

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

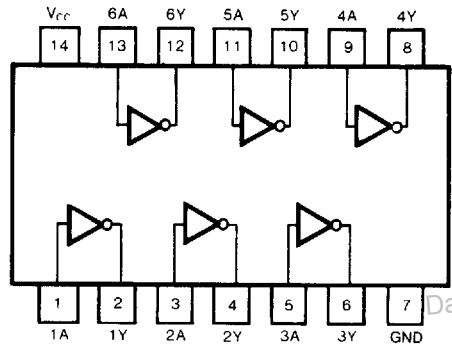
$$R_{MAX} = \frac{V_{CC(Min)} - V_{OH}}{N_1(I_{OH}) + N_2(I_{IH})}$$

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

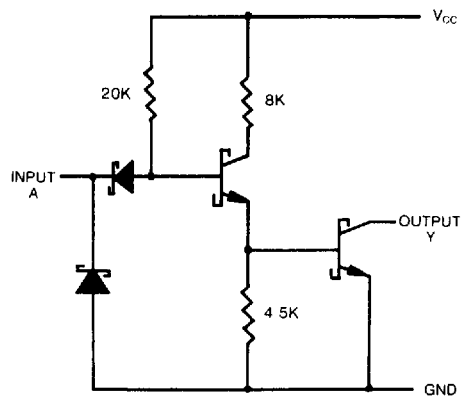
Where: $N_1(I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2(I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3(I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

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