
HD74HC221

Dual Monostable Multivibrators (with Schmitt Trigger Input)

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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

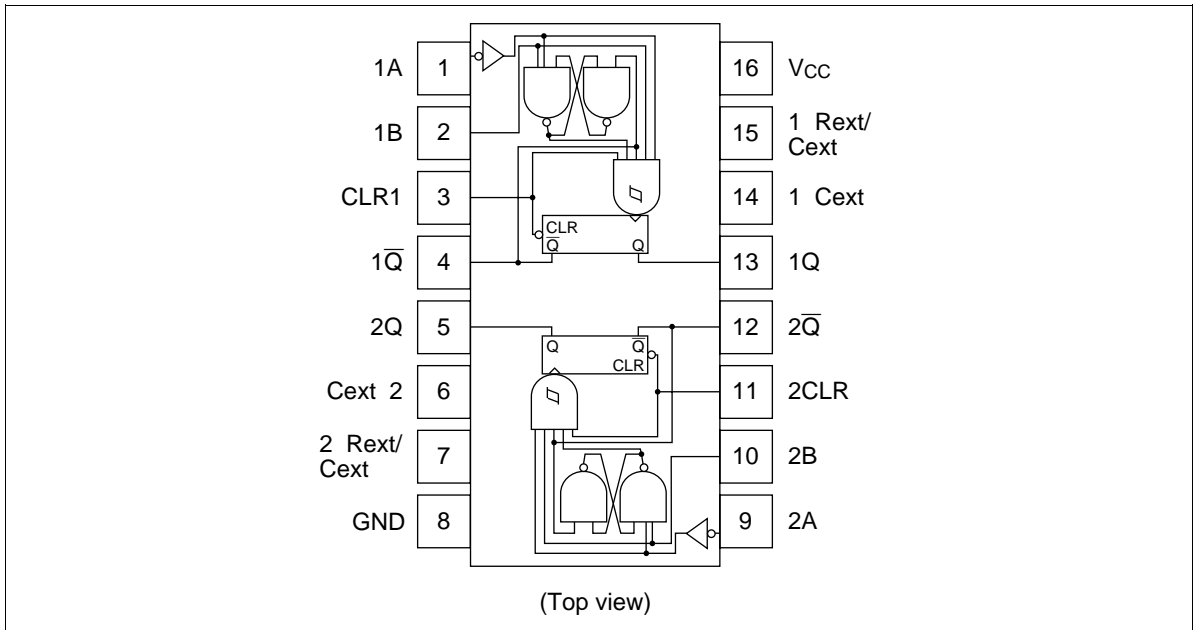
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current

Function Table

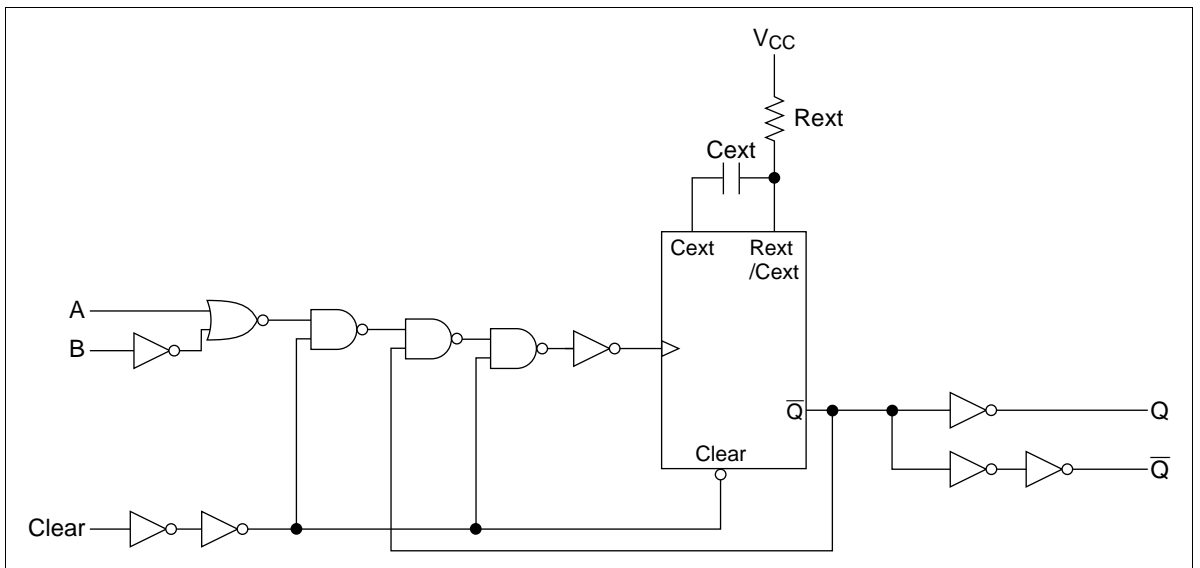
| Inputs | | | Outputs | |
|--|---|---|---|---|
| Clear | A | B | Q | \bar{Q} |
| L | X | X | L | H |
| X | H | X | L | H |
| X | X | L | L | H |
| H | L |  |  |  |
| H |  | H |  |  |
|  | L | H |  |  |

HD74HC221

Pin Arrangement



Logic Diagram



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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} | |

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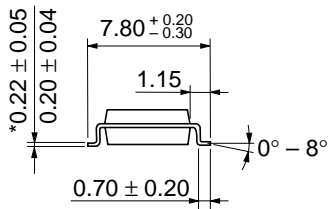
AC Characteristics ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

| Item | Symbol | V_{CC} (V) | $T_a = 25^\circ\text{C}$ | | $T_a = -40$ to $+85^\circ\text{C}$ | | 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 | $t_{WQ(\text{min})}$ | 2.0 | — | 1.5 | — | — | — | μs | 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 μF | 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.



| | |
|--------------------------|----------|
| 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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