

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

Pull-Up Resistor Equations

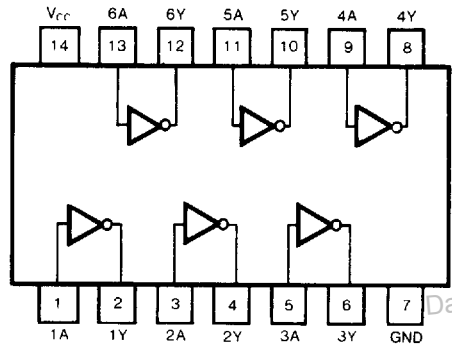
$$R_{MAX} = \frac{V_{CC(Min)} - V_{OH}}{N_1(I_{OH}) + N_2(I_{IH})}$$

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

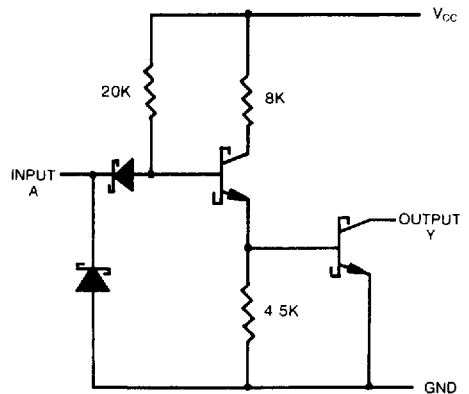
Where: $N_1(I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2(I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3(I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Absolute Maximum Ratings

- Supply voltage, V_{CC} www.DataSheet4U.com
- Input voltage 7V
- output 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

Pin Configuration

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

Circuit Schematic (each gate)

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			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 (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	
I_{OH}	High-level output current	$V_{CC} = \text{Min}, V_{IL} = \text{Min}$ $V_{OH} = \text{Max}$			100	μA	
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$ $V_{IH} = \text{Min}$	$I_{OL} = 4\text{mA}$	54, 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	μA
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$				-0.4	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

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	$C_L = 15\text{pF}, R_L = 2\text{k}\Omega$		17	32	ns
t_{PHL}	Propagation delay time, high-to-low-level output			15	28	ns

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