National Semiconductor

November 1995

74F37
Quad Two-Input NAND Buffer

General Description

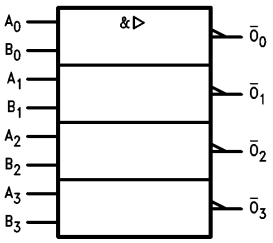
This device contains four independent gates, each of which performs the logic NAND function.

Commercial	Package Number	Package Description
74F37PC	N14A	14-Lead (0.300″ Wide) Molded Dual-In-Line
74F37SC (Note 1)	M14A	14-Lead (0.150″ Wide) Molded Small Outline, JEDEC

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

Logic Symbol

IEEE/IEC



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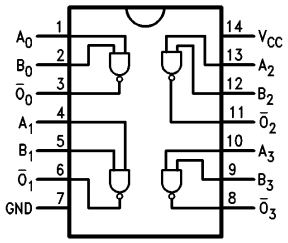
Connection Diagram

Pin Assignment for SOIC and DIP



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Unit Loading/Fan Out

Pin Names	Description	74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
A_n, B_n	Inputs	1.0/2.0	20 μA/−1.2 mA
$\overline{O}_n$	Outputs	600/106.6 (80)	−12 mA/64 mA (48 mA)

Function Table

Inputs		Output
A	B	$\overline{O}$
L	L	H
L	H	H
H	L	H
H	H	L

H = HIGH Voltage Level
L = LOW Voltage Level

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Absolute Maximum Ratings (Note 1)

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)

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	
Commercial	0°C to +70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

DC Electrical Characteristics

Symbol	Parameter		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	74F 10% V_{CC}	2.4			V	Min	I_{OH} = −3 mA
		74F 10% V_{CC}	2.0					I_{OH} = −15 mA
		74F 5% V_{CC}	2.7					I_{OH} = −3 mA
V_{OL}	Output LOW Voltage	74F 10% V_{CC}			0.55	V	Min	I_{OL} = 64 mA
I_{IH}	Input HIGH Current	74F			5.0	μA	Max	V_{IN} = 2.7V
I_{BVI}	Input HIGH Current Breakdown Test	74F			7.0	μA	Max	V_{IN} = 7.0V
I_{CEX}	Output HIGH Leakage Current	74F			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				−1.2	mA	Max	V_{IN} = 0.5V
I_{OS}	Output Short-Circuit Current		−100		−225	mA	Max	V_{OUT} = 0V
I_{CCH}	Power Supply Current			3.7	6.0	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			28.0	33.0	mA	Max	V_O = LOW

AC Electrical Characteristics

Symbol	Parameter	74F $T_A = +25°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF			74F $T_A, V_{CC} =$ Com, $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	2.0	3.2	5.5	1.5	6.5	ns
t_{PHL}	A_n, B_n to $\overline{O}_n$	1.5	2.4	4.5	1.0	5.0	

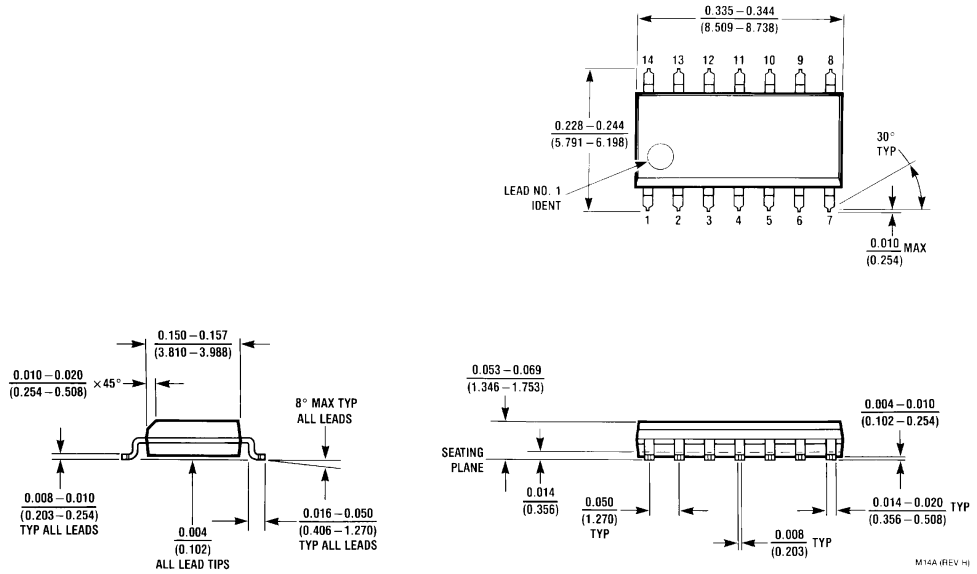
Ordering Information

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

74F 37 S C X

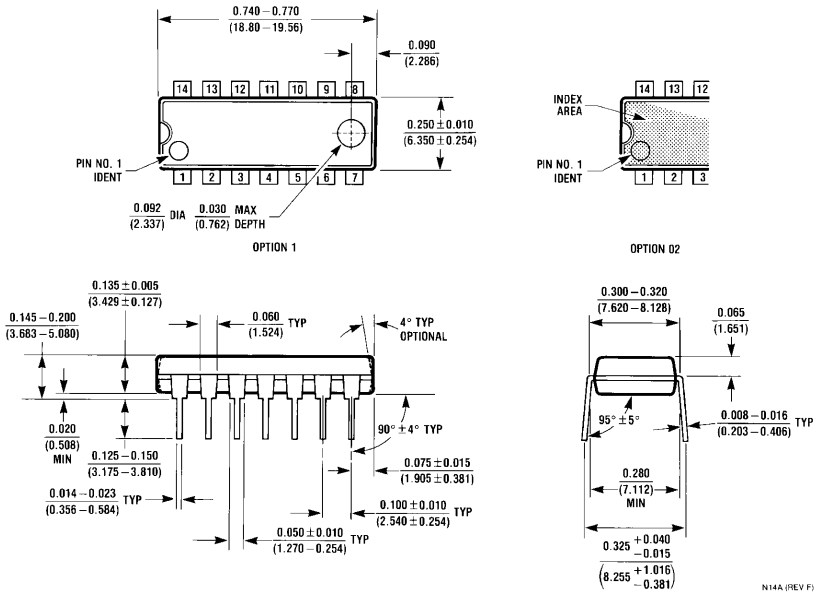
- Temperature Range Family: 74F = Commercial
- Device Type: 37
- Package Code: P = Plastic DIP; S = Small Outline SOIC JEDEC
- Temperature Range: C = Commercial (0°C to +70°C)
- Special Variations: X = Devices shipped in 13″ reel

Physical Dimensions inches (millimeters)



14-Lead (0.150″ Wide) Molded Small Outline Package (S)
NS Package Number M14A

Physical Dimensions inches (millimeters) (Continued)



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

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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