

GD54/74S05

HEX INVERTERS WITH OPEN-COLLECTOR OUTPUTS

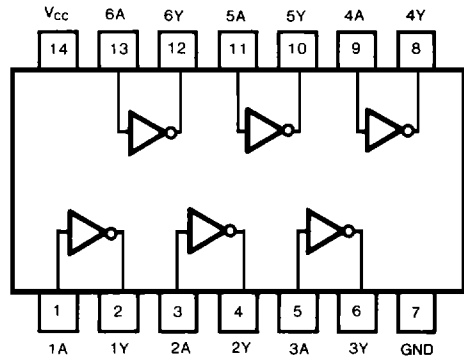
Description

This device contains six independent inverters. It performs the Boolean function $Y = \bar{A}$. The open collector outputs require pull-up resistor to perform correctly. Open-collector devices are often used to generate higher V_{OH} levels.

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

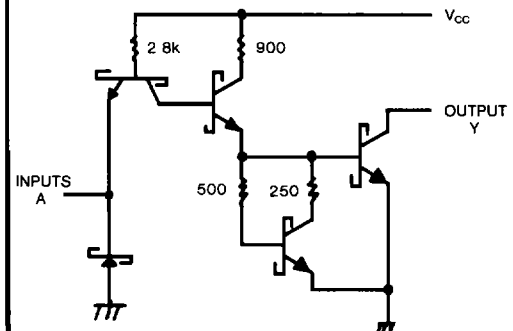
Pull-Up Resistor Equations

$$R_{MAX} = \frac{V_{CC}(\text{Min}) - V_{OH}}{N_1(I_{OH}) + N_2(I_{IH})}$$

$$R_{MIN} = \frac{V_{CC}(\text{Max}) - V_{OL}}{I_{OL} - N_3(I_{IL})}$$

Where: $N_1(I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2(I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3(I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Circuit 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	
V_{OH}	High-level output voltage	54, 74			5.5	V
I_{OL}	Low-level output current	54, 74			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				0.8	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}, I_I = -18\text{mA}$			-1.2	V
I_{OH}	High-level output current	$V_{CC} = \text{Min}, V_{OH} = \text{Max}, V_{IL} = \text{Max}$			250	μA
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$ $I_{OL} = \text{Max}, V_{IH} = \text{Min}$			0.5	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}, V_I = 5.5\text{V}$			1	mA
I_{IH}	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$			50	μA
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.5\text{V}$			-2	mA
I_{CCH}	Supply current	Total with outputs high	$V_{CC} = \text{Max}$	9.0	19.8	mA
I_{CCL}		Total with outputs low	$V_{CC} = \text{Max}$	30	54	mA

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

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	$C_L = 15\text{pF}, R_L = 280\Omega$		5	7.5	ns
t_{PHL}	Propagation delay time, high-to-low-level output		4.5	7		

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