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NTE74121 Integrated Circuit TTL – One-Shot w/Clear and Complementary Outputs 14-Lead DIP Type Package

Description:

The NTE74121 is a monostable multivibrator in a 14-Lead plastic DIP type package featuring both positive and negative edge triggering with complementary outputs. An internal 2kΩ timing resistor is provided for design convenience minimizing component count and layout problems, this device can be used with a single external capacitor. Inputs (A) are active-LOW trigger transition inputs and input (B) is an active-HIGH transition Schmitt trigger input that allows jitter-free triggering from inputs with transition rates as slow as 1 volt/second. A high immunity to V_{CC} noise for typically 1.5V is also provided by internal circuitry at the input stage.

Features:

- Triggered from Active-HIGH Transition or Active-LOW Transition Inputs
- Variable Pulse Width from 30ns to 28 Seconds
- Jitter Free Schmitt-Trigger Input
- Excellent Noise Immunity Typically 1.2V
- Stable Pulse Width up to 90% Duty Cycle
- TTL, DTL Compatible
- Compensated for V_{CC} and Temperature Variations
- Input Clamping Diode

Absolute Maximum Ratings: (Note 1)

| | |
|---|----------------|
| Supply Voltage, V _{CC} | 7V |
| Input Voltage, V _I | 5.5V |
| Operating Ambient Temperature Range, T _A | 0° to +70°C |
| Storage Temperature Range, T _{stg} | -65° to +150°C |

Note 1. The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the “Electrical Characteristics” tables are not guaranteed at the Absolute Maximum Ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Recommended Operating Conditions:

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|-----------|------|-----|------|--------------|
| Supply Voltage | V_{CC} | 4.75 | 5.0 | 5.25 | V |
| Positive-Going Input Threshold Voltage at the A Input ($V_{CC} = \text{Min}$) | V_{T+} | - | 1.4 | 2.0 | V |
| Negative-Going Input Threshold Voltage at the A Input ($V_{CC} = \text{Min}$) | V_{T-} | 0.8 | 1.4 | - | V |
| Positive-Going Input Threshold Voltage at the B Input ($V_{CC} = \text{Min}$) | V_{T+} | - | 1.5 | 2.0 | V |
| Negative-Going Input Threshold Voltage at the B Input ($V_{CC} = \text{Min}$) | V_{T-} | 0.8 | 1.5 | - | V |
| High-Level Output Current | I_{OH} | - | - | -0.4 | mA |
| Low-Level Output Current | I_{OL} | - | - | 16 | mA |
| Input Pulse Width, Note 2 | t_w | 40 | - | - | ns |
| Rate of Rise or fall of Schmitt Input (B), Note 2 | dV/dt | - | - | 1 | V/s |
| Rate of Rise or fall of Schmitt Input (A), Note 2 | dV/dt | - | - | 1 | V/ μ s |
| External Timing Resistance, Note 2 | R_{ext} | 1.4 | - | 40 | k Ω |
| External Timing Capacitance, Note 2 | C_{ext} | 0 | - | 1000 | μ F |
| Duty Cycle, Note 2 $R_T = 2k\Omega$ | DC | - | - | 67 | % |
| $R_T = R_{EXT} (\text{Max})$ | | - | - | 90 | % |
| Operating Temperature Range | T_A | 0 | - | +70 | $^{\circ}$ C |

Note 2. $V_{CC} = +5V$, $T_A = +25^{\circ}C$

Electrical Characteristics: ($T_A = 0$ to $+70^{\circ}C$, Note 3, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|------------------------------------|----------|---|-----------|-----|------|------|---------|
| Input Clamp Voltage | V_{IK} | $V_{CC} = \text{Min}$, $I_I = -12\text{mA}$ | - | - | -1.5 | V | |
| HIGH Level Output Voltage | V_{OH} | $V_{CC} = \text{Min}$, $V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$, $I_{OH} = \text{Max}$ | 2.4 | 3.4 | - | V | |
| LOW Level Output Voltage | V_{OL} | $V_{CC} = \text{Min}$, $V_{IH} = \text{Max}$, $V_{IL} = \text{Min}$, $I_{OL} = \text{Max}$ | - | 0.2 | 0.4 | V | |
| Input Current at Max Input Voltage | I_I | $V_{CC} = \text{Max}$, $V_I = 5.5V$ | - | - | 1 | mA | |
| High Level Input Current | I_{IH} | $V_{CC} = \text{Max}$, $V_I = 2.4V$ | A1, A2 | - | - | 40 | μ A |
| | | | B | - | - | 80 | μ A |
| Low Level Input Current | I_{IL} | $V_{CC} = \text{Max}$, $V_I = 0.4V$ | A1, A2 | - | - | -1.6 | μ A |
| | | | B | - | - | -3.2 | μ A |
| Short-Circuit Output Current | I_{OS} | $V_{CC} = \text{Max}$, Note 4 | -18 | - | -35 | mA | |
| Supply Current | I_{CC} | $V_{CC} = \text{Max}$ | Quiescent | - | 13 | 25 | mA |
| | | | Triggered | - | 23 | 40 | mA |

Note 3. All typical values are at $V_{CC} = 5V$, $T_A = +25^{\circ}C$.

Note 4. Not more than one output should be shorted at a time.











Switching Characteristics: ($V_{CC} = 5V$, $T_A = +25^\circ C$ unless otherwise specified)



| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--|--------------|--|--|-----|-----|------|----|
| Propagation Delay Time (From A1, A2 Input to Q Output) | t_{PLH} | $C_{ext} = 80pF$, R_{INT} to V_{CC} , $R_L = 400\Omega$, $C_L = 15pF$ | - | - | 70 | ns | |
| (From B Input to Q Output) | | | - | - | 55 | ns | |
| (From A1, A2 Input to \bar{Q} Output) | t_{PHL} | | - | - | 80 | ns | |
| (From B Input to \bar{Q} Output) | | | - | - | 65 | ns | |
| Output Pulse Width (From A1, A2, or B Input to Q, \bar{Q} Output) using the Internal Timing Resistor | $t_{w(OUT)}$ | | $C_{ext} = 80pF$, R_{INT} to V_{CC} , $R_L = 400\Omega$, $C_L = 15pF$ | 70 | - | 100 | ns |
| Output Pulse Width (From A1, A2, or B Input to Q, \bar{Q} Output) using Zero Timing Capacitance | $t_{w(OUT)}$ | | $C_{ext} = 0pF$, R_{INT} to V_{CC} , $R_L = 400\Omega$, $C_L = 15pF$ | - | - | 50 | ns |
| Output Pulse Width (From A1, A2 Input to Q, \bar{Q} Output) using External Timing Resistor | $t_{w(OUT)}$ | $C_{ext} = 100pF$, $R_{INT} = 10k\Omega$, $R_L = 400\Omega$, $C_L = 15pF$ | 600 | - | 800 | ns | |
| | | $C_{ext} = 1\mu F$, $R_{INT} = 10k\Omega$, $R_L = 400\Omega$, $C_L = 15pF$ | 6 | - | 8 | ms | |

Functional Description:

The basic output pulse width is determined by selection of an internal resistor, R_{INT} or an external resistor (R_X) and capacitor (C_X). Once triggered the output pulse width is independent of further transitions of the inputs and is function of the timing components. Pulse width can vary from a few nano-seconds to 28 seconds by choosing appropriate R_X and C_X combinations. There are three trigger inputs from the device, two negative edge-triggering (A) inputs, one positive edge Schmitt-triggering (B) input..

Function Table:

| Inputs | | | Outputs | |
|--------|----|---|---|---|
| A1 | A2 | B | Q | \bar{Q} |
| L | X | H | L | H |
| X | L | H | L | H |
| X | X | L | L | H |
| H | H | X | L | H |
| H | ↓ | H |  |  |
| ↓ | H | H |  |  |
| ↓ | ↓ | H |  |  |
| L | X | ↑ |  |  |
| X | L | ↑ |  |  |

H = HIGH Logic Level
L = LOW Logic Level
X = Can be either LOW or HIGH
↑ = Positive Going Transition
↓ = Negative Going Transition
 = A Positive Pulse
 = A Negative Pulse

Pin Connection Diagram

