PI74FCT373T/533T/573T (25Ω Series) P174FCT2373T/2573T OCTAL TRANSPARENT LATCHES

Fast CMOS Octal Transparent Latches

Product Features:

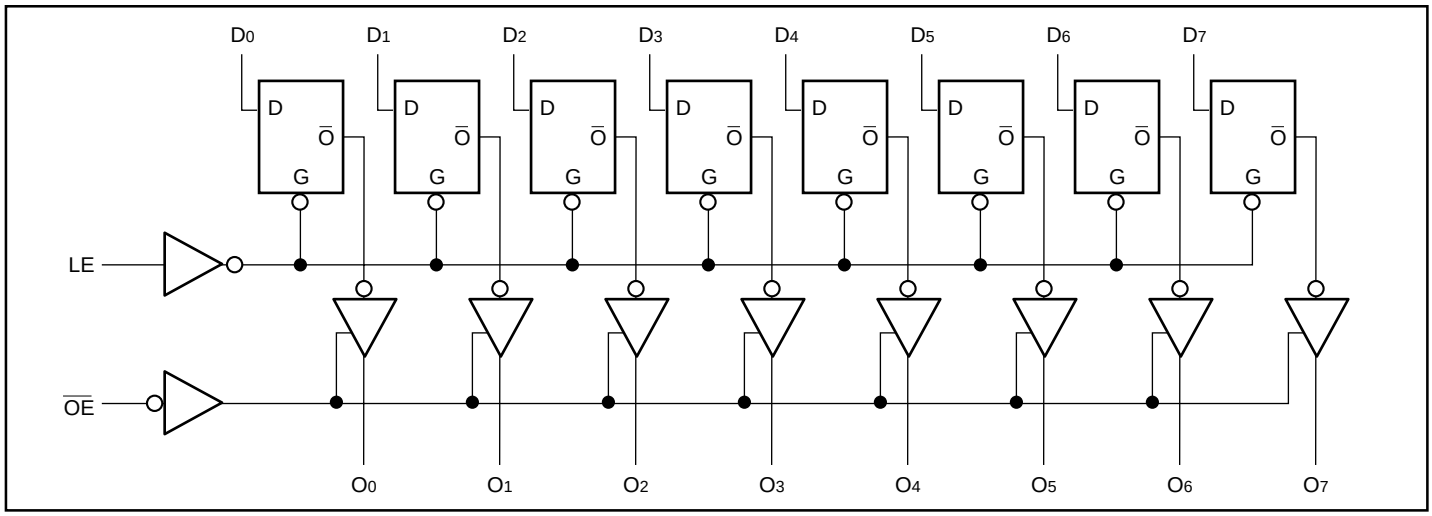
- PI74FCT373/533/573/2373/2573T is pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- 25Ω series resistor on all outputs (FCT2XXX only)
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Packages available:
  - 20-pin 173 mil wide plastic TSSOP (L)
  - 20-pin 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:

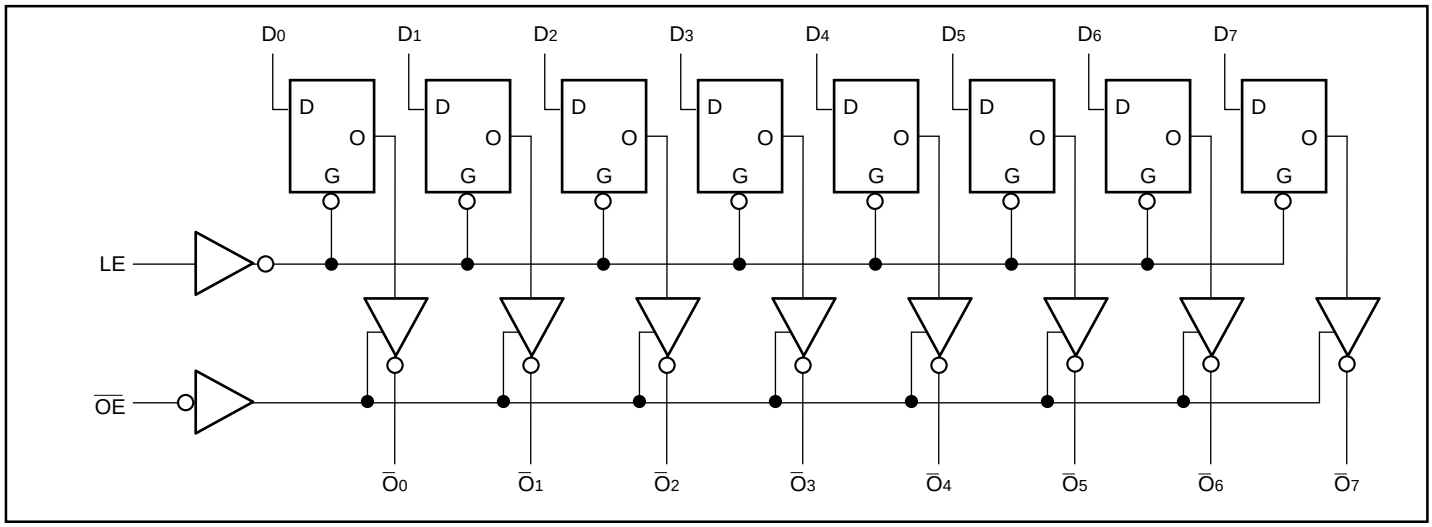
Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.6/0.8 micron CMOS technology, achieving industry leading speed grades. All PI74FCT2XXX devices have a built-in 25 ohm series resistor on all outputs to reduce noise resulting from reflections, thus eliminating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

The PI74FCT373T/533T/573T and P174FCT2373T/2573T are 8-bit wide octal transparent latches designed with 3-state outputs and are intended for bus oriented applications. When Latch Enable (LE) is HIGH, the flip-flops appear transparent to the data. The data that meets the set-up time when LE is LOW is latched. When OE is HIGH, the bus output is in the high impedance state.

PI74FCT373/2373T and PI74FCT573/2573T Logic Block Diagram



PI74FCT533T Logic Block Diagram



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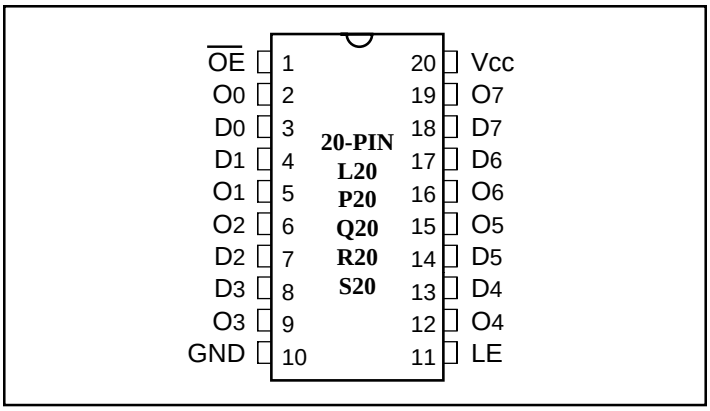
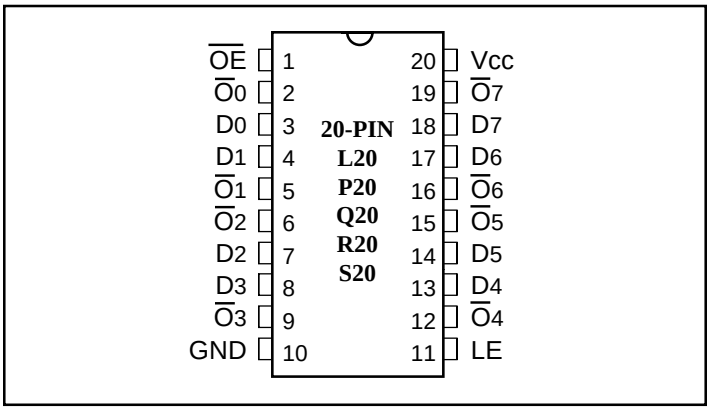
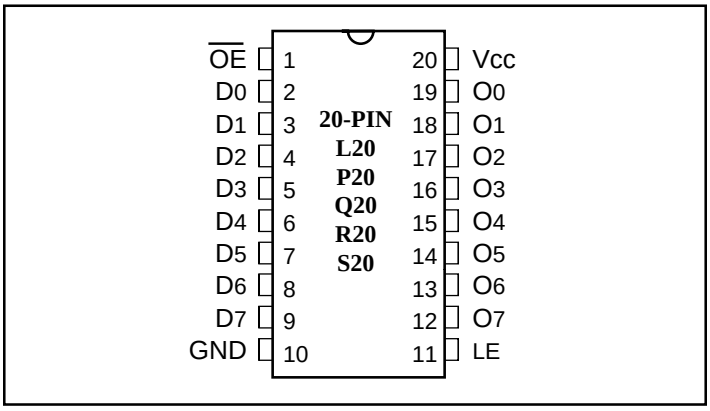
PI74FCT373/2373T Product Pin Configuration



PI74FCT533T Product Pin Configuration



PI74FCT573/2573T Product Pin Configuration



Product Pin Description

Pin Name	Description
$\overline{OE}$	Output Enable Input (Active LOW)
LE	Latch Enable Input (Active HIGH)
D0-D7	Data Inputs
O0-O7	3-State Outputs
$\overline{O}$0-$\overline{O}$7	Complementary 3-State Outputs
GND	Ground
VCC	Power

PI74FCT533T Truth Table[1]

Inputs			Outputs
DN	**LE**	**$\overline{OE}$**	**$\overline{O}$N**
H	H	L	L
L	H	L	H
X	X	H	Z

PI74FCT373/573/2373/2573T Truth Table[1]

Inputs			Outputs
DN	**LE**	**$\overline{OE}$**	**ON**
H	H	L	H
L	H	L	L
X	X	H	Z

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

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	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, T_A = –40°C to +85°C, V_{CC} = 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} = –15.0 mA	2.4	3.0		V
V_{OL}	Output LOW Current	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 64 mA		0.3	0.55	V
V_{OL}	Output LOW Current	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 12 mA (25Ω Series)		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} = –18 mA			–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 (T_A = 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	2.0	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs Open $\overline{OE}$ = GND LE = 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 $\overline{OE}$ = GND LE = V_{CC} One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND		1.5	3.0[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 $\overline{OE}$ = GND LE = 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 conditions shown as Max. or Min., 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.

PI74FCT373/2373T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	373T/2373T Com. Min	373T/2373T Com. Max	373AT/2373AT Com. Min	373AT/2373AT Com. Max	373CT/2373CT Com. Min	373CT/2373CT Com. Max	373DT Com. Min	373DT Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay D_N to O_N	C_L = 50 pF R_L = 500Ω	1.5	8.0	1.5	5.2	1.5	4.2	1.5	3.8	ns
t_{PLH} t_{PHL}	Propagation Delay LE to O_N		2.0	13.0	2.0	8.5	2.0	5.5	1.5	4.9	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_N		1.5	12.0	1.5	6.5	1.5	5.5	1.5	5.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}$ to O_N		1.5	7.5	1.5	5.5	1.5	5.0	1.5	5.0	ns
t_{SU}	Setup Time HIGH or LOW, D_N to LE		2.0	—	2.0	—	2.0	—	2.0	—	ns
t_H	Hold Time HIGH or LOW, D_N to LE		1.5	—	1.5	—	1.5	—	1.5	—	ns
t_W	LE Pulse Width[3] HIGH		6.0	—	5.0	—	5.0	—	4.0	—	ns

PI74FCT533T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	533T Com. Min	533T Com. Max	533AT Com. Min	533AT Com. Max	533CT Com. Min	533CT Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay D_N to O_N	C_L = 50 pF R_L = 500Ω	1.5	10.0	1.5	5.2	1.5	4.2	ns
t_{PLH} t_{PHL}	Propagation Delay LE to O_N		2.0	13.0	2.0	8.5	2.0	5.5	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_N		1.5	11.0	1.5	6.5	1.5	5.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}$ to O_N		1.5	7.0	1.5	5.5	1.5	5.0	ns
t_{SU}	Setup Time HIGH or LOW, D_N to LE		2.0	—	2.0	—	2.0	—	ns
t_H	Hold Time HIGH or LOW, D_N to LE		1.5	—	1.5	—	1.5	—	ns
t_W	LE Pulse Width[3] HIGH		6.0	—	5.0	—	5.0	—	ns

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

PI74FCT573/2573T Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	573T/2573T Com. Min	573T/2573T Com. Max	573AT/2573AT Com. Min	573AT/2573AT Com. Max	573CT Com. Min	573CT Com. Max	573DT Com. Min	573DT Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay D_N to $\overline{O}_N$	C_L = 50 pF R_L = 500Ω	1.5	8.0	1.5	5.2	1.5	4.2	1.5	3.8	ns
t_{PLH} t_{PHL}	Propagation Delay LE to $\overline{O}_N$		2.0	12.0	2.0	8.5	2.0	5.5	2.0	4.9	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_N		1.5	9.5	1.5	6.5	1.5	5.5	1.5	5.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $\overline{OE}$ to O_N		1.5	6.5	1.5	5.5	1.5	5.0	1.5	5.0	ns
t_{SU}	Setup Time HIGH or LOW, D_N to LE		2.0	—	2.0	—	2.0	—	1.5	—	ns
t_H	Hold Time HIGH or LOW, D_N to LE		1.5	—	1.5	—	1.5	—	1.0	—	ns
t_W	LE Pulse Width[3] HIGH		6.0	—	5.0	—	5.0	—	3.0	—	ns

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