
HD74HC221

Dual Monostable Multivibrators (with Schmitt Trigger Input)

HITACHI

Description

Each multivibrator features both a negative, A, and a positive, B, transition triggered input, either of which can be used as an inhibit. Also included is a clear input that when taken low resets the one shot. The HD74HC221 can be triggered on the positive transition of the clear while A is held low and B is held high.

This device is a non-retriggerable, and therefore cannot be retriggered until the output pulse times out.

The output pulse equation is simply:

$$t_w = 0.7 \cdot (R_{ext}) \cdot (C_{ext})$$

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

Function Table

Inputs			Outputs	
Clear	A	B	Q	\bar{Q}
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	\uparrow	\downarrow	\uparrow
H	\downarrow	H	\downarrow	\uparrow
\uparrow	L	H	\downarrow	\uparrow

DC Characteristics

Item	Sym- bol	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		
		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
		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	—	—	130	—	220	μA	Vin = V _{CC} or GND	I _{out} = 0 μA	
		6.0	—	—	130	—	220			Rext/Cent = 0.5 V _{CC}	

HD74HC221

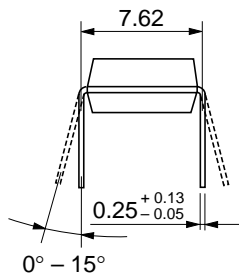
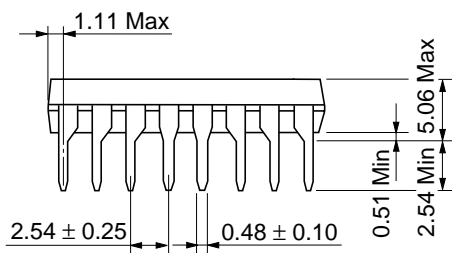
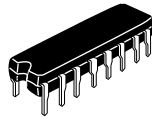
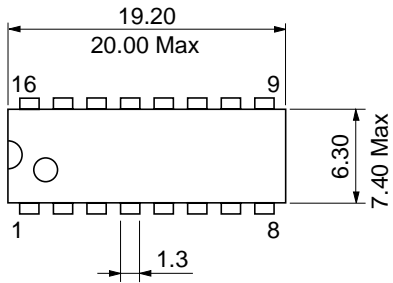
AC Characteristics ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

Item	Symbol	V_{CC} (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions			
			Min	Typ	Max	Min			Max		
Trigger propagation delay time	t_{PLH}	2.0	—	—	210	—	265	ns	A, B or Clear to Q		
		4.5	—	—	42	—	53				
		6.0	—	—	36	—	45				
	t_{PHL}	2.0	—	—	240	—	300	ns	A, B or Clear to \bar{Q}		
		4.5	—	—	48	—	60				
		6.0	—	—	41	—	51				
Propagation delay time	t_{PHL}	2.0	—	—	170	—	215	ns	Clear to Q		
		4.5	—	—	34	—	43				
		6.0	—	—	29	—	37				
	t_{PLH}	2.0	—	—	180	—	225	ns	Clear to \bar{Q}		
		4.5	—	—	36	—	45				
		6.0	—	—	31	—	38				
Pulse width	t_w	2.0	80	—	—	100	—	ns	A, B, Clear		
		4.5	16	—	—	20	—				
		6.0	14	—	—	17	—				
Minimum output pulse width	$t_{WQ(min)}$	2.0	—	1.5	—	—	—	μ s	Cext = 28 pF Rext = 6 k Ω		
		4.5	—	450	—	—	—			ns	Rext = 2 k Ω
		6.0	—	380	—	—	—				
Output pulse width	t_{WQ}	4.5	0.63	0.7	0.77	—	—	ms	Cext = 0.1 μ F Rext = 10 k Ω		
Output rise/fall time	t_{TLH}	2.0	—	—	75	—	95	ns			
	t_{THL}	4.5	—	—	15	—	19				
		6.0	—	—	13	—	16				
Input capacitance	Cin	—	—	5	10	—	10	pF			

Caution in use: In order to prevent any malfunctions due to noise, connect a high-frequency performance capacitor between V_{CC} and GND, and keep the wiring between the external components and Cext, Rext/Cext pins as short as possible.

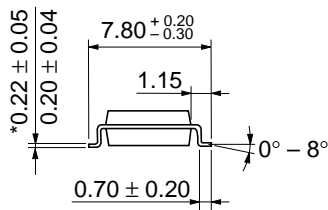
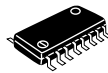
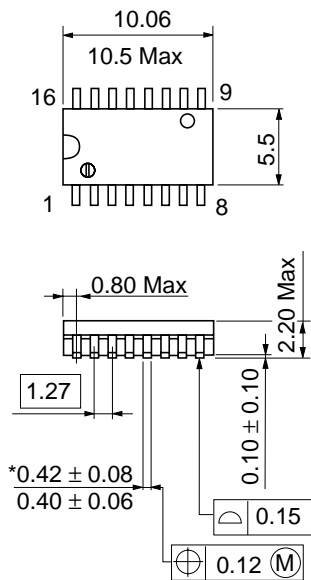
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Unit: mm



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

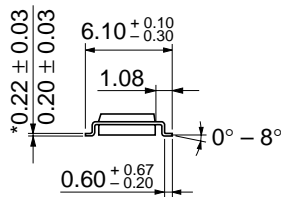
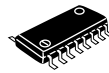
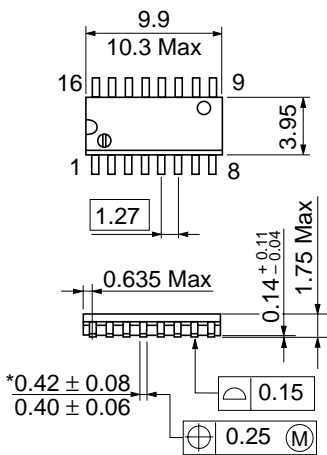
Unit: mm



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

*Dimension including the plating thickness
Base material dimension

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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