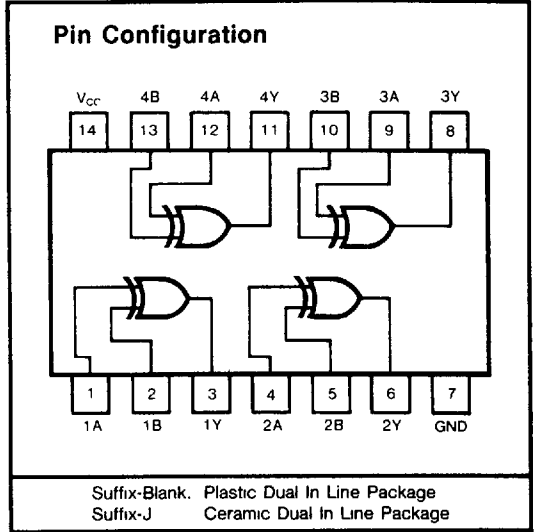


GD54/74LS86

QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

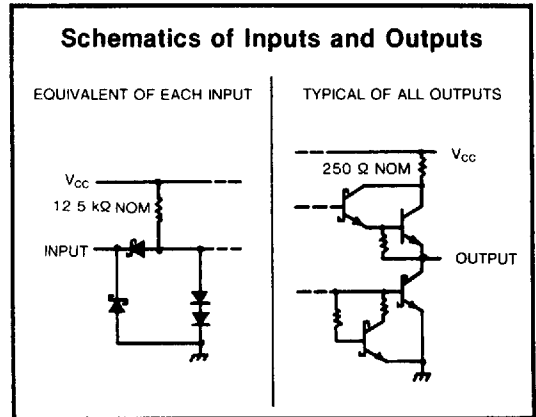
Description

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



Function Table (each gate)

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



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	μ A
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	$V_{CC} = \text{Min}, V_{IL} = \text{Max}$	54,74		0.25	0.4	
		$V_{IH} = \text{Min}, I_{OL} = 8\text{mA}$			74		0.35
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}$			0.2	mA	
I_{IH}	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$			40	μ A	
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$			-0.8	mA	
I_{OS}	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)		-20	-100	mA	
I_{CCH}	Supply current	Total with outputs high	$V_{CC} = \text{Max}$		6.1	10	mA
I_{CCL}		Total with outputs low	$V_{CC} = \text{Max}$		9	15	mA

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

PARAMETER*	FROM (INPUT)	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Other input low			12	ns
t_{PHL}					23	
t_{PLH}	A or B	Other input high			10	ns
t_{PHL}					17	
t_{PLH}	A or B	Other input high			20	ns
t_{PHL}					30	
t_{PLH}	A or B	Other input high			13	ns
t_{PHL}					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