

## 54F/74F11 Triple 3-Input AND Gate

### General Description

This device contains three independent gates, each of which performs the logic AND function.

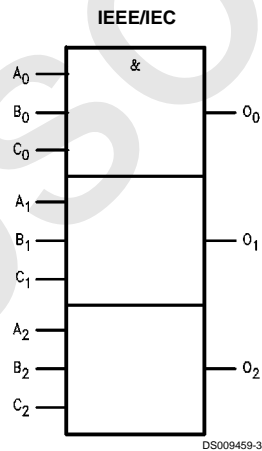
**Ordering Code:** See Section 0

Commercial	Military	Package Number	Package Description
74F11PC		N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
	54F11DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F11SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F11SJ (Note 1)		M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F11FM (Note 2)	W14B	14-Lead Cerpack
	54F11LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

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

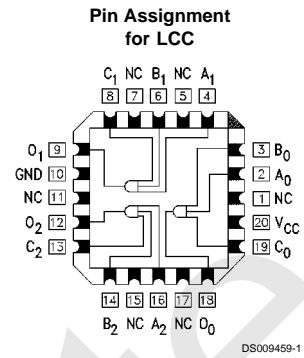
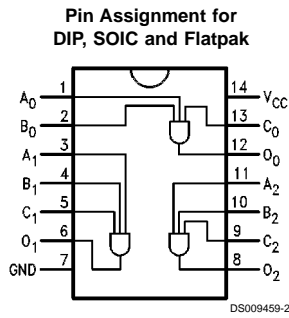
**Note 2:** Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

### Logic Symbol



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## Connection Diagrams



## Unit Loading/Fan Out

See Section 0 for U.L. definitions

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

DSXXX

### Absolute Maximum Ratings (Note 3)

If Military/Aerospace specified devices are required, please 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
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)

### 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

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.

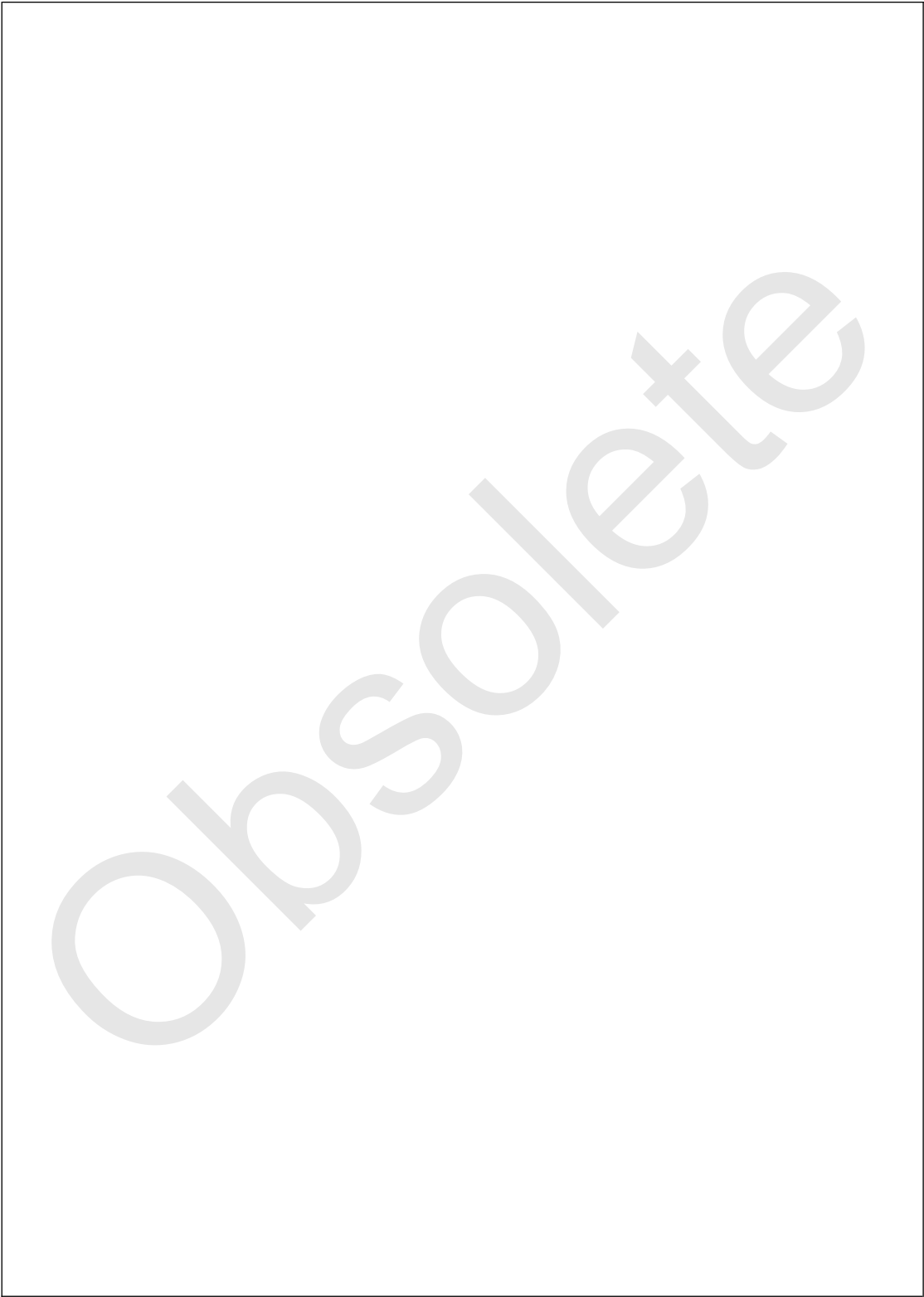
### DC Electrical Characteristics

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				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	4.1			6.2	mA	Max	V <sub>O</sub> = HIGH
I <sub>CCL</sub>	Power Supply Current	6.5			9.7	mA	Max	V <sub>O</sub> = LOW

### AC Electrical Characteristics

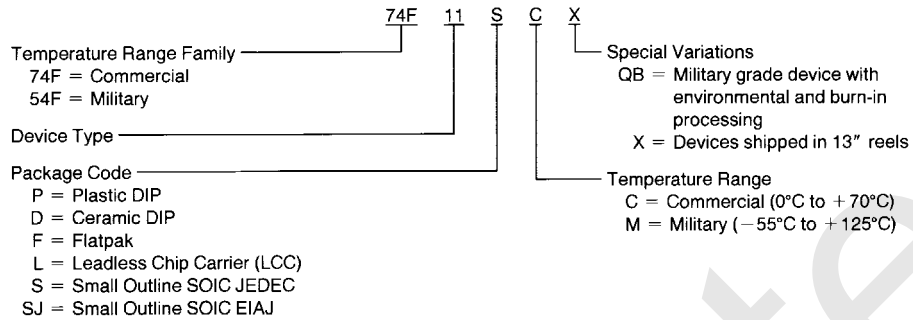
See Section 0 for Waveforms and Load Configurations

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	3.0	4.2	5.6	2.5	7.5	3.0	6.6	ns	◆◆◆
t <sub>PHL</sub>	A <sub>n</sub> , B <sub>n</sub> , C <sub>n</sub> to O <sub>n</sub>	2.5	4.1	5.5	2.0	7.5	2.5	6.5		



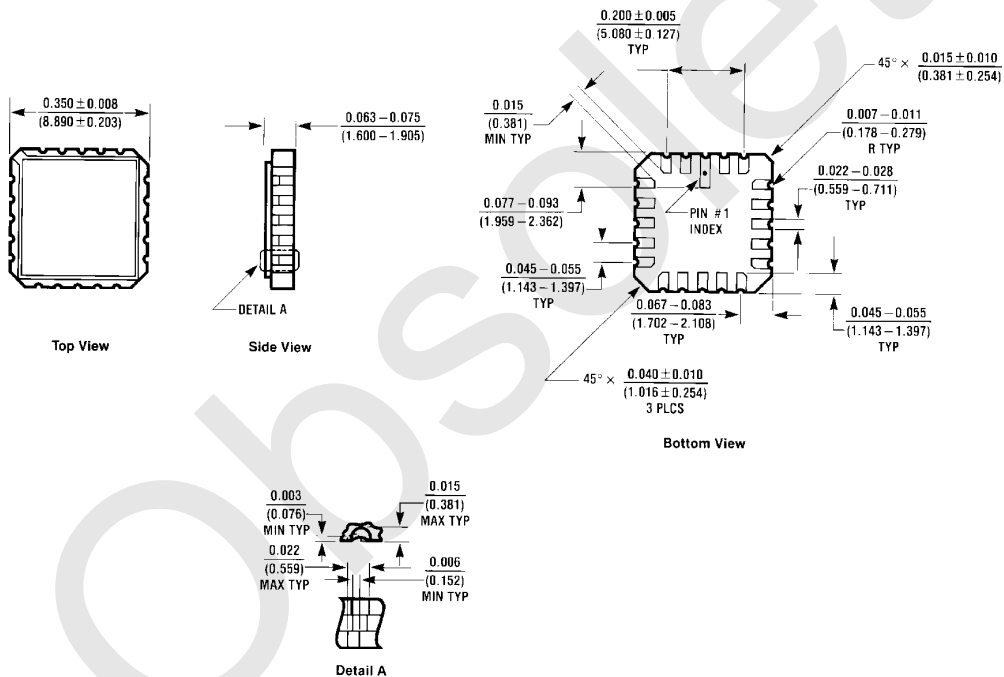
## Ordering Information

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



DS009459-4

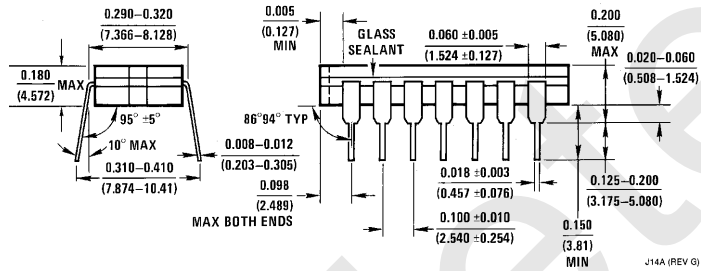
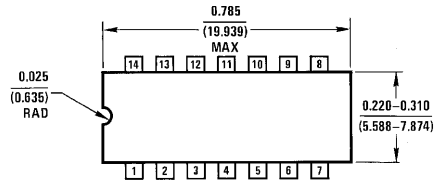
## Physical Dimensions inches (millimeters) unless otherwise noted



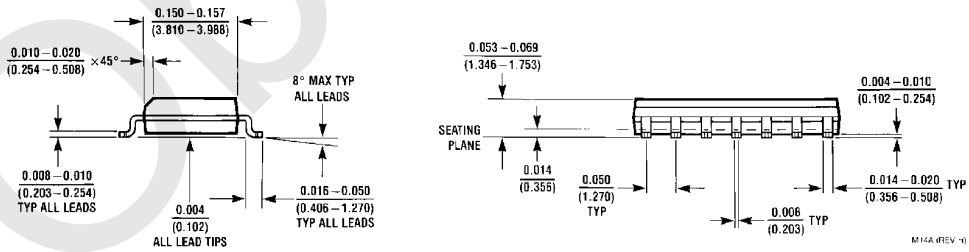
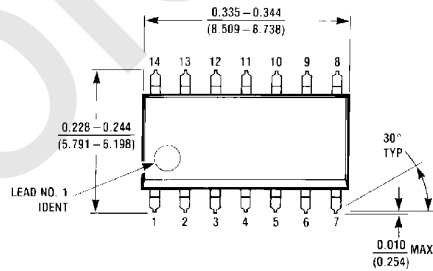
20-Lead Ceramic Leadless Chip Carrier (L)  
NS Package Number E20A

E20A (REV. 01)

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

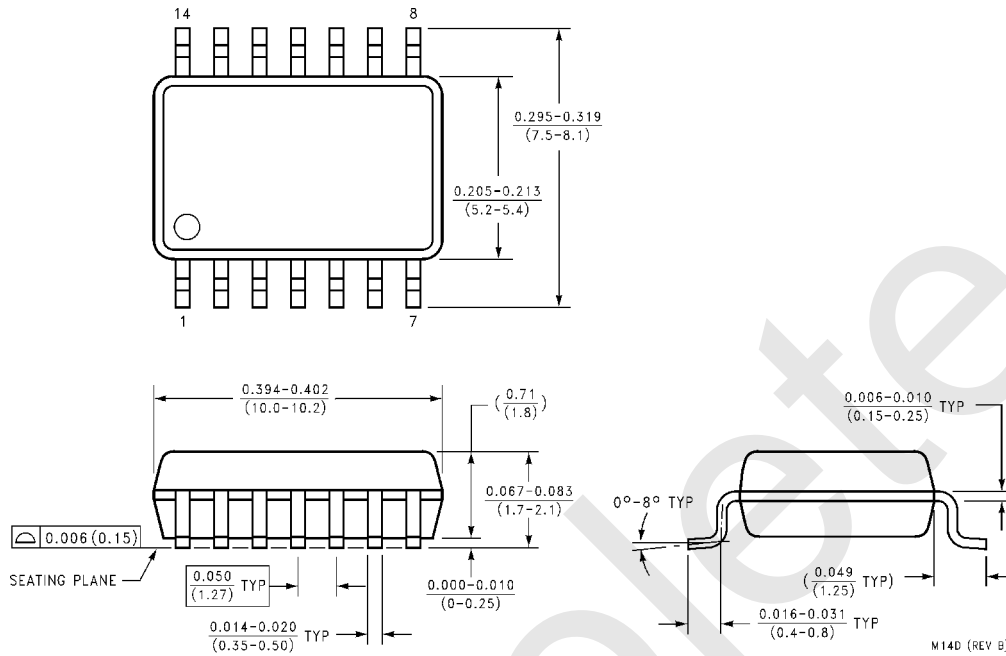


**14-Lead Ceramic Dual-In-Line Package (D)  
NS Package Number J14A**

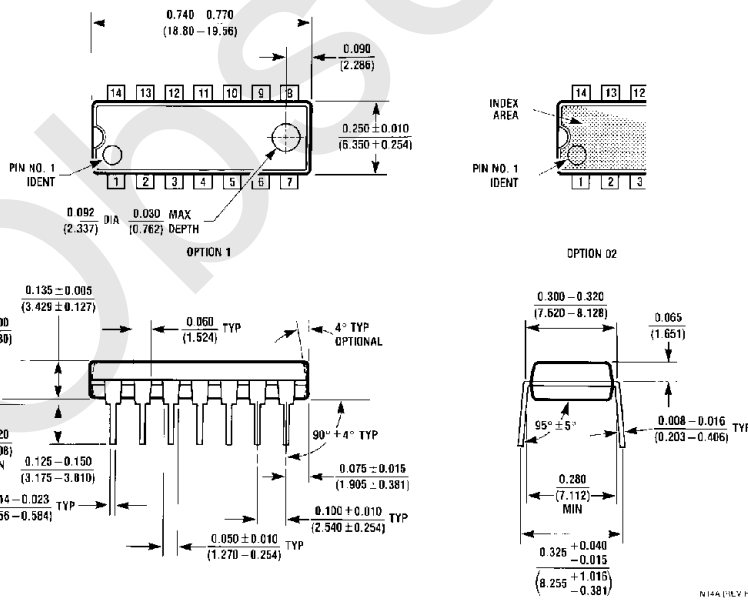


**14-Lead (0.150" Wide) Molded Small Outline, JEDEC (S)  
NS Package Number M14A**

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

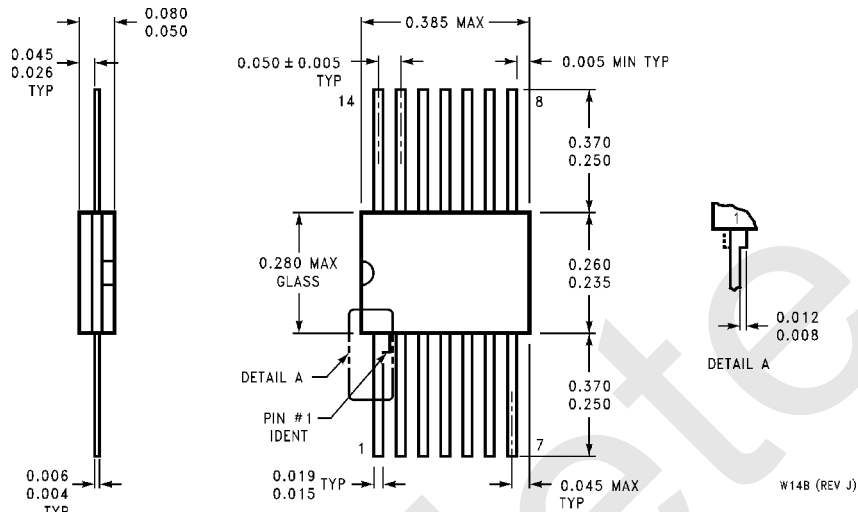


**14-Lead (0.300" Wide) Molded Small Outline, EIAJ (SJ)  
NS Package Number M14D**



**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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