MN74HC02/MN74HC02S

Quad 2-Input NOR Gates

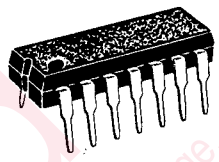
■ Outline

The MN74HC02/MN74HC02C is a 2-input positive logic NOR gate having four built-in circuits in one chip.

Owing to the silicon gate CMOS process, this NOR gate has realized low power consumption and high noise immunity equivalent to those of a standard CMOS and the operation speed as high as of an LS TTL. The buffer added to the gate output improves the input/output transfer characteristic and minimizes the propagation delay time fluctuation caused by the load capacity increase. The MN74HC02/ MN74HC02S can directly drive ten LS TTL inputs.

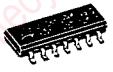
To protect the input and output against electrostatic breakdown, a resistor and a diode are used for the V_{CC} and the GND. The pin configuration and the function are the same as those of the standard 54LS/74LS logic family.

P-1



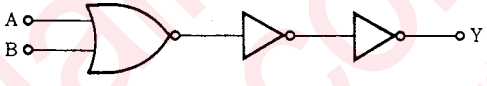
14-pin plastic DIL package

P-2

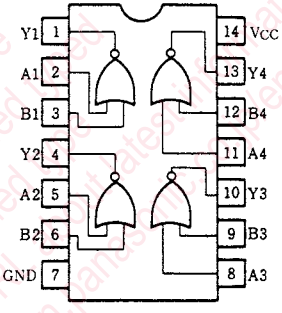


14-pin PANAFLAT package (SO-14D)

■ Logic Diagram (1 Gate)



Pin Configuration



■ Absolute Maximum Ratings

Item			Symbol	Rating	Unit
Supply voltage			V_{CC}	−0.5~+7.0	V
Input output voltage			V_I, V_O	−0.5~V_{CC}+0.5	V
Input protective diode current			I_{IK}	±20	mA
Output parasitic diode current			I_{OK}	±20	mA
Output current			I_O	±25	mA
Supply current			I_{CC}, I_{GND}	±50	mA
Storage temperature			T_{stg}	−65~+150	°C
Power dissipation	MN74HC02	Ta=−40~+60°C	P_D	400	mW
		Ta=+60~+85°C		Decrease to 200mW at the rate of 8mW/°C	
	MN74HC02S	Ta=−40~+60°C	P_D	275	mW
		Ta=+60~+85°C		Decrease to 200mW at the rate of 3.8mW/°C	

■ Recommended Operating Conditions

Item	Symbol	V_{CC}(V)	Rating	Unit
Operating power supply voltage	V_{CC}		1.4~6.0	V
Input output voltage	V_I, V_O		0~V_{CC}	V
Operating temperature	T_A		−40~+85	°C
Input rise, fall time	t_r, t_f	2.0	0~1000	ns
		4.5	0~500	ns
		6.0	0~400	ns

■ DC Characteristics (GND=0V)

Item	Symbol	V_{CC} (V)	Test Condition V_I	Test Condition I_O	Test Condition Unit	Temperature Ta=25°C min.	Temperature Ta=25°C typ.	Temperature Ta=25°C max.	Temperature Ta=−40~+85°C min.	Temperature Ta=−40~+85°C max.	Unit
Input voltage high level	V_{IH}	2.0				1.5			1.5		V
		4.5				3.15			3.15		
		6.0				4.2			4.2		
Input voltage low level	V_{IL}	2.0						0.3		0.3	V
		4.5						0.9		0.9	
		6.0						1.2		1.2	
Output voltage high level	V_{OH}	2.0	V_{IL}	−20.0	μA	1.9	2.0		1.9		V
		4.5		−20.0	μA	4.4	4.5		4.4		
		6.0		−20.0	μA	5.9	6.0		5.9		
		4.5		−4.0	mA	3.92			3.84		
		6.0		−5.2	mA	5.48			5.34		
Output voltage low level	V_{OL}	2.0	V_{IH} or V_{IL}	20.0	μA		0.0	0.1		0.1	V
		4.5		20.0	μA		0.0	0.1		0.1	
		6.0		20.0	μA		0.0	0.1		0.1	
		4.5		4.0	mA			0.26		0.33	
		6.0		5.2	mA			0.26		0.33	
Input leakage current	I_I	6.0	V_I=V_{CC} or GND					±0.1		±1.0	μA
Static supply current	I_{CC}	6.0	V_I=V_{CC} or GND, I_O=0					2.0		20.0	μA

■ AC Characteristics (GND=0V, Input transition time≦6ns, C_L=50pF)

Item	Symbol	V_{CC} (V)	Test Condition	Temperature Ta=25°C min.	Temperature Ta=25°C typ.	Temperature Ta=25°C max.	Temperature Ta=−40~+85°C min.	Temperature Ta=−40~+85°C max.	Unit
Output rise time	t_{TLH}	2.0			25	75		95	ns
		4.5			8	15		19	
		6.0			7	13		16	
Output fall time	t_{THL}	2.0			20	75		95	ns
		4.5			7	15		19	
		6.0			6	13		16	
Propagation time (L→H)	t_{PLH}	2.0			25	75		95	ns
		4.5			8	15		19	
		6.0			7	13		16	
Propagation time (H→L)	t_{PHL}	2.0			25	75		95	ns
		4.5			8	15		19	
		6.0			7	13		16	

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