

54F/74F00

Quad 2-Input NAND Gate

General Description

This device contains four independent gates, each of which performs the logic NAND function.

Features

- Guaranteed 4000V minimum ESD protection

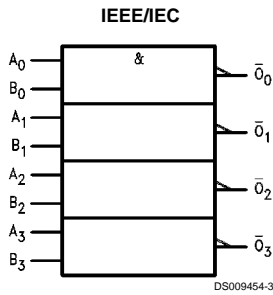
Ordering Code: See Section 0

| Commercial | Military | Package Number | Package Description |
|------------------|------------------|----------------|---|
| 74F00PC | | N14A | 14-Lead (0.300" Wide) Molded Dual-In-Line |
| | 54F00DM (Note 2) | J14A | 14-Lead Ceramic Dual-In-Line |
| 74F00SC (Note 1) | | M14A | 14-Lead (0.150" Wide) Molded Small Outline, JEDEC |
| 74F00SJ (Note 1) | | M14D | 14-Lead (0.300" Wide) Molded Small Outline, EIAJ |
| | 54F00FM (Note 2) | W14B | 14-Lead Cerpack |
| | 54F00LM (Note 2) | E20A | 20-Lead Ceramic Leadless Chip Carrier, Type C |

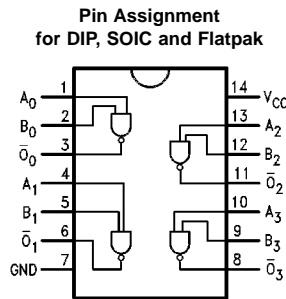
Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

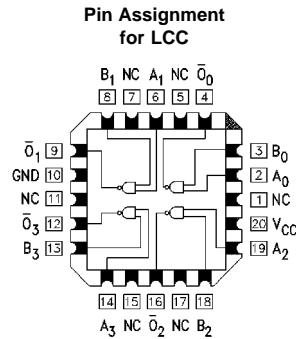
Logic Symbol



Connection Diagrams



DS009454-2



DS009454-1

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Unit Loading/Fan Out

See Section 0 for U.L. definitions

DSXXX

| Pin Names | Description | 54F74F | |
|-------------|-------------|------------------|---|
| | | U.L. HIGH/LOW | Input I_{IH}/I_{IL} 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 |

Absolute Maximum Ratings (Note 3)

| | |
|---|--------------------------|
| 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 |
| Plastic | -55°C to +150°C |
| V _{CC} Pin Potential to Ground Pin | -0.5V to +7.0V |
| Input Voltage (Note 4) | -0.5V to +7.0V |
| Input Current (Note 4) | -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)
ESD Last Passing Voltage (Min) 4000V

Recommended Operating Conditions

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

Note 3: 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 4: Either voltage limit or current limit is sufficient to protect inputs.

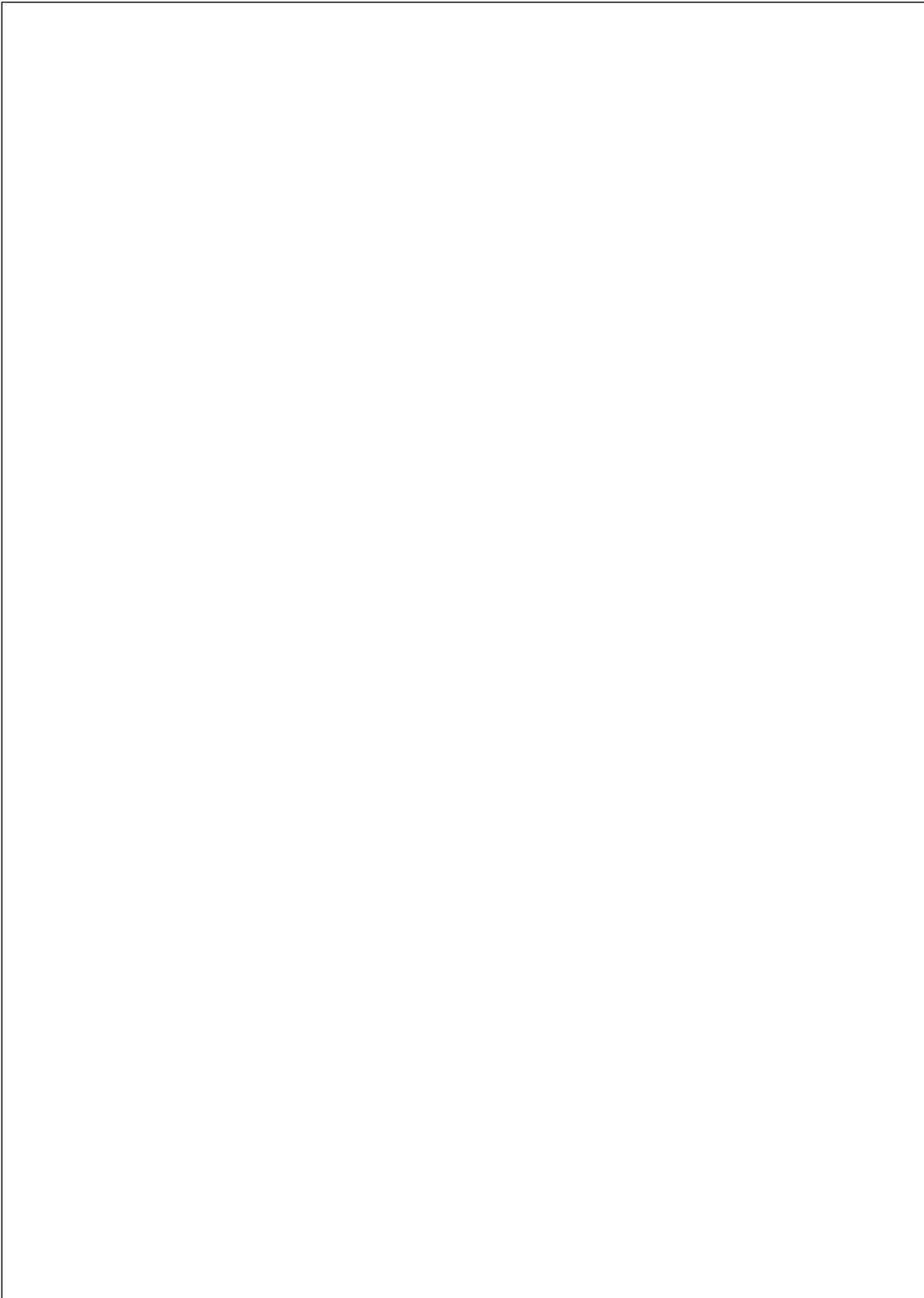
DC Electrical Characteristics

| 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 |
| | | 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 |
| | | 74F 10% V _{CC} | 0.5 | | | | |
| I _{IH} | Input HIGH Current | 54F | 20.0 | | μA | Max | V _{IN} = 2.7V |
| | | 74F | 5.0 | | | | |
| I _{BVI} | Input HIGH Current Breakdown Test | 54F | 100 | | μA | Max | V _{IN} = 7.0V |
| | | 74F | 7.0 | | | | |
| I _{CEx} | Output HIGH Leakage Current | 54F | 250 | | μA | Max | V _{OUT} = V _{CC} |
| | | 74F | 50 | | | | |
| V _{ID} | Input Leakage Test | 74F | 4.75 | | V | 0.0 | I _{ID} = 1.9 μA All other pins grounded |
| I _{OD} | Output Leakage Circuit Current | 74F | 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 | | | mA | Max | V _{OUT} = 0V |
| I _{CCH} | Power Supply Current | 1.9 | | | mA | Max | V _O = HIGH |
| I _{CCL} | Power Supply Current | 6.8 | | | mA | Max | V _O = LOW |

AC Electrical Characteristics

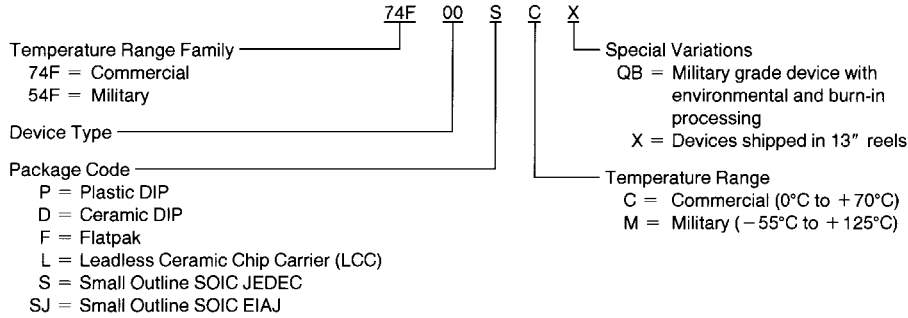
See Section 0 for Waveforms and Load Configurations

| 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 | ◆◆◆◆ |
| t _{PHL} | A _n , B _n to \bar{O}_n | 1.5 | 3.2 | 4.3 | 1.5 | 6.5 | 1.5 | 5.3 | | |



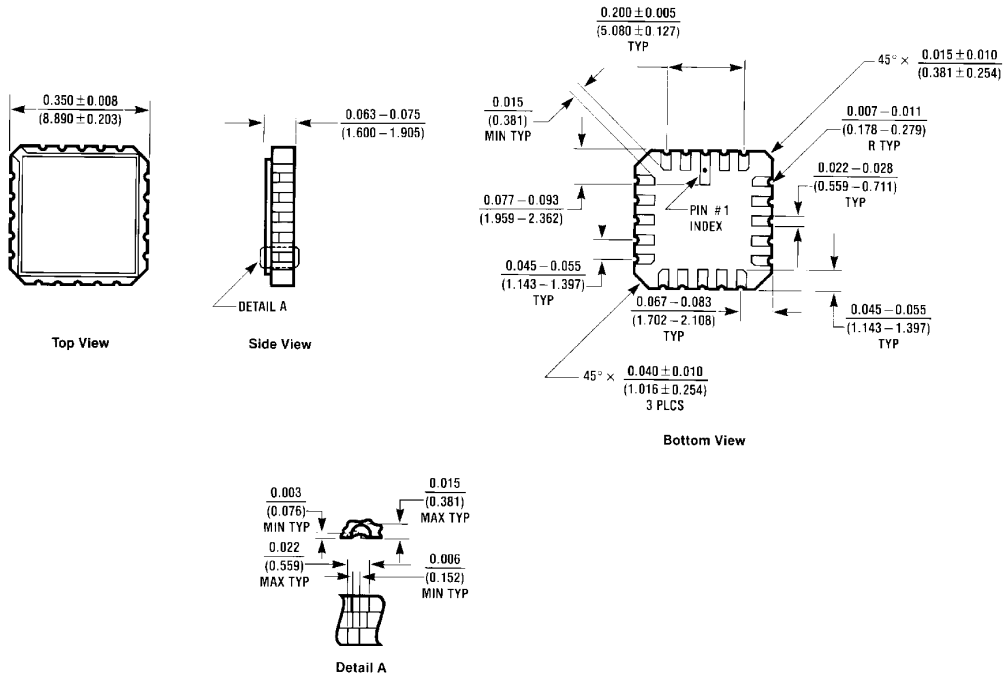
Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



DS009454-4

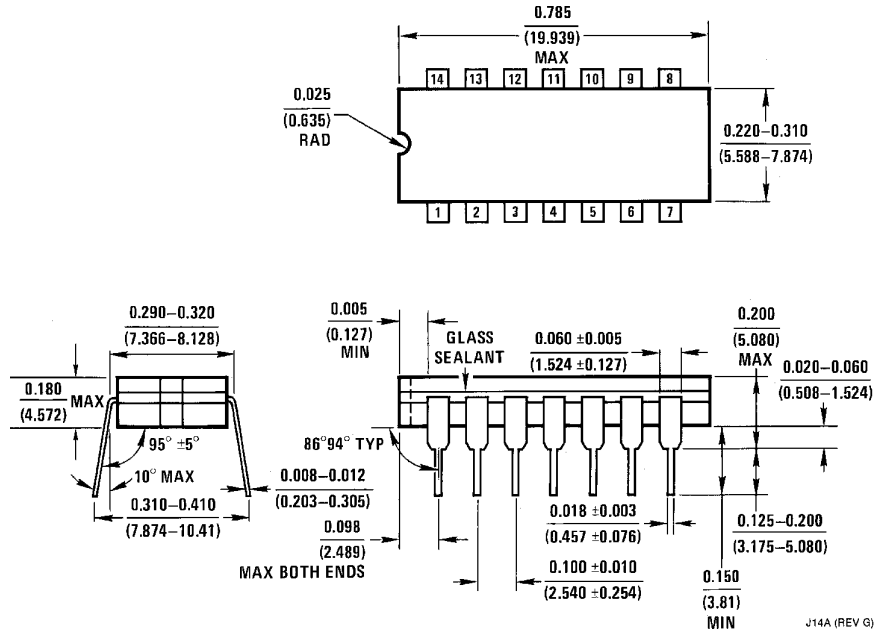
Physical Dimensions inches (millimeters) unless otherwise noted



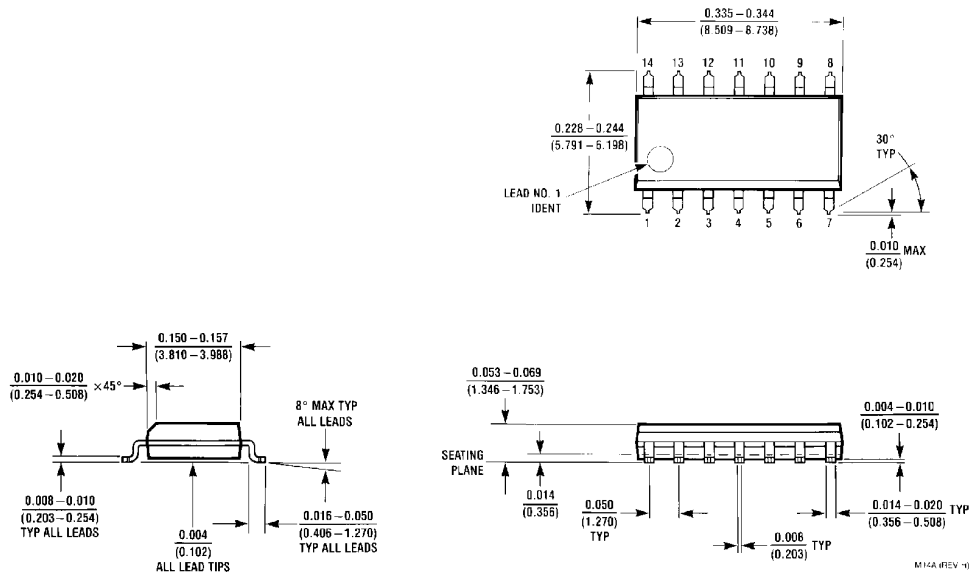
E20A (REV 01)

**20-Lead Ceramic Leadless Chip Carrier (L)
NS Package Number E20A**

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

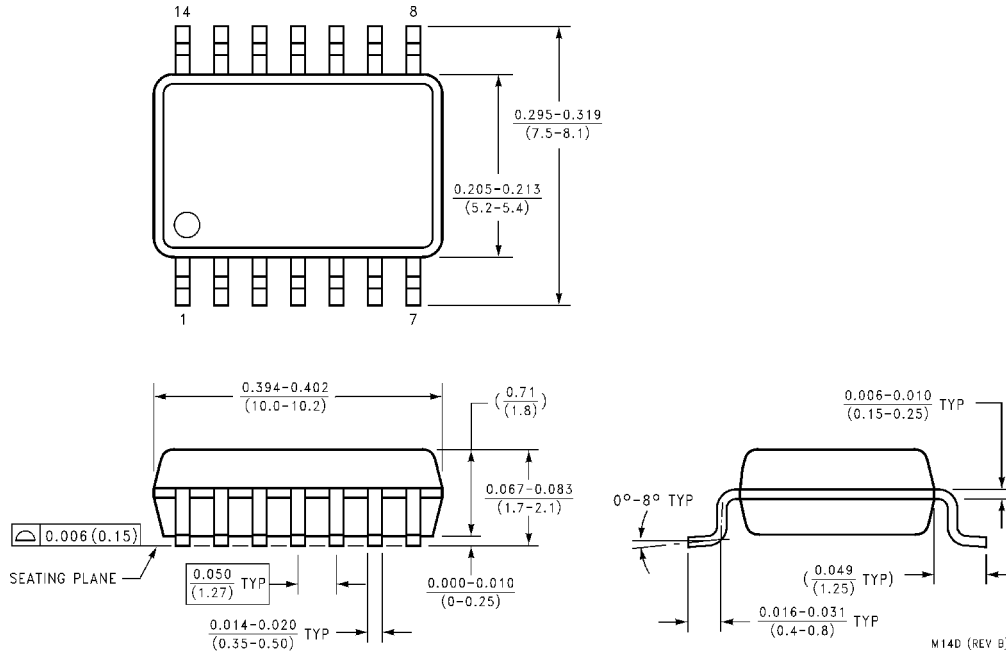


**14-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J14A**

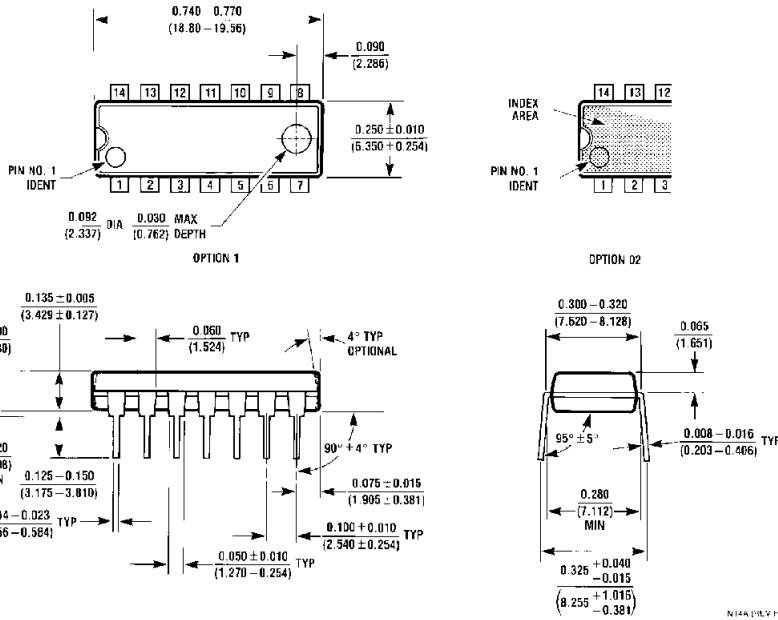


**14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M14A**

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

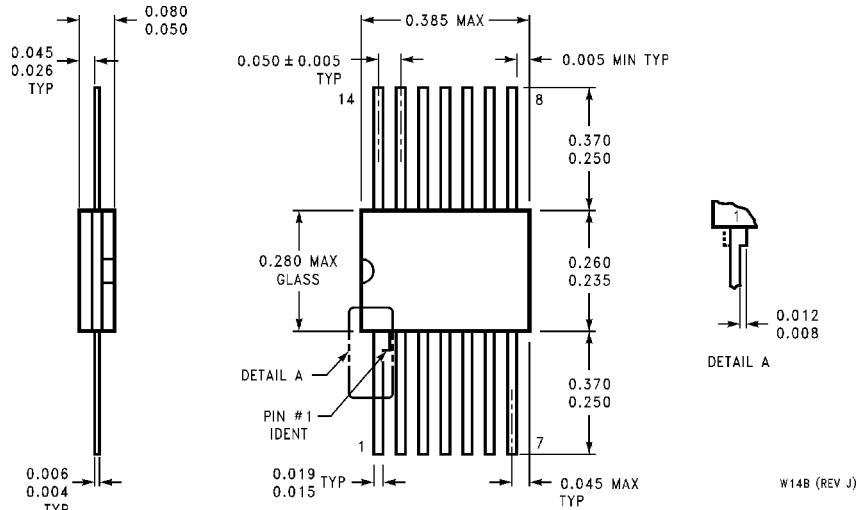


**14-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
NS Package Number M14D**



**14-Lead (0.300" Wide) Molded Dual-In-Line Package (P)
NS Package Number N14A**

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



**14-Lead Ceramic Flatpak (F)
NS Package Number W14B**

W14B (REV J)

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