

# GD54/74LS10

## TRIPLE 3-INPUT POSITIVE NAND GATES

### Description

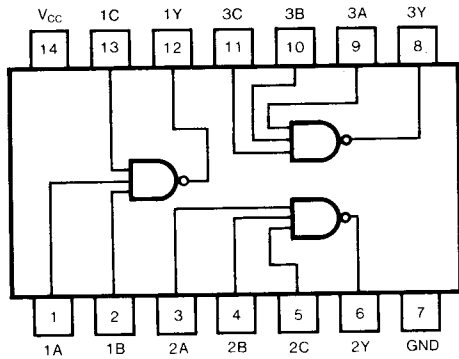
This device contains three independent 3-input NAND gates. It performs the Boolean functions  $Y = \overline{A \cdot B \cdot C}$  or  $Y = \overline{\overline{A} + \overline{B} + \overline{C}}$  in positive logic.

### Function Table (each gate)

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

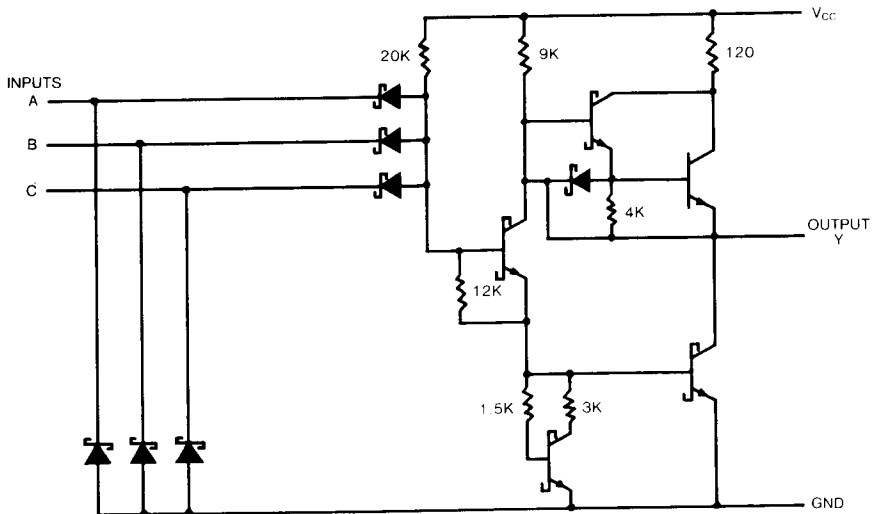
\*  $N = B \cdot C$

### 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 .....  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$   
74LS .....  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$
- Storage temperature range .....  $-65^{\circ}\text{C}$  to  $150^{\circ}\text{C}$

**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	$\mu\text{A}$
$I_{OL}$	Low-level output current	54			4	mA
		74			8	
$T_A$	Operating free-air temperature	54	-55		125	$^{\circ}\text{C}$
		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	$V_{CC} = \text{Min}, I_{OH} = \text{Max}, V_{IL} = \text{Max}$	54	2.5	3.4	V	
			74	2.7	3.4		
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}$	$I_{OL} = 4\text{mA}$	74	0.25	0.4	V
			$I_{OL} = 8\text{mA}$	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	$\mu\text{A}$	
$I_{IL}$	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	mA	
$I_{CCH}$	Supply current	Total with outputs high	$V_{CC} = \text{Max}$		0.6	1.2	mA
		Total with outputs low	$V_{CC} = \text{Max}$		1.8	3.3	

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 the duration should not exceed one second.

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

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	

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