

GD54/74LS30

8-INPUT POSITIVE NAND GATE

Description

This device contains a single 8-input NAND gate and performs the following Boolean functions in positive logic.

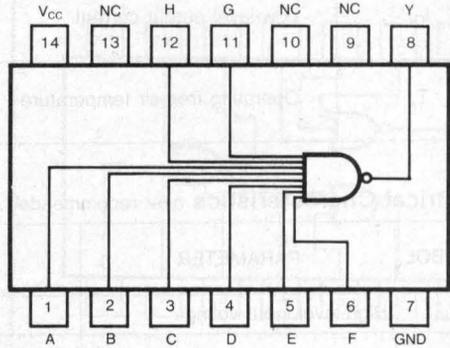
$$Y = \overline{A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H} \text{ or}$$

$$Y = \overline{A} + \overline{B} + \overline{C} + \overline{D} + \overline{E} + \overline{F} + \overline{G} + \overline{H}$$

Function Table

INPUTS A THRU H	OUTPUT Y
All inputs H	L
One or more inputs L	H

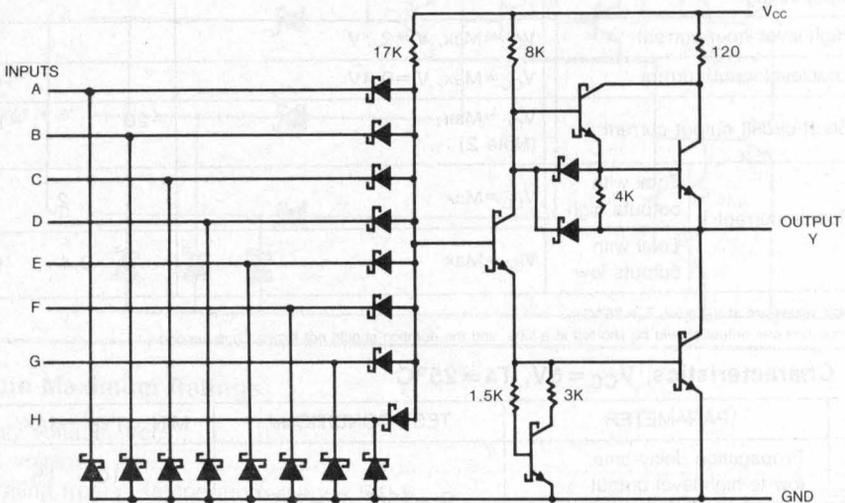
Pin Configuration



NC: No internal connection

Suffix-Blank: Plastic Dual In Line Package
 Suffix-J : Ceramic Dual In Line Package

Circuit Schematics (each gate)



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input voltage 7V
- Operating free-air temperature range 54LS -55°C to 125°C
74LS 0°C to 70°C
- Storage temperature range -65°C to 150°C

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
I_{OH}	High-level output current	54,74			-400	μA
I_{OL}	Low-level output current	54			4	mA
		74			8	
T_A	Operating free-air temperature	54	-55		125	$^{\circ}\text{C}$
		74	0		70	

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT	
V_{IH}	High-level input voltage			2		V	
V_{IL}	Low-level input voltage		54		0.7	V	
			74		0.8		
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}, I_I = -18\text{mA}$			-1.5	V	
V_{OH}	High-level output voltage	$V_{CC} = \text{Min}, I_{OH} = \text{Max}, V_{IL} = \text{Max}$	54	2.5	3.4	V	
			74	2.7	3.4		
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}$	54,74		0.25	0.4	V
					$I_{OL} = 4\text{mA}$	0.35	
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}$			0.1	mA	
I_{IH}	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$			20	μA	
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$			-0.4	mA	
I_{OS}	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)			-20	-100	mA
I_{CCH}	Supply current	Total with outputs high	$V_{CC} = \text{Max}$		0.36	0.5	mA
I_{CCL}		Total with outputs low	$V_{CC} = \text{Max}$		0.6	1.1	mA

Note 1: All typical values are at $V_{CC} = 5\text{V}, T_A = 25^{\circ}\text{C}$.

Note 2: Not more than one output should be shorted at a time, and duration should not exceed one second.

Switching Characteristics, $V_{CC} = 5\text{V}, T_A = 25^{\circ}\text{C}$

SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time low-to-high-level output,	$C_L = 15\text{pF}, R_L = 2\text{k}\Omega$		8	15	ns
t_{PHL}	Propagation delay time high-to-low-level output,			13	20	

#For load circuit and voltage wave forms, see page 3-11.