PI74FCT240T/241T/ 244T/540T/541T (25 ohmSeries) PI74FCT2240T/2241T/2244T/2541T

Fast CMOS Octal Buffer/Line Drivers

Product Features

- PI74FCT240/241/244/540/541T and PI74FCT2240/2241/2244/ 2541T are pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- 25Ω series resistor on all outputs (FCT2XXX only)
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Packages available:
  - 20-pin 173 mil wide plastic TSSOP (L)
  - 20-pin 209 mil wide plastic SSOP (H)
  - 20-pin 300 mil wide plastic DIP (P)
  - 20-pin 150 mil wide plastic QSOP (Q)
  - 20-pin 150 mil wide plastic TQSOP (R)
  - 20-pin 300 mil wide plastic SOIC (S)
- Device models available upon request

Product Description

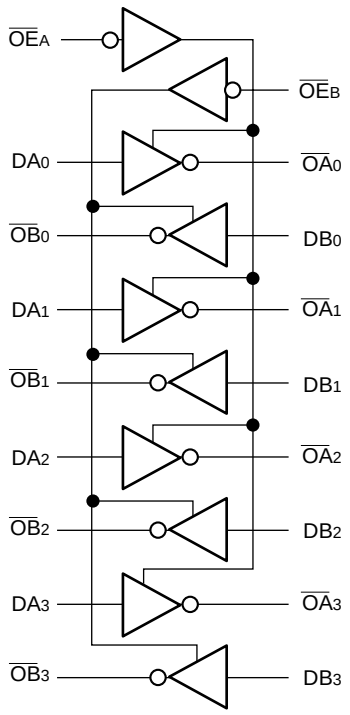
Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.6/0.8 micron CMOS technology, achieving industry leading speed grades. All PI74FCT2XXX devices have a built-in 25 ohm series resistor on all outputs to reduce noise because of reflections, thus eliminating the need for an external terminating resistor.

The PI74FCT240T/241T/244T/540T/541T and P174FCT2240T/ 2241T/2244/2541T are 8-bit wide driver circuits, designed to be used in applications requiring high-speed and high-output drive. Ideal applications would include bus drivers, memory drivers, address drivers, and system clock drivers.

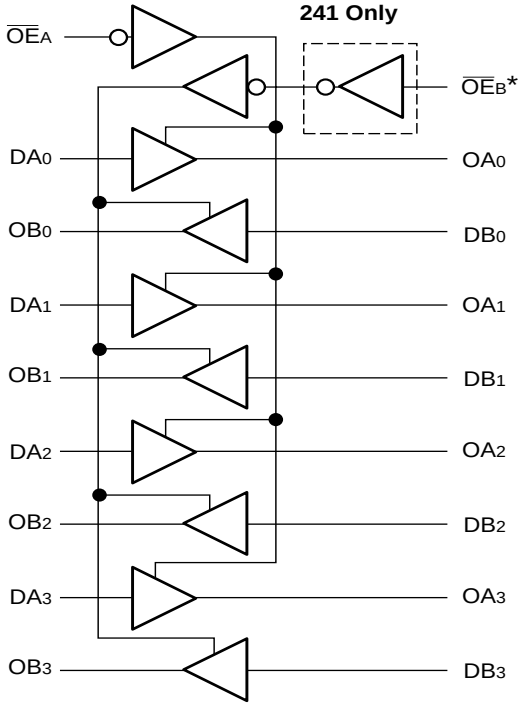
The PI74FCT540T and PI74FCT541/2541T provide similar driver capabilities, but have their pins physically grouped by function. All inputs are located on one side of the package, while outputs are on the opposite side, allowing for a much simpler and denser board layout.

Logic Block Diagrams

PI74FCT240/2240T

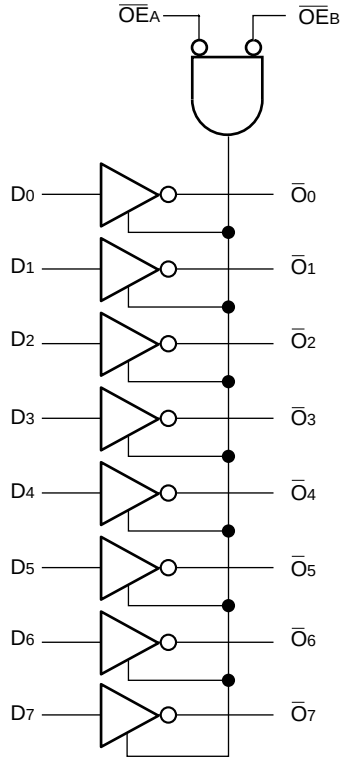


PI74FCT241/2241T
PI74FCT244/2244T



*OE_B for 241T, *$\overline{OE}_B$ for 244T,

PI74FCT540T
PI74FCT541/2541T



*Logic diagram shown for 540T.
541/2541T is the non-inverting option.

Product Pin Description

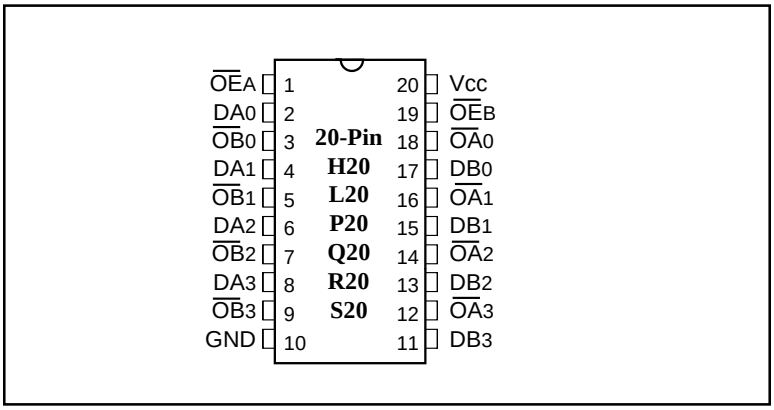
Pin Name	Description
$\overline{OE}A$, $\overline{OE}B$	3-State Output Enable Inputs (Active LOW)
OEB[1]	3-State Output Enable Input (Active HIGH)
Dxx	Inputs
Oxx	Outputs
GND	Ground
VCC	Power

Truth Table

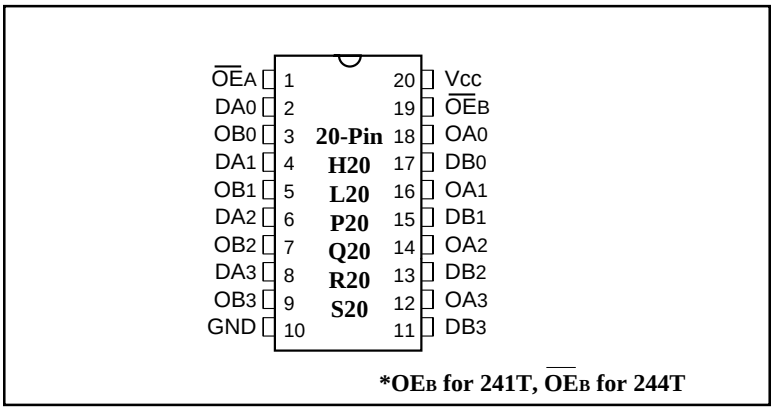
Inputs[1]				Outputs[1]				
$\overline{OE}A$	$\overline{OE}B$	OEB[2]	D	240	241	244	540	541
L	L	H	L	H	L	L	H	L
L	L	H	H	L	H	H	L	H
H	H	L	X	Z	Z	Z	Z	Z

Note:
1. H = High Voltage Level, X = Don't Care, L = Low Voltage Level, Z = High Impedance
2. OEB for 241 only.

PI74FCT240/2240T Product Pin Configuration

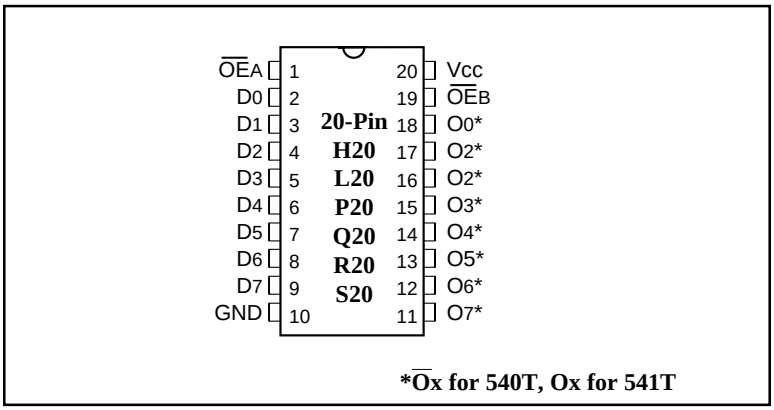


PI74FCT241/2241/244/2244T Product Pin Configuration



***OEB for 241T, $\overline{OE}B$ for 244T**

PI74FCT540/541/2541T Product Pin Configuration



***$\overline{O}x$ for 540T, Ox for 541T**

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 0.5W

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 = 5.0V ± 5%)

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –15.0mA	2.4	3.0		V
V_{OL}	Output LOW Current	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 64mA		0.3	0.55	V
V_{OL}	Output LOW Current	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 12mA (25ΩSeries)		0.3	0.50	V
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level		2.0			V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level				0.8	V
I_{IH}	Input HIGH Current	V_{CC} = Max.	V_{IN} = V_{CC}			1	µA
I_{IL}	Input LOW Current	V_{CC} = Max.	V_{IN} = GND			–1	µA
I_{OZH}	High Impedance	V_{CC} = MAX.	V_{OUT} = 2.7V			1	µA
I_{OZL}	Output Current		V_{OUT} = 0.5V			–1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA			–0.7	–1.2	V
I_{OFF}	Power Down Disable	V_{CC} = GND, V_{OUT} = 4.5V		—	—	100	µA
I_{OS}	Short Circuit Current	V_{CC} = Max.[3], V_{OUT} = GND		–60	–120		mA
V_H	Input Hysteresis				200		mV

Capacitance (TA = 25°C, f = 1 MHz)

Parameters[4]	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	6	10	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	12	pF

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 = 5.0V, +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 determined by device characterization but is not production tested.

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	500	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.4V[3]		0.5	2.5	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs Open $\overline{OE}_A$ = $\overline{OE}_B$ = GND or $\overline{OE}_A$ = GND, $\overline{OE}_B$ = V_{CC} One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		0.15	0.25	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_I = 10 MHz 50% Duty Cycle $\overline{OE}_A$ = $\overline{OE}_B$ = GND or $\overline{OE}_A$ = GND, $\overline{OE}_B$ = V_{CC} One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND		1.5	3.5[5]	mA
			V_{IN} = 3.4V V_{IN} = GND		1.8	4.5[5]	
		V_{CC} = Max., Outputs Open f_I = 2.5 MHz 50% Duty Cycle $\overline{OE}_A$ = $\overline{OE}_B$ = GND or $\overline{OE}_A$ = GND, $\overline{OE}_B$ = V_{CC} Eight Bits Toggling	V_{IN} = V_{CC} V_{IN} = GND		3.0	6.0[5]	
			V_{IN} = 3.4V V_{IN} = GND		5.0	14.0[5]	

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at Vcc = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V); all other inputs at Vcc 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. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_I N_I)$
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   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)
   f_I = Input Frequency
   N_I = Number of Inputs at f_I
   All currents are in milliamps and all frequencies are in megahertz.

PI74FCT240/2240T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	240T/2240T Com. Min	240T/2240T Com. Max	240AT/2240AT Com. Min	240AT/2240AT Com. Max	240CT/2240CT Com. Min	240CT/2240CT Com. Max	240DT Com. Min	240DT Com. Max	Units
t_{PLH} t_{PHL}	Propagation Delay D_N to $\overline{O}_N$	C_L = 50pF R_L = 500Ω	1.5	8.0	1.5	4.8	1.5	4.3	1.5	3.6	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}_X$ to $\overline{O}_N$		1.5	10.0	1.5	6.2	1.5	5.8	1.5	4.8	ns
t_{PHZ} t_{PLZ}	Output Disable Time(3) $\overline{OE}_X$ to $\overline{O}_N$		1.5	9.5	1.5	5.6	1.5	5.2	1.5	4.0	ns

PI74FCT241/2241T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	241T/2241T Com. Min	241T/2241T Com. Max	241AT/2241AT Com. Min	241AT/2241AT Com. Max	241CT/2241CT Com. Min	241CT/2241CT Com. Max	241DT Com. Min	241DT Com. Max	Units
t_{PLH} t_{PHL}	Propagation Delay D_N to O_N	C_L = 50pF R_L = 500Ω	1.5	6.5	1.5	4.8	1.5	4.1	1.5	3.6	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}_A$/$\overline{OE}_B$ to O_N		1.5	8.0	1.5	6.2	1.5	5.8	1.5	4.8	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}_A$/$\overline{OE}_B$ to O_N		1.5	7.0	1.5	5.6	1.5	5.2	1.5	4.0	ns

PI74FCT244/2244T Switching Characteristics over Operating Range

Parameters Units	Description	Conditions[1]	244T/2244T Com. Min	244T/2244T Com. Max	244AT/2244AT Com. Min	244AT/2244AT Com. Max	244CT/2244CT Com. Min	244CT/2244CT Com. Max	244DT Com. Min	244DT Com. Max	
t_{PLH}	Propagation Delay	C_L = 50pF	1.5	6.5	1.5	4.8	1.5	4.1	1.5	3.6	ns
t_{PHL}	D_N to O_N	R_L = 500Ω									
t_{PZH}	Output Enable Time		1.5	8.0	1.5	6.2	1.5	5.8	1.5	4.8	ns
t_{PZL}	$\overline{OE}_X$ to O_N										
t_{PHZ}	Output Disable Time[3]		1.5	7.0	1.5	5.6	1.5	5.2	1.5	4.0	ns
t_{PLZ}	$\overline{OE}_X$ to O_N										

Notes:
1. See test circuit and wave forms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. This parameter is guaranteed but not production tested.

PI74FCT540T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	540T Com. Min	540T Com. Max	540AT Com. Min	540AT Com. Max	540CT Com. Min	540CT Com. Max	540DT Com. Min	540DT Com. Max	Units
t_{PLH} t_{PHL}	Propagation Delay D_N to $\overline{O}_N$	C_L = 50pF R_L = 500Ω	1.5	5.5	1.5	4.8	1.5	4.3	1.5	3.8	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}_X$ to $\overline{O}_N$		1.5	10.0	1.5	6.2	1.5	5.8	1.5	5.2	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}_X$ to $\overline{O}_N$		1.5	6.0	1.5	5.6	1.5	5.2	1.5	5.2	ns

PI74FCT541/2541T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	541T/2541T Com. Min	541T/2541T Com. Max	541AT/2541AT Com. Min	541AT/2541AT Com. Max	541CT/2541CT Com. Min	541CT/2541CT Com. Max	541DT Com. Min	541DT Com. Max	Units
t_{PLH} t_{PHL}	Propagation Delay D_N to O_N	C_L = 50pF R_L = 500Ω	1.5	6.0	1.5	4.8	1.5	4.1	1.5	3.8	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}_X$ to O_N		1.5	9.5	1.5	6.2	1.5	5.8	1.5	5.2	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}_X$ to O_N		1.5	6.5	1.5	5.6	1.5	5.2	1.5	5.2	ns

Notes:
1. See test circuit and wave forms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. This parameter is guaranteed but not production tested.