FAIRCHILD SEMICONDUCTOR™

March 1998

74F51
Dual 2-Wide 2-Input; 2-Wide 3-Input AND-OR-Invert Gate

General Description

This device contains two independent logic units, one performing a 2-2 AND-OR-INVERT and the other performing a 3-3 AND-OR-INVERT function.

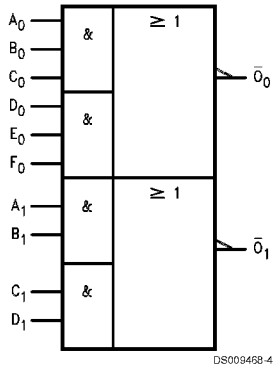
Ordering Code:

Commercial	Package Number	Package Description
74F51PC	N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
74F51SC (Note 1)	M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F51SJ (Note 1)	M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ

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

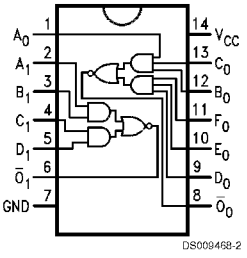
Logic Symbol

IEEE/IEC



Connection Diagram

Pin Assignment for SOIC and DIP



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, C_n, D_n, E_n, F_n	Inputs	1.0/1.0	20 µA/−0.6 mA
$\overline{O}_n$	Outputs	50/33.3	−1 mA/20 mA

Function Table for 3-Input Gates

Inputs						Output
A_o	B_o	C_o	D_o	E_o	F_o	$\overline{O}_o$
H	H	H	X	X	X	L
X	X	X	H	H	H	L
All other combinations						H

Function Table for 2-Input Gates

Inputs				Output
A_1	B_1	C_1	D_1	$\overline{O}_1$
H	H	X	X	L
X	X	H	H	L
All other combinations				H

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

Absolute Maximum Ratings (Note 2)

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 3)	−0.5V to +7.0V
Input Current (Note 3)	−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)

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0°C to +70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

Note 2: 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 3: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

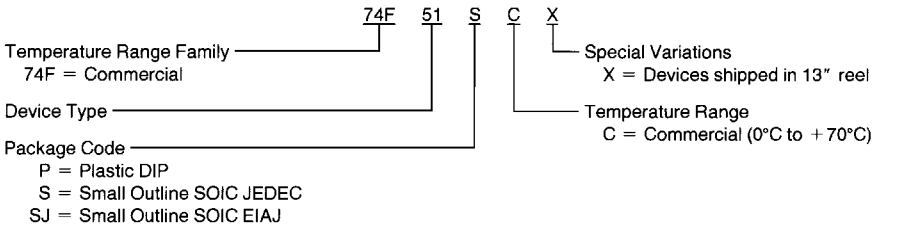
Symbol	Parameter		74F			Units	V_{CC}	Conditions
			Min	Typ	Max			
V_{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage	74F 10% V_{CC}	2.5			V	Min	I_{OH} = −1 mA
		74F 5% V_{CC}	2.7					I_{OH} = −1 mA
V_{OL}	Output LOW Voltage	74F 10% V_{CC}			0.5	V	Min	I_{OL} = 20 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				−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			1.9	3.0	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			5.3	8.5	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} = Comm C_L = 50 pF		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	2.0	3.7	6.0	1.5	6.5	ns
t_{PHL}	A_n, B_n, C_n, D_n, E_n, F_n to $\overline{O}_n$	1.0	2.6	4.0	1.0	4.5	

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:



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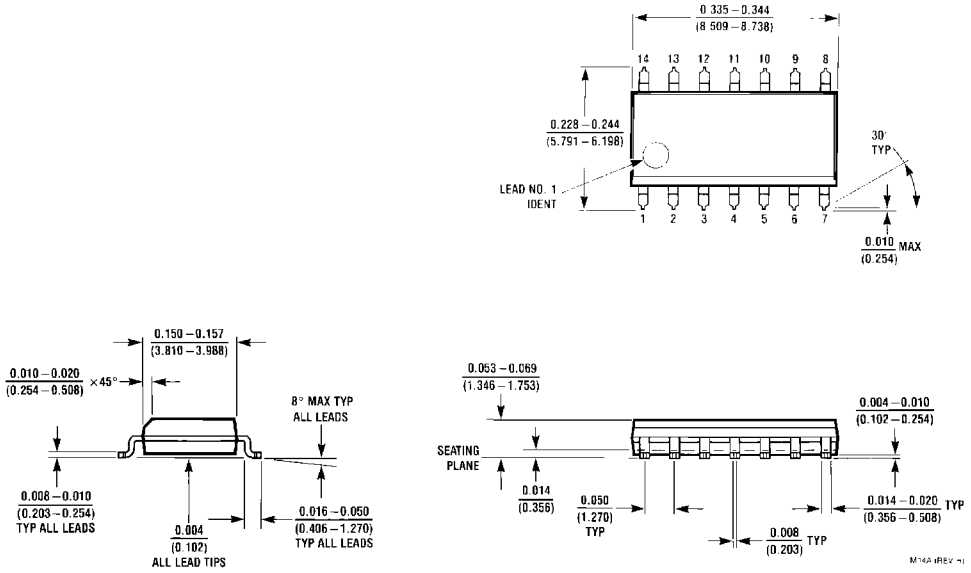
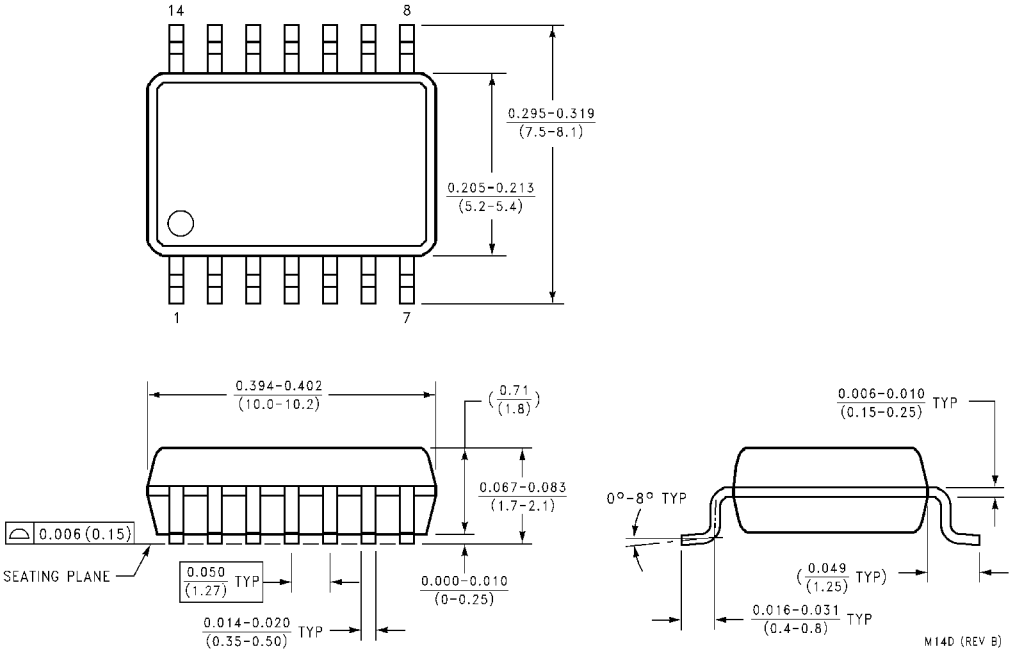
Physical Dimensions inches (millimeters) unless otherwise noted

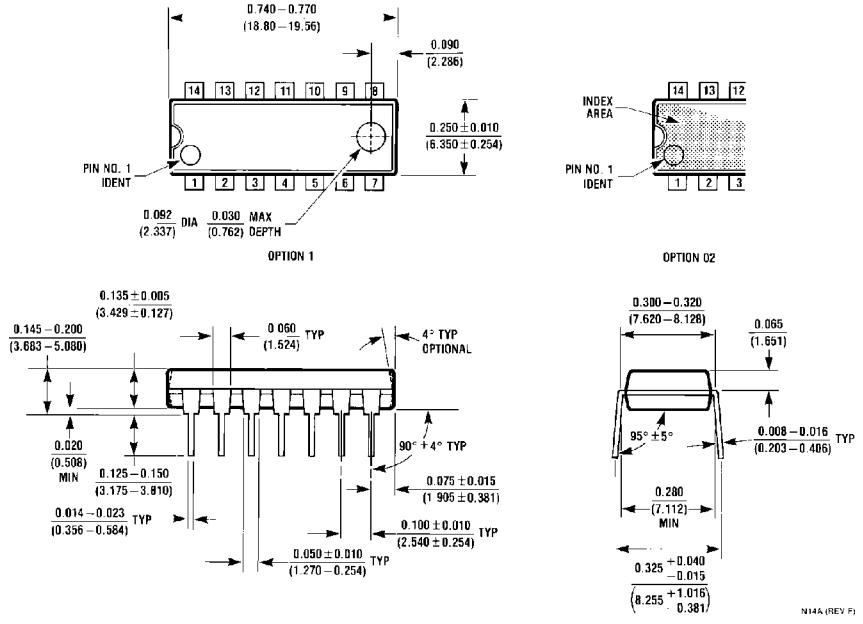


14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
Package Number M14A

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



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



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

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2. A critical component in 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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