

# GD54/74LS04

## HEX INVERTERS

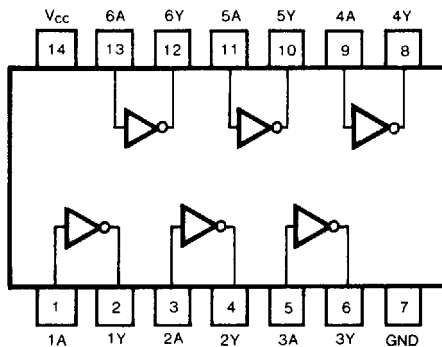
### Description

This device contains six independent inverters. It performs the Boolean function  $Y = \bar{A}$ .

### Function Table (each inverter)

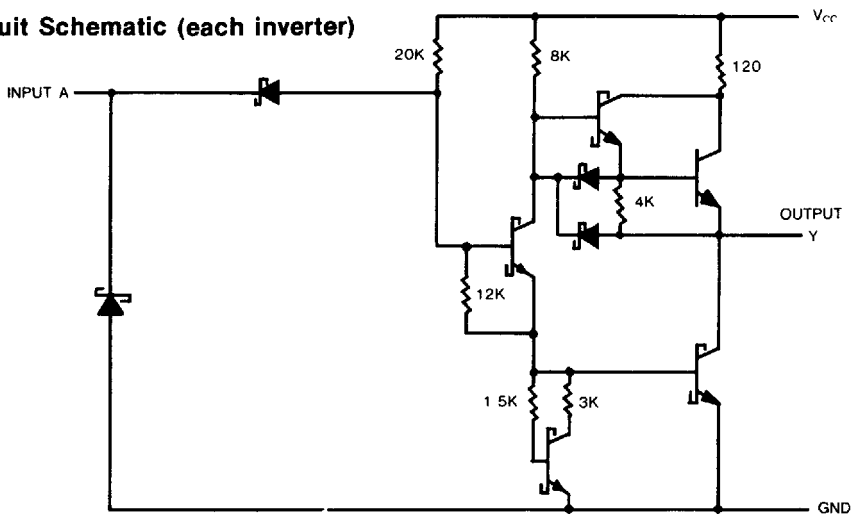
INPUT	OUTPUT
A	Y
H	L
L	H

### Pin Configuration



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

### Circuit Schematic (each inverter)



### 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	$\mu A$
$I_{OL}$	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 (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	
		$I_{OH} = \text{Max}$	74	2.7	3.4		
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{Min}, I_{OL} = 4\text{mA}$	54,74		0.25	0.4	V
		$V_{IH} = \text{Min}, I_{OL} = 8\text{mA}$	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	$\mu A$
$I_{IL}$	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	$V_{CC} = \text{Max}$		1.2	2.4	mA
$I_{CCL}$		Total with outputs low	$V_{CC} = \text{Max}$		3.6	6.6	mA

Note 1: All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^{\circ}C$ .

Note 2: Not more than one output should be shorted at a time, and duration should not exceed one second

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

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	ns

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