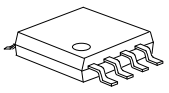
U74HC2G00

CMOS IC

2-INPUT NAND GATE



MSOP-8

■ DESCRIPTION

The UTC **U74HC2G00** is a high-speed CMOS device which provides 2-input NAND gates.

■ FEATURES

* Operation Voltage Range: 2.0~6.0V
* Low Power Dissipation: I_{CC}=10μA (Max.)
* High Speed: tpd=9ns (V_{CC}=4.5V, C_L=50pF)

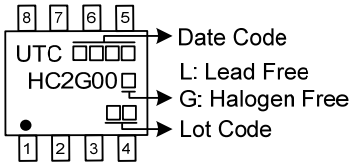
■ ORDERING INFORMATION

Order Number		Package	Packing
Lead Free	Halogen Free		
U74HC2G00L-SM1-R	U74HC2G00G-SM1-R	MSOP-8	Tape Reel

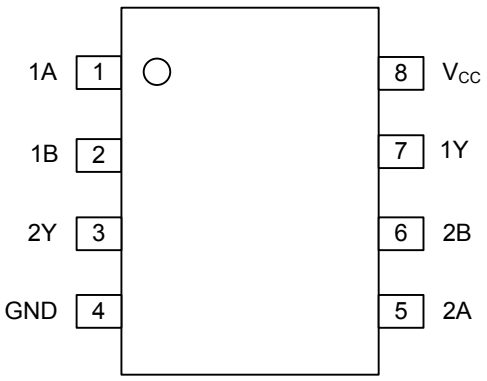
U74HC2G00G-SM1-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) SM1: MSOP-8
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



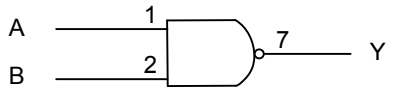
■ PIN CONFIGURATION



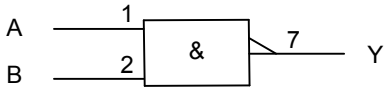
■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7.0	V
Input Voltage	V_{IN}	-0.5 ~ +7.0	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	°C

Note: 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	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	V_{CC}=2.0V	$\Delta t/\Delta v$			625	ns/V
	V_{CC}=4.5V			1.67	139	ns/V
	V_{CC}=6.0V				83	ns/V
Operating Temperature		T_A	-40	+25	+125	°C

■ ELECTRICAL CHARACTERISTICS

(Voltage are referenced to GND=0V, T_A=25°C, unless otherwise specified)

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

■ DYNAMIC CHARACTERISTICS (Input: t_R, $t_F \leq 6ns$; PRR≤1MHz, C_L=50pF)

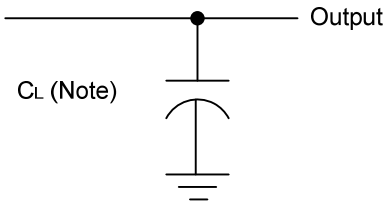
See Fig. 1 and Fig. 2 for test circuit and waveforms.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A and B) to output(Y)	t_{PHL} /t_{PLH}	V_{CC}=2.0V		25	95	ns
		V_{CC}=4.5V		9	19	
		V_{CC}=6.0V		7	16	
Output transition Time	t_{THL} /t_{TLH}	V_{CC}=2.0V		18	95	ns
		V_{CC}=4.5V		6	19	
		V_{CC}=6.0V		5	16	

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, f=1MHz, V_{CC}=5V		10		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

Fig. 1 Load circuitry for switching times.

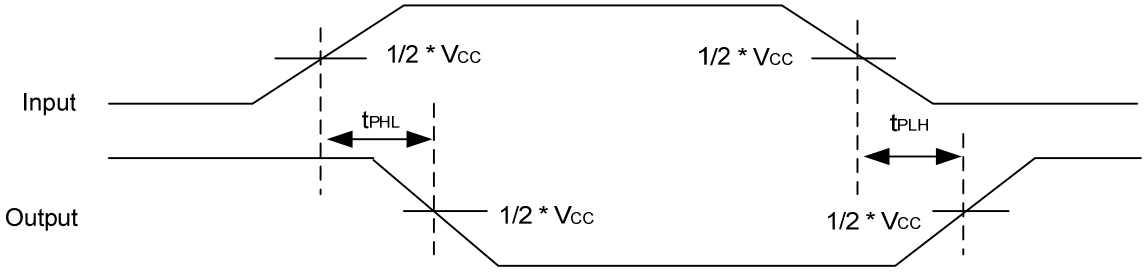


Fig. 2 Propagation delay from input(A and B) to output(Y) and Output transition time.