

# 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.

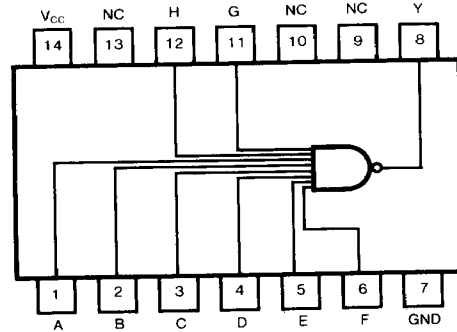
$$Y = \overline{A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H} \text{ or}$$

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

### Function Table

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

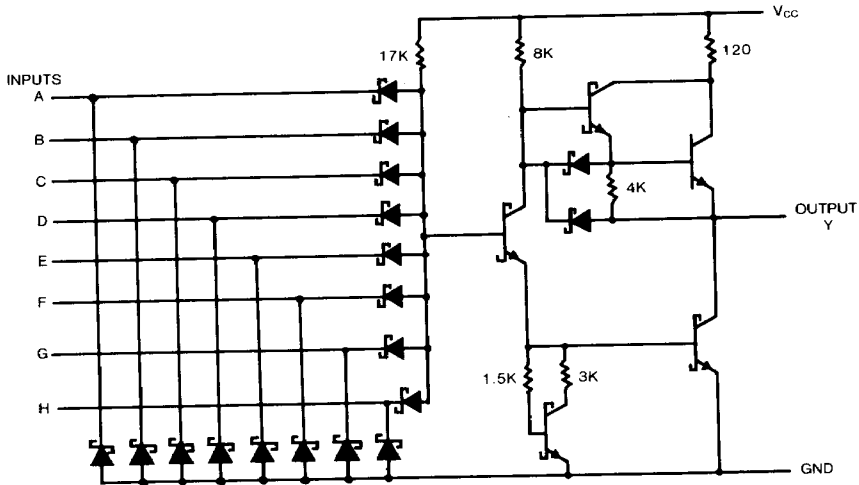
### Pin Configuration



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 .....  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$   
74LS .....  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$
- Storage temperature range .....  $-65^{\circ}\text{C}$  to  $150^{\circ}\text{C}$

## 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	$\mu\text{A}$
$I_{OL}$	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	TYP			UNIT	
			MIN	(Note 1)	MAX		
$V_{IH}$	High-level input voltage		2			V	
$V_{IL}$	Low-level input voltage		54			0.7	
			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	$V_{CC}=\text{Min}, V_{IL}=\text{Max}$ $I_{OH}=\text{Max}$	54	2.5	3.4	V	
			74	2.7	3.4		
$V_{OL}$	Low-level output voltage	$V_{CC}=\text{Min}$ $V_{IH}=\text{Min}$	$I_{OL}=4\text{mA}$	54, 74	0.25	0.4	V
			$I_{OL}=8\text{mA}$	74	0.35	0.5	
$I_I$	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 $\mu\text{A}$	
$I_{IL}$	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		

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.