

FAIRCHILD
SEMICONDUCTOR™

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74F51

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

General Description

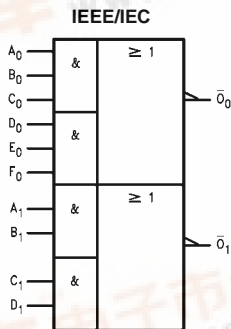
This device contains two independent logic units, one performing a 2-2 AND-OR-INVERT and the other performing a 3-3 AND-OR-INVERT function.

Ordering Code:

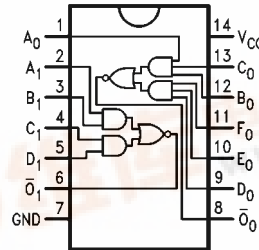
Order Number	Package Number	Package Description
74F51SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
74F51SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F51PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I _H /I _L Output I _O H/I _O L
A _n , B _n , C _n , D _n , E _n , F _n	Inputs	1.0/1.0	20 μA/-0.6 mA
\bar{O}_n	Outputs	50/33.3	-1 mA/20 mA

Function Table for 3-Input Gates

Inputs						Output
A ₀	B ₀	C ₀	D ₀	E ₀	F ₀	\bar{O}_0
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	\bar{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

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



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 +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}

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

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.

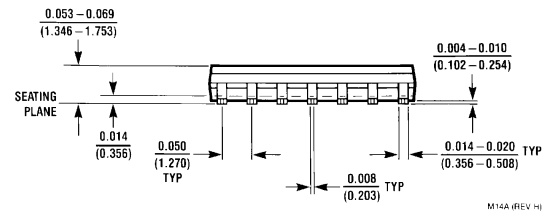
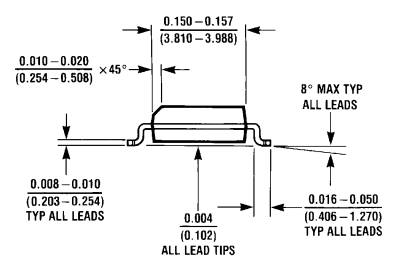
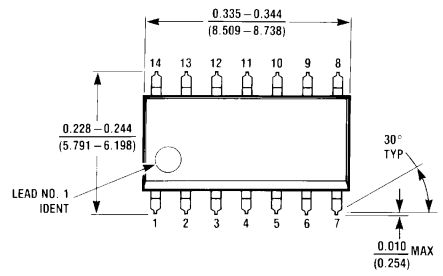
DC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Units	V _{CC}	Conditions
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	10% V _{CC} 5% V _{CC}	2.5 2.7		V	Min	I _{OH} = -1 mA I _{OH} = -1 mA
V _{OL}	Output LOW Voltage	10% V _{CC}		0.5	V	Min	I _{OL} = 20 mA
I _{IH}	Input HIGH Current			5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test			7.0	μA	Max	V _{IN} = 7.0V
I _{CEX}	Output HIGH Leakage Current			50	μA	Max	V _{OUT} = V _{CC}
V _{ID}	Input Leakage Test	4.75			V	0.0	I _{ID} = 1.9 μA All other pins grounded
I _{OD}	Output Leakage Circuit Current			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

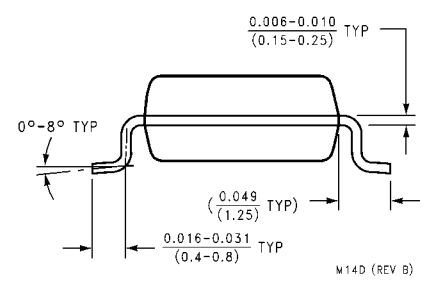
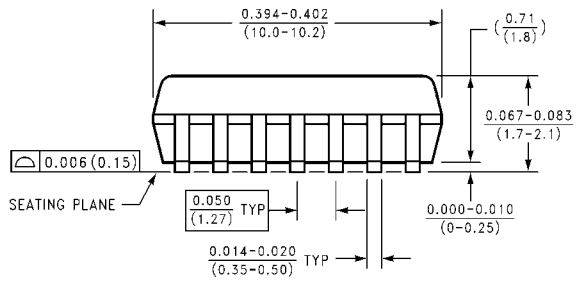
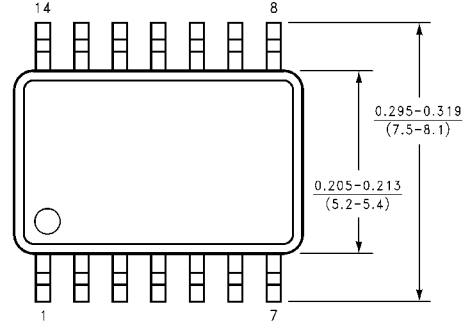
AC Electrical Characteristics

Symbol	Parameter	T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A = 0°C to +70°C V _{CC} = +5.0V 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 \bar{O}_n	1.0	2.6	4.0	1.0	4.5	

Physical Dimensions inches (millimeters) unless otherwise noted

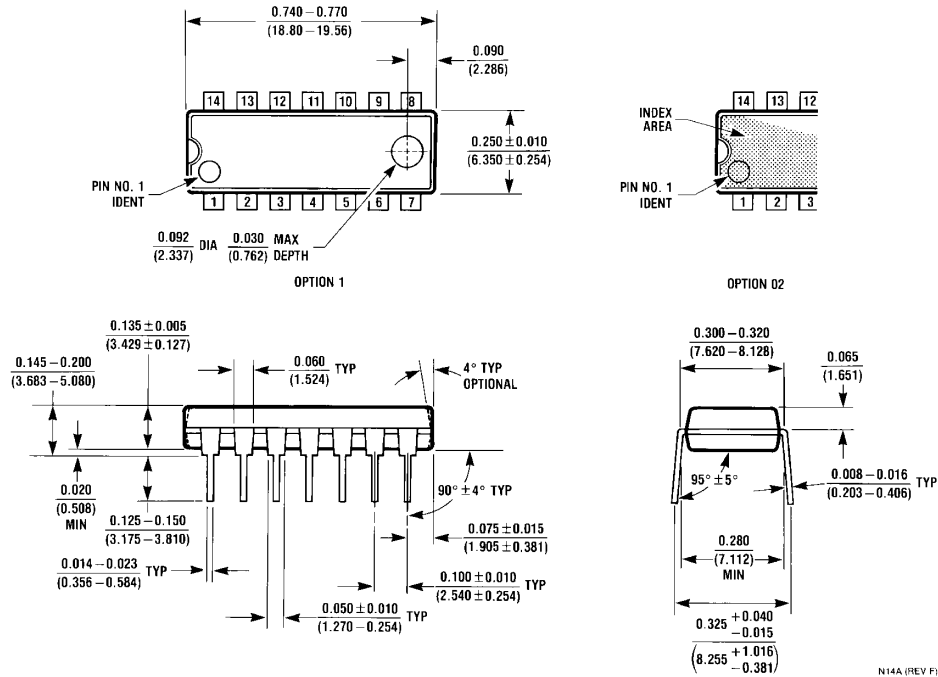


**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
Package Number M14A**



**14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D**

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



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N14A

N14A (REV F)

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