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April 1988
Revised June 2003

74F86 2-Input Exclusive-OR Gate

General Description

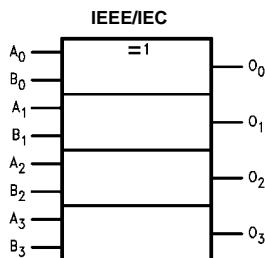
This device contains four independent gates, each of which performs the logic exclusive-OR function.

Ordering Code:

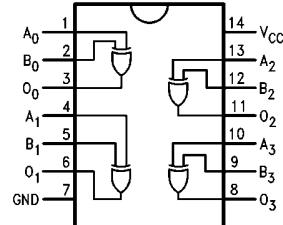
Order Number	Package Number	Package Description
74F86SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74F86SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F86PC	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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_{IH}/I_{IL} Output I_{OH}/I_{OL}
A_n, B_n O_n	Inputs Outputs	1.0/1.0 50/33.3	20 μ A/-0.6 mA -1 mA/20 mA

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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 +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

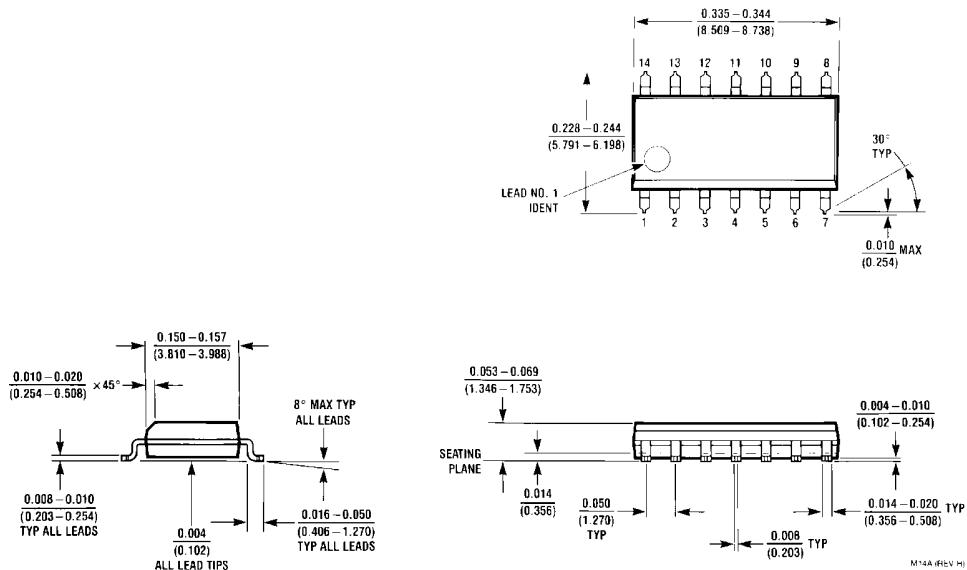
Symbol	Parameter	Min	Typ	Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage			-1.2	V	Min	$I_{IN} = -18$ mA
V_{OH}	Output HIGH Voltage 10% V_{CC} 5% V_{CC}	2.5 2.7			V	Min	$I_{OH} = -1$ mA $I_{OH} = -1$ mA
V_{OL}	Output LOW Voltage 10% V_{CC}			0.5		Min	$I_{OL} = 20$ mA
I_{IH}	Input HIGH Current			5.0	μ A	Max	$V_{IN} = 2.7$ V
I_{BVI}	Input HIGH Current Breakdown Test			7.0	μ A	Max	$V_{IN} = 7.0$ V
I_{CEX}	Output HIGH Leakage Current			50	μ A	Max	$V_{OUT} = V_{CC}$
V_{ID}	Input Leakage Test	4.75			V	0.0	$I_{ID} = 1.9$ μ A All other pins grounded
I_{OD}	Output Leakage Circuit Current			3.75	μ A	0.0	$V_{OD} = 150$ mV All other pins grounded
I_{IL}	Input LOW Current			-0.6	mA	Max	$V_{IN} = 0.5$ V
I_{OS}	Output Short-Circuit Current	-60		-150	mA	Max	$V_{OUT} = 0$ V
I_{CCH}	Power Supply Current		12	18	mA	Max	$V_O = \text{HIGH}$
I_{CCL}	Power Supply Current		18	28	mA	Max	$V_O = \text{LOW}$

AC Electrical Characteristics

Symbol	Parameter	$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50$ pF			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay A_n, B_n to O_n (Other Input LOW)	3.0	4.0	5.5	3.0	6.5	ns
t_{PHL}	Propagation Delay A_n, B_n to O_n (Other Input HIGH)	3.0	4.2	5.5	3.0	6.5	ns
t_{PLH}	Propagation Delay A_n, B_n to O_n (Other Input HIGH)	3.5	5.3	7.0	3.5	8.0	ns
t_{PHL}		3.0	4.7	6.5	3.0	7.5	ns

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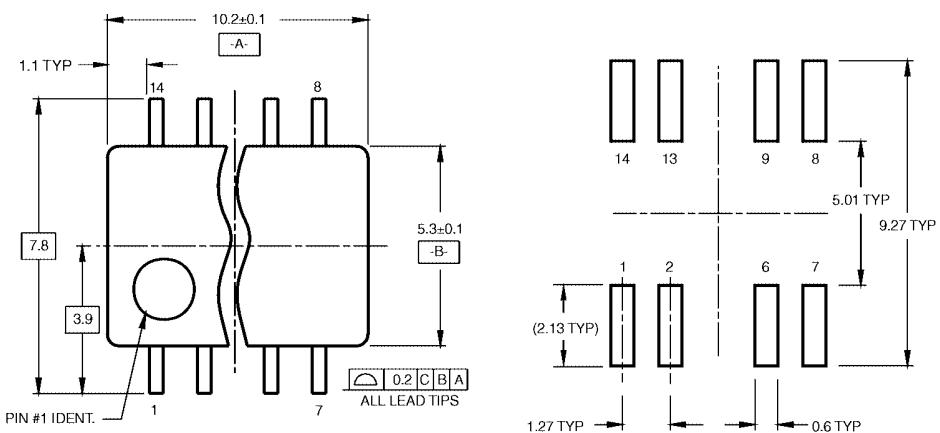
Physical Dimensions inches (millimeters) unless otherwise noted



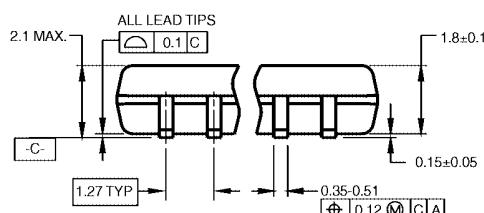
14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

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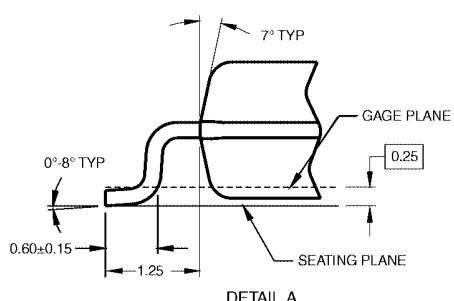
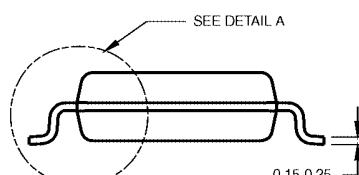
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



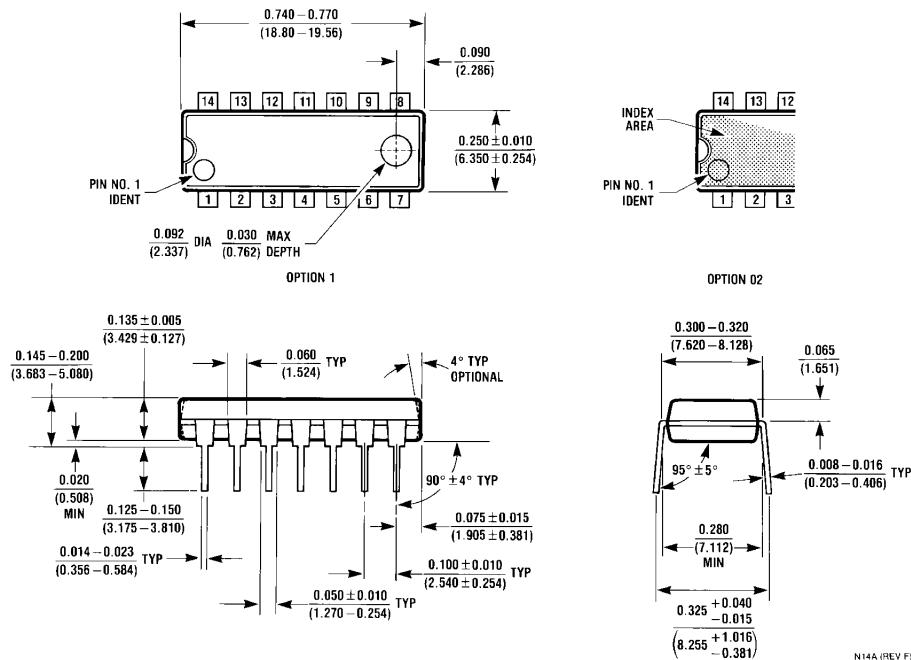
NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M14DRevB1

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

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