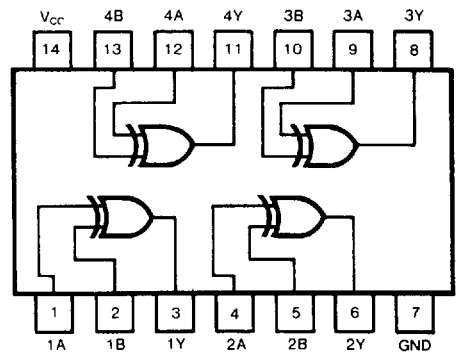
GD54/74LS86

QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

Description

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

Pin Configuration

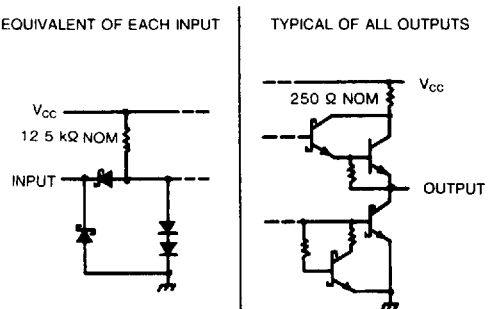


Suffix-Blank. Plastic Dual In Line Package
Suffix-J Ceramic Dual In Line Package

Function Table (each gate)

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

Schematics of Inputs and Outputs



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_{IL}=Max, 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					0.2	mA
I_{IH}	High-level input current	V_{CC}=Max, V_I=2.7V					40	μA
I_{IL}	Low-level input current	V_{CC}=Max, V_I=0 4V					−0.8	mA
I_{OS}	Short-circuit output current	V_{CC}=Max (Note 2)			−20		−100	mA
I_{CCH}	Supply current, Total with outputs high	V_{CC}=Max				6.1	10	mA
I_{CCL}	Supply current, Total with outputs low	V_{CC}=Max				9	15	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 duration should not exceed one second

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

PARAMETER*	FROM (INPUT)	TEST CONDITION#		MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Other input low	C_L=15 pF, R_L=2KΩ		12	23	ns
t_{PHL}					10	17	
t_{PLH}	A or B	Other input high			20	30	ns
t_{PHL}					13	22	

* t_{PLH}=propagation delay time low to-high-level output
* t_{PHL}=propagation delay time high to-low level output
#For load circuit and voltage waveforms, see page 3-11