

HD74HC390

Dual Decade Counters

HITACHI

ADE-205-503 (Z)
1st. Edition
Sep. 2000

Description

The HD74HC390 incorporate dual decade counters, each composed of a divide-by-two and a divide-by-five counter. The divide-by-two and divide-by-five counters can be cascaded to form dual decade, dual bi-quinary, or various combinations up to a single divide-by-100 counter.

The HD74HC390 is incremented on the high to low transition (negative edge) of the clock input, and each has an independent clear input. When clear is set high all four bits of each counter are set to a low level. This enables count truncation and allows the implementation of divide-by-N counter configurations.

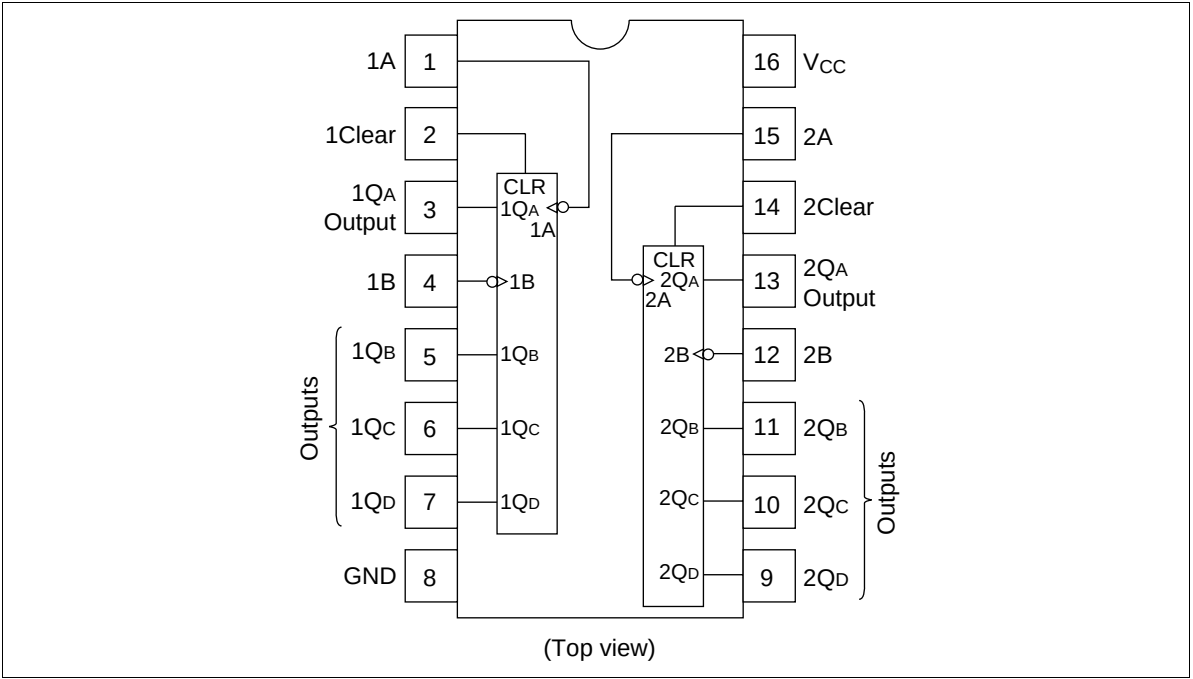
Features

- High Speed Operation: t_{pd} (Clock A to Q_A) = 11 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

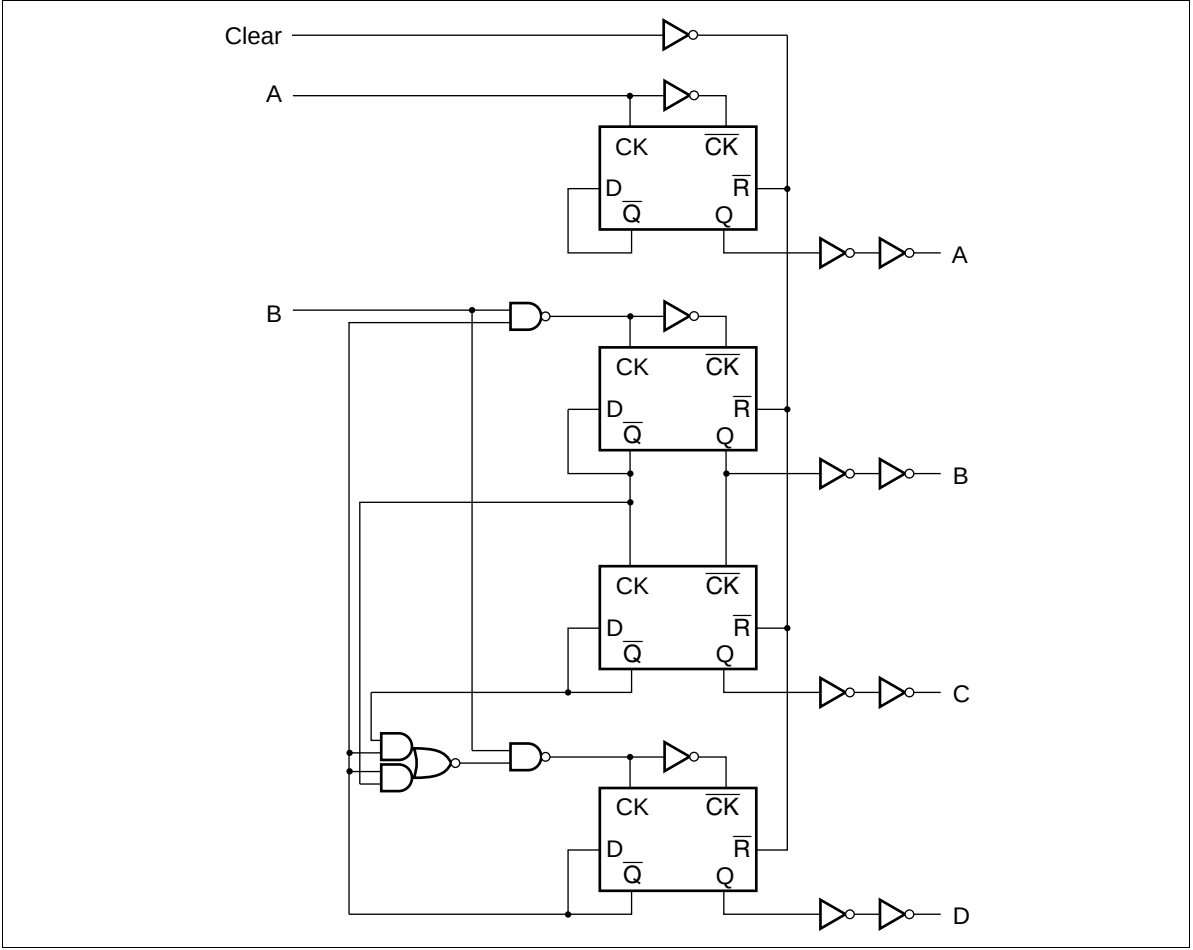
Function Table

Clock		Clear	Operation
A	B		
X	X	H	Clear $\div 2$ and $\div 5$
	X	L	Increment $\div 2$
X		L	Increment $\div 5$

Pin Arrangement



Block Diagram (1/2)



DC Characteristics

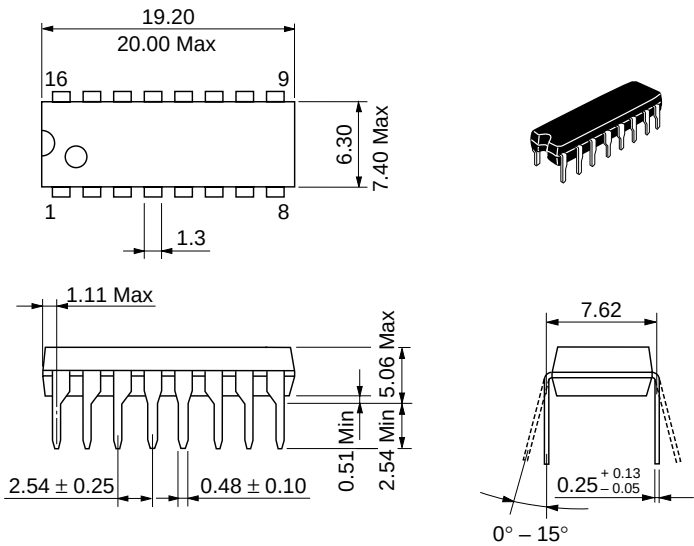
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V _{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V _{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA	
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I _{OH} = -4 mA
		6.0	5.68	—	—	5.63	—			I _{OH} = -5.2 mA
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL} I _{OL} = 20 μA	
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I _{OL} = 4 mA
		6.0	—	—	0.26	—	0.33			I _{OL} = 5.2 mA
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND	
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, I _{out} = 0 μA	

AC Characteristics ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

Item	Symbol	$V_{CC} \text{ (V)}$	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Maximum clock frequency	$f_{\max}$	2.0	—	—	5	—	4	MHz	
		4.5	—	—	27	—	21		
		6.0	—	—	32	—	25		
Propagation delay time	t_{PLH}	2.0	—	—	120	—	150	ns	Clock A to Q_A
		4.5	—	11	24	—	30		
		6.0	—	—	20	—	26		
	t_{PLH}	2.0	—	—	290	—	365	ns	Clock A to Q_C (Q_A connected to Clock B)
		4.5	—	32	58	—	73		
		6.0	—	—	49	—	62		
	t_{PLH}	2.0	—	—	130	—	165	ns	Clock B to Q_B
		4.5	—	16	26	—	33		
		6.0	—	—	22	—	28		
	t_{PLH}	2.0	—	—	185	—	230	ns	Clock B to Q_C
		4.5	—	20	37	—	46		
		6.0	—	—	31	—	39		
	t_{PLH}	2.0	—	—	130	—	165	ns	Clock B to Q_D
		4.5	—	15	26	—	33		
		6.0	—	—	22	—	28		
	t_{PHL}	2.0	—	—	165	—	205	ns	Clear to Q_A, Q_B, Q_C, Q_D
		4.5	—	14	33	—	41		
		6.0	—	—	28	—	35		
Pulse width	t_w	2.0	80	—	—	100	—	ns	
		4.5	16	8	—	20	—		
		6.0	14	—	—	17	—		
Removal time	t_h	2.0	25	—	—	31	—	ns	
		4.5	5	1	—	6	—		
		6.0	4	—	—	5	—		
Output rise/fall time	t_{TLH}	2.0	—	—	75	—	95	ns	
		4.5	—	5	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	C_{in}	—	—	5	10	—	10	pF	

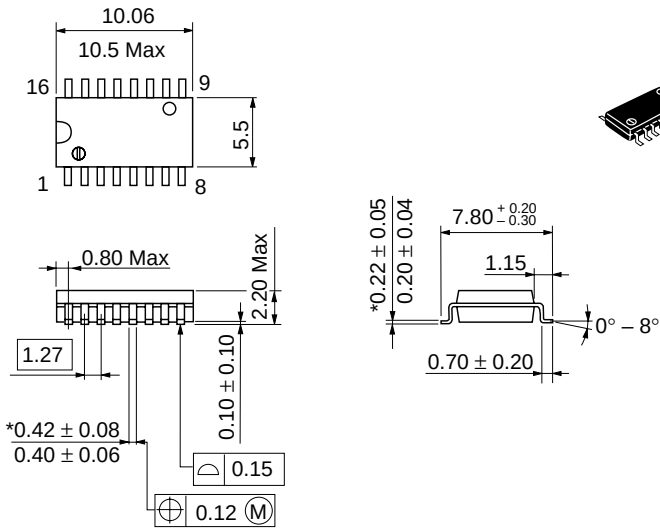
Package Dimensions

Unit: mm



Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	1.07 g

Unit: mm



Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.24 g

*Dimension including the plating thickness
Base material dimension

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