ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089
http://www.nteinc.com

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} = Min)	V_{T+}	–	1.4	2.0	V
Negative−Going Input Threshold Voltage at the A Input (V_{CC} = Min)	V_{T-}	0.8	1.4	–	V
Positive−Going Input Threshold Voltage at the B Input (V_{CC} = Min)	V_{T+}	–	1.5	2.0	V
Negative−Going Input Threshold Voltage at the B Input (V_{CC} = 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/μs
External Timing Resistance, Note 2	R_{ext}	1.4	–	40	kΩ
External Timing Capacitance, Note 2	C_{ext}	0	–	1000	μF
Duty Cycle, Note 2 R_T = 2kΩ	DC	–	–	67	%
$R_T = R_{EXT}$ (Max)		–	–	90	%
Operating Temperature Range	T_A	0	–	+70	°C

Note 2. .V_{CC} = +5V, T_A = +25°C

Electrical Characteristics: (T_A = 0 to +70C, Note 3, unless otherwise specified)

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

Note 3. All typical values are at V_{CC} = 5V, T_A = +25°C.
Note 4. Not more than one output should be shorted at a time.

Switching Characteristics: (V_{CC} = 5V, T_A = +25°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 = 400Ω, C_L = 15pF	–	–	70	ns
(From B Input to Q Output)			–	–	55	ns
(From A1, A2 Input to $\overline{Q}$ Output)	t_{PHL}		–	–	80	ns
(From B Input to $\overline{Q}$ Output)			–	–	65	ns
Output Pulse Width (From A1, A2, or B Input to Q, $\overline{Q}$ Output) using the Internal Timing Resistor	$t_{w(OUT)}$	C_{ext} = 80pF, R_{INT} to V_{CC}, R_L = 400Ω, C_L = 15pF	70	–	100	ns
Output Pulse Width (From A1, A2, or B Input to Q, $\overline{Q}$ Output) using Zero Timing Capacitance	$t_{w(OUT)}$	C_{ext} = 0pF, R_{INT} to V_{CC}, R_L = 400Ω, C_L = 15pF	–	–	50	ns
Output Pulse Width (From A1, A2 Input to Q, $\overline{Q}$ Output) using External Timing Resistor	$t_{w(OUT)}$	C_{ext} = 100pF, R_{INT} = 10kΩ,, R_L = 400Ω, C_L = 15pF	600	–	800	ns
		C_{ext} = 1μF, R_{INT} = 10kΩ,, R_L = 400Ω, 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**	**$\overline{Q}$**
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