

Octal D-type flip-flop with data enable; positive-edge trigger

74HC/HCT377

FEATURES

- Ideal for addressable register applications
- Data enable for address and data synchronization applications
- Eight positive-edge triggered D-type flip-flops
- See “273” for master reset version
- See “373” for transparent latch version
- See “374” for 3-state version
- Output capability: standard
- I_{CC} category: MSI

GENERAL DESCRIPTION

The 74HC/HCT377 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT377 have eight edge-triggered, D-type flip-flops with individual D inputs and Q outputs. A common clock (CP) input loads all flip-flops simultaneously when the data enable (\bar{E}) is LOW. The state of each D input, one set-up time before the LOW-to-HIGH clock transition, is transferred to the corresponding output (Q_n) of the flip-flop.

The \bar{E} input must be stable only one set-up time prior to the LOW-to-HIGH transition for predictable operation.

QUICK REFERENCE DATA

GND = 0 V; T_{amb} = 25 °C; t_r = t_f = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t _{PHL} / t _{PLH}	propagation delay CP to Q _n	C _L = 15 pF; V _{CC} = 5 V	13	14	ns
f _{max}	maximum clock frequency		77	53	MHz
C _I	input capacitance		3.5	3.5	pF
C _{PD}	power dissipation capacitance per flip-flop	notes 1 and 2	20	20	pF

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i = input frequency in MHz

f_o = output frequency in MHz

∑ (C_L × V_{CC}² × f_o) = sum of outputs

C_L = output load capacitance in pF

V_{CC} = supply voltage in V

2. For HC the condition is V_I = GND to V_{CC}
For HCT the condition is V_I = GND to V_{CC} – 1.5 V

ORDERING INFORMATION

See “74HC/HCT/HCU/HCMOS Logic Package Information”.

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DC CHARACTERISTICS FOR 74HC

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: standard

I_{CC} category: MSI

AC CHARACTERISTICS FOR 74HC

GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

SYMBOL	PARAMETER	T _{amb} (°C)						UNIT	TEST CONDITIONS		
		74HC							V _{CC} (V)	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t _{PHL} / t _{PLH}	propagation delay CP to Q _n		44 16 13	160 32 27		200 40 34		240 48 41	ns	2.0 4.5 6.0	Fig.6
t _{THL} / t _{TLH}	output transition time		19 7 6	75 15 13		95 19 16		110 22 19	ns	2.0 4.5 6.0	Fig.6
t _W	clock pulse width HIGH or LOW	80 16 14	14 5 4		100 20 17		120 24 20		ns	2.0 4.5 6.0	Fig.6
t _{su}	set-up time D _n to CP	60 12 10	14 5 4		75 15 13		90 18 15		ns	2.0 4.5 6.0	Fig.7
t _{su}	set-up time \bar{E} to CP	60 12 10	6 2 2		75 15 13		90 18 15		ns	2.0 4.5 6.0	Fig.7
t _h	hold time D _n to CP	3 3 3	-8 -3 -2		3 3 3		3 3 3		ns	2.0 4.5 6.0	Fig.7
t _h	hold time \bar{E} to CP	4 4 4	-3 -1 -1		4 4 4		4 4 4		ns	2.0 4.5 6.0	Fig.7
f _{max}	maximum clock pulse frequency	6 30 35	23 70 83		5 24 28		4 20 24		MHz	2.0 4.5 6.0	Fig.6