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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HC123A

Dual Retriggerable Monostable Multivibrators (with Clear)



ADE-205-438 (Z)

1st. Edition

Sep. 2000

Description

This multivibrator features both a negative, A, and a positive, B, transition triggered input, either of which can be used as an inhibit input. Also included is a clear input that when taken low resets the one shot. The HD74HC123A can be triggered on the positive transition of the clear while A is held low and B is held high.










The HD74HC123A is retriggerable. That is it may be triggered repeatedly while their outputs are generating a pulse and the pulse will be extended.

Pulse width stability over a wide range of temperature. The output pulse equation is simply: $t_w = (R_{ext})(C_{ext})$.

Features

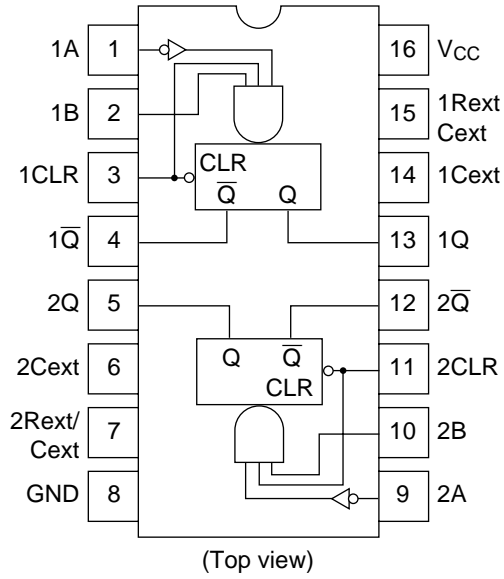
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current

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 |  |  |

Note: External timing capacitance connects between C_{ext} and R_{ext}/C_{ext} .

Pin Arrangement



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 |
| | | V _{OL} | 2.0 | — | 0.0 | 0.1 | — | | | 0.1 |
| | 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 | | I _{in} | 6.0 | — | — | ±0.1 | — | ±1.0 | μA |
| | Quiescent supply current | Standby state | I _{CC} | 6.0 | — | — | 130 | — | 220 | μA |
| Active state | | — | | — | 130 | — | 220 | μA | I _{out} = 0 μA Rext/Cext = 0.5 V _{CC} | |

HD74HC123A

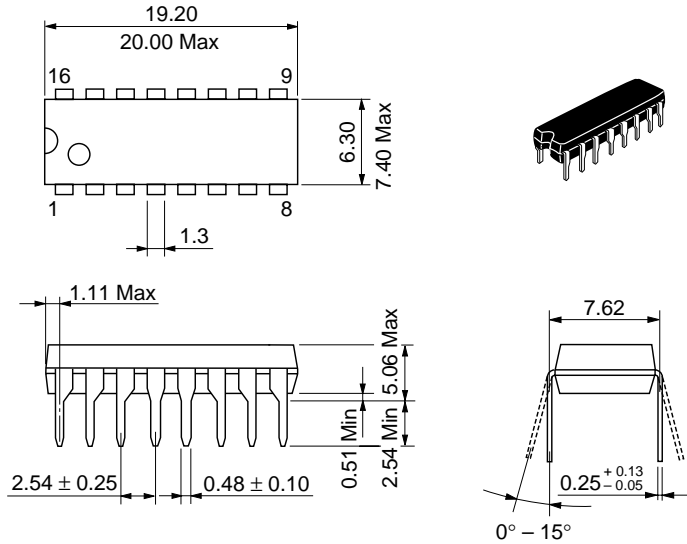
AC Characteristics ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

| 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 | | | |
| Propagation delay time | t_{PLH} | 2.0 | — | — | 210 | — | 265 | ns | A, B or Clear to Q | | | |
| | | 4.5 | — | 22 | 42 | — | 53 | | | | | |
| | | 6.0 | — | — | 36 | — | 45 | | | | | |
| | t_{PHL} | 2.0 | — | — | 240 | — | 300 | ns | A, B or Clear to \bar{Q} | | | |
| | | 4.5 | — | 23 | 48 | — | 60 | | | | | |
| | | 6.0 | — | — | 41 | — | 51 | | | | | |
| | t_{PHL} | 2.0 | — | — | 170 | — | 215 | ns | Clear to Q | | | |
| | | 4.5 | — | 18 | 34 | — | 43 | | | | | |
| | | 6.0 | — | — | 29 | — | 37 | | | | | |
| t_{PLH} | 2.0 | — | — | 180 | — | 225 | ns | Clear to \bar{Q} | | | | |
| | 4.5 | — | 16 | 36 | — | 45 | | | | | | |
| | 6.0 | — | — | 31 | — | 38 | | | | | | |
| Output rise time | t_{TLH} | 2.0 | — | — | 75 | — | 95 | ns | | | | |
| | | 4.5 | — | 5 | 15 | — | 19 | | | | | |
| | | 6.0 | — | — | 13 | — | 16 | | | | | |
| Output fall time | t_{THL} | 2.0 | — | — | 75 | — | 95 | ns | | | | |
| | | 4.5 | — | 5 | 15 | — | 19 | | | | | |
| | | 6.0 | — | — | 13 | — | 16 | | | | | |
| Pulse width | t_w | 2.0 | 150 | — | — | 190 | — | ns | A, B, Clear | | | |
| | | 4.5 | 30 | 6 | — | 38 | — | | | | | |
| | | 6.0 | 26 | — | — | 33 | — | | | | | |
| Minimum output pulse width | $t_{WQ(\min)}$ | 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 | — | 1.0 | — | — | — | ms | Cext = 0.1 μF , Rext = 10 k Ω | | | |
| Input capacitance | C_{in} | — | — | 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.

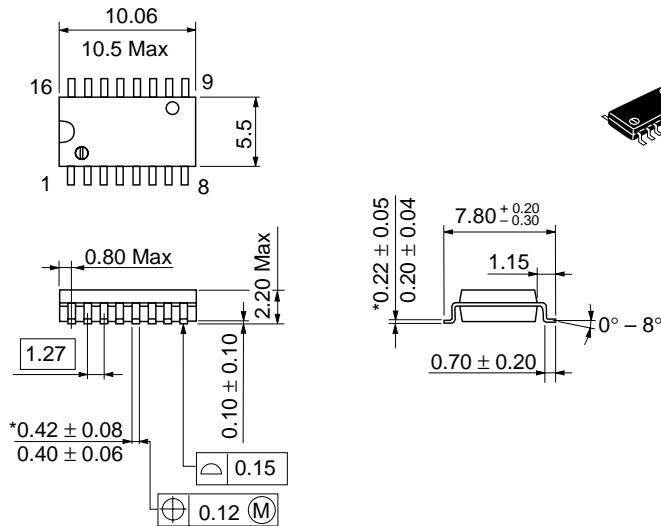
Package Dimensions

Unit: mm



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

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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