

54F/74F08

Quad 2-Input AND Gate

General Description

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

Features

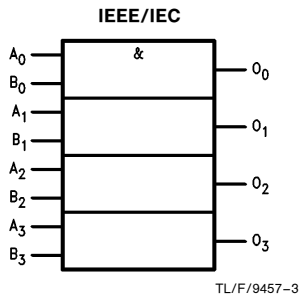
- Guaranteed 4000V minimum ESD protection

Commercial	Military	Package Number	Package Description
74F08PC		N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
	54F08DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F08SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F08SJ (Note 1)		M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F08FM (Note 2)	W14B	14-Lead Cerpack
	54F08LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

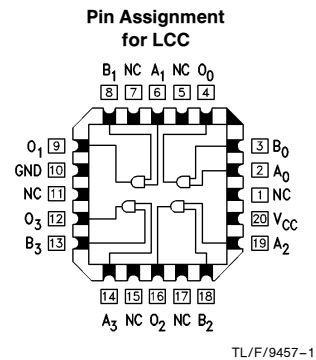
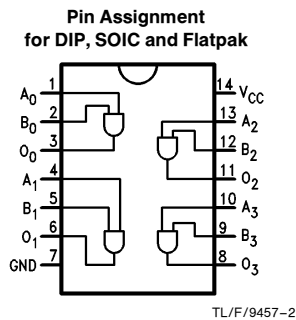
Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

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

Logic Symbol



Connection Diagrams



Unit Loading/Fan Out

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 μ A/ -0.6 mA
O_n	Outputs	50/33.3	-1 mA/20 mA

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Absolute Maximum Ratings (Note 1)

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_{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)

ESD Last Passing Voltage (Min) 4000V

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

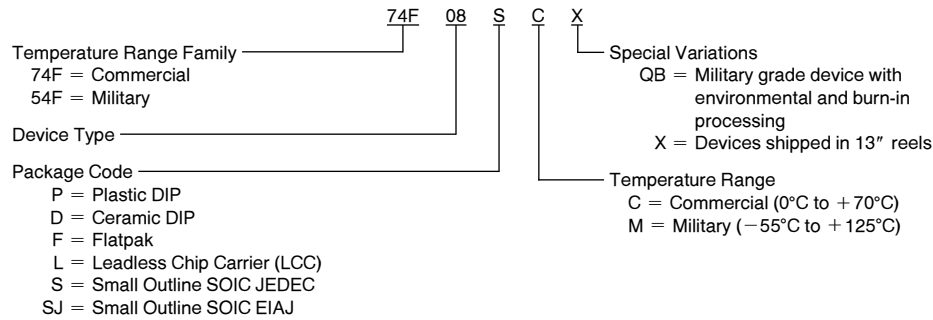
Symbol	Parameter	54F/74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage			–1.2	V	Min	I _{IN} = –18 mA
V _{OH}	Output HIGH Voltage	54F 10% V _{CC} 74F 10% V _{CC} 74F 5% V _{CC}	2.5 2.5 2.7		V	Min	I _{OH} = –1 mA I _{OH} = –1 mA I _{OH} = –1 mA
V _{OL}	Output LOW Voltage	54F 10% V _{CC} 74F 10% V _{CC}		0.5 0.5	V	Min	I _{OL} = 20 mA I _{OL} = 20 mA
I _{IH}	Input HIGH Current	54F 74F		20.0 5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test	54F 74F		100 7.0	μA	Max	V _{IN} = 7.0V
I _{CEX}	Output HIGH Leakage Current	54F 74F		250 50	μA	Max	V _{OUT} = V _{CC}
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	–150	mA	Max	V _{OUT} = 0V
I _{CCH}	Power Supply Current		5.5	8.3	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current		8.6	12.9	mA	Max	V _O = LOW

AC Electrical Characteristics

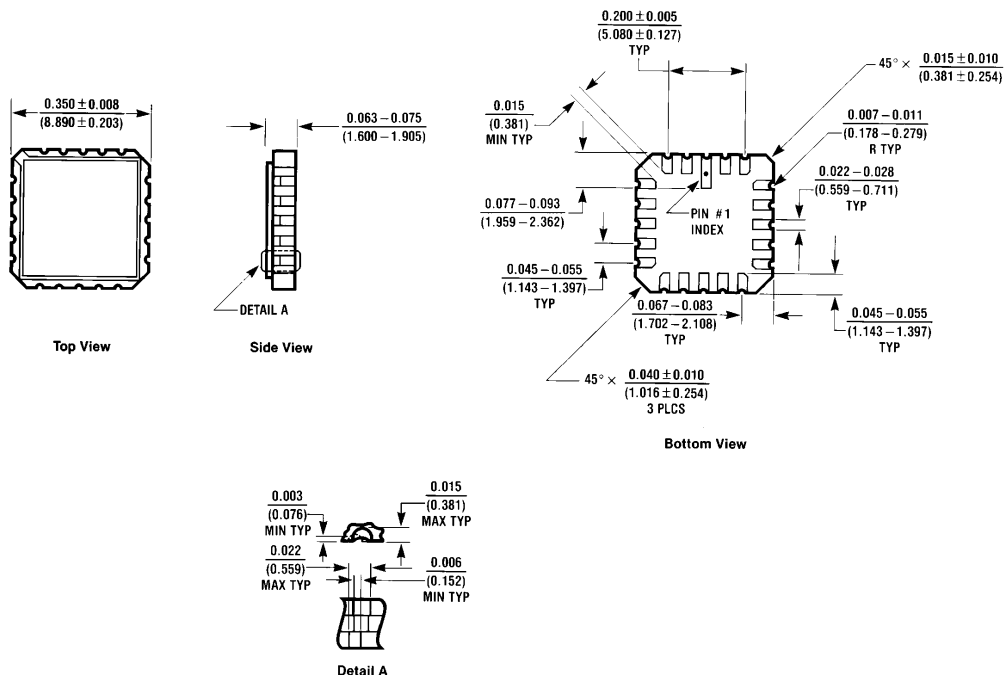
Symbol	Parameter	74F			54F		74F		Units
		$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{pF}$			$T_A, V_{CC} = \text{Mil}$ $C_L = 50\text{pF}$		$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{pF}$		
		Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	3.0	4.2	5.6	2.5	7.5	3.0	6.6	ns
t_{PHL}	A_n, B_n to O_n	2.5	4.0	5.3	2.0	7.5	2.5	6.3	

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:



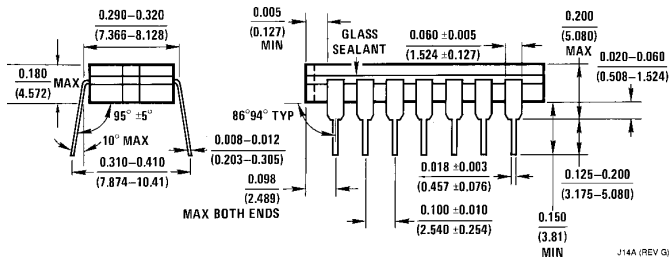
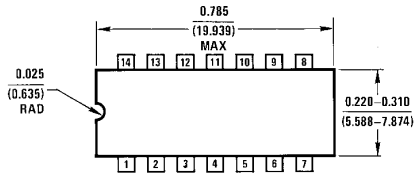
Physical Dimensions inches (millimeters)



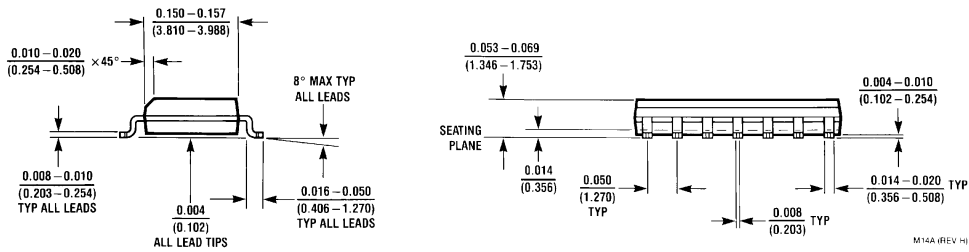
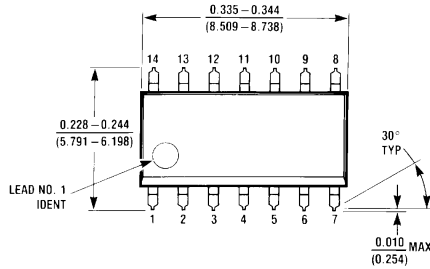
20-Lead Ceramic Leadless Chip Carrier (L)
NS Package Number E20A

E20A (REV D)

Physical Dimensions inches (millimeters) (Continued)

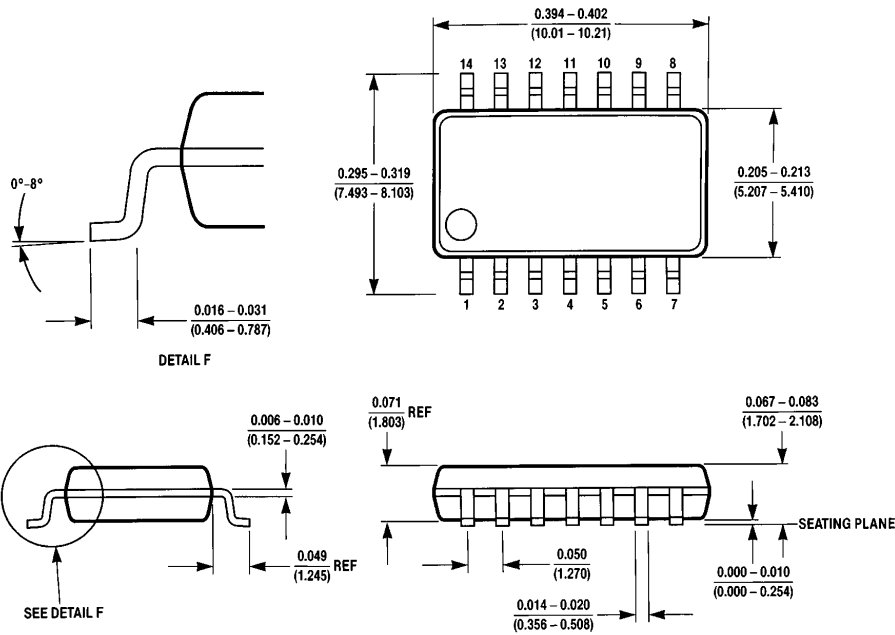


14-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J14A



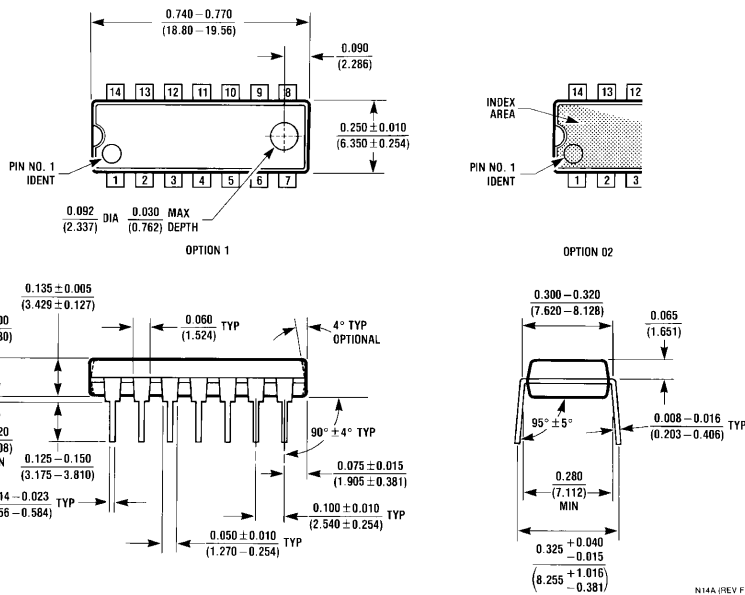
14-Lead (0.150" Wide) Molded Small Outline, JEDEC (S)
NS Package Number M14A

Physical Dimensions inches (millimeters) (Continued)



M14D (REV A)

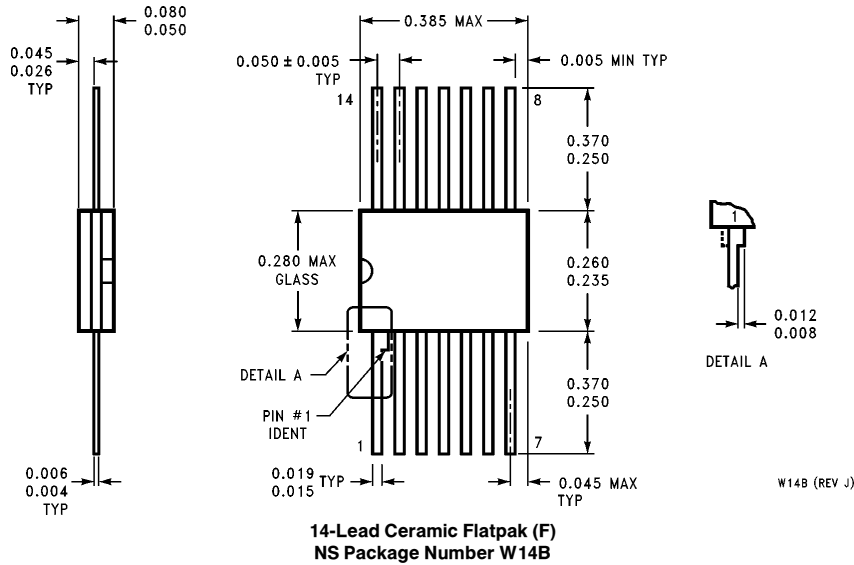
**14-Lead (0.300" Wide) Molded Small Outline, EIAJ (SJ)
NS Package Number M14D**



N14A (REV F)

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

Physical Dimensions inches (millimeters) (Continued)



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74F08 - <http://www.ti.com/product/74f08?HQS=TI-null-null-dscatalog-df-pf-null-ww>

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