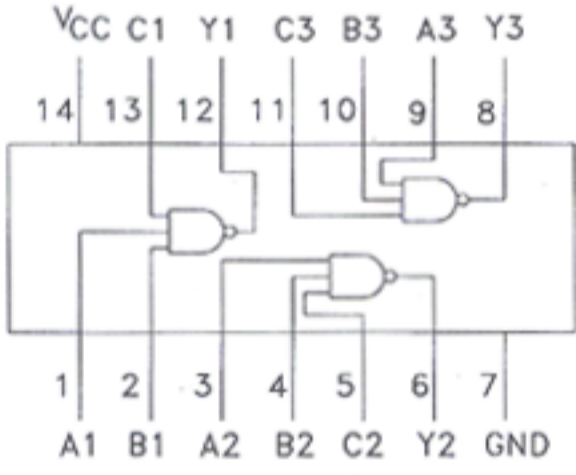
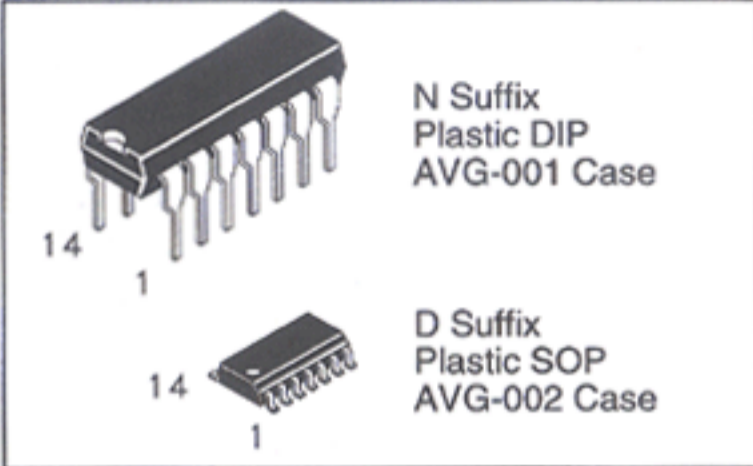


Triple 3-Input NAND Gate

DV74HC10
DV74HCT10

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

- Output Drive Capability: 10 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2 to 6 V for HC devices
- Low Input Current: 1 μ A
- DC, AC parameters guaranteed from -55°C to 125°C



TRUTH TABLE
 $Y = \overline{ABC}$

Inputs			Outputs
A	B	C	Y
L	X	X	H
X	L	X	H
X	X	L	H
H	H	H	L

H = High Logic Level
L = Low Logic Level
X = Don't Care

ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V _{IN}	DC Input Voltage (Referenced to GND)	-1.5 to V _{CC} +1.5	V
V _{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to V _{CC} +0.5	V
I _{IN}	DC Input Current, per Pin	± 20	mA
I _{OUT}	DC Output Current, per Pin	± 25	mA
I _{CC}	DC Supply Current, V _{CC} and GND Pins	± 50	mA
P _D	Power Dissipation in Still Air, Plastic DIP SOP Package	750 500	mW
T _{STG}	Storage Temperature Range	-65 to +150	°C
TL	Lead Temperature, 1mm from Case for 10 Seconds (Plastic DIP or Sop Package)	260	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage, HC (HCT), Referenced to GND	2.0 (4.5)	6.0 (5.5)	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage, Referenced to GND	0	V _{CC}	V
T _A	Ambient Temperature	-55	+125	°C
t _r , t _f	Input Rise and Fall Time: HC: V _{CC} =2.0V HCT: V _{CC} =5.5V / HC: V _{CC} =4.5V HC: V _{CC} =6.0V	0	1000 500 400	ns

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HC-10

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits			Unit
				25°C to -55°C	≤85°C	≤125°C	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} =0.1V, or V _{OUT} =V _{CC} -0.1V I _{OUT} ≤20 μA	2.0	1.5	1.5	1.5	V
			4.5	3.15	3.15	3.15	
			6.0	4.2	4.2	4.2	
V _{IL}	Maximum Low-Level Input Voltage	V _{OUT} =0.1V, or V _{OUT} =V _{CC} -0.1V I _{OUT} ≤20 μA	2.0	0.3	0.3	0.3	V
			4.5	0.9	0.9	0.9	
			6.0	1.2	1.2	1.2	
V _{OH}	Minimum High-Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤20 μA	2.0	1.9	1.9	1.9	V
			4.5	4.4	4.4	4.4	
			6.0	5.9	5.9	5.9	
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤4.0mA I _{OUT} ≤5.2 mA	4.5	3.98	3.84	3.7	
			6.0	5.48	5.34	5.2	
			6.0	5.48	5.34	5.2	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤20 μA	2.0	0.1	0.1	0.1	V
			4.5	0.1	0.1	0.1	
			6.0	0.1	0.1	0.1	
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤4.0mA I _{OUT} ≤5.2 mA	4.5	0.26	0.33	0.40	V
			6.0	0.26	0.33	0.40	
			6.0	0.26	0.33	0.40	
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	6.0	±0.1	±1.0	±1.0	μA
I _{CC}	Maximum Quiescent Supply Current (Per Package)	V _{IN} = V _{CC} or GND I _{OUT} ≤0 μA	6.0	2.0	20	40	μA

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AC ELECTRICAL CHARACTERISTICS over full operating conditions (C_L=50 pF, Input t_f=t_r=6ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			25°C to -55°C	≤85°C	≤125°C	
t _{PLH} , t _{PHL}	Maximum Propagation Delay Time, Input A,B or C To Output Y	2.0	95	120	145	ns
		4.5	19	24	29	
		6.0	16	20	25	
t _{TLH} , t _{THL}	Maximum Output Transition Time Any Output	2.0	75	95	110	ns
		4.5	15	19	22	
		6.0	13	16	19	
C _{IN}	Maximum Input Capacitance	—	10	10	10	pF

C _{PD}	Power Dissipation Capacitance (Per Gate) Used to determine the no-load dynamic power consumption P _D = C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} = 5 V			pF
		25			

HCT-10

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits						Unit
				25°C to -55°C		≤85°C		≤125°C		
				Min	Max	Min	Max	Min	Max	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} = 0.1 V or V _{CC} -0.1 V I _{OUT} ≤20 μA	4.5	2.00		2.00		2.00		V
			5.5	2.00		2.00		2.00		
V _{IL}	Maximum Low-Level Input Voltage	V _{OUT} = 0.1 V or V _{CC} -0.1 V I _{OUT} ≤20 μA	4.5		0.80		0.80		0.80	V
			5.5		0.80		0.80		0.80	

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits						Unit
				25°C to -55°C		≤85°C		≤125°C		
				Min	Max	Min	Max	Min	Max	
V _{OH}	Minimum High-Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 20 μA	4.5	4.40		4.40		4.40		V
		V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 4.0 mA	4.5	3.98		3.84		3.70		V
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	4.5		0.1		0.1		0.1	V
		V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 4.0mA	4.5		0.26		0.33		0.40	V
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	5.5		± 0.1		±0.1		±1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	5.5		2		20		40	μA

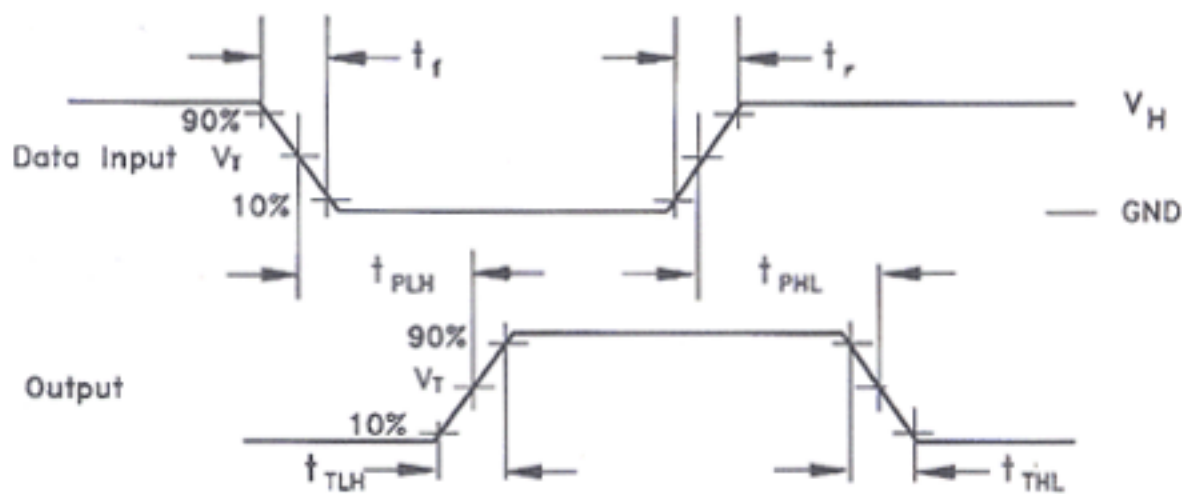
Δ I _{CC}	Additional Quiescent Supply Current	V _{IN} =2.4V, Any One Input V _{IN} =V _{CC} or GND, Other Inputs I _{OUT} =0 μA	5.5	≥ -55°C		25°C to 125°C		mA
				2.9	2.4			

AC ELECTRICAL CHARACTERISTICS over full operating conditions (CL=50pF, Input t_r=t_f=6ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit						Unit
			25°C to -55°C		≤85°C		≤125°C		
			Min	Max	Min	Max	Min	Max	
t _{PLH} , t _{PHL}	Propagation Delay Time, Input to Output	5.0V ± 10%		19		24		29	ns
t _{TLH} , t _{THL}	Output Transition Time Any Output			15		19		22	ns
C _{IN}	Maximum Input Capacitance	—		10		10		10	pF

C _{PD}	Power Dissipation Capacitance (Per Inverter) Used to determine the no-load dynamic power consumption, P _D = C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} = 5 V		pF
		27		

SWITCHING WAVEFORMS



Input and Output threshold voltage, $V_T=50\% V_{CC}$ for HC, 1.3V for HCT
 $V_H=V_{CC}$ for HC, 3V for HCT