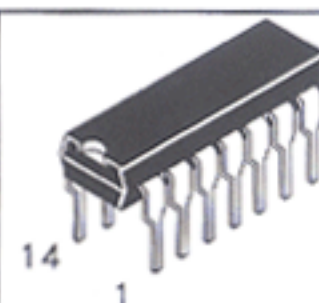


Quad 2-Input NOR Gate

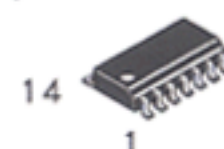
This device contains four independent gates, each of which performs the logic NOR function.

- 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

DV74HC02A
DV74HCT02A



N Suffix
Plastic DIP
AVG-001Case



D Suffix
Plastic SOP
AVG-002 Case

02A



TRUTH TABLE
 $Y = A + B$

INPUTS		Outputs
A	B	Y
L	L	H
L	H	L
H	L	L
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	± 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	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 0 0	1000 500 400	ns

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits			Unit
				25°C to -55°C	≤85°C	≤125°C	
V _{IH}	High Level Input Voltage (Referenced to GND)	V _{OUT} = 0.1 V or V _{CC} - 0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.5 3.15 4.2	1.5 3.15 4.2	1.5 3.15 4.2	V
V _{IL}	Low Level Input Voltage	V _{OUT} = 0.1 V or V _{CC} - 0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.5 1.35 1.8	0.5 1.35 1.8	0.5 1.35 1.8	V
V _{OH}	Minimum High Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} < 20 mA	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	V
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} < 4.0 mA I _{OUT} < 5.2 mA	4.5 6.0	3.98 5.48	3.84 5.34	3.70 5.20	V
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	V
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} < 4.0 mA I _{OUT} < 5.2 mA	4.5 6.0	0.26 0.26	0.33 0.33	0.40 0.40	V
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	V _{IN} = V _{CC} or GND I _{OUT} ≤ 0 μA	6.0	1	10	40	μA

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

Symbol	Parameter	Vcc V	Guaranteed Limit			Unit
			25°C to -55°C	≤85°C	≤125°C	
tPLH, tPHL	Propagation Delay Time, Input A or B To Output Y	2.0 4.5 6.0	80 16 14	100 20 17	120 24 20	ns
tTLH, tTHL	Output Transition Time Any Output	2.0 4.5 6.0	75 15 13	95 19 16	110 22 19	ns
CIN	Maximum Input Capacitance	—	10	10	10	pF

CPD	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, VCC= 5 V	pF
		22	

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 5.5	2.00 2.00		2.00 2.00		2.00 2.00		V
V _{IL}	Maximum Low- Level Input Voltage	V _{OUT} =0.1 V or V _{CC} - 0.1 V I _{OUT} ≤ 20 μA	4.5 5.5		0.80 0.80		0.80 0.80		0.80 0.80	V

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 5.5	4.40 5.40		4.40 5.40		4.40 5.40		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 5.5		0.1 0.1		0.1 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		± 1.0		± 1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	5.5		1		10		40	μA

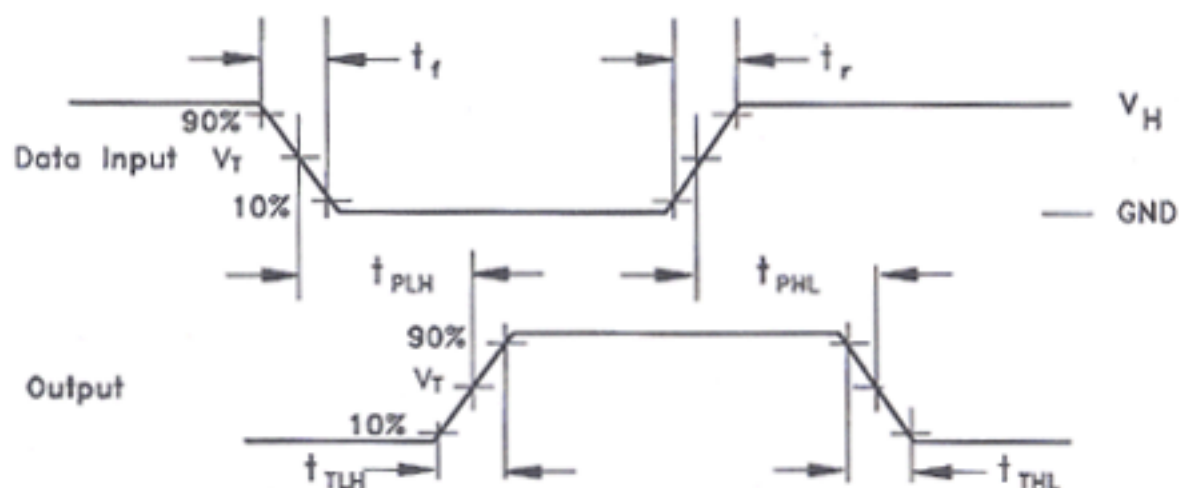
ΔI_{CC}	Additional Quiescent Supply Current	$V_{IN}=2.4V$, Any One Input $V_{IN}=V_{CC}$ or GND, Other Inputs $I_{OUT}=0\ \mu A$	5.5	$\geq -55^{\circ}C$	$25^{\circ}C$ to $125^{\circ}C$	mA
				2.9	2.4	

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		16		20		24	ns
t _{TLH} , t _{THL}	Output Transition Time Any Output	± 10%		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	
		25	pF

SWITCHING WAVEFORMS



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