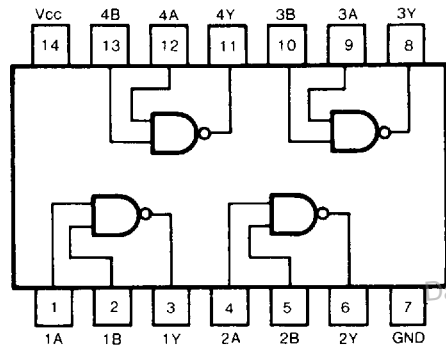# GD54/74LS00

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 $Y = \overline{A} + \overline{B}$ in positive logic.

Pin Configuration

Vcc	4B	4A	4Y	3B	3A	3Y
14	13	12	11	10	9	8

1	2	3	4	5	6	7
1A	1B	1Y	2A	2B	2Y	GND

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

Function Table (each gate)

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

Circuit Schematic (each gate)
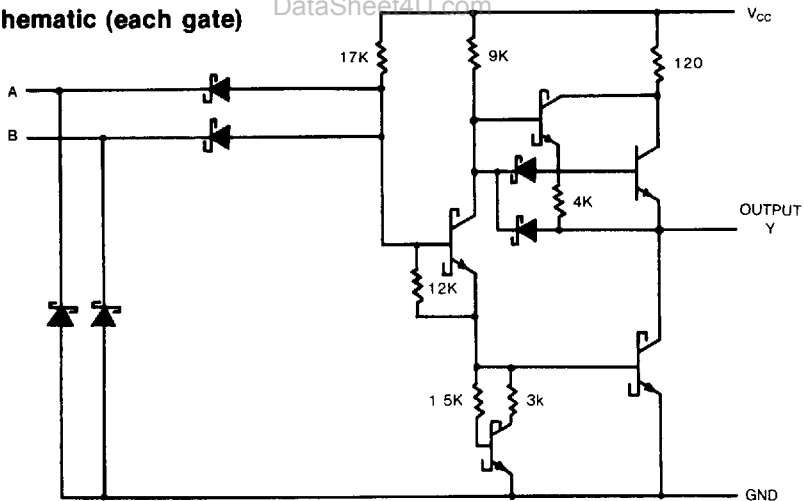
Absolute Maximum Ratings

- Supply voltage, Vcc 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	°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}=Min, I_I=−18mA				−1 5	V
V_{OH}	High-level output voltage	V_{CC}=Min, V_{IL}=Max I_{OH}=Max, V_{IH}=Min	54	2 5	3 4		V
			74	2.7	3.4		
V_{OL}	Low-level output voltage	V_{CC}=Min V_{IH}=Min	I_{OL}=4mA 54, 74		0.25	0 4	V
			I_{OL}=8mA 74		0 35	0 5	
I_I	Input current at maximum input voltage	V_{CC}=Max, V_I=7V				0 1	mA
I_{IH}	High-level input current	V_{CC}=Max, V_I=2 7V				20	μA
I_{IL}	Low-level input current	V_{CC}=Max, V_I=0 4V				−0 4	mA
I_{OS}	Short-circuit output current	V_{CC}=Max (Note 2)		−20		−100	μA
I_{CCH}	Supply current	Total with outputs high	V_{CC}=Max		0 8	1 6	mA
I_{CCL}		Total with outputs low	V_{CC}=Max		2.4	4 4	mA

Note 1   All typical values are at V_{CC}=5V T_A=25°C
Note 2   Not more than one output should be shorted at a time and the duration should not exceed ond second

Switching Characteristics, V_{CC} = 5V, T_A = 25°C

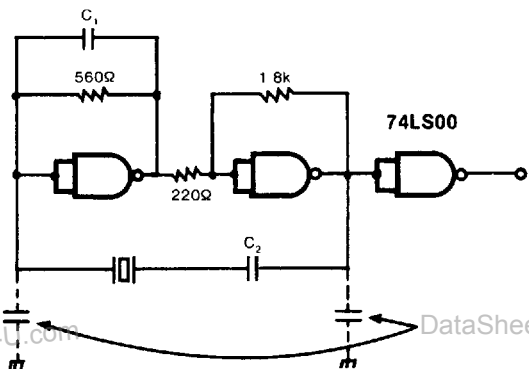| SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L=15pF, R_L=2kΩ		9	15	ns
t_{PHL}	Propagation delay time, high-to-low-level output			10	15	ns

#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