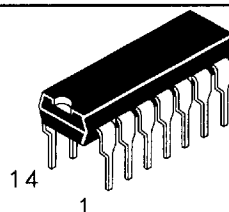


Quad 2-Input NOR Gate

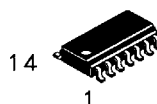
This device contains four independent gates, each of which performs the logic NOR function.

- 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

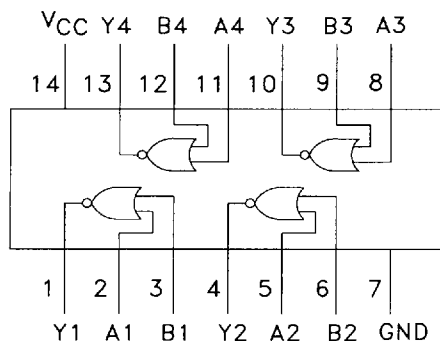
DV74HC02A
DV74HCT02A



N Suffix
Plastic DIP
AVG-001 Case



D Suffix
Plastic SOP
AVG-002 Case



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

DV74HC02A, DV74HCT02A

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1-800-AVG-SEMI

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HC-02A

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_r = t_f = 6ns)

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

CPD	Power Dissipation Capacitance (Per Gate) Used to determine the no-load dynamic power consumption, PD = CPD VCC²f + ICC VCC	Typical @ 25°C, VCC= 5 V	pF
		22	

HCT-02A

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

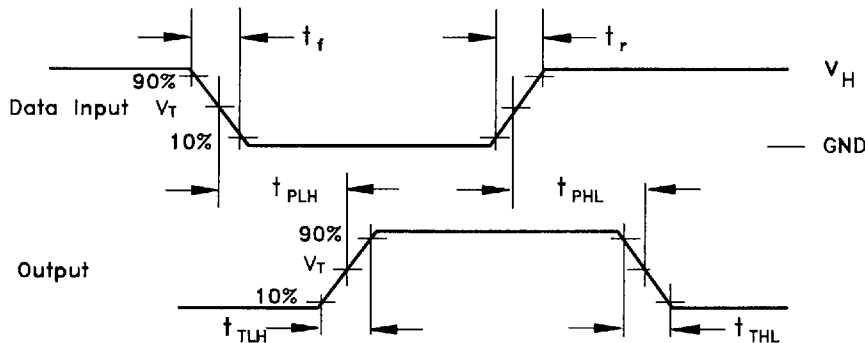
ΔI_{CC}	Additional Quiescent Supply Current	$V_{IN}=2.4V$, Any One Input $V_{IN}=V_{CC}$ or GND, Other Inputs $I_{OUT}=0\ \mu A$	5.5	$\geq -55^{\circ}C$	$25^{\circ}C$ to $125^{\circ}C$	mA
				2.9	2.4	

AC ELECTRICAL CHARACTERISTICS over full operating conditions (CL=50pF, Input t_f=t_r=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%		16		20		24	ns
t _{TLH} , t _{THL}	Output Transition Time Any Output			15		19		22	ns
C _{IN}	Maximum Input Capacitance	—		10		10		10	pF

CPD	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, $V_{CC} = 5\text{ V}$	
		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