   [ 19       30 ]  4A0
4Y1   [ 20       29 ]  4A1
GND   [ 21       28 ]  GND
4Y2   [ 22       27 ]  4A2
4Y3   [ 23       26 ]  4A3
4OE   [ 24       25 ]  4OE
```

48-PIN
V48
A48
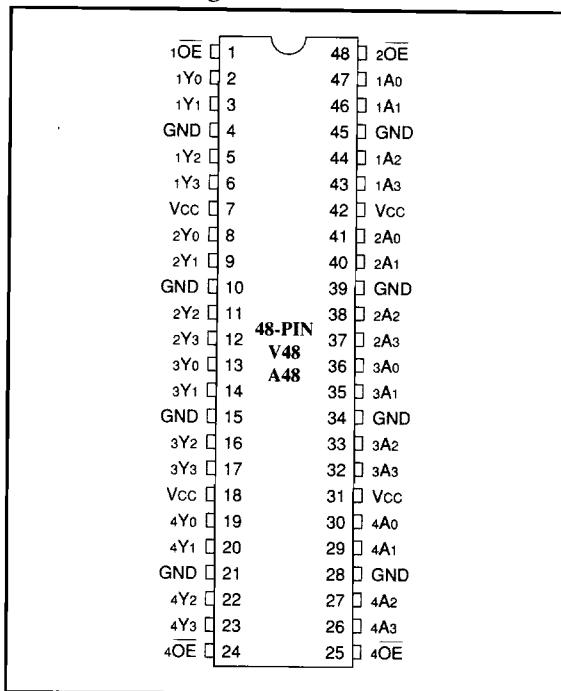
Capacitance (T$_A$ = 25°C, f = 1 MHz)

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

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

5

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Maximum Ratings
(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature ....–55°C to +125°C	**Note:**
Ambient Temperature with Power Applied ....–40°C to +85°C	Stresses greater than those listed under
Supply Voltage to Ground Potential (Inputs & Vcc Only)...........–0.5V to +7.0V	MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating
Supply Voltage to Ground Potential (Outputs & D/O Only) ....–0.5V to Vcc	only and functional operation of the device at
DC Input Voltage ....–0.5V to +7.0V	these or any other conditions above those indicated in the operational sections of this
DC Output Current ....120 mA	specification is not implied. Exposure to
Power Dissipation 1.0W	absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics (Over the Operating Range, TA = –40°C to +85°C, VCC = 3.3V ± 0.3V)

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)	Vcc = Max.	V_{IN} = 5.5V			±5	μA
	Input HIGH Current (I/O pins)	Vcc = Max.	V_{IN} = Vcc			15	μA
I_{IL}	Input LOW Current (Input pins)	Vcc = Max.	V_{IN} = GND			±5	μA
	Input LOW Current (I/O pins)	Vcc = Max.	V_{IN} = GND			15	μA
I_{OZH}	High Impedance Output Current	Vcc = Max.	V_{OUT} = Vcc			10	μA
I_{OZL}	(3-State Output pins)	Vcc = Max.	V_{OUT} = GND			10	μA
V_{IK}	Clamp Diode Voltage	Vcc = Min., I_{IN} = –18 mA				–1.2	V
I_{ODH}	Output HIGH Current	Vcc = 3.3V, V_{IN} = V_{IH} or V_{IL}, Vo = 1.5V[3]		–36		–110	mA
I_{ODL}	Output LOW Current	Vcc = 3.3V, V_{IN} = V_{IH} or V_{IL}, Vo = 1.5V[3]		50		200	mA
V_{OH}	Output HIGH Voltage	Vcc = Min.	I_{OH} = –0.1mA	Vcc-0.2			V
		V_{IN} = V_{IH} or V_{IL}	I_{OH} = –8mA	2.4			V
			I_{OH} = –24mA	2.0			V
V_{OL}	Output LOW Voltage	Vcc = Min.	I_{OL} = 0.1mA			0.2	V
		V_{IN} = V_{IH} or V_{IL}	I_{OL} = 16mA			0.4	V
			I_{OL} = 24mA			0.5	V
I_{OS}	Short Circuit Current[4]	Vcc = Max.[3], V_{OUT} = GND		–60	–135	–240	mA
I_{OFF}		Vcc = 0V, V_{IN} or V_{OUT} = 4.5V				100	μA
V_H	Input Hysteresis				150		mV
I_{CCL} I_{CCH} I_{CCZ}	Quiescent Power Supply Current	Vcc = Max., V_{IN} = GND or Vcc				1.5	mA

Notes:
1. For conditions show as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 3.3, +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.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max.	$V_{IN} = V_{CC} - 0.6$[3]		2.0	30	μA
			V_{IN} = 2.4 V[3]		70	500	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	μA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_1 = 10 MHz	$V_{IN} = V_{CC} - 0.6V$ V_{IN} = GND		0.6	2.3	mA
		50% Duty Cycle x$\overline{OE}$ = GND One Bit Toggling	V_{IN} = 2.4 V V_{IN} = GND		0.6	2.5	
		V_{CC} = Max., Outputs Open f_1 = 2.5 MHz	$V_{IN} = V_{CC} - 0.6V$ V_{IN} = GND		2.1	4.7[5]	
		50% Duty Cycle x$\overline{OE}$ = GND 16 Bits Toggling	V_{IN} = 2.4 V V_{IN} = GND		2.6	8.5[5]	

Notes:
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V_{CC} = 3.3 V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4 V); 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 Icc formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_1 N_1)$
   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_1 = Input Frequency
   N_1 = Number of Inputs at f_1
   All currents are in milliamps and all frequencies are in megahertz.

5

12/11/93

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Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	FCT163244T Com.		FCT163244AT Com.		Unit
			Min	Max	Min	Max	
tPLH tPHL	Propagation Delay xAx to xYx	$C_L = 50$ pF $R_L = 500\Omega$	1.5	6.5	1.5	4.8	ns
tPZH tPZL	Output Enable Time		1.5	8.0	1.5	6.2	ns
tPHZ tPLZ	Output Disable Time		1.5	7.0	1.5	5.6	ns
tSK(o)	Output Skew[3]			0.5		0.5	ns

Notes:
1. See test circuit and wave forms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Skew between any two outputs, of the same package, switching in the same direction. This parameter is guaranteed by design.

12/11/93