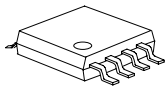
U74HC2G02

CMOS IC

2-INPUT NOR GATE



MSOP-8

*Pb-free plating product number: U74HC2G02L

■ DESCRIPTION

The U74HC2G02 is a 2-input NOR gate which provides the Function $Y=\overline{A+B}$.

■ FEATURES

* Operation Voltage Range: 2.0~6.0V
* Low Power Dissipation: I_{CC}=10μA(Max)
* High Speed: tpd=9ns(Vcc=4.5V, C_L=50pF)
*Specified from -40 to +85℃ and -40 to +125℃

■ ORDERING INFORMATION

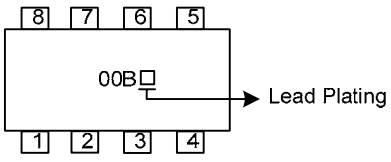
Ordering Number		Package	Packing
Normal	Lead Free Plating		
U74HC2G02-SM1-R	U74HC2G02L-SM1-R	MSOP-8	Tape Reel
U74HC2G02-SM1-T	U74HC2G02L-SM1-T	MSOP-8	Tube

U74HC2G02L-SM1-R

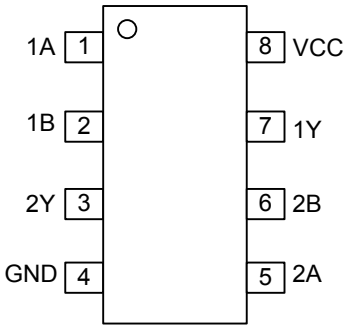
(1)Packing Type
(2)Package Type
(3)Lead Plating

(1) R: Tape Reel, T: Tube
(2) SM1: MSOP-8
(3) L: Lead Free Plating, Blank: Pb/Sn

■ MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

■ LOGIC DIAGRAM (positive logic)

■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~7	V
Input Voltage	V_{IN}	-0.5~7	V
Output Voltage	V_{OUT}	-0.5~V_{CC}+0.5	V
Input Clamp Current	I_{IK}	±20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	25	mA
V_{CC} or GND Current	I_{CC}	50	mA
Power dissipation	P_D	300	mW
Storage Temperature	T_{STG}	-65 ~ +150	℃

Note 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2.0	5.0	6.0	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Times	t_R ,t_F	V_{CC}=2.0V			1000	ns
		V_{CC}=4.5V		6	500	
		V_{CC}=6V			400	
Operating Temperature	T_A		-40	25	125	℃

■ STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	-40~85℃			-40~125℃		UNIT
			MIN	TYP	MAX	MIN	MAX	
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5	1.2		1.5		V
		V_{CC}=4.5V	3.15	2.4		3.15		
		V_{CC}=6.0V	4.2	3.2		4.2		
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V		0.8	0.5		0.5	V
		V_{CC}=4.5V		2.1	1.35		1.35	
		V_{CC}=6.0V		2.8	1.8		1.8	
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-20μA	1.9	2.0		1.9		V
		V_{CC}=4.5V, I_{OH}=-20μA	4.4	4.5		4.4		
		V_{CC}=6.0V, I_{OH}=-20μA	5.9	6.0		5.9		
		V_{CC}=4.5V, I_{OH}=-4mA	4.13	4.32		3.7		
		V_{CC}=6.0V, I_{OH}=-5.2mA	5.63	5.81		5.2		
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=20μA		0	0.1		0.1	V
		V_{CC}=4.5V, I_{OL}=20μA		0	0.1		0.1	
		V_{CC}=6.0V, I_{OL}=20μA		0	0.1		0.1	
		V_{CC}=4.5V, I_{OH}=4mA		0.15	0.33		0.4	
		V_{CC}=6.0V, I_{OH}=5.2mA		0.16	0.33		0.4	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=6.0V, V_{IN}=V_{CC} or GND			±1		±1	μA
Quiescent Supply Current	I_Q	V_{CC}=6.0V, V_{IN}=V_{CC} or GND, I_{OUT}=0			10		20	μA
Input Capacitance	C_{IN}	V_{CC}=5.0V, V_{IN}=V_{CC} or GND		1.5				pF

■ DYNAMIC CHARACTERISTICS (Input: t_R,t_F≤6ns;PRR≤1MHz)

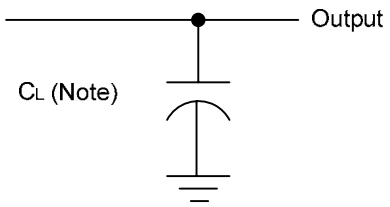
See Fig.1 and Fig.2 for test circuit and waveforms.

PARAMETER	SYMBOL	TEST CONDITIONS	-40~85°C			-40~125°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
Propagation Delay from Input (A and B) to Output(Y)	t_{PHL} /t_{PLH}	V_{CC}= 2.0, C_L= 50pF		26	95		110	ns
		V_{CC}= 4.5, C_L= 50pF		9	19		22	
		V_{CC}= 6.0, C_L= 50pF		8	16		20	
Output transition Time	T_{THL} /t_{TLH}	V_{CC}= 2.0, C_L= 50pF		19	95		125	ns
		V_{CC}= 4.5, C_L= 50pF		7	19		25	
		V_{CC}= 6.0, C_L= 50pF		5	16		20	

Operating Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power Dissipation Capacitance	Cpd	No load, f=1MHz, V_{CC}=5	10	pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

Fig. 1 Load circuitry for switching times.

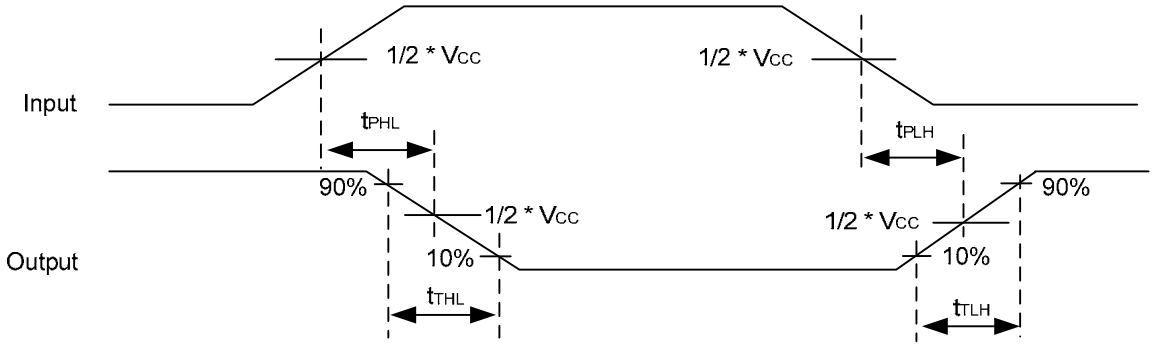


Fig. 2 Propagation delay from input(A and B) to output(Y) and Output transition time.