



## U74AHC86

CMOS IC

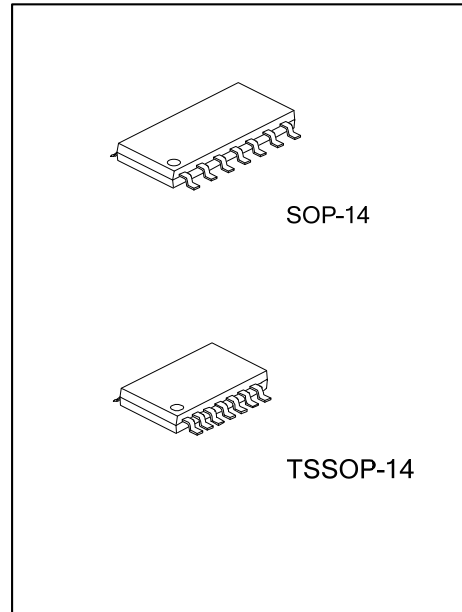
### QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

#### DESCRIPTION

The **U74AHC86** device is quadruple 2-input EXCLUSIVE-OR gate which perform the function  $Y=A \oplus B$  or  $Y = \bar{A}B + A\bar{B}$ .

#### FEATURES

- \* Operate from 2V to 5.5V
- \* Max tpd of 8.8ns at 5.0V
- \* Low Quiescent Current:  $I_{CC}=2\mu A(\text{Max})$  at  $T_A=25^\circ C$

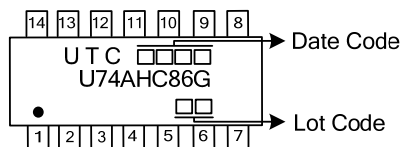


#### ORDERING INFORMATION

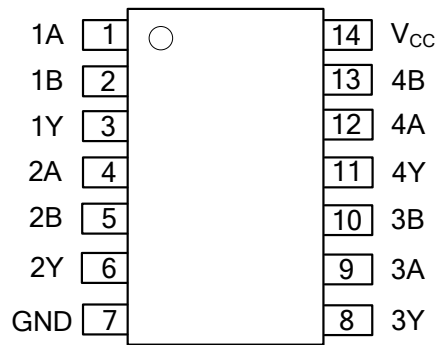
Ordering Number	Package	Packing
U74AHC86G-S14-R	SOP-14	Tape Reel
U74AHC86G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC86G-P14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P14: TSSOP-14, S14: SOP-14 (3) G: Halogen Free and Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

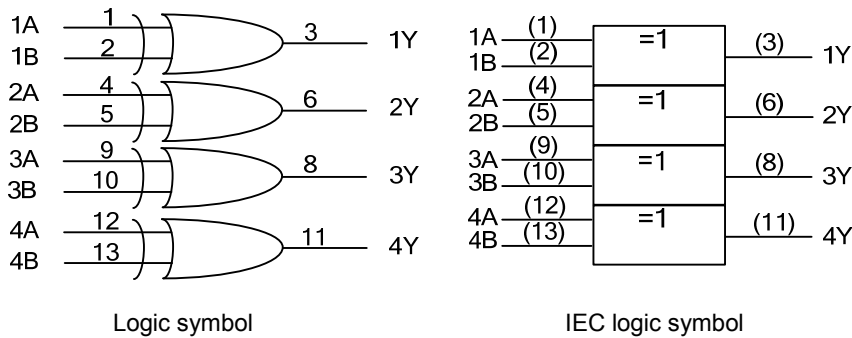


■ FUNCTION TABLE

INPUT(nA)	INPUT(nB)	OUTPUT(nY)
H	H	L
H	L	H
L	H	H
L	L	L

Note: H: High voltage level; L: Low voltage level

■ LOGIC SYMBOL



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.5 ~ +7	V
Input Voltage	V <sub>IN</sub>	-0.5 ~ +7	V
Output Voltage	V <sub>OUT</sub>	-0.5 ~ V <sub>CC</sub> +0.5	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±50	mA
Output Current	I <sub>OUT</sub>	±25	mA
Input Clamp Current	I <sub>IK</sub>	-20	mA
Output Clamp Current	I <sub>OK</sub>	±20	mA
Storage Temperature	T <sub>STG</sub>	-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. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		2.0	5.0	5.5	V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Input Transition Rise or Fall Rate	Δt/Δv	V <sub>CC</sub> =3.3±0.3V			100	ns/V
		V <sub>CC</sub> =5.0±0.5V			20	
Operating Temperature	T <sub>A</sub>		-40	+25	+85	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14	86	°C/W
	TSSOP-14	113	°C/W

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> = 2.0V	1.5			V
		V <sub>CC</sub> = 3.0V	2.1			
		V <sub>CC</sub> = 5.5V	3.85			
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> = 2.0V			0.5	V
		V <sub>CC</sub> = 3.0V			0.9	
		V <sub>CC</sub> = 5.5V			1.65	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =2V, I <sub>OH</sub> =-50μA	1.9	2		V
		V <sub>CC</sub> =3V, I <sub>OH</sub> =-50μA	2.9	3		
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-50μA	4.4	4.5		
		V <sub>CC</sub> =3V, I <sub>OH</sub> =-4mA	2.58			
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-8mA	3.94			
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =2V, I <sub>OL</sub> =50μA			0.1	V
		V <sub>CC</sub> =3V, I <sub>OL</sub> =50μA			0.1	
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =50μA			0.1	
		V <sub>CC</sub> =3V, I <sub>OL</sub> =4mA			0.36	
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =8mA			0.36	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>IN</sub> =5.5V or GND, V <sub>CC</sub> = 0V to 5.5V			0.1	μA
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0, V <sub>CC</sub> = 5.5V			2	μA
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND		4	10	pF

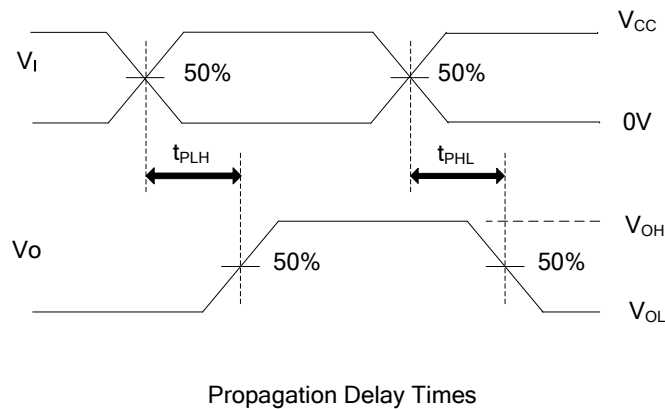
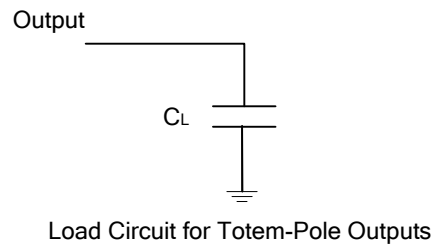
■ SWITCHING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , see TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output(Y)	$t_{PLH}$	$V_{CC} = 3.3V \pm 0.3V$	$C_L = 15 \text{ pF}$		7	11	Ns
			$C_L = 50 \text{ pF}$		9.5	14.5	
	$t_{PHL}$	$V_{CC} = 5.0V \pm 0.5V$	$C_L = 15 \text{ pF}$		4.8	6.8	Ns
			$C_L = 50 \text{ pF}$		6.3	8.8	

■ OPERATING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load, $f=1\text{MHz}$		18		pF

■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.  
 PRR  $\leq$  1MHz,  $Z_o = 50\Omega$ ,  $t_R \leq 3ns$ ,  $t_F \leq 3ns$ .

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