

GD54/74S08

QUADRUPLE 2-INPUT POSITIVE AND GATES

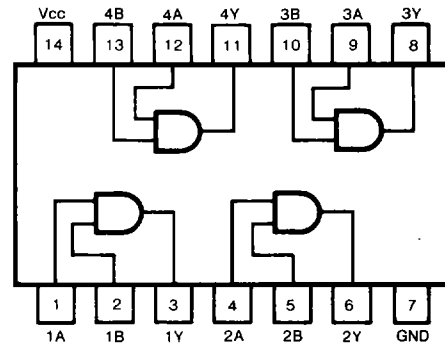
Description

This device contains four independent 2-input AND gates. It performs the Boolean functions $Y=A \cdot B$ or $Y=\overline{A+B}$ in positive logic.

Function Table (each gate)

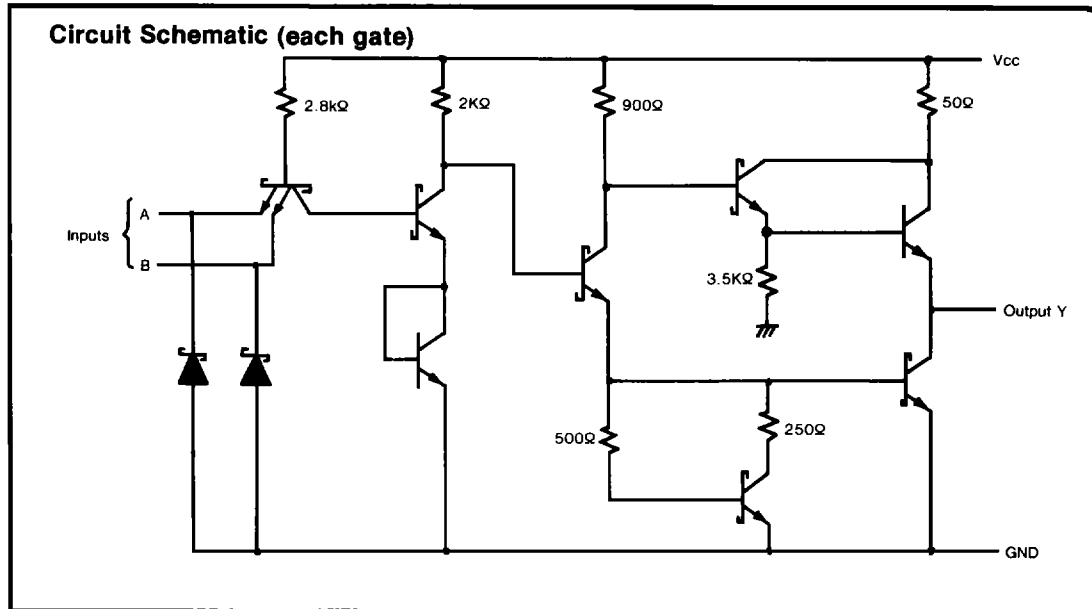
| INPUT | | OUTPUT |
|-------|---|--------|
| A | B | Y |
| H | H | H |
| L | X | L |
| X | L | L |

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 5.5V
- Operating free-air temperature range 54 S -65°C to 150°C
 74 S 0°C to 70°C
- Storage temperature range -65°C to 150°C

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

| 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 | | | | -1000 | μ A |
| I_{OL} | Low-level output current | | | | 20 | mA |
| T_A | Operating free-air temperature | 54 | -55 | | 125 | $^{\circ}$ 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 | | 0.8 | V |
| | | | 74 | | 0.8 | |
| V_{IK} | Input clamp voltage | $V_{CC} = \text{Min}, I_I = -18 \text{ mA}$ | | | -1.2 | V |
| V_{OH} | High level output voltage | $V_{CC} = \text{Min}, I_{OH} = \text{Max}, V_{IH} = \text{Min}$ | 54 | 2.5 | 3.4 | V |
| | | | 74 | 2.7 | 3.4 | |
| V_{OL} | Low-level output voltage | $V_{CC} = \text{Min}, V_{IL} = \text{Max}, I_{OL} = \text{Max}$ | | | 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 | μ A |
| I_{IL} | Low-level input current | $V_{CC} = \text{Max}, V_I = 0.5\text{V}$ | | | -2 | mA |
| I_{OS} | Short-circuit output current | $V_{CC} = \text{Max}$ (Note 2) | -40 | | -100 | mA |
| I_{CCH} | Supply current | Total with outputs high | $V_{CC} = \text{Max}$ | 18 | 32 | mA |
| I_{CCL} | | Total with outputs low | $V_{CC} = \text{Max}$ | 32 | 57 | mA |

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

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