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## NTE74LS13 Integrated Circuit TTL – Dual 4–Input Positive NAND Schmitt Trigger

**Description:**

The NTE74LS13 is a dual 4–Input NAND Schmitt trigger in a 14–Lead plastic DIP type package. The device is temperature–compensated and can be triggered from the slowest of input ramps and still give clean, jitter–free output signals.

**Absolute Maximum Ratings:** (Note 1)

Supply Voltage,  $V_{CC}$  ..... 7V  
 DC Input Voltage,  $V_{IN}$  ..... 7V  
 Operating Temperature Range,  $T_A$  ..... 0°C to +70°C  
 Storage Temperature Range,  $T_{stg}$  ..... –65°C to +150°C

Note 1. Unless otherwise specified, all voltages are referenced to GND.

**Recommended Operating Conditions:**

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	4.75	5.0	5.25	V
High–Level Output Current	$I_{OH}$	–	–	–0.4	mA
Low–Level Output Current	$I_{OL}$	–	–	8	mA
Operating Temperature Range	$T_A$	0	–	+70	°C

**Electrical Characteristics:** (Note 2, Note 3)

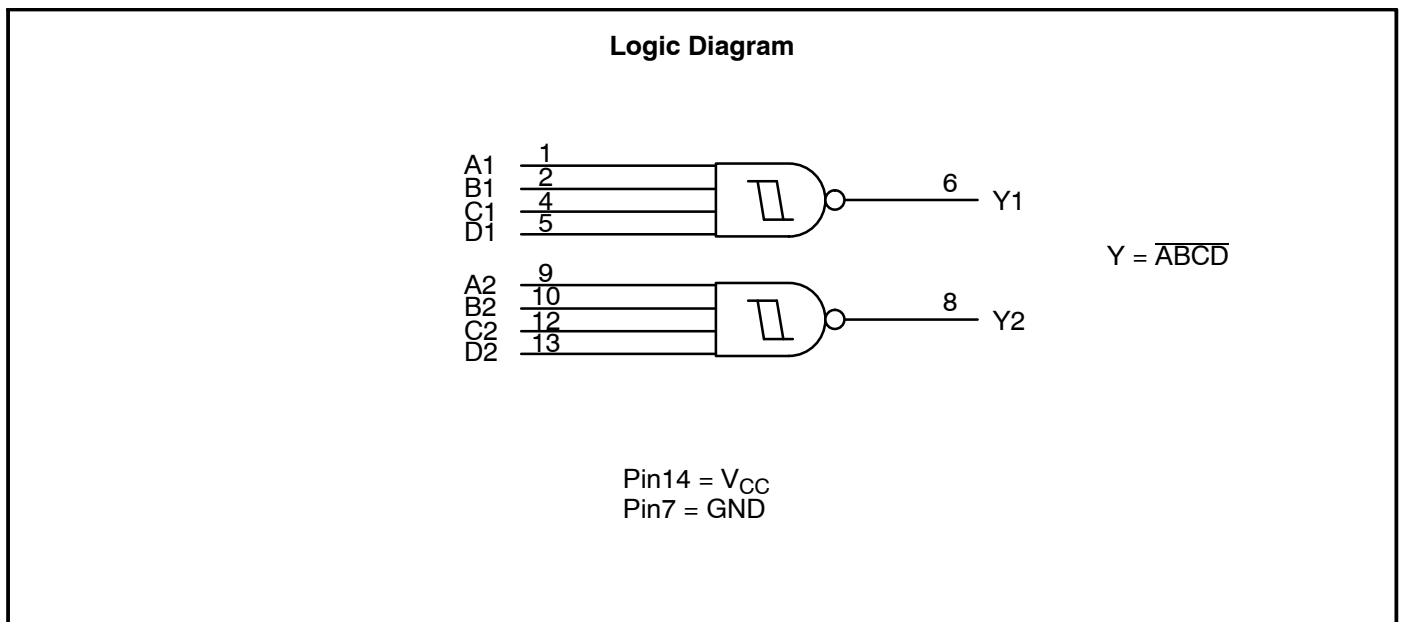
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Positive-Going Threshold Voltage	$V_{T+}$	$V_{CC} = 5V$	1.4	1.6	1.9	V
Negative-Going Threshold Voltage	$V_{T-}$	$V_{CC} = 5V$	0.5	0.8	1.0	V
Hysteresis Voltage	$V_H$	$V_{CC} = 5V$	0.4	0.8	-	V
Input Clamp Voltage	$V_{IK}$	$V_{CC} = \text{MIN}, I_I = -18\text{mA}$	-	-	-1.5	V
High Level Output Voltage	$V_{OH}$	$V_{CC} = \text{MIN}, V_I = 0.5V, I_{OH} = -0.4\text{mA}$	2.7	3.4	-	V
Low Level Output Voltage	$V_{OL}$	$V_{CC} = \text{MIN}, V_I = 1.9V, I_{OL} = 4\text{mA}$	-	0.25	0.4	V
		$V_{CC} = \text{MIN}, V_I = 1.9V, I_{OL} = 8\text{mA}$	-	0.35	0.5	V
Positive-Going Threshold Current	$I_{T+}$	$V_{CC} = 5V, V_I = V_{T+}$	-	-0.14	-	mA
Negative-Going Threshold Current	$I_{T-}$	$V_{CC} = 5V, V_I = V_{T-}$	-	-0.18	-	mA
Input Current	$I_I$	$V_{CC} = \text{MAX}, V_I = 7V$	-	-	0.1	mA
High Level Input Current	$I_{IH}$	$V_{CC} = \text{MAX}, V_I = 2.7V$	-	-	20	$\mu\text{A}$
Low Level Input Current	$I_{IL}$	$V_{CC} = \text{MAX}, V_I = 0.4V$	-	-	-0.4	mA
Short-Circuit Output Current	$I_{OS}$	$V_{CC} = \text{MAX}, \text{Note 4}$	-20	-	-100	mA
High Level Supply Current	$I_{CCH}$	$V_{CC} = \text{MAX}$	-	2.9	6.0	mA
Low Level Supply Current	$I_{CCL}$	$V_{CC} = \text{MAX}$	-	4.1	7.0	mA

Note 2. For conditions shown as MIN or MAX, use the appropriate value specified under "Recommended Operation Conditions".

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time From Any Input to Y Output)	$t_{PLH}$	$R_L = 2k\Omega, C_L = 15\text{pF}$	-	15	22	ns
	$t_{PHL}$		-	18	27	ns



### Pin Connection Diagram

