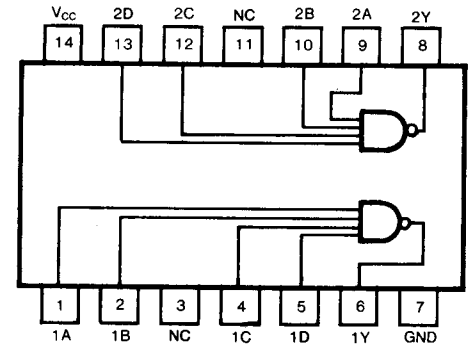
GD54/74S20

DUAL 4-INPUT POSITIVE NAND GATES

Description

This device contains two independent 4-input NAND gates. It performs the Boolean functions, $Y=\overline{A.B.C.D}$ or $Y=\overline{A}+\overline{B}+\overline{C}+\overline{D}$ in positive logic.

Pin Configuration



NC: No internal connection

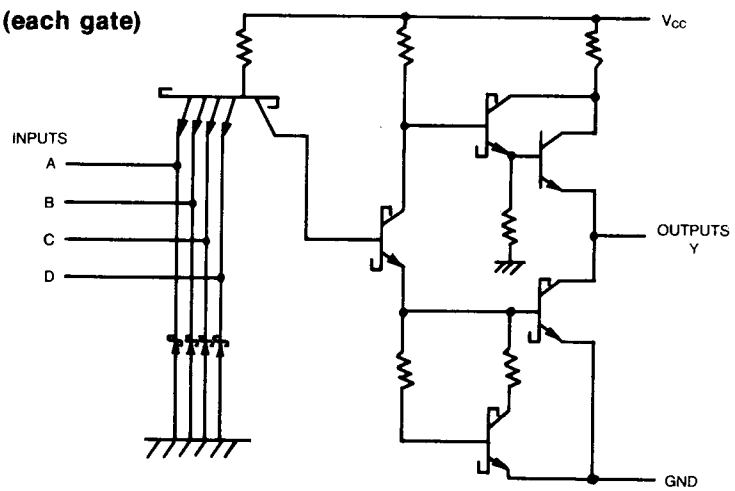
Suffix-Blank: Plastic Dual In Line Package
Suffix-J : Ceramic Dual In Line Package

Function Table (each gate)

INPUTS		OUTPUT
A	N*	Y
L	L	H
H	L	H
L	H	H
H	H	L

*N=B·C·D

Schematic (each gate)



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input voltage 5.5V
- Operating free-air temperature range 54S .....−55°C to 125°C
  74S ..... 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				−1	mA
I_{OL}	Low-level output current				20	mA
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			0.8	V
				74			0.8	
V_{IK}	Input clamp voltage		V_{CC}=Min, I_I=−18mA				−1.2	V
V_{OH}	High-level output voltage		V_{CC}=Min, V_{IL}=Max, I_{OH}=Max	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}=Max				0.5	V
I_I	Input current at maximun input voltage		V_{CC}=Max, V_I=5.5V				1	mA
I_{IH}	High-level input current		V_{CC}=Max, V_I=2.7V				50	μA
I_{IL}	Low-level input current		V_{CC}=Max, V_I=0.5V				−2	mA
I_{OS}	Short-circuit output current		V_{CC}=Max (Note 2)		−40		−100	mA
I_{CCH}	Supply current	Total with outputs high	V_{CC}=Max			5	8	mA
I_{CCL}		Total with outputs low	V_{CC}=Max			10	18	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 one second.

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

SYMBOL	PARAETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L=15pF, R_L=280Ω		3	4.5	ns
t_{PHL}	Propagation delay time, high-to-low-level output			3	5	

#For load circuit and voltage waveforms, see page 3-12.