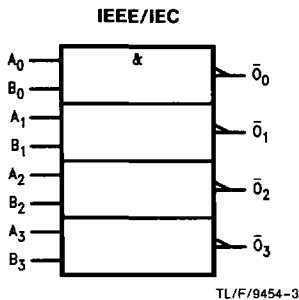




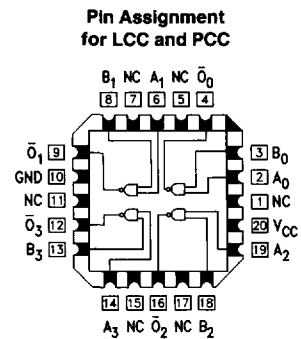
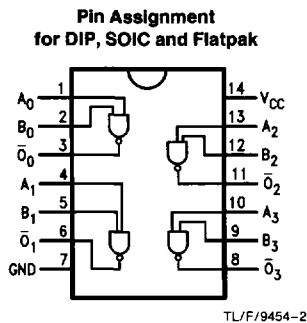
54F/74F00 Quad 2-Input NAND Gate

Ordering Code: See Section 5

Logic Symbol



Connection Diagrams



Unit Loading/Fan Out: See Section 2 for U.L. definitions

| Pin Names | Description | 54F/74F | |
|-------------|-------------|------------------|---|
| | | U.L. HIGH/LOW | Input I_{IH}/I_{IL} Output I_{OH}/I_{OL} |
| A_n, B_n | Inputs | 1.0/1.0 | $20 \mu A / -0.6 \text{ mA}$ |
| \bar{O}_n | Outputs | 50/33.3 | $-1 \text{ mA} / 20 \text{ mA}$ |

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

| | |
|---|--------------------------------------|
| Storage Temperature | -65°C to +150°C |
| Ambient Temperature under Bias | -55°C to +125°C |
| Junction Temperature under Bias | -55°C to +175°C |
| V _{CC} Pin Potential to Ground Pin | -0.5V to +7.0V |
| Input Voltage (Note 2) | -0.5V to +7.0V |
| Input Current (Note 2) | -30 mA to +5.0 mA |
| Voltage Applied to Output in HIGH State (with V _{CC} = 0V) | |
| Standard Output | -0.5V to V _{CC} |
| TRI-STATE® Output | -0.5V to +5.5V |
| Current Applied to Output in LOW State (Max) | twice the rated I _{OL} (mA) |

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

| | |
|------------------------------|-----------------|
| Free Air Ambient Temperature | |
| Military | -55°C to +125°C |
| Commercial | 0°C to +70°C |
| Supply Voltage | |
| Military | +4.5V to +5.5V |
| Commercial | +4.5V to +5.5V |

DC Electrical Characteristics

| Symbol | Parameter | 54F/74F | | | Units | V _{CC} | Conditions |
|------------------|-----------------------------------|-------------------------|-----|------|-------|-----------------|---|
| | | Min | Typ | Max | | | |
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | | Recognized as a HIGH Signal |
| V _{IL} | Input LOW Voltage | | | 0.8 | V | | Recognized as a LOW Signal |
| V _{CD} | Input Clamp Diode Voltage | | | -1.2 | V | Min | I _{IN} = -18 mA |
| V _{OH} | Output HIGH Voltage | 54F 10% V _{CC} | 2.5 | | V | Min | I _{OH} = -1 mA I _{OH} = -1 mA I _{OH} = -1 mA |
| | | 74F 10% V _{CC} | 2.5 | | | | |
| | | 74F 5% V _{CC} | 2.7 | | | | |
| V _{OL} | Output LOW Voltage | 54F 10% V _{CC} | | 0.5 | V | Min | I _{OL} = 20 mA I _{OL} = 20 mA |
| | | 74F 10% V _{CC} | | 0.5 | | | |
| I _{IH} | Input HIGH Current | | | 20 | μA | Max | V _{IN} = 2.7V |
| I _{BVI} | Input HIGH Current Breakdown Test | | | 100 | μA | Max | V _{IN} = 7.0V |
| I _{IL} | Input LOW Current | | | -0.6 | mA | Max | V _{IN} = 0.5V |
| I _{OS} | Output Short-Circuit Current | -60 | | -150 | mA | Max | V _{OUT} = 0V |
| I _{CEX} | Output HIGH Leakage Current | | | 250 | μA | Max | V _{OUT} = V _{CC} |
| I _{CCH} | Power Supply Current | | 1.9 | 2.8 | mA | Max | V _O = HIGH |
| I _{CCL} | Power Supply Current | | 6.8 | 10.2 | mA | Max | V _O = LOW |

AC Electrical Characteristics: See Section 2 for Waveforms and Load Configurations

| Symbol | Parameter | 74F | | | 54F | | 74F | | Units | Fig No |
|------------------|---|---|-----|-----|--|-----|--|-----|-------|--------|
| | | T _A = +25°C V _{CC} = +5.0V C _L = 50 pF | | | T _A , V _{CC} = Mil C _L = 50 pF | | T _A , V _{CC} = Com C _L = 50 pF | | | |
| | | Min | Typ | Max | Min | Max | Min | Max | | |
| t _{PLH} | Propagation Delay | 2.4 | 3.7 | 5.0 | 2.0 | 7.0 | 2.4 | 6.0 | ns | 2-3 |
| t _{PHL} | A _n , B _n to O _n | 1.5 | 3.2 | 4.3 | 1.5 | 6.5 | 1.5 | 5.3 | | |