



HCT374
HCT534
HCT564
HCT574

Octal Edge-Triggered Flip Flops

Ordering Information

Package	Outputs	Commercial 74HCT	Military 54HCT	Military Hi-Rel RB 54HCT
20-pin plastic DIP	Non-Inverting Inverting Inverting Non-Inverting	74HCT374P 74HCT534P 74HCT564P 74HCT574P	N/A	N/A
20-pin CERDIP	Non-Inverting Inverting Inverting Non-Inverting	74HCT374D 74HCT534D 74HCT564D 74HCT574D	54HCT374D 54HCT534D 54HCT564D 54HCT574D	RB54HCT374D RB54HCT534D RB54HCT564D RB54HCT574D
20-pin ceramic side-brazed DIP	Non-Inverting Inverting Inverting Non-Inverting	74HCT374C 74HCT534C 74HCT564C 74HCT574C	54HCT374C 54HCT534C 54HCT564C 54HCT574C	RB54HCT374C RB54HCT534C RB54HCT564C RB54HCT574C
20-pin ceramic leadless chip carrier	Non-Inverting Inverting Inverting Non-Inverting	74HCT374LC 74HCT534LC 74HCT564LC 74HCT574LC	54HCT374LC 54HCT534LC 54HCT564LC 54HCT574LC	RB54HCT374LC RB54HCT534LC RB54HCT564LC RB54HCT574LC

Features

- Meets or exceeds JEDEC #7 specs
- Max DC operating supply current: 8 μ A @25 °C
- Fast propagation delay times
- Plug in replacement for LSTTL series
- Full TTL, NMOS and CMOS compatibility
- 55 °C to +125 °C operating temperature range
- Capable of operation over 3-volt to 6-volt range
- High speed silicon-gate CMOS technology
- MIL STD 883B Screening
- Leadless chip carrier available
- Excellent latch-up immunity

General Description

These 8 bit flip flops feature 3-state operation and are designed for use in high speed, bus oriented systems.

These octal flip flops are edge-triggered D-type. On the positive transition of the clock, the Q outputs will be set to the last state that was setup at the D-inputs.

A buffered output control input can be used to place the outputs in either an active state or in a high impedance state. While in the high impedance state, the outputs neither load nor drive the bus lines.

These devices are manufactured and tested to meet or exceed the specifications of the EIA JEDEC 40.2 committee Standard #7 for High Speed CMOS Logic.

Absolute Maximum Ratings*

Rating	Value
Supply voltage, V_{CC}	-0.5V to +7.0V
Input voltage, V_I	-1.5V to $V_{CC} + 1.5V$
DC input diode current, I_{IK}	$\pm 100mA$
DC output diode current, I_{OK}	$\pm 100mA$
Short circuit output current, I_{SC} (not more than 1 output for 1 second)	$\pm 100mA$
DC V_{CC} or ground current, I_{CC} or I_{GND}	$\pm 70mA$
Operating temperature range, T_A : 74HCT (Commercial) 54HCT (Military)	-40 °C to +85 °C -55 °C to +125 °C
Storage temperature, T_S	-65 °C to +150 °C
Power dissipation, P_D	500mW

* Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may effect device reliability.

Recommended Operating Conditions

Symbol	Parameter	74HCT			54HCT			Unit
		min	typ	max	min	typ	max	
V_{CC}	Supply voltage	4.50	5.00	5.50	4.50	5.00	5.50	V
V_I	Input voltage	0		V_{CC}	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	0		V_{CC}	V
T_A	Operating free-air temperature	-40		85	-55		125	°C
t_r and t_f	Input rise and fall time	0		500	0		500	ns
t_W	Clock/enable pulse clock width high	15			15			ns
	low	15			15			
t_{SU}	Data setup time*	20†			20†			ns
t_H	Data hold time*	10†			10†			ns
V_{CCF}	Functional operating V_{CC} range	3.00		6.00	3.00		6.00	V

* Clock/Enable transition

† = Low to high

Electrical Characteristics

Symbol	Parameter	VCC V	Temperature °C						Unit	Test Conditions	
			54HCT/74HCT 25 °C		74HCT -40 to +85 °C		54HCT -55 to +125 °C				
			min	max	min	max	min	max			
V _{IH}	High Level Input Voltage	4.5 to 5.5	2.0		2.0		2.0		V		
V _{IL}	Low Level Input Voltage	4.5 to 5.5		0.8		0.8		0.8	V		
V _{OH}	High Level Output Voltage	4.5	4.4		4.4		4.4		V	V _I	I _O
		4.5	3.86		3.76		3.7		V	V _{IH} or V _{IL}	BUS DRIVER Unit -20.0 μA -6.0 mA
V _{OL}	Low Level Output Voltage	4.5		0.1		0.1		0.1	V	V _{IH} or V _{IL}	20.0 μA
		4.5		0.32		0.37		0.4	V	V _{IH} or V _{IL}	6.0 mA
I _I	Input Leakage Current	5.5		±0.1		±1.0		±1.0	μA	V _I = V _{CC} or GND	
I _{OZ}	3-state Output Off-State Current	5.5		±0.5		±5.0		±10.0	μA	V _I = V _{IH} or V _{IL} V _O = V _{CC} or GND	
I _{CC}	Quiescent Supply Current	5.5		8.0		80.0		160.	μA	V _I = V _{CC} or GND I _O = 0	

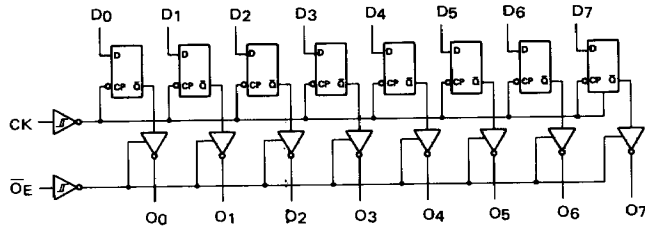
Switching Characteristics (VCC = 4.5V)

Symbol	Parameter	Temperature °C			Unit	Conditions
		25 °C 54HCT/74HCT	-40 to +85 °C 74HCT	-55 to +125 °C 54HCT		
t _{PLH} , t _{PHL}	Maximum clock/enable to output propagation delay	35 ns	40 ns	45 ns	ns	C _L = 50 pF
t _{PZH} , t _{PZL}	Maximum output control to output propagation delay, enable time	30 ns	35 ns	40 ns	ns	C _L = 50 pF R _L = 1K
t _{PHZ} , t _{PLZ}	Maximum output control to output propagation delay, disable time	30 ns	35 ns	40 ns	ns	
f	Maximum operation frequency	25	20	16	MHz	
C _I	Typical input capacitance	8	8	8	pF	

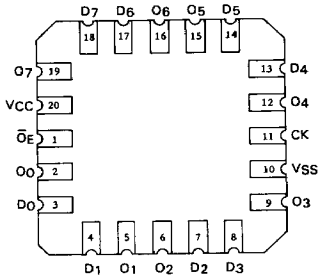
RE: Switching waveforms

Functional Block Diagrams and Pin Configurations

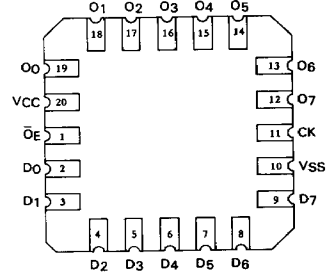
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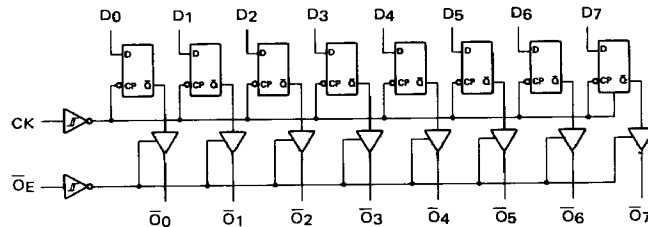
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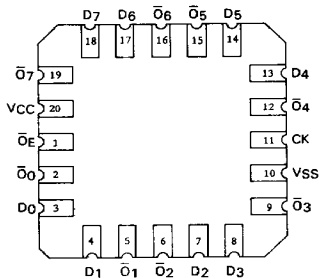
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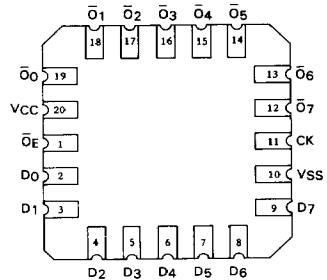
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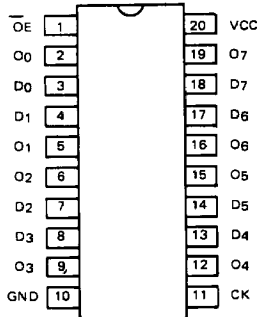
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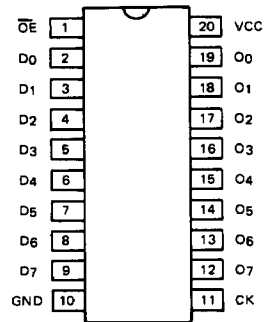
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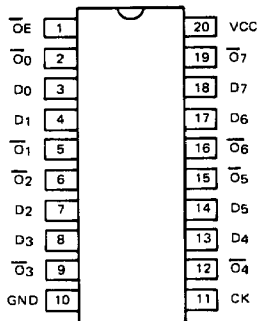
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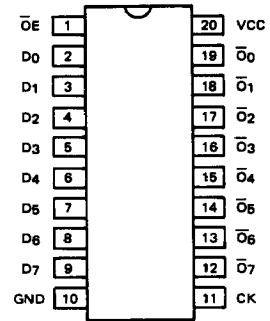
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374, 534, 564, 574 Function Table

OPERATING MODE	Inputs			Outputs	
	\overline{OE}	CK	D_{IN}^*	374,574 ON	534,564 ON
Latch and Read Register	L	↑	$D_{IN}^* \cdot 2$	D	\overline{D}
* Latch Register and Output disable	H	↑	$D_{IN}^* \cdot 2$	Hi - Z	Hi - Z

$D_{IN}^* \cdot 2$ = Voltage level on input one set up time prior to Low to High transition on CK.

*Even though the outputs may be disabled the latch function of the device is still operational.