

# 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  $\mu$ A max
- Low Quiescent Supply Current

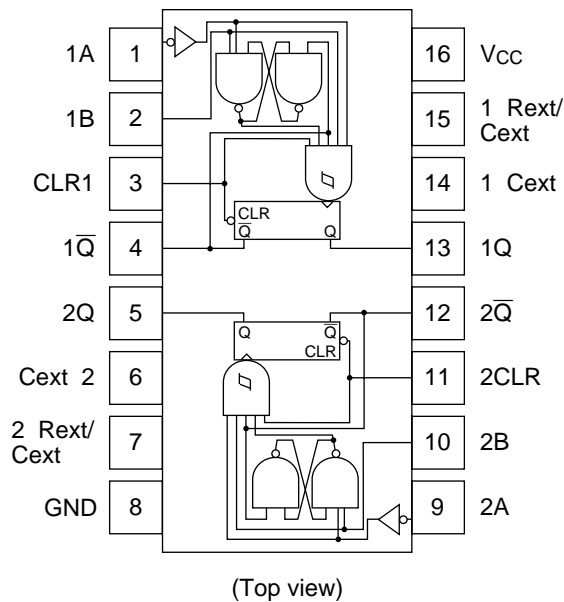
## Function Table

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

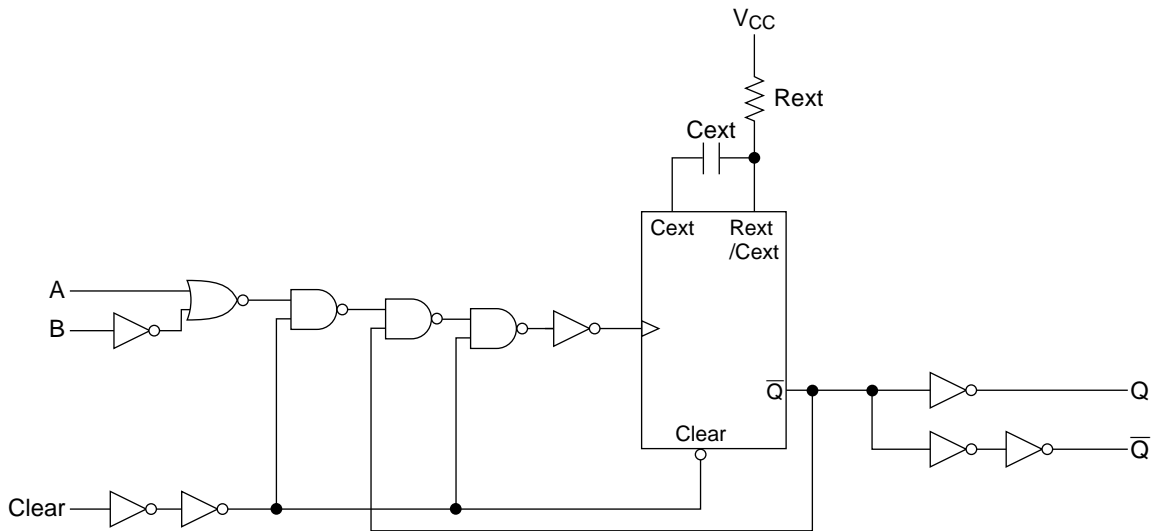


**HD74HC221**

## Pin Arrangement



### Logic Diagram

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## DC Characteristics

Item	Sym- bol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -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 <sub>OH</sub> = -4 mA
		6.0	5.68	—	—	5.63	—			I <sub>OH</sub> = -5.2 mA
	V <sub>OL</sub>	2.0	—	0.0	0.1	—	0.1	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 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 <sub>OL</sub> = 4 mA
		6.0	—	—	0.26	—	0.33			I <sub>OL</sub> = 5.2 mA
Input current	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	µA	Vin = V <sub>CC</sub> or GND	
Quiescent supply current	I <sub>CC</sub>	6.0	—	—	130	—	220	µA	Vin = V <sub>CC</sub> or GND	I <sub>out</sub> = 0 µA
		6.0	—	—	130	—	220			Rext/Cent = 0.5 V <sub>CC</sub>

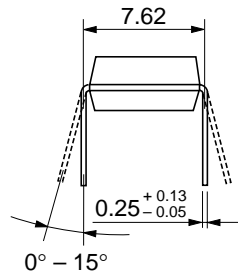
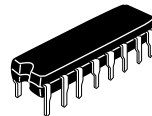
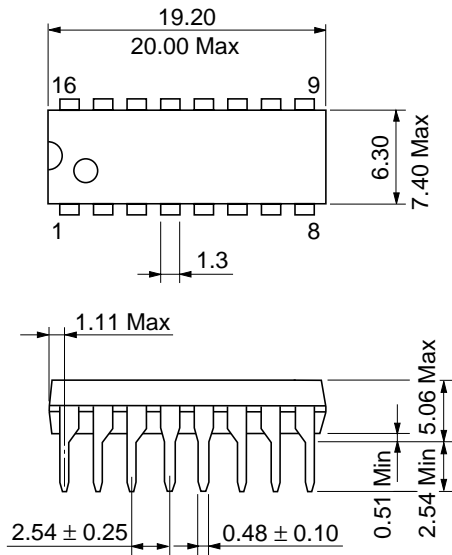
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AC Characteristics (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

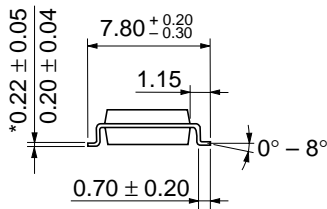
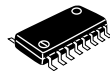
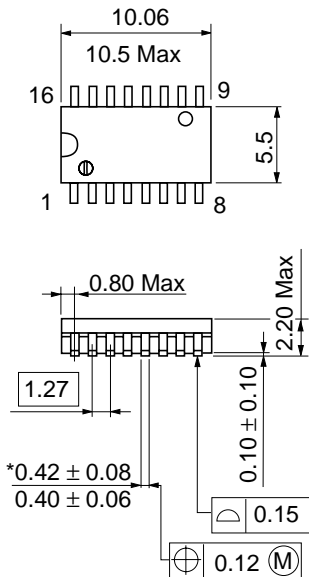
Item	Symbol	V <sub>cc</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Trigger propagation delay time	t <sub>PLH</sub>	2.0	—	—	210	—	265	ns	A, B or Clear to Q	
		4.5	—	—	42	—	53			
		6.0	—	—	36	—	45			
	t <sub>PHL</sub>	2.0	—	—	240	—	300	ns	A, B or Clear to $\overline{Q}$	
		4.5	—	—	48	—	60			
		6.0	—	—	41	—	51			
Propagation delay time	t <sub>PHL</sub>	2.0	—	—	170	—	215	ns	Clear to Q	
		4.5	—	—	34	—	43			
		6.0	—	—	29	—	37			
	t <sub>PLH</sub>	2.0	—	—	180	—	225	ns	Clear to $\overline{Q}$	
		4.5	—	—	36	—	45			
		6.0	—	—	31	—	38			
Pulse width	t <sub>w</sub>	2.0	80	—	—	100	—	ns	A, B, Clear	
		4.5	16	—	—	20	—			
		6.0	14	—	—	17	—			
Minimum output pulse width	t <sub>WQ (min)</sub>	2.0	—	1.5	—	—	—	μs	Cext = 28 pF	Rext = 6 kΩ
		4.5	—	450	—	—	—	ns		Rext = 2 kΩ
		6.0	—	380	—	—	—			
Output pulse width	t <sub>WQ</sub>	4.5	0.63	0.7	0.77	—	—	ms	Cext = 0.1 μF Rext = 10 kΩ	
Output rise/fall time	t <sub>TLH</sub>	2.0	—	—	75	—	95	ns		
	t <sub>THL</sub>	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<sub>cc</sub> and GND, and keep the wiring between the external components and Cext, Rext/Cext pins as short as possible.

Unit: mm

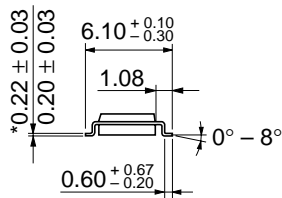
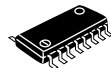
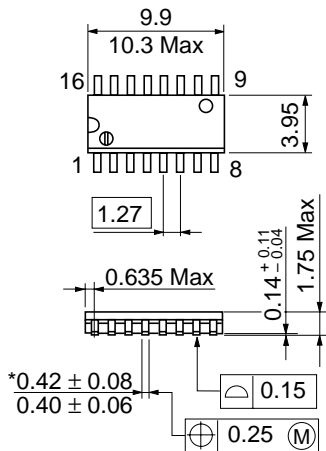


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*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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