

GD54/74LS11

TRIPLE 3-INPUT POSITIVE AND GATES

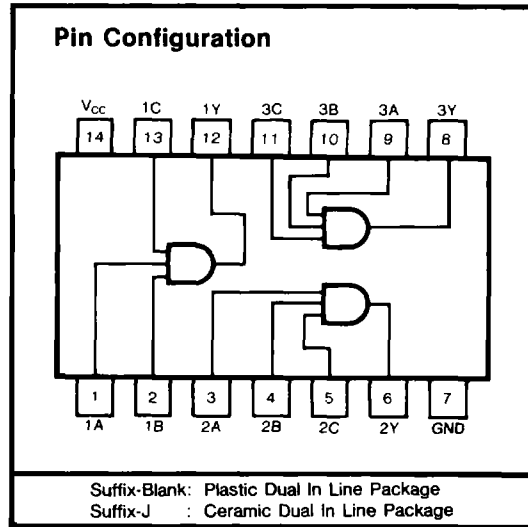
Description

This device contains three independent 3-input AND gates. It performs the Boolean functions $Y=A \cdot B \cdot C$ or $Y=\overline{A+B+C}$ in positive logic.

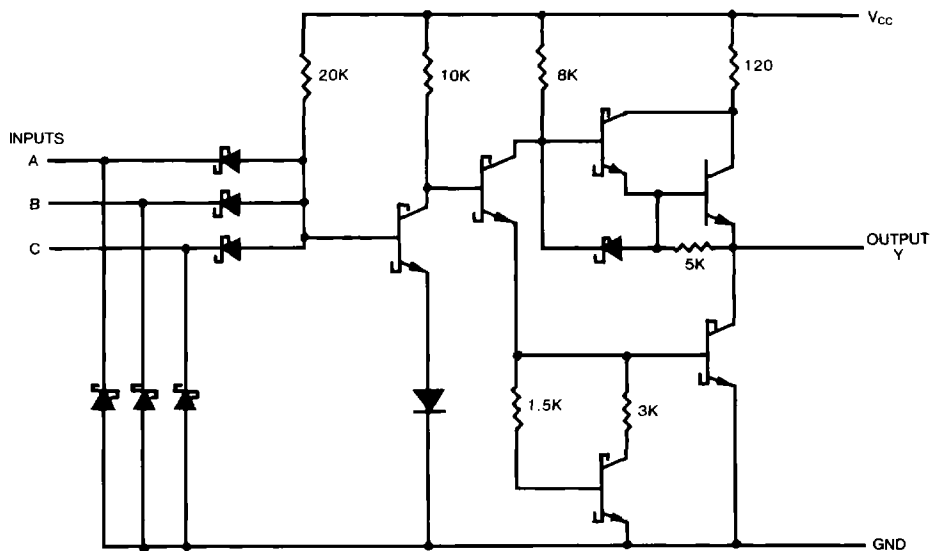
Function Table (each gate)

| INPUTS | | OUTPUT |
|--------|----|--------|
| A | N* | Y |
| L | L | L |
| H | L | L |
| L | H | L |
| H | H | H |

* $N=B \cdot C$



Circuit Schematic (each gate)



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input 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

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 | μA | |
| 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 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 | | 0.7 | 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 | $V_{CC} = \text{Min}$ $I_{OH} = \text{Max}$ | $V_{IH} = \text{Min}$ | 54 | 2.5 | 3.4 | V |
| | | | | 74 | 2.7 | 3.4 | |
| V_{OL} | Low-level output voltage | $V_{CC} = \text{Min}$ $V_{IL} = \text{Max}$ | $I_{OL} = 4\text{mA}$ | 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_{OS} | Short-circuit output current | $V_{CC} = \text{Max}$ (Note 2) | -20 | | -100 | mA | |
| I_{CCH} | Supply current | Total with outputs high | $V_{CC} = \text{Max}$ | | 1.8 | 3.6 | mA |
| I_{CCL} | | Total with outputs low | $V_{CC} = \text{Max}$ | | 3.3 | 6.6 | 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 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 | $C_L = 15\text{pF}, R_L = 2\text{k}\Omega$ | | 8 | 15 | ns |
| t_{PHL} | Propagation delay time, high-to-low-level output | | | 10 | 20 | |

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