



U74HC10

CMOS IC

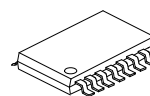
TRIPLE 3-INPUT NAND GATES

DESCRIPTION

The **U74HC10** is an IC that integrates three separate 3-input NAND gates. For each gate, the output is determined by the logical NAND of its three inputs, which can be expressed as $Y = A \cdot B \cdot C$.

FEATURES

- * Significant power reduction compared to LSTTL logic ICs
- * Wide supply voltage range: 2V to 6V
- * Wide operating temperature range: -40°C to $+125^{\circ}\text{C}$
- * Buffered inputs
- * Green & Pb Free



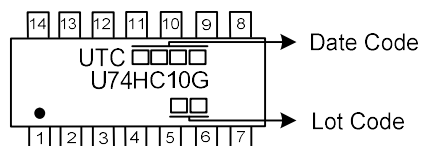
TSSOP-14U

ORDERING INFORMATION

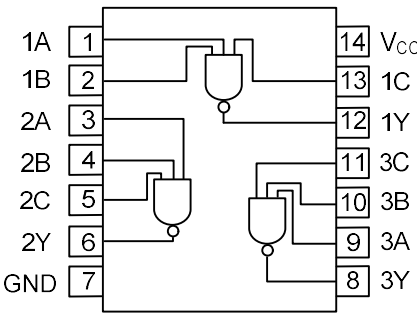
Ordering Number	Package	Packing
U74HC10G-UEB-R	TSSOP-14U	Tape Reel

U74HC10G-UEB-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) UEB: TSSOP-14U (3) G: Halogen Free and Lead Free
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MARKING



PIN CONFIGURATION



PIN DESCRIPTION

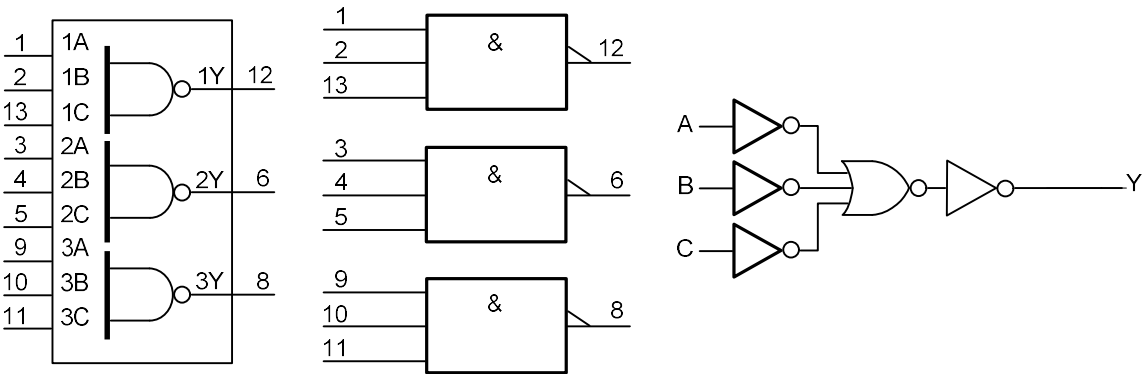
PIN NO.	PIN NAME	I/O	DESCRIPTION
1	1A	I	Channel 1, Input A
2	1B	I	Channel 1, Input B
3	2A	I	Channel 2, Input A
4	2B	I	Channel 2, Input B
5	2C	I	Channel 2, Input C
6	2Y	O	Channel 2, Input Y
7	GND		Ground
8	3Y	O	Channel 3, Input Y
9	3A	I	Channel 3, Input A
10	3B	I	Channel 3, Input B
11	3C	I	Channel 3, Input C
12	1Y	O	Channel 1, Input Y
13	1C	I	Channel 1, Input C
14	V _{CC}		Positive Supply

FUNCTION TABLE

INPUT			OUTPUT
A	B	C	Y
H	H	H	L
L	X	X	H
X	L	X	H
X	X	L	H

H = HIGH voltage level, L = LOW voltage level.

LOGIC DIAGRAM (positive logic)



Logic Symbol

IEC Logic Symbol

Logic Diagram for One Gate

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified) (Note 1, 2)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V _{CC}		-0.5 ~ 7	V
Input Clamp Current	I _{IK}	V _{IN} < 0 or V _{IN} > V _{CC}	±20	mA
Output Clamp Current	I _{OK}	V _{OUT} = 0 to V _{CC}	±20	mA
Continuous Output Current	I _{OUT}		±25	mA
Continuous Current Through		V _{CC} or GND	±50	mA
Junction Temperature	T _J		+150	°C
Storage Temperature	T _{STG}		-65 ~ +150	°C

Notes: 1. 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.

2. Its guarantee by design, this parameter is not production tested.

■ RECOMMENDED OPERATING CONDITIONS (NOTE)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}		2		6	V
Input Voltage	V _{IN}		0		V _{CC}	V
Output Voltage	V _{OUT}		0		V _{CC}	V
Input Transition Rise or Fall Rate	Δt/Δv	V _{CC} =2V			1000	ns
		V _{CC} =4.5V			500	ns
		V _{CC} =6V			400	ns
Operating Temperature	T _A		-40		+125	°C

Note: Its guarantee by design, this parameter is not production tested.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	155	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V _{IH}	V _{CC} =2V	1.5						V
		V _{CC} =4.5V	3.15						V
		V _{CC} =6V	4.2						V
Low-Level Input Voltage	V _{IL}	V _{CC} =2V			0.5				V
		V _{CC} =4.5V			1.35				V
		V _{CC} =6V			1.8				V
High-Level Output Voltage	V _{OH}	V _{CC} =2V, I _{OH} =-20μA	1.9			1.9			V
		V _{CC} =4.5V, I _{OH} =-20μA	4.4			4.4			V
		V _{CC} =6V, I _{OH} =-20μA	5.9			5.9			V
		V _{CC} =4.5V, I _{OH} =-4mA	3.98			3.94			V
		V _{CC} =6V, I _{OH} =-5.2mA	5.48			5.34			V
Low-Level Output Voltage	V _{OL}	V _{CC} =2V, I _{OL} =20μA			0.1			0.1	V
		V _{CC} =4.5V, I _{OL} =20μA			0.1			0.1	V
		V _{CC} =6V, I _{OL} =20μA			0.1			0.1	V
		V _{CC} =4.5V, I _{OL} =-4mA			0.26			0.33	V
		V _{CC} =6V, I _{OL} =-5.2mA			0.26			0.33	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =6V, V _{IN} =V _{CC} or 0			±0.1			±1	μA
Supply Current	I _{CC}	V _{CC} =6V, V _{IN} =V _{CC} or 0			2			20	μA
Input Capacitance	C _{IN}	V _{CC} =2V ~ 6V			10			10	pF

Note: Its guarantee by design, this parameter is not production tested.

■ DYNAMIC CHARACTERISTICS (Input: t_R , $t_F=6ns$, unless otherwise specified)

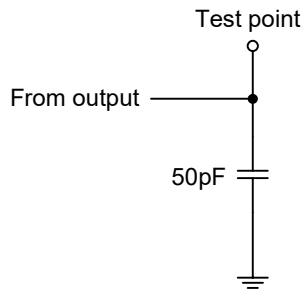
PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A, B, C) to Output (Y)	t _{PD}	V _{CC} =2V, C _L =50pF			95			120	ns
		V _{CC} =4.5V, C _L =50pF			19			24	ns
		V _{CC} =6V, C _L =50pF			16			20	ns
Transition Time From Input (Y)	t _i	V _{CC} =2V, C _L =50pF			75			95	ns
		V _{CC} =4.5V, C _L =50pF			15			19	ns
		V _{CC} =6V, C _L =50pF			13			16	ns

Note: Its guarantee by design, this parameter is not production tested.

■ OPERATING CHARACTERISTICS

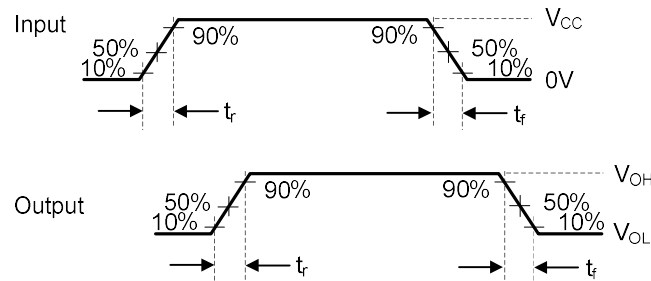
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =2V ~ 6V, No Load		25		pF

■ TEST CIRCUIT AND WAVEFORMS



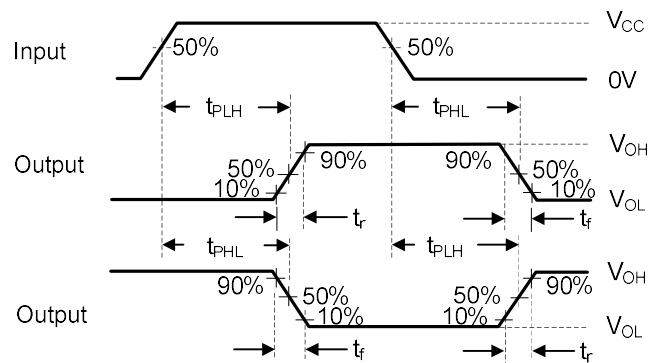
TEST CIRCUIT

Notes: 1. C_L includes probe and jig capacitance.
2. $P_{RR} \leq 1\text{MHz}$, $Z_O = 50\Omega$, $t_r \leq 6\text{ns}$.



Note: t_t is the greater of t_r and t_f .

VOLTAGE WAVEFORM



Note: The maximum between t_{PLH} and t_{PHL} is used for t_{PD} .

PROPAGATION DELAY TIMES

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.