

74F132 Quad 2-Input NAND Schmitt Trigger

General Description

The F132 contains four 2-input NAND gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have a greater noise margin than conventional NAND gates.

Each circuit contains a 2-input Schmitt Trigger followed by level shifting circuitry and a standard FAST™ output struc-

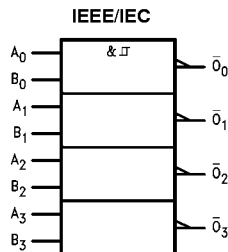
ture. The Schmitt Trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input threshold (typically 800 mV) is determined by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

Ordering Code:

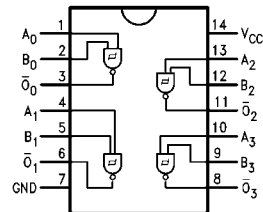
| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| 74F132SC | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow |
| 74F132SJ | M14D | 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| 74F132PC | N14A | 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



Unit Loading/Fan Out

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

Function Table

| Inputs | | Outputs |
|--------|---|-----------|
| A | B | \bar{O} |
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

H = HIGH Voltage Level
L = LOW Voltage Level

Absolute Maximum Ratings (Note 1)

| | |
|--|--------------------------------------|
| Storage Temperature | -65°C to +150°C |
| Ambient Temperature under Bias | -55°C to +125°C |
| Junction Temperature under Bias | -55°C to +150°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} |
| 3-STATE Output | -0.5V to +5.5V |
| Current Applied to Output in LOW State (Max) | twice the rated I _{OL} (mA) |
| ESD Last Passing Voltage (Min) | 4000V |

Recommended Operating Conditions

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

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.

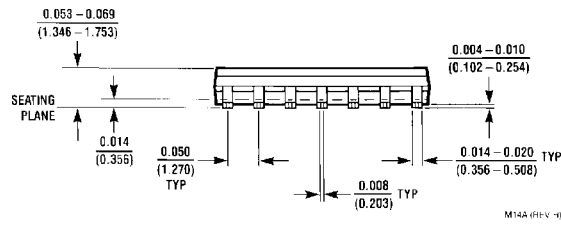
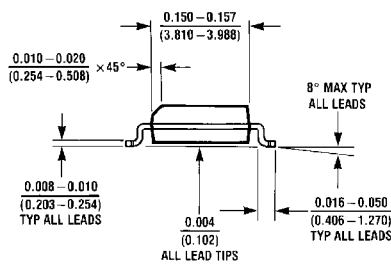
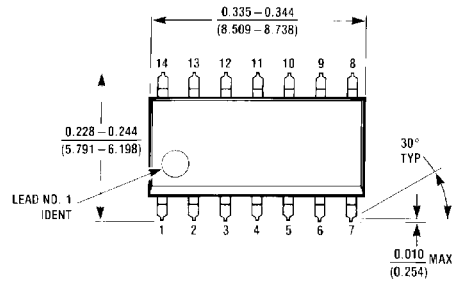
DC Electrical Characteristics

| Symbol | Parameter | Min | Typ | Max | Units | V _{CC} | Conditions |
|------------------|---|---|-----|------|-------|-----------------|--|
| V _{T+} | Positive-going Threshold | 1.5 | | 2.0 | V | 5.0 | |
| V _{T-} | Negative-going Threshold | 0.7 | | 1.1 | V | 5.0 | |
| ΔV _T | Hysteresis (V _{T+} - V _{T-}) | 0.4 | | | V | 5.0 | |
| V _{CD} | Input Clamp Diode Voltage | | | -1.2 | V | Min | I _{IN} = -18 mA |
| V _{OH} | Output HIGH Voltage | 10% V _{CC} 5% V _{CC} | 2.5 | | V | Min | I _{OH} = -1 mA I _{OH} = -1 mA |
| V _{OL} | Output LOW Voltage | 10% V _{CC} | | 0.5 | V | Min | I _{OL} = 20 mA |
| I _{IH} | Input HIGH Current | | | 5.0 | μA | Max | V _{IN} = 2.7V |
| I _{BVI} | Input HIGH Current Breakdown Test | | | 7.0 | μA | Max | V _{IN} = 7.0V |
| I _{CEX} | Output HIGH Leakage Current | | | 50 | μA | Max | V _{OUT} = V _{CC} |
| V _{ID} | Input Leakage Test | 4.75 | | | V | 0.0 | I _{ID} = 1.9 μA All Other Pins Grounded |
| I _{OD} | Output Leakage Circuit Current | | | 3.75 | μA | 0.0 | V _{IOD} = 150 mV All Other Pins Grounded |
| 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 _{CCH} | Power Supply Current | | | 17.0 | mA | Max | V _O = HIGH |
| I _{CCL} | Power Supply Current | | | 18.0 | mA | Max | V _O = LOW |

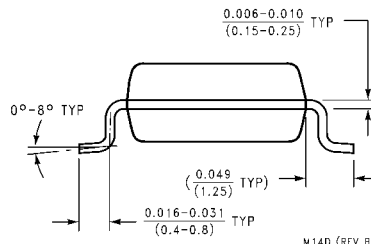
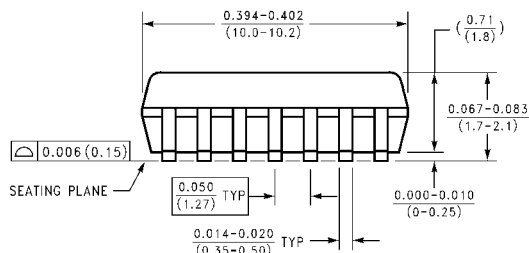
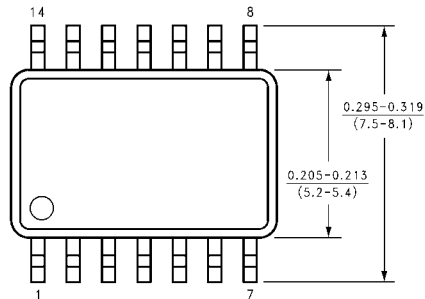
AC Electrical Characteristics

| Symbol | Parameter | T _A = +25°C V _{CC} = +5.0V C _L = 50 pF | | | T _A = 0°C to +70°C V _{CC} = +5.0V C _L = 50 pF | | Units |
|------------------|--|---|-----|------|--|------|-------|
| | | Min | Typ | Max | Min | Max | |
| t _{PLH} | Propagation Delay | 4.0 | | 10.5 | 3.5 | 12.0 | ns |
| t _{PHL} | A _n , B _n to \bar{O}_n | 5.0 | | 12.5 | 5.0 | 13.0 | |

Physical Dimensions inches (millimeters) unless otherwise noted

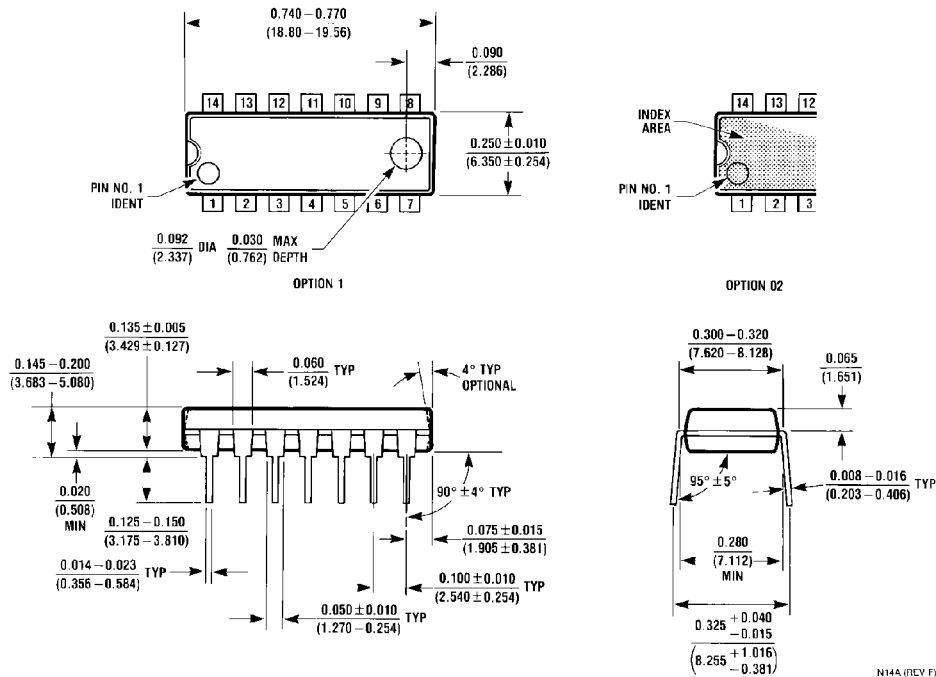


14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow Package Number M14A



14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M14D

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N14A

N14A (REV F)

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