

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 inpt that when taken low resets the one shot. The HD74HC221 can be triggered on the positive transition of teh 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

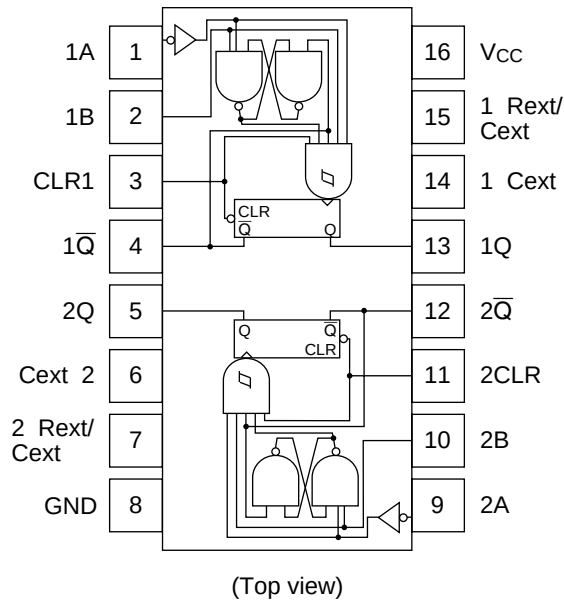
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current

Function Table

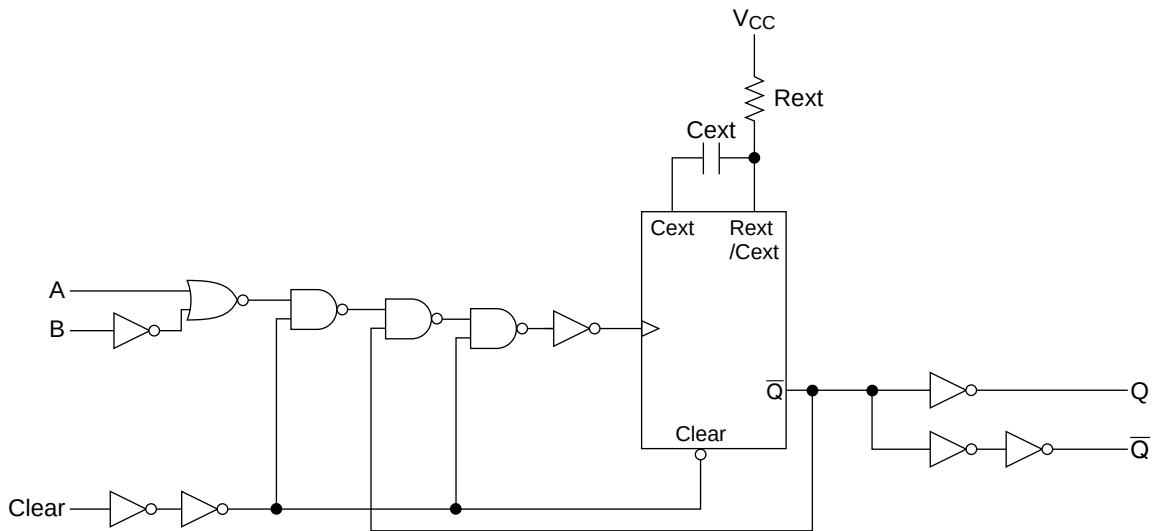
Inputs			Outputs	
Clear	A	B	Q	$\bar{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L			
H		H		
	L	H		



Pin Arrangement



Logic Diagram



DC Characteristics

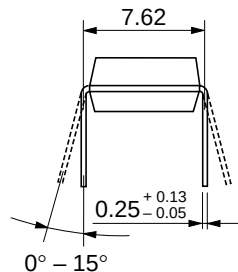
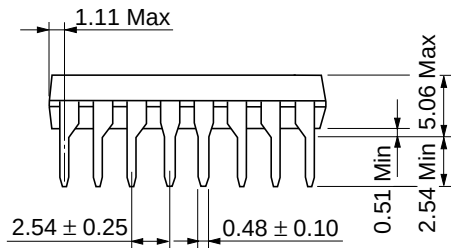
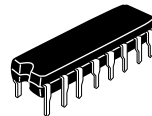
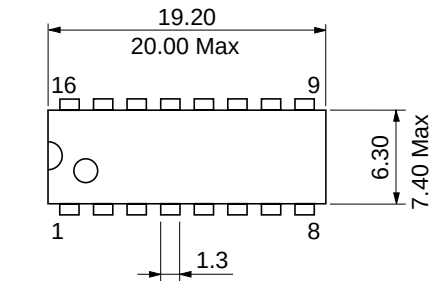
Item	Sym- bol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -20 \mu\text{A}$
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			$I_{OH} = -4 \text{ mA}$
		6.0	5.68	—	—	5.63	—			$I_{OH} = -5.2 \text{ mA}$
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20 \mu\text{A}$
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			$I_{OL} = 4 \text{ mA}$
		6.0	—	—	0.26	—	0.33			$I_{OL} = 5.2 \text{ mA}$
Input current	I_{in}	6.0	—	—	± 0.1	—	± 1.0	μA	$V_{in} = V_{CC} \text{ or GND}$	
Quiescent supply current	I_{CC}	6.0	—	—	130	—	220	μA	$V_{in} = V_{CC} \text{ or GND}$	$I_{out} = 0 \mu\text{A}$
		6.0	—	—	130	—	220			$R_{ext}/C_{ent} = 0.5 V_{CC}$

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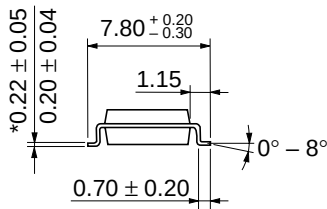
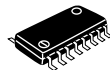
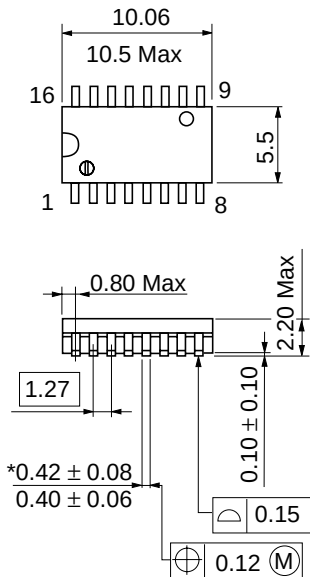
AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = −40 to +85°C					Unit	Test Conditions	
			Ta = 25°C							
			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 $\overline{Q}$	
		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 $\overline{Q}$	
		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	—	—	—	μs	Cext = 28 pF	Rest = 6 kΩ
		4.5	—	450	—	—	—	ns		Rest = 2 kΩ
		6.0	—	380	—	—	—			
Output pulse width	t _{WQ}	4.5	0.63	0.7	0.77	—	—	ms	Cext = 0.1 μF Rest = 10 kΩ	
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.

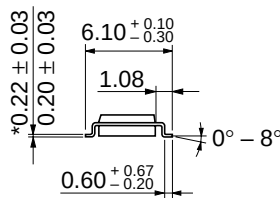
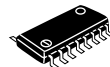
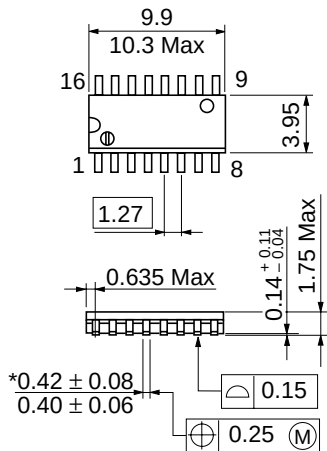


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



*Dimension including the plating thickness
Base material dimension

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



*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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