

74F14 Hex Inverter Schmitt Trigger

General Description

The 'F14 contains six logic inverters 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 inverters.

Each circuit contains a Schmitt trigger followed by a Darlington level shifter and a phase splitter driving a TTL totem-pole output. The Schmitt trigger uses positive feedback to effectively speed-up slow input transition, and provide different in-

put threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input thresholds (typically 800 mV) is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

Features

- Guaranteed 4000V minimum ESD protection
- Standard Military Drawing
- 5962-88752

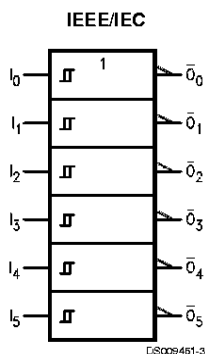
Ordering Code:

Commercial	Military	Package Number	Package Description
74F14PC		N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
	54F14DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F14SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F14SJ (Note 1)		M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F14FM (Note 2)	W14B	14-Lead Cerpack
	54F14LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

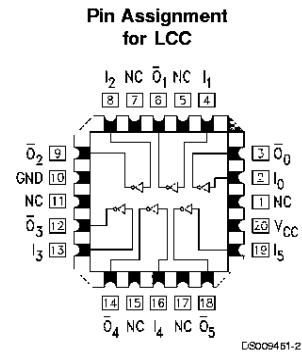
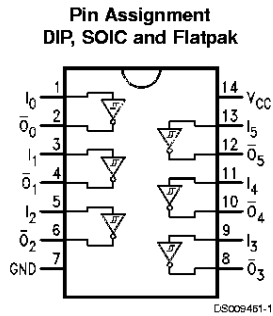
Note 1: Devices also available in 13" reel. Use Suffix = SCX and SJX

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

Logic Symbol



Connection Diagrams



Unit Loading/Fan Out

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
I_n	Input	1.0/1.0	20 μ A/-0.6 mA
\bar{O}_n	Output	50/33.3	-1 mA/20 mA

Function Table

Input	Output
A	\bar{O}
L	H
H	L

H = HIGH Voltage Level
L = LOW Voltage Level

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
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}
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	
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

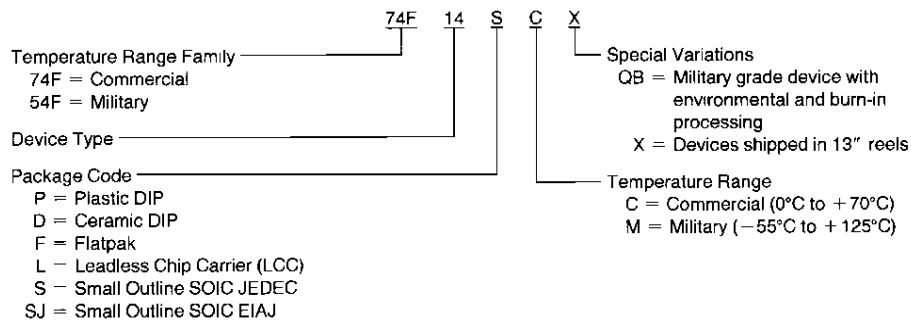
Symbol	Parameter	54F/74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{T+}	Positive-Going Threshold	1.5	1.7	2.0	V	5.0V	
V _{T-}	Negative-Going Threshold	0.7	0.9	1.1	V	5.0V	
ΔV _T	Hysteresis (V _{T+} -V _{T-})	0.4	0.8		V	5.0V	
V _{CD}	Input Clamp Diode Voltage			-1.2	V	Min	I _{IN} = -18 mA
V _{OH}	Output HIGH	54F 10% V _{CC}	2.5		V	Min	I _{OH} = -1 mA
	Voltage	74F 10% V _{CC}	2.5				
		74F 5% V _{CC}	2.7				
V _{OL}	Output LOW	54F 10% V _{CC}		0.5	V	Min	I _{OL} = 20 mA
	Voltage	74F 10% V _{CC}		0.5			
I _{IH}	Input HIGH	54F		20.0	μA	Max	V _{IN} = 2.7V
	Current	74F		5.0			
I _{BVI}	Input HIGH	54F		100	μA	Max	V _{IN} = 7.0V
	Current						
	Breakdown Test	74F		7.0			
I _{CEX}	Output HIGH	54F		250	μA	Max	V _{OUT} = V _{CC}
	Leakage Current	74F		50			
V _{ID}	Input Leakage Test	74F	4.75		V	Max	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			25	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current			25	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	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	4.0	10.5	4.0	13.0	4.0	11.5	ns
t_{PHL}	$I_n \rightarrow \bar{O}_n$	3.5	8.5	3.5	10.0	3.5	9.0	

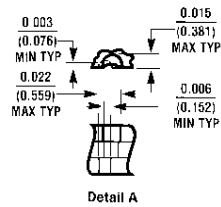
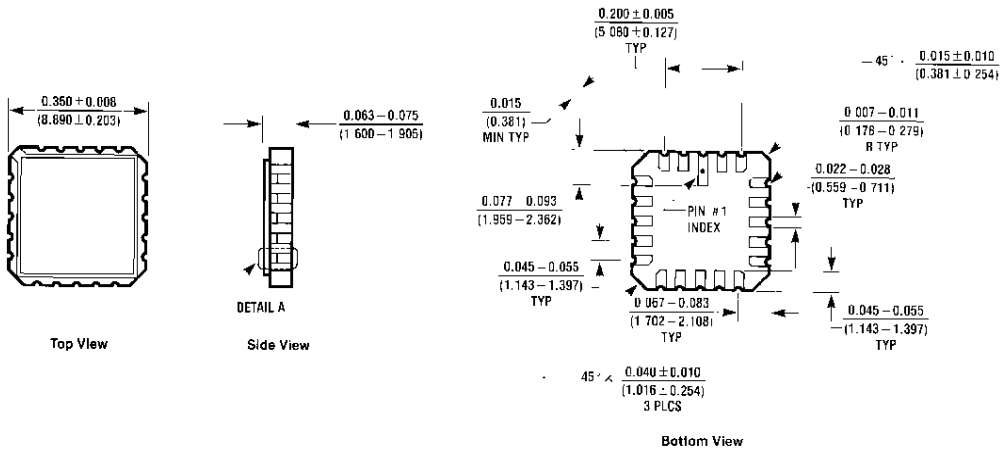
Ordering Information

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

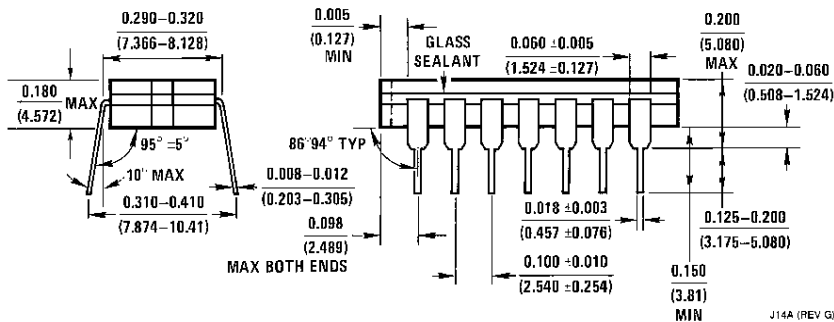
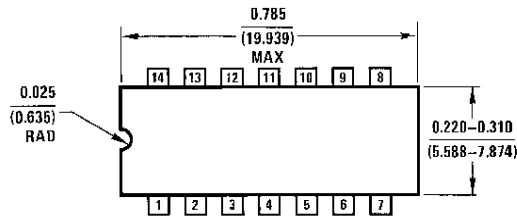


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Physical Dimensions inches (millimeters) unless otherwise noted

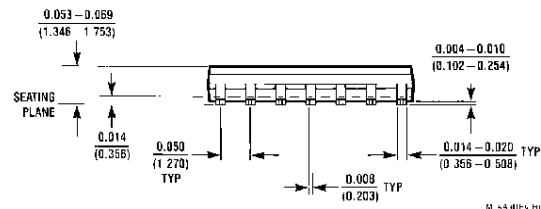
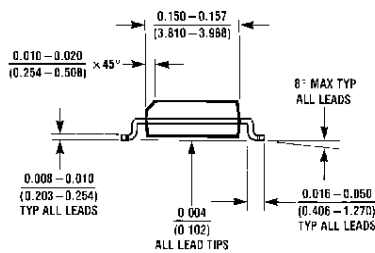
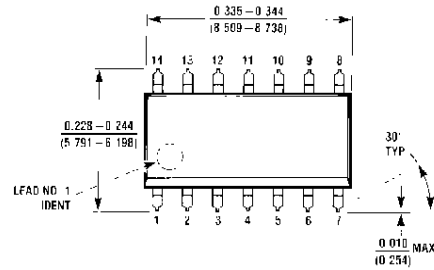


20-Terminal Ceramic Leadless Chip Carrier (L)
 NS Package Number E20A

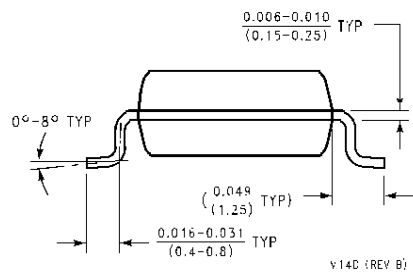
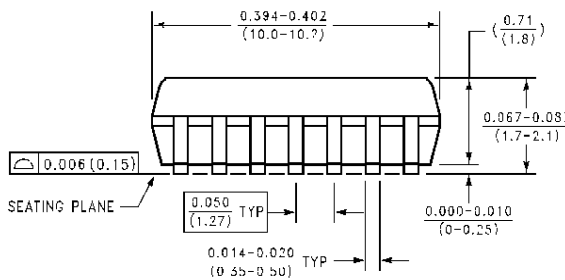
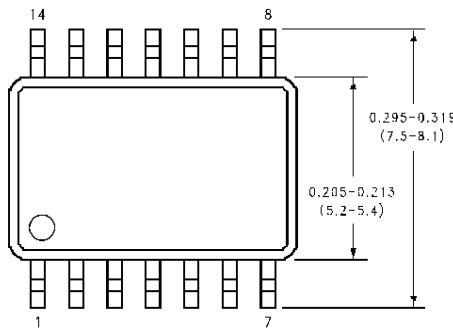


14-Lead Ceramic Dual-In-Line Package (D)
 NS Package Number J14A

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

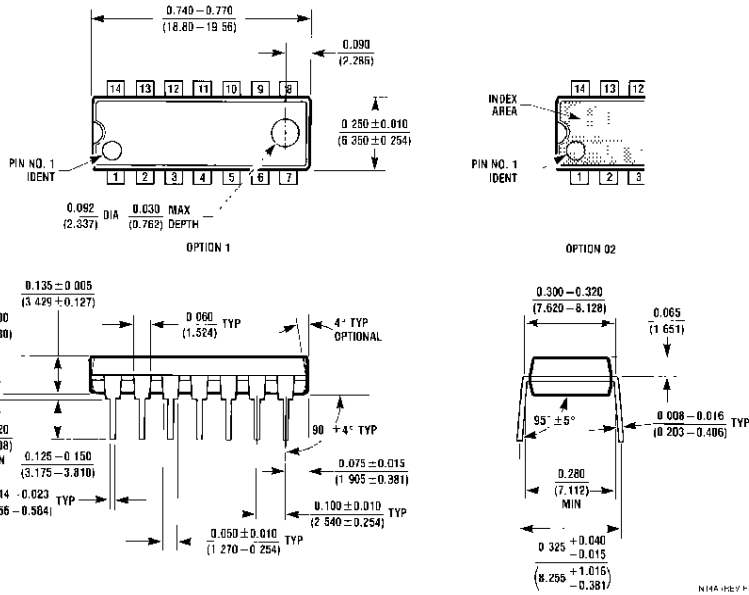


**14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M14A**

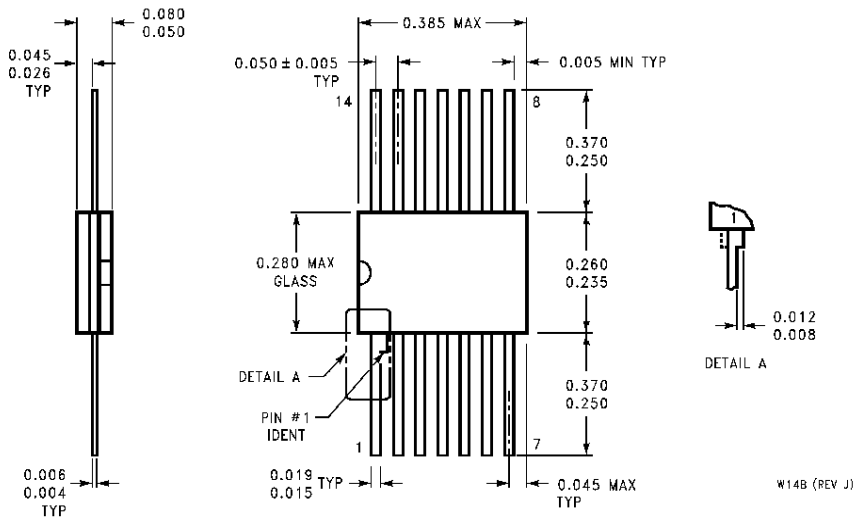


**14-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
NS Package Number M14D**

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



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



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

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