

GD54/74LS00

QUADRUPLE 2-INPUT POSITIVE NAND GATES

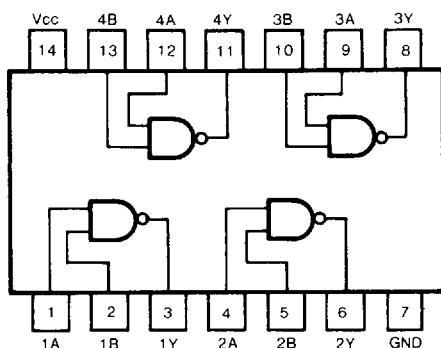
Description

This device contains four independent 2-input NAND gates. It performs the Boolean functions $Y = \overline{A \cdot B}$ or $Y = \overline{A + B}$ in positive logic.

Function Table (each gate)

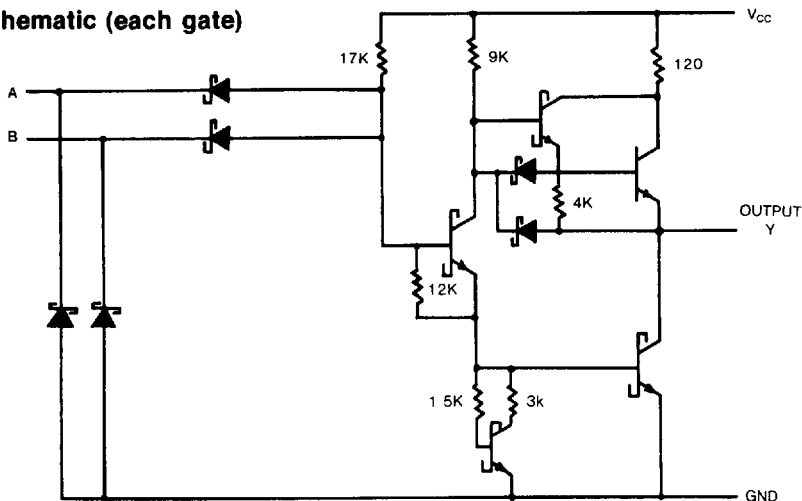
INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

Pin Configuration



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

Circuit Schematic (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	$^{\circ}C$
		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	$V_{CC} = \text{Min}$, $V_{IL} = \text{Max}$	54	2.5	3.4	V
		$I_{OH} = \text{Max}$, $V_{IH} = \text{Min}$	74	2.7	3.4	
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$, $I_{OL} = 4\text{mA}$	54, 74	0.25	0.4	V
		$V_{IH} = \text{Min}$, $I_{OL} = 8\text{mA}$	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	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	μA
I_{CCH}	Supply current	Total with outputs high $V_{CC} = \text{Max}$		0.8	1.6	mA
I_{CCL}		Total with outputs low $V_{CC} = \text{Max}$		2.4	4.4	mA

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

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

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

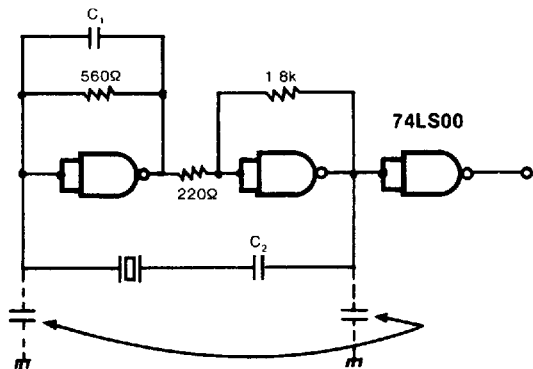
SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	$C_L = 15\text{pF}$, $R_L = 2\text{k}\Omega$		9	15	ns
t_{PHL}	Propagation delay time, high-to-low-level output			10	15	ns

For load circuit and voltage waveforms, see page 3-11.

Application Example

Crystal Clock Generator

(1) GD74LS00



Frequency (MHz)	C_1 (pF)	C_2 (pF)
1~ 3	47	24
3~ 4	47	22
4~ 6	22	24
6~ 8	22	22
8~10	10	20
10~13	0	20
13~16	0	18

(2) GD74LS04

