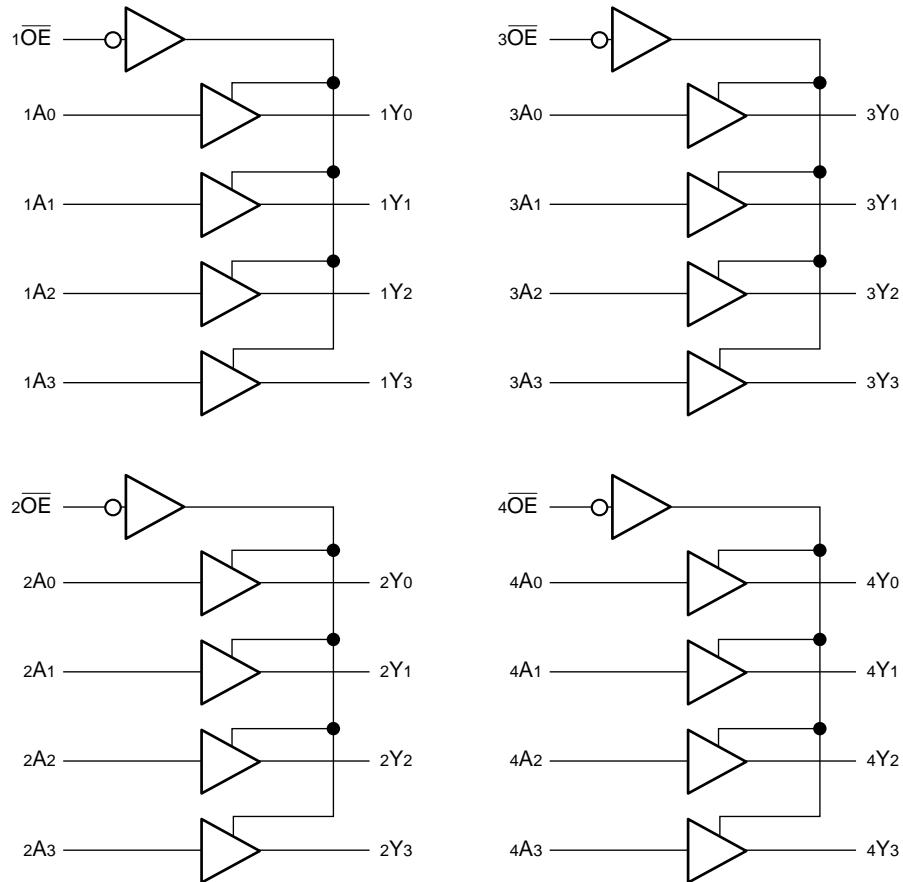


## Product Features

- Advanced Low Power CMOS Operation
- Can serve as a 5V to 3V translator
- Excellent output drive capability:
  - Balanced drives (24 mA sink and source)
  - Compatible with LVC™ class of products
- Pin compatible with industry standard double-density pinouts
- Low ground bounce outputs
- Hysteresis on all inputs
- Industrial operating temperature range:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Inputs can be driven by 3.3V or 5V devices
- Multiple center pin and distributed V<sub>CC</sub>/GND pins minimize switching noise
- Packages available:
  - 48-pin 240 mil wide plastic TSSOP (A)
  - 48-pin 300 mil wide plastic SSOP (V)
  - 48-pin 173 mil wide plastic TVSOP (K)
- Device models available on request

## Logic Block Diagram



## Product Description

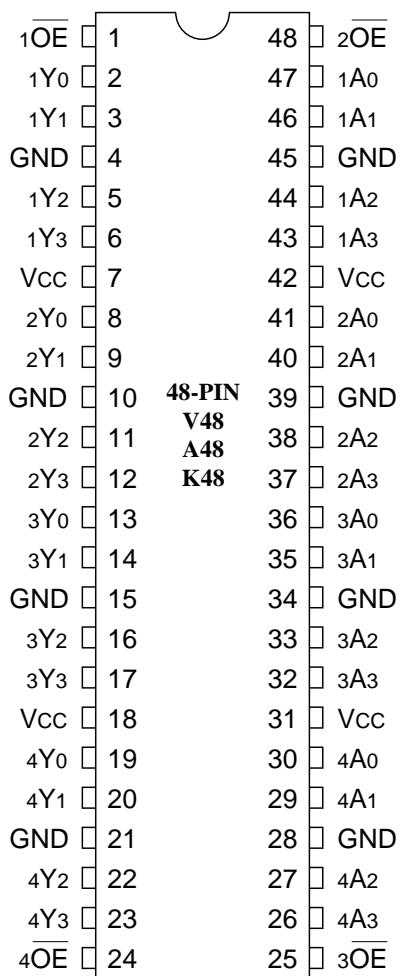
Pericom Semiconductor's PI74FCT series of logic circuits are produced in the company's advanced 0.6 micron CMOS technology, achieving industry leading speed grades.

The PI74FCT163244 is a 16-bit buffer/line driver designed for applications driving high capacitive 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.

### Product Pin Description

Pin Name	Description
xOE	3-State Output Enable Inputs (Active LOW)
xAx	Inputs
xYx	3-State Outputs
GND	Ground
Vcc	Power

### Product Pin Configuration



### Truth Table

Inputs <sup>(1)</sup>		Outputs <sup>(1)</sup>
xOE	xAx	xYx
L	L	L
L	H	H
H	X	Z

#### Notes:

1. H = High Voltage Level

X = Don't Care

L = Low Voltage Level

Z = High Impedance

### Capacitance ( $T_A = 25^\circ C$ , $f = 1 \text{ MHz}$ )

Parameters <sup>(1)</sup>	Description	Test Conditions	Typ.	Max.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	4.5	6	pF
C <sub>OUT</sub>	Output Capacitance	V <sub>OUT</sub> = 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 .....	120 mA
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, TA = -40°C to +85°C, VCC = 2.7V to 3.6V)

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ <sup>(2)</sup>	Max.	Units
VIH	Input HIGH Voltage (Input pins)	Guaranteed Logic HIGH Level		2.2	—	5.5	V
	Input HIGH Voltage (I/O pins)			2.0	—	Vcc+0.5	V
VIL	Input LOW Voltage (Input and I/O pins)	Guaranteed Logic LOW Level		-0.5	—	0.8	V
IIH	Input HIGH Current (Input pins)	VCC = Max.	VIN = 5.5V	—	—	±1	µA
	Input HIGH Current (I/O pins)	VCC = Max.	VIN = VCC	—	—	±1	µA
IIL	Input LOW Current (Input pins)	VCC = Max.	VIN = GND	—	—	±1	µA
	Input LOW Current (I/O pins)	VCC = Max.	VIN = GND	—	—	±1	µA
IOZH	High Impedance Output Current	VCC = Max.	VOUT = VCC	—	—	±1	µA
IOZL	(3-State Output pins)	VCC = Max.	VOUT = GND	—	—	±1	µA
VIK	Clamp Diode Voltage	VCC = Min., IIN = -18 mA		—	-0.7	-1.2	V
IODH	Output HIGH Current	VCC = 3.3V, VIN = VIH or VIL, VO = 1.5V <sup>(3)</sup>	-36	-60	-110	mA	
IODL	Output LOW Current	VCC = 3.3V, VIN = VIH or VIL, VO = 1.5V <sup>(3)</sup>	50	90	200	mA	
VOH	Output HIGH Voltage	VCC = Min.	IOH = -0.1mA	Vcc-0.2	—	—	V
		VIN = VIH or VIL	IOH = -3mA	2.4	3.0	—	V
		VCC = 3.0V,	IOH = -8mA	2.4 <sup>(5)</sup>	3.0	—	V
		VIN = VIH OR VIL	IOH = -24mA	2.0	—	—	V
VOL	Output LOW Voltage	VCC = Min.	IOL = 0.1mA	—	—	0.2	V
		VIN = VIH or VIL	IOL = 16mA	—	0.2	0.4	V
			IOL = 24mA	—	0.3	0.5	V
IOS	Short Circuit Current <sup>(4)</sup>	VCC = Max. <sup>(3)</sup> , VOUT = GND		-60	-85	-240	mA
VH	Input Hysteresis			—	150	—	mV

### Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at VCC = 3.3V, +25°C ambient and maximum loading.
- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- This parameter is guaranteed but not tested.
- VOH = VCC - 0.6V at rated current.

## Power Supply Characteristics

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
ICC	Quiescent Power Supply Current	VCC = Max.	VIN = GND or VCC		0.1	10	µA
ΔICC	Quiescent Power Supply Current TTL Inputs HIGH	VCC = Max.	VIN = VCC – 0.6V <sup>(3)</sup>		2.0	30	µA
ICCD	Dynamic Power Supply <sup>(4)</sup>	VCC = Max., Outputs Open $X\bar{O}E$ = GND One Bit Toggling 50% Duty Cycle	VIN = VCC VIN = GND		50	75	µA/ MHz
IC	Total Power Supply Current <sup>(6)</sup>	VCC = Max., Outputs Open $f_I = 10$ MHZ 50% Duty Cycle $X\bar{O}E$ = GND One Bit Toggling	VIN = VCC – 0.6V VIN = GND		0.5	0.8	mA
		VCC = Max., Outputs Open $f_I = 2.5$ MHZ 50% Duty Cycle $X\bar{O}E$ = GND 16 Bits Toggling	VIN = VCC – 0.6V VIN = GND		2.0	3.3 <sup>(5)</sup>	

### Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at  $V_{cc} = 3.3V$ ,  $+25^{\circ}C$  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 Icc formula. These limits are guaranteed but not tested.
6.  $IC = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$

$$IC = ICC + \Delta ICC DH_{NT} + ICCD (f_{CP}/2 + f_I NI)$$

ICC = Quiescent Current (ICCL, ICCH and ICCZ)

$\Delta ICC$  = Power Supply Current for a TTL High Input

DH = Duty Cycle for TTL Inputs High

NT = Number of TTL Inputs at DH

ICCD = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)

f<sub>CP</sub> = Clock Frequency for Register Devices (Zero for Non-Register Devices)

NCP = Number of Clock Inputs at f<sub>CP</sub>

f<sub>I</sub> = Input Frequency

NI = Number of Inputs at f<sub>I</sub>

All currents are in milliamps and all frequencies are in megahertz.

**Switching Characteristics over Operating Range<sup>(1)</sup>**

Parameters	Description	Conditions <sup>(2)</sup>	FCT163244		FCT163244A		FCT163244C		Units	
			Com.		Com.		Com.			
			Min. <sup>(3)</sup>	Max.	Min. <sup>(3)</sup>	Max.	Min. <sup>(3)</sup>	Max.		
tPLH tPHL	Propagation Delay xAX to xYx	CL = 50 pF RL = 500Ω	1.5	6.5	1.5	4.8	1.5	4.1	ns	
tPZH tPZL	Output Enable Time xOE to xYx		1.5	8.0	1.5	6.2	1.5	5.8	ns	
tPHZ tPLZ	Output Disable Time <sup>(4)</sup> xOE to xYx		1.5	7.0	1.5	5.6	1.5	5.2	ns	
tSK(o)	Output Skew <sup>(5)</sup>			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.