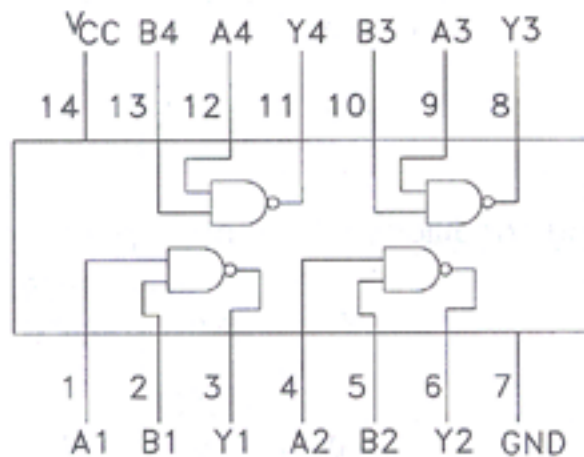
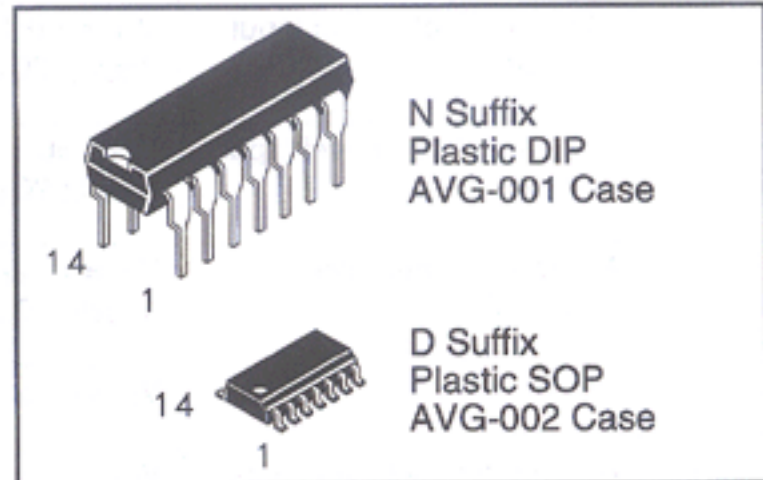


### DV74HC00A DV74HCT00A

## Quad 2-Input NAND Gate

This device contains four 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  $\mu$ A
- DC, AC parameters guaranteed from -55°C to 125°C



**TRUTH TABLE**  
 $Y = AB$

Inputs		Outputs
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

H = High Logic Level  
L = Low Logic Level

### 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	$\pm 20$	mA
$I_{OUT}$	DC Output Current, per Pin	$\pm 25$	mA
$I_{CC}$	DC Supply Current, $V_{CC}$ and GND Pins	$\pm 50$	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



# HC-00A

## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> V	Guaranteed Limits			Unit
				25°C to -55°C	≤85°C	≤125°C	
V <sub>IH</sub>	Minimum High-Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V  I <sub>OUT</sub>   ≤ 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 <sub>IL</sub>	Maximum Low-Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V  I <sub>OUT</sub>   ≤ 20 μA	2.0	0.5	0.5	0.5	V
			4.5	1.35	1.35	1.35	
			6.0	1.8	1.8	1.8	
V <sub>OH</sub>	Minimum High-Level Output Voltage	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  I <sub>OUT</sub>   ≤ 20 μA	2.0	1.9	1.9	1.9	V
			4.5	4.4	4.4	4.4	
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  I <sub>OUT</sub>   ≤ 4.0 mA  I <sub>OUT</sub>   ≤ 5.2 mA	4.5	3.98	3.84	3.70	V
			6.0	5.48	5.34	5.20	
V <sub>OL</sub>	Maximum Low Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  I <sub>OUT</sub>   ≤ 20 μA	2.0	0.1	0.1	0.1	V
			4.5	0.1	0.1	0.1	
		V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  I <sub>OUT</sub>   ≤ 4.0 mA  I <sub>OUT</sub>   ≤ 5.2 mA	4.5	0.26	0.33	0.40	V
			6.0	0.26	0.33	0.40	
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	6.0	±0.1	±1.0	±1.0	μA
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND  I <sub>OUT</sub>   = 0 μA	6.0	1	10	40	μA

## AC ELECTRICAL CHARACTERISTICS over full operating conditions (C<sub>L</sub>=50pF, Input t<sub>r</sub>=t<sub>f</sub>=6ns)

Symbol	Parameter	V <sub>CC</sub> V	Guaranteed Limit			Unit
			25°C to -55°C	≤85°C	≤125°C	
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay Time, Input to Output	2.0	75	95	110	ns
		4.5	15	19	22	
		6.0	13	16	19	
t <sub>TLH</sub> , t <sub>THL</sub>	Output Transition Time Any Output	2.0	75	95	110	ns
		4.5	15	19	22	
		6.0	13	16	19	
C <sub>IN</sub>	Maximum Input Capacitance	—	10	10	10	pF

C <sub>PD</sub>	Power Dissipation Capacitance (Per Gate) Used to determine the no-load dynamic power consumption, P <sub>D</sub> = C <sub>PD</sub> V <sub>CC</sub> <sup>2</sup> f + I <sub>CC</sub> V <sub>CC</sub>	Typical @ 25°C, V <sub>CC</sub> = 5 V			pF
		22			

# HCT-00A

## DC ELECTRICAL CHARACTERISTICS

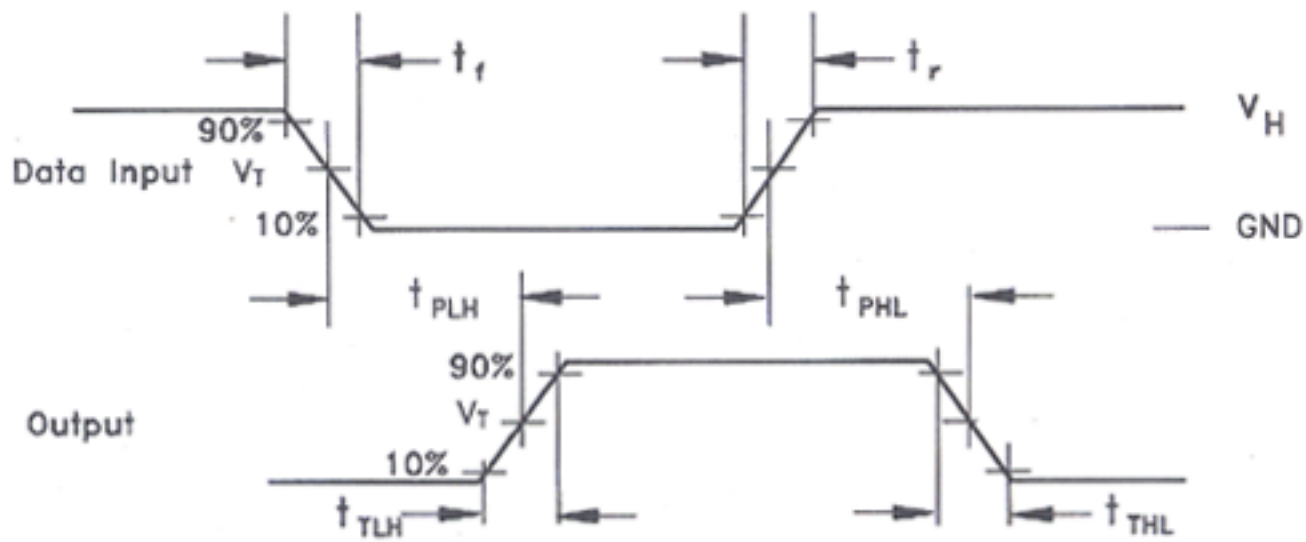
Symbol	Parameter	Conditions	V <sub>CC</sub> V	Guaranteed Limits						Unit
				25°C to -55°C		≤85°C		≤125°C		
				Min	Max	Min	Max	Min	Max	
V <sub>IH</sub>	Minimum High-Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V  I <sub>OUT</sub>   ≤ 20 μA	4.5	2.00		2.00		2.00		V
			5.5	2.00		2.00		2.00		
V <sub>IL</sub>	Maximum Low-Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V  I <sub>OUT</sub>   ≤ 20 μA	4.5		0.80		0.80		0.80	V
			5.5		0.80		0.80		0.80	
V <sub>OH</sub>	Minimum High-Level Output Voltage	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  I <sub>OUT</sub>   ≤ 20 μA	4.5	4.40		4.40		4.40		V
			5.5	5.40		5.40		5.40		
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  I <sub>OUT</sub>   ≤ 4.0 mA	4.5	3.98		3.84		3.70		V

Symbol	Parameter	Conditions	V <sub>CC</sub> V	Guaranteed Limits						Unit
				25°C to -55°C		≤85°C		≤125°C		
				Min	Max	Min	Max	Min	Max	
V <sub>OL</sub>	Maximum Low Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  I <sub>OUT</sub>   ≤ 20 μA	4.5	0.1		0.1		0.1	V	
		V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  I <sub>OUT</sub>   ≤ 4.0mA	5.5	0.1		0.1		0.1	V	
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  I <sub>OUT</sub>   ≤ 4.0mA	4.5	0.26		0.33		0.40	μA	
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND  I <sub>OUT</sub>   = 0 μA	5.5	± 0.1		± 1.0		± 1.0	μA	
Δ I <sub>CC</sub>	Additional Quiescent Supply Current	V <sub>IN</sub> =2.4V, Any One Input V <sub>IN</sub> =V <sub>CC</sub> or GND, Other Inputs I <sub>OUT</sub> =0 μA	5.5	≥ -55°C		25°C to 125°C				
				2.9		2.4		mA		

**AC ELECTRICAL CHARACTERISTICS** over full operating conditions (CL=50pF, Input t<sub>f</sub>=t<sub>r</sub>=6ns)

Symbol	Parameter	V <sub>CC</sub> V	Guaranteed Limit						Unit
			25°C to -55°C		≤85°C		≤125°C		
			Min	Max	Min	Max	Min	Max	
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay Time, Input to Output	5.0V ± 10%		19		24		28	ns
t <sub>TLH</sub> , t <sub>THL</sub>	Output Transition Time Any Output			15		19		22	ns
C <sub>IN</sub>	Maximum Input Capacitance	—		10		10		10	pF
C <sub>PD</sub>	Power Dissipation Capacitance (Per Inverter) Used to determine the no-load dynamic power consumption, P <sub>D</sub> = C <sub>PD</sub> V <sub>CC</sub> <sup>2</sup> f + I <sub>CC</sub> V <sub>CC</sub>	Typical @ 25°C, V <sub>CC</sub> = 5 V							
		15						pF	

**SWITCHING WAVEFORMS**



Input and Output threshold voltage, V<sub>T</sub>=50% V<sub>CC</sub> for HC; 1.3V for HCT  
V<sub>H</sub>=V<sub>CC</sub> for HC, 3V for HCT