

## 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

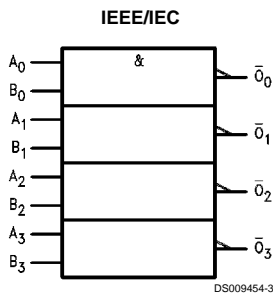
**Ordering Code:** See Section 0

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.

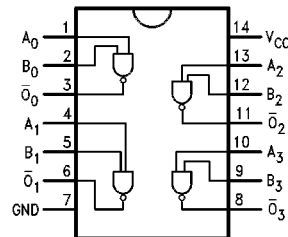
**Note 2:** Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

### Logic Symbol

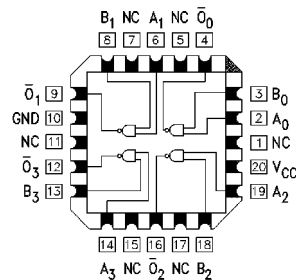


### Connection Diagrams

Pin Assignment  
for DIP, SOIC and Flatpak



Pin Assignment  
for LCC



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## Unit Loading/Fan Out

See Section 0 for U.L. definitions

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 $\mu$ A/–0.6 mA
$\overline{O}_n$	Outputs	50/33.3	–1 mA/20 mA

DSXXX

## 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 <sub>CC</sub> 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 <sub>CC</sub> = 0V)	
Standard Output	−0.5V to V <sub>CC</sub>
TRI-STATE® Output	−0.5V to +5.5V
Current Applied to Output	

in LOW State (Max) twice the rated I<sub>OL</sub> (mA)  
ESD Last Passing Voltage (Min) 4000V

## Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Commercial	
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 <sub>CC</sub>	Conditions	
			Min	Typ	Max				
V <sub>IH</sub>	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal	
V <sub>IL</sub>	Input LOW Voltage				0.8	V		Recognized as a LOW Signal	
V <sub>CD</sub>	Input Clamp Diode Voltage				−1.2	V	Min	I <sub>IN</sub> = −18 mA	
V <sub>OH</sub>	Output HIGH Voltage	54F 10% V <sub>CC</sub>	2.5			V	Min	I <sub>OH</sub> = −1 mA	
		74F 10% V <sub>CC</sub>	2.5					I <sub>OH</sub> = −1 mA	
		74F 5% V <sub>CC</sub>	2.7					I <sub>OH</sub> = −1 mA	
V <sub>OL</sub>	Output LOW Voltage	54F 10% V <sub>CC</sub>			0.5	V	Min	I <sub>OL</sub> = 20 mA	
		74F 10% V <sub>CC</sub>			0.5			I <sub>OL</sub> = 20 mA	
I <sub>IH</sub>	Input HIGH Current	54F			20.0	μA	Max	V <sub>IN</sub> = 2.7V	
		74F			5.0				
I <sub>BVI</sub>	Input HIGH Current Breakdown Test	54F			100	μA	Max	V <sub>IN</sub> = 7.0V	
		74F			7.0				
I <sub>CEX</sub>	Output HIGH Leakage Current	54F			250	μA	Max	V <sub>OUT</sub> = V <sub>CC</sub>	
		74F			50				
V <sub>ID</sub>	Input Leakage Test	74F	4.75			V	0.0	I <sub>ID</sub> = 1.9 μA All other pins grounded	
I <sub>OD</sub>	Output Leakage Circuit Current	74F			3.75	μA	0.0	V <sub>IOD</sub> = 150 mV All other pins grounded	
I <sub>IL</sub>	Input LOW Current				−0.6	mA	Max	V <sub>IN</sub> = 0.5V	
I <sub>OS</sub>	Output Short-Circuit Current		−60		−150	mA	Max	V <sub>OUT</sub> = 0V	
I <sub>CCH</sub>	Power Supply Current			1.9	2.8	mA	Max	V <sub>O</sub> = HIGH	
I <sub>CCL</sub>	Power Supply Current			6.8	10.2	mA	Max	V <sub>O</sub> = LOW	

## AC Electrical Characteristics

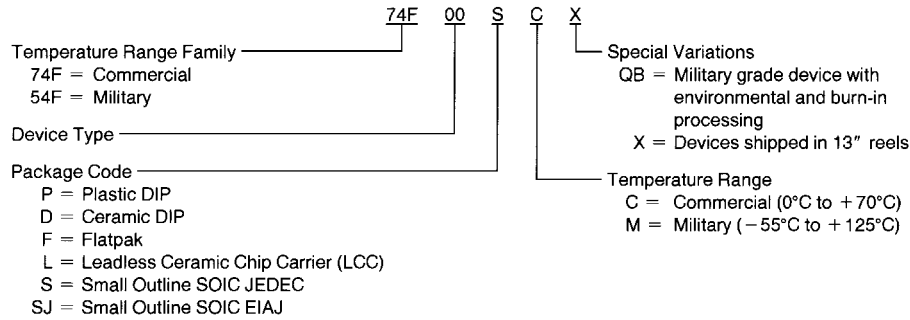
See Section 0 for Waveforms and Load Configurations

Symbol	Parameter	74F			54F		74F		Units	Fig. No.
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> , V <sub>CC</sub> = Mil C <sub>L</sub> = 50 pF		T <sub>A</sub> , V <sub>CC</sub> = Com C <sub>L</sub> = 50 pF			
		Min	Typ	Max	Min	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	2.4	3.7	5.0	2.0	7.0	2.4	6.0	ns	◆◆◆◆
t <sub>PHL</sub>	A <sub>n</sub> , B <sub>n</sub> to $\overline{O}_n$	1.5	3.2	4.3	1.5	6.5	1.5	5.3		



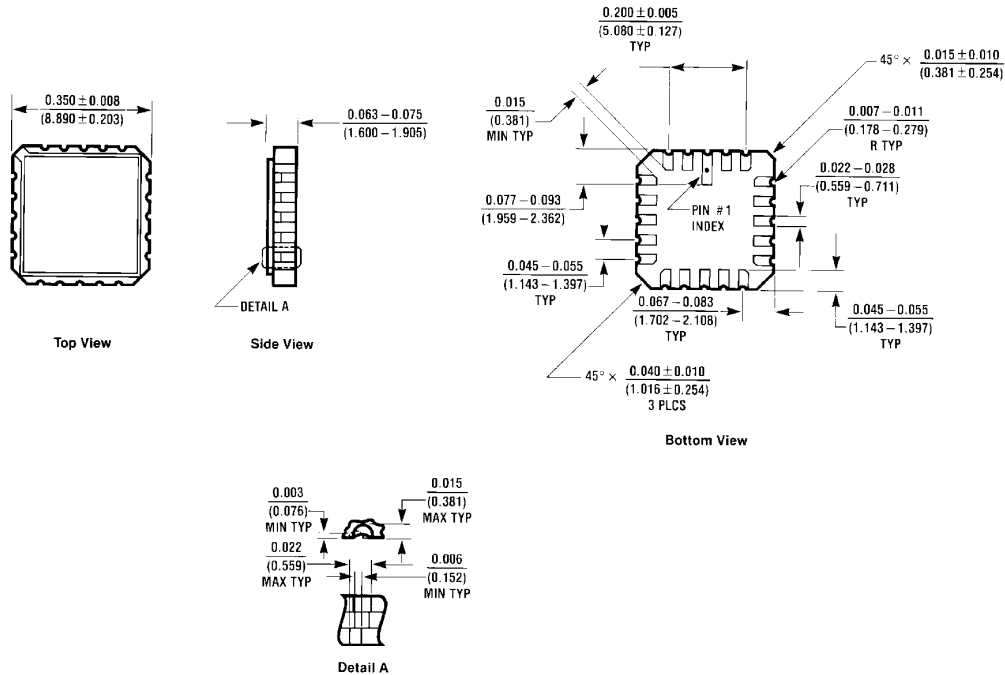
## Ordering Information

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**

Technical drawing of a 14-pin D-sub connector showing top, side, and detail views with dimensions in inches and millimeters.

**Top View Dimensions:**

- Overall Width:  $0.785$  (19.939) MAX
- Pin Pitch:  $0.025$  (0.635) RAD
- Pin Numbers: 14, 13, 12, 11, 10, 9, 8 (top); 1, 2, 3, 4, 5, 6, 7 (bottom)
- Overall Height:  $0.220-0.310$  (5.588-7.874)

**Side View Dimensions:**

- Overall Height:  $0.290-0.320$  (7.366-8.128)
- Mounting Flange Height:  $0.180$  MAX (4.572)
- Flange Angle:  $95^\circ \pm 5^\circ$
- Flange Thickness:  $10^\circ$  MAX
- Pin Height:  $0.310-0.410$  (7.874-10.41)
- Pin Spacing:  $0.008-0.012$  (0.203-0.305)
- Pin Diameter:  $0.098$  (2.489)
- Pin Angle:  $86^\circ-94^\circ$  TYP
- Pin Length:  $0.005$  (0.127) MIN

**Detail View Dimensions (Glass Sealant):**

- Sealant Thickness:  $0.060 \pm 0.005$  (1.524  $\pm$  0.127)
- Sealant Width:  $0.200$  (5.080) MAX
- Sealant Height:  $0.020-0.060$  (0.508-1.524)
- Pin Spacing:  $0.018 \pm 0.003$  (0.457  $\pm$  0.076)
- Pin Height:  $0.100 \pm 0.010$  (2.540  $\pm$  0.254)
- Pin Diameter:  $0.125-0.200$  (3.175-5.080)
- Pin Length:  $0.150$  (3.81) MIN

**Other Dimensions:**

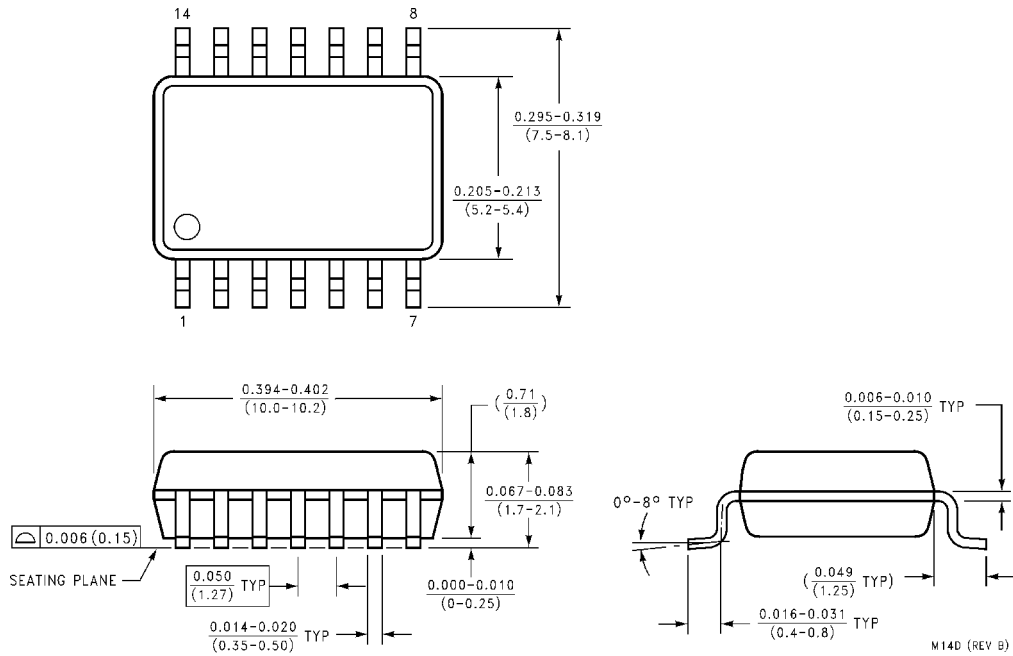
- MAX BOTH ENDS

J14A (REV G)

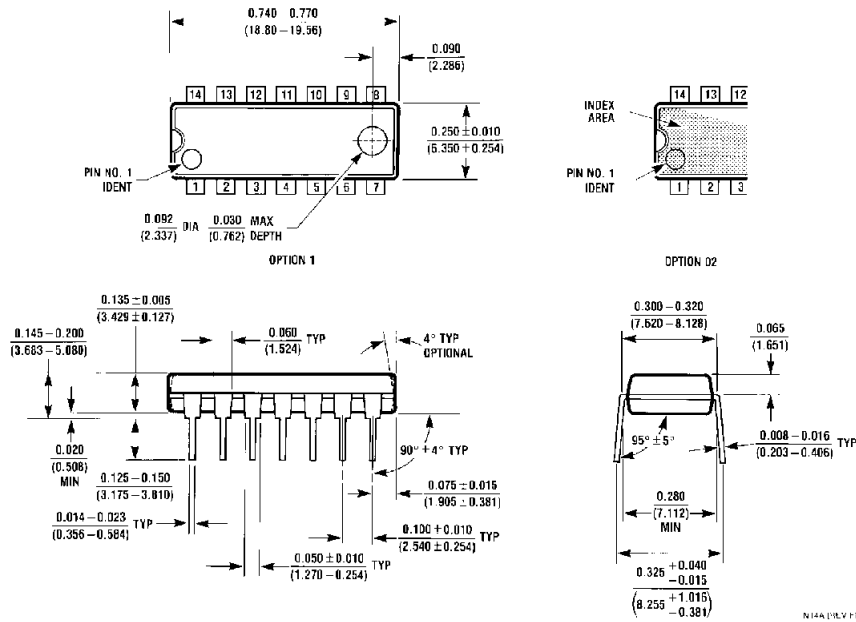
Diagram illustrating the dimensions for a 0.50 inch wide leaded component. The dimensions are specified in inches and millimeters:

- Lead Width:  $0.150 - 0.157$  (3.810 - 3.988)
- Lead Height:  $0.010 - 0.020$  (0.254 - 0.508)
- Lead Angle:  $45^\circ$
- Lead Tip Height:  $0.008 - 0.010$  (0.203 - 0.254) TYP ALL LEADS
- Lead Tip Width:  $0.004$  (0.102) ALL LEAD TIPS
- Lead Tip Angle:  $8^\circ$  MAX TYP ALL LEADS
- Lead Tip Height (Right):  $0.016 - 0.050$  (0.406 - 1.270) TYP ALL LEADS

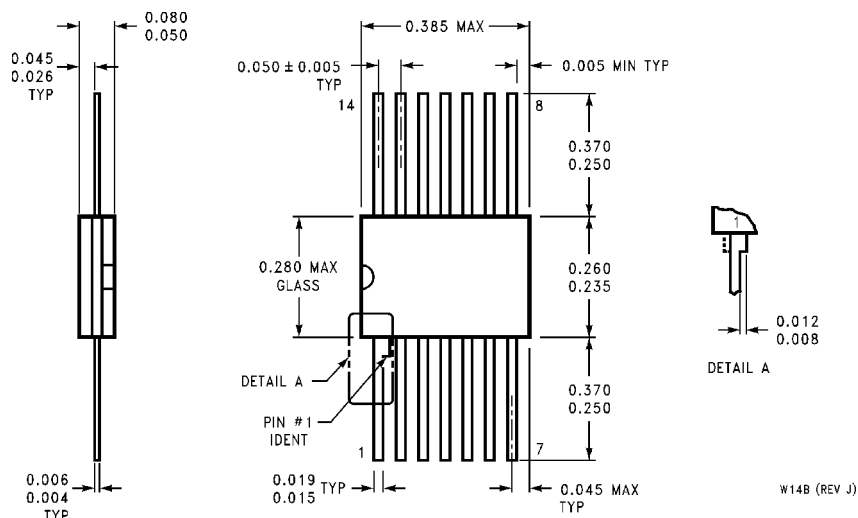
**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



**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**

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