National Semiconductor

November 1995

74F27
Triple 3-Input NOR Gate

General Description

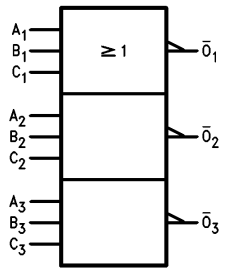
This device contains three independent gates, each of which performs the logic NOR function.

Commercial	Package Number	Package Description
74F27PC	N14A	14-Lead (0.300″ Wide) Molded Dual-In-Line
74F27SC (Note 1)	M14A	14-Lead (0.150″ Wide) Molded Small Outline, JEDEC
74F27SJ (Note 1)	M14D	14-Lead (0.300″ Wide) Molded Small Outline, EIAJ

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

Logic Symbol

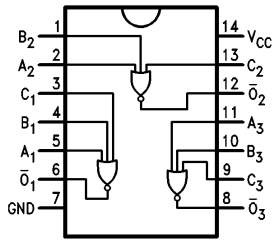
IEEE/IEC



TL/F/9539–3

Connection Diagram

Pin Assignment for SOIC and DIP



TL/F/9539–2

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	Data Inputs	1.0/1.0	20 μA/−0.6 mA
$\overline{O}_n$	Data Outputs	50/33.3	−1 mA/20 mA

Function Table

Inputs			Output
A_n	B_n	C_n	$\overline{O}_n$
L	L	L	H
X	X	H	L
X	H	X	L
H	X	X	L

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

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RRD-B30M115/Printed in U. S. A.

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

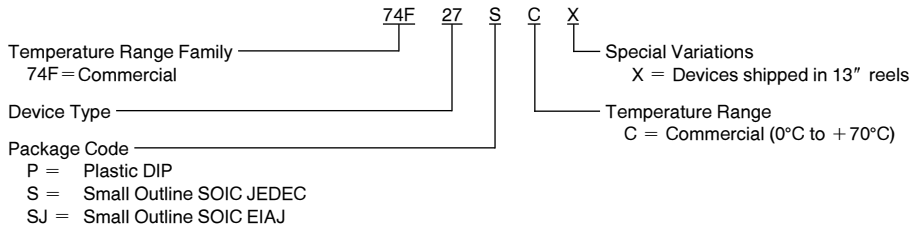
Symbol	Parameter		74F			Units	V_{CC}	Conditions
			Min	Typ	Max			
V_{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage	74F 10% V_{CC}	2.5			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			4.0	5.5	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			8.7	12.0	mA	Max	V_O = LOW

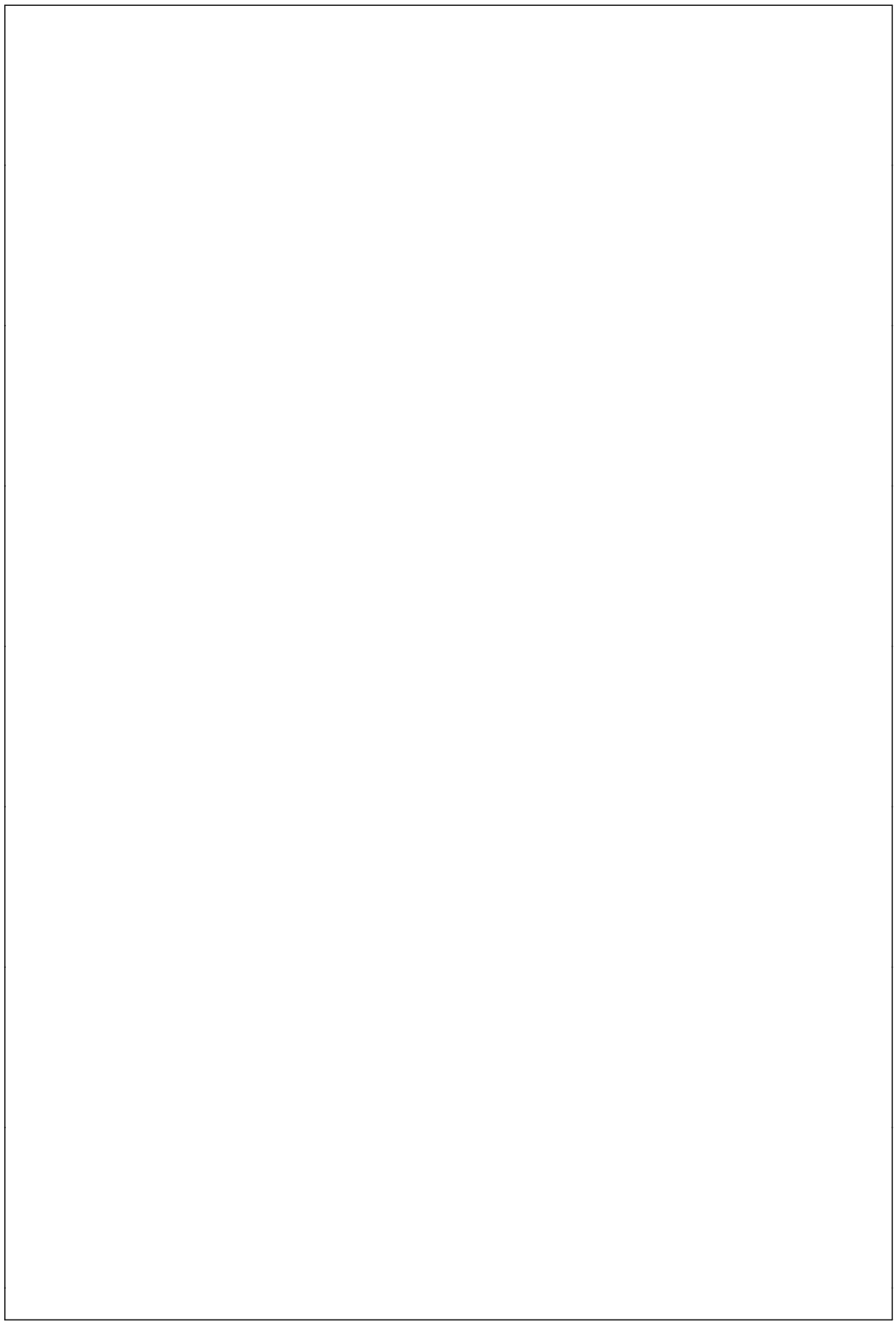
AC Electrical Characteristics

Symbol	Parameter	74F			74F		Units
		$T_A = +25°C$ $V_{CC} = +5.0V$ $C_L = 50$ pF			$T_A, V_{CC} =$ Com $C_L = 50$ pF		
		Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay	2.0 1.0	3.8 2.6	6.0 4.0	1.5 1.0	6.5 4.5	ns

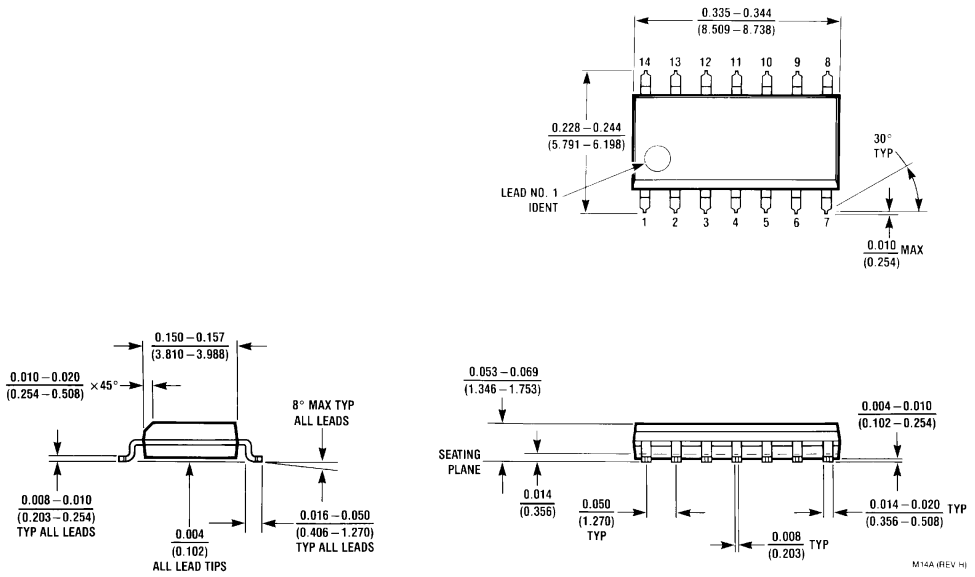
Ordering Information

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

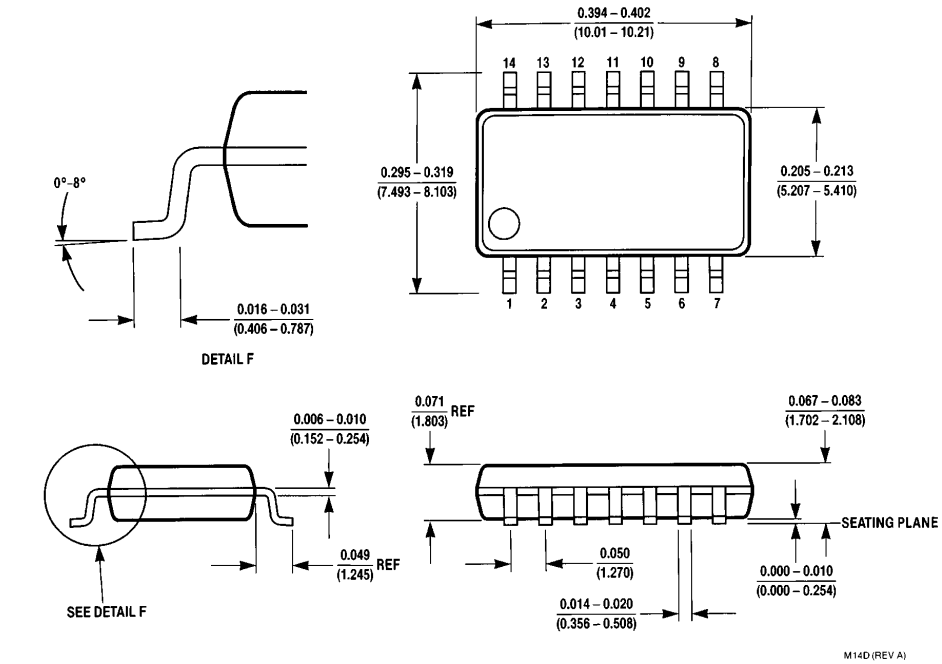




Physical Dimensions inches (millimeters)

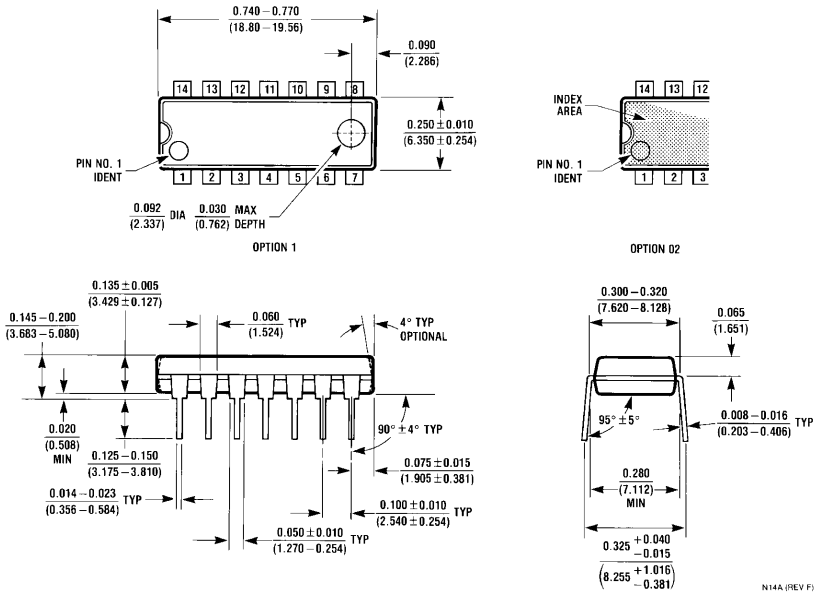


14-Lead (0.150″ Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M14A



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

Physical Dimensions inches (millimeters) (Continued)



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

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