

54F/74F20

Dual 4-Input NAND Gate

General Description

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

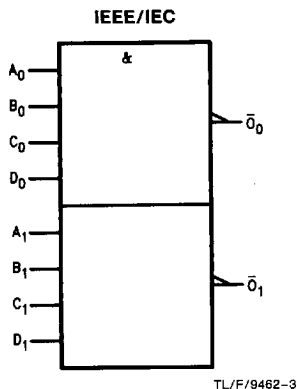
Ordering Code: See Section 11

Commercial	Military	Package Number	Package Description
74F20PC		N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
	54F20DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F20SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F20SJ (Note 1)		M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F20FM (Note 2)	W14B	14-Lead Cerpack
	54F20LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

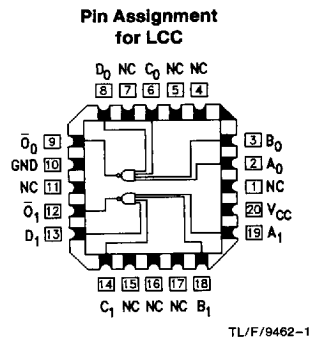
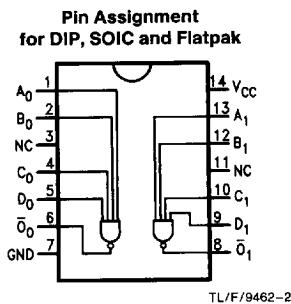
Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

Logic Symbol



Connection Diagrams



Unit Loading/Fan Out: See Section 2 for U.L. definitions

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
A_n, B_n, C_n, D_n	Inputs	1.0/1.0	20 μ A / -0.6 mA
O_n	Outputs	50/33.3	-1 mA / 20 mA

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

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	
Military	-55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

DC Electrical Characteristics

Symbol	Parameter	54F/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	54F 10% V_{CC}	2.5		V	Min	$I_{OH} = -1$ mA $I_{OH} = -1$ mA $I_{OH} = -1$ mA
		74F 10% V_{CC}	2.5				
		74F 5% V_{CC}	2.7				
V_{OL}	Output LOW Voltage	54F 10% V_{CC}		0.5	V	Min	$I_{OL} = 20$ mA $I_{OL} = 20$ mA
		74F 10% V_{CC}		0.5			
I_{IH}	Input HIGH Current	54F		20.0	μ A	Max	$V_{IN} = 2.7V$
		74F		5.0			
I_{BI}	Input HIGH Current Breakdown Test	54F		100	μ A	Max	$V_{IN} = 7.0V$
		74F		7.0			
I_{CEX}	Output HIGH Leakage Current	54F		250	μ A	Max	$V_{OUT} = V_{CC}$
		74F		50			
V_{ID}	Input Leakage Test	74F	4.75		V	0.0	$I_{ID} = 1.9$ μ A All other pins grounded
I_{OD}	Output Leakage Circuit Current	74F		3.75	μ A	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			0.9	mA	Max	$V_O = HIGH$
				1.4			
I_{CCL}	Power Supply Current			3.4	mA	Max	$V_O = LOW$

AC Electrical Characteristics: See Section 2 for Waveforms and Load Configurations

[查询"54F20DMQB"供应商](#)

Symbol	Parameter	74F			54F		74F		Units	Fig. No.
		T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Mil C _L = 50 pF		T _A , V _{CC} = Com C _L = 50 pF			
		Min	Typ	Max	Min	Max	Min	Max		
t _{PLH}	Propagation Delay	2.4	3.7	5.0	2.0	7.0	2.4	6.0	ns	2-3
t _{PHL}	A _n , B _n , C _n , D _n to \bar{O}_n	1.5	3.2	4.3	1.5	6.5	1.5	5.3		