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:

$t_W = 0.7 \cdot (Rext) \cdot (Cext)$

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 µA max
- Low Quiescent Supply Current

Function Table

Inputs			Outputs	
Clear	**A**	**B**	**Q**	$\overline{\mathbf{Q}}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⊓	⊔
H	↓	H	⊓	⊔
↑	L	H	⊓	⊔

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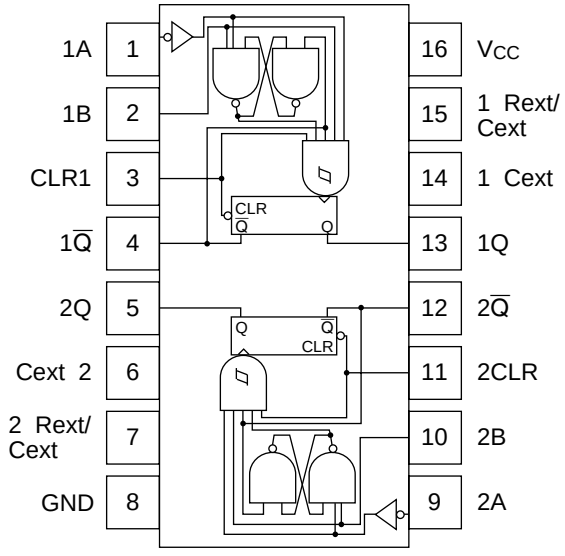
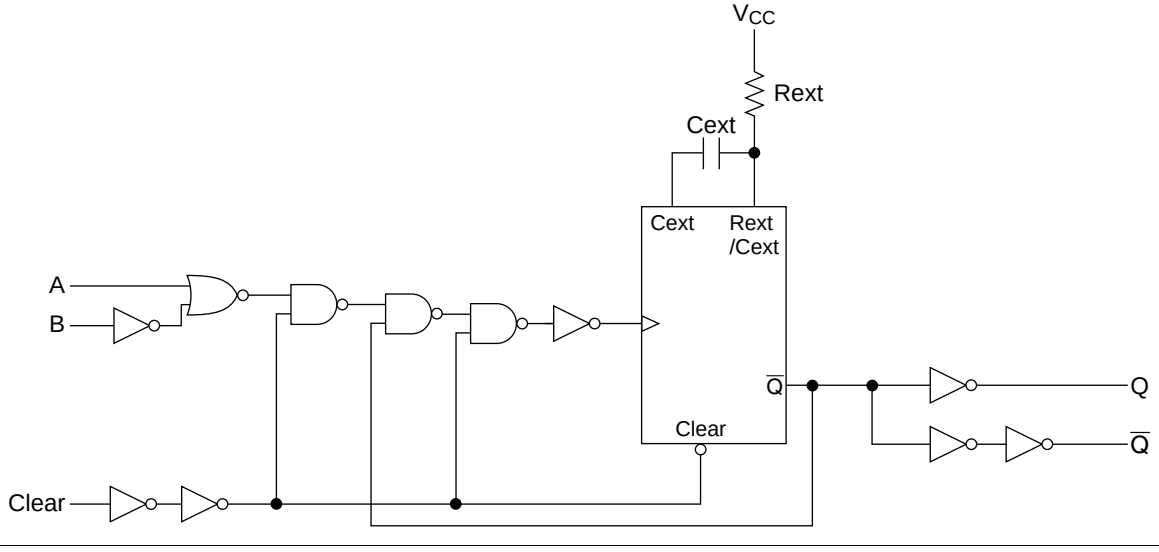
Pin Arrangement



(Top view)

Logic Diagram



DC Characteristics

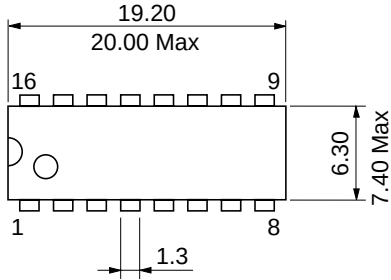
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions	
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	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	Iin	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	Iout = 0 µA
		6.0	—	—	130	—	220			Rext/Cent = 0.5 V_{CC}

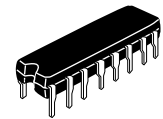
AC Characteristics (C_L = 50 pF, Input $t_r = t_f$ = 6 ns)

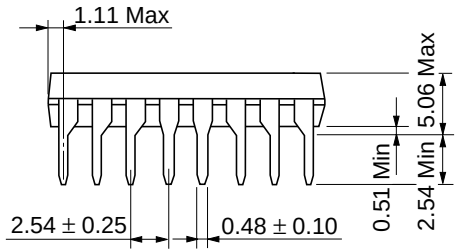
			Ta = 25°C			Ta = –40 to +85°C			
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**	**Test Conditions**
Trigger propagation delay time	t_{PLH}	2.0	—	—	210	—	265	ns	A, B or Clear to Q
		4.5	—	—	42	—	53		
		6.0	—	—	36	—	45		
	t_{PHL}	2.0	—	—	240	—	300	ns	A, B or Clear to $\overline{Q}$
		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, Rext = 6 kΩ
		4.5	—	450	—	—	—	ns	Rext = 2 kΩ
		6.0	—	380	—	—	—		
Output pulse width	t_{WQ}	4.5	0.63	0.7	0.77	—	—	ms	Cext = 0.1 µF, Rext = 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	

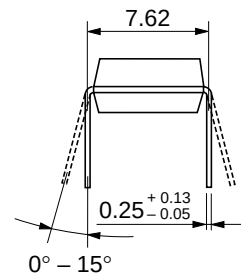
Caution in use: In order to prevent any malfunctions due to noise, connect a high-frequency performance capacitor between V_{CC} and GND, and keep the wiring between the external components and Cext, Rext/Cext pins as short as possible.

Unit: mm



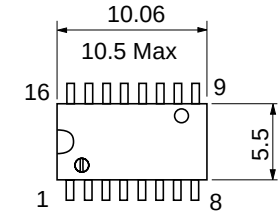


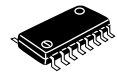


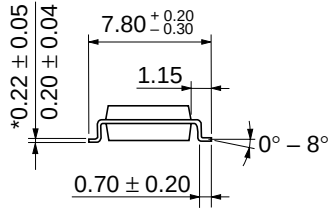


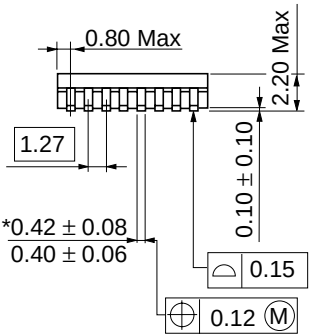
Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

Unit: mm





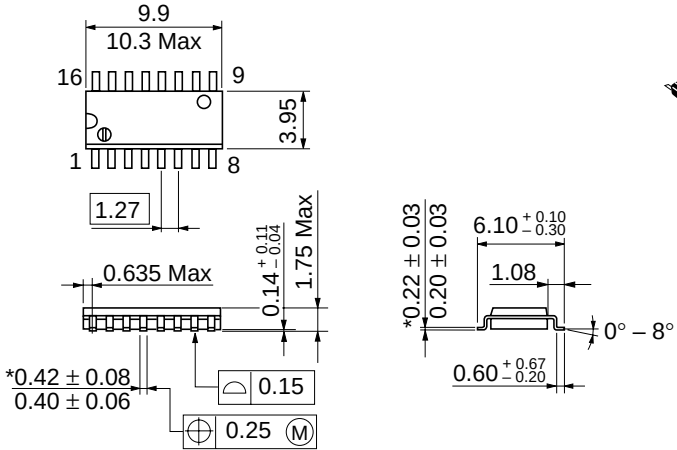


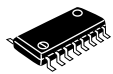


*Dimension including the plating thickness
Base material dimension

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

Unit: mm





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

*Dimension including the plating thickness
Base material dimension

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