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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74HC4017

Decade Counter/Divider



ADE-205-530 (Z)

1st. Edition

Sep. 2000

Description

The HD74HC4017 is a 5-stage divide-by-10 Johnson counter with ten decoded outputs and a carry-out bit. High-speed operation and spike-free outputs are obtained by use of the Johnson decade counter configuration.

The ten decoded outputs are normally low and go high only at their respective decimal time periods. A high signal on Reset R asynchronously clears the decade counter and sets the carry output and Y_0 high. With $\overline{CE}$ low, the count is advanced on a low-to-high transition at C input. Alternatively, if C is high, the count is advanced on a high-to-low transition at $\overline{CE}$. Each decoded output remains high for one full clock cycle. The carry output is high while Q_0 , Q_1 , Q_2 , Q_3 or Q_4 is high, then is low while Q_5 , Q_6 , Q_7 , Q_8 or Q_9 is high.

Features

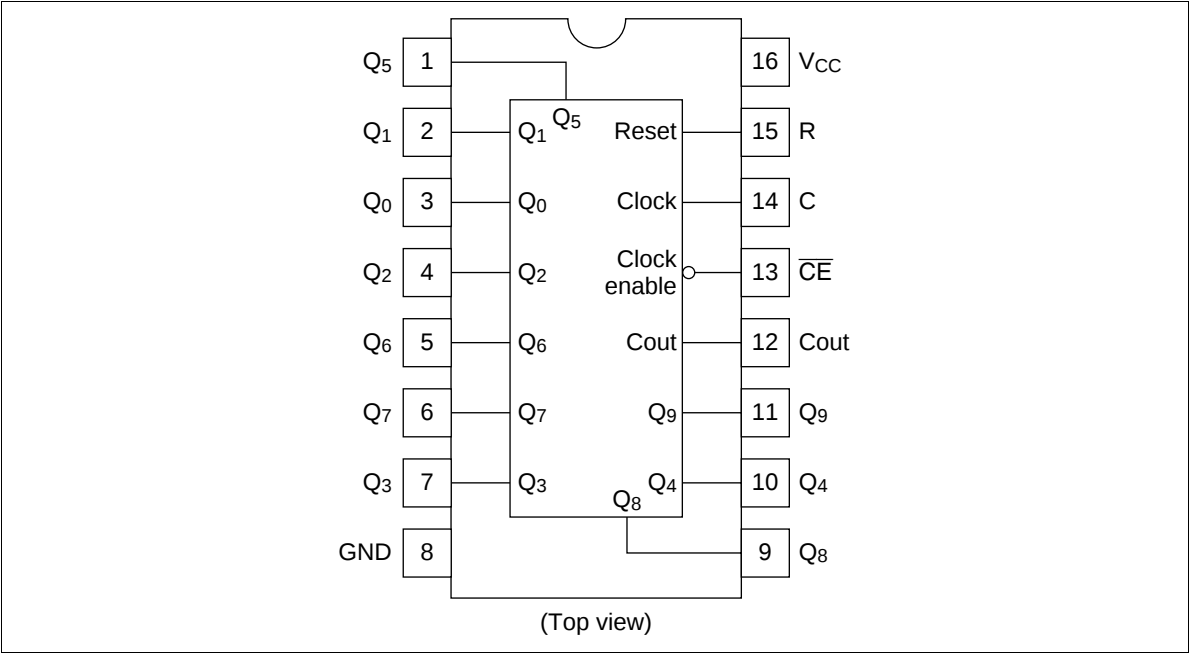
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

C	$\overline{CE}$	R	Decode Output = n
L	X	L	n
X	H	L	n
X	X	H	Q_0
	L	L	$n + 1$
	X	L	n
X		L	n
H		L	$n + 1$

Notes: 1. X: Don't care
2. If $n < 5$ Carry = "H", Otherwise = "L"

Pin Arrangement



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, Iout = 0 μA	

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

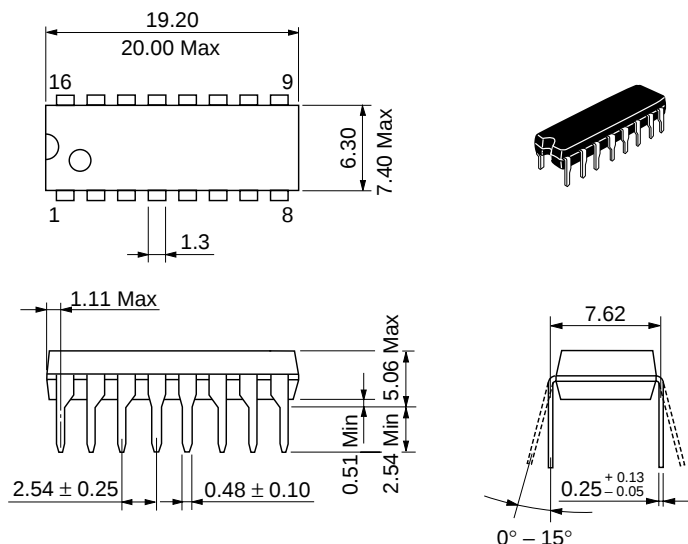
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Maximum clock frequency	f _{max}	2.0	—	—	6	—	5	MHz	
		4.5	—	—	31	—	27		
		6.0	—	—	36	—	31		
Propagation delay time	t _{PLH} t _{PHL}	2.0	—	—	230	—	290	ns	C to Q
		4.5	—	20	46	—	58		
		6.0	—	—	39	—	49		

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

Item	Symbol	V _{CC} (V)	Ta = 25°C		Ta = −40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min			Max
Propagation delay time	t _{PLH}	2.0	—	—	230	—	290	ns	C to Cout
		4.5	—	19	46	—	58		
		6.0	—	—	39	—	49		
	t _{PLH}	2.0	—	—	250	—	315	ns	$\overline{CE}$ to Q
		4.5	—	21	50	—	63		
		6.0	—	—	43	—	54		
	t _{PLH}	2.0	—	—	250	—	315	ns	$\overline{CE}$ to Cout
		4.5	—	20	50	—	63		
		6.0	—	—	43	—	54		
	t _{PLH}	2.0	—	—	230	—	290	ns	R to Q
		4.5	—	18	46	—	58		
		6.0	—	—	39	—	49		
	t _{PLH}	2.0	—	—	230	—	290	ns	R to Cout
		4.5	—	13	46	—	58		
		6.0	—	—	39	—	49		
Pulse width	t _w	2.0	80	—	—	100	—	ns	
		4.5	16	5	—	20	—		
		6.0	14	—	—	17	—		
Setup time	t _{su}	2.0	75	—	—	95	—	ns	
		4.5	15	5	—	19	—		
		6.0	13	—	—	16	—		
Hold time	t _h	2.0	50	—	—	65	—	ns	
		4.5	10	4	—	13	—		
		6.0	9	—	—	11	—		
Removal time	t _{rem}	2.0	100	—	—	125	—	ns	
		4.5	20	−3	—	25	—		
		6.0	17	—	—	21	—		
Output rise/fall time	t _{TLH}	2.0	—	—	75	—	95	ns	
		4.5	—	6	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	C _{in}	—	—	5	10	—	10	pF	

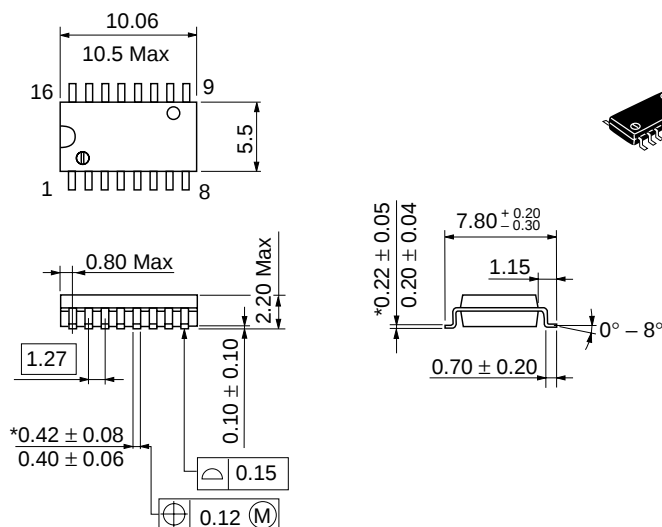
Package Dimensions

Unit: mm



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

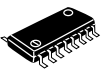
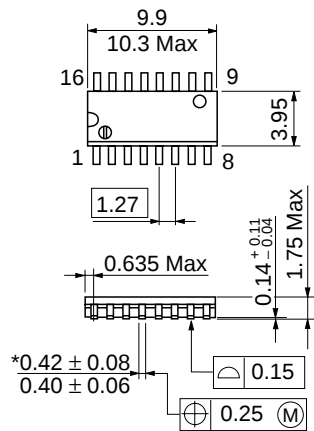
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.15 g

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