



## U74HC86

CMOS IC

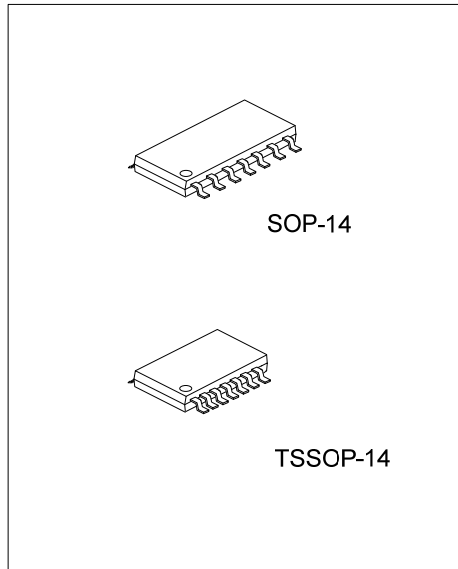
### QUAD 2-INPUT EXCLUSIVE-OR GATES

#### DESCRIPTION

The **U74HC86** contains four independent 2-input exclusive-or gates, it provides the Boolean function  $Y=A\oplus B$  or  $Y=\overline{A}B+A\overline{B}$  in positive logic.

#### FEATURES

\* Operation Voltage range: 2~6V

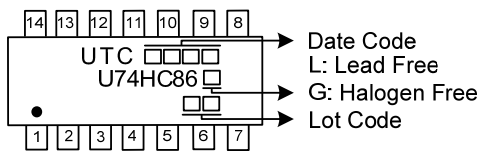


#### ORDERING INFORMATION

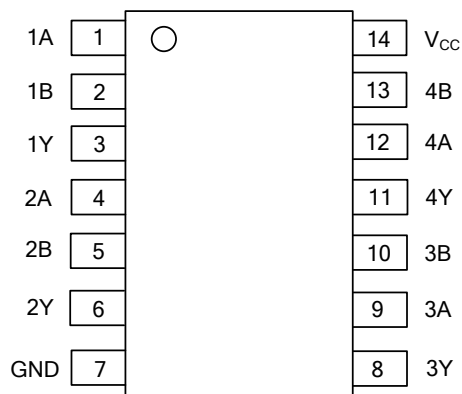
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC86L-S14-R	U74HC86G-S14-R	SOP-14	Tape Reel
U74HC86L-P14-R	U74HC86G-P14-R	TSSOP-14	Tape Reel

<p>U74HC86G-S14-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S14: SOP-14, P14: TSSOP-14</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE

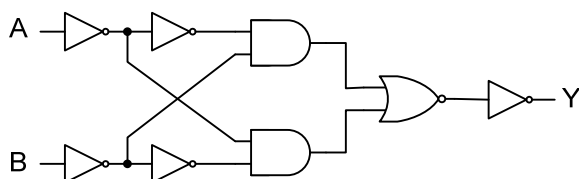
INPUTS(A)	INPUTS(B)	OUTPUT(Y)
L	L	L
L	H	H
H	L	H
H	H	L

Note: H: HIGH voltage level; L: LOW voltage level.

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



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### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~7	V
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 50$	mA
Output Current	$I_{OUT}$	$\pm 25$	mA
Input Clamp Current	$I_{IK}$	$\pm 20$	mA
Output Clamp Current	$I_{OK}$	$\pm 20$	mA
Ambient Operating Temperature	$T_{OPR}$	-40 ~ + 85	°C
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.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14	$\theta_{JA}$	°C /W
	TSSOP-14		
		113	

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2	5	6	V
High-level Input Voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=4.5V$	3.15			
		$V_{CC}=6.0V$	4.2			
Low-level Input Voltage	$V_{IL}$	$V_{CC}=2.0V$	0		0.5	V
		$V_{CC}=4.5V$	0		1.35	
		$V_{CC}=6.0V$	0		1.8	
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
Input Rise or Fall Times	$t_R, t_F$	$V_{CC}=2.0V$			1	$\mu s$
		$V_{CC}=4.5V$			0.5	
		$V_{CC}=6.0V$			0.4	

### ■ ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	$V_{OH}$	$V_{CC}=2.0V, I_{OH}=-20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$	1.9	1.998		V
		$V_{CC}=4.5V, I_{OH}=-20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$	4.4	4.499		
		$V_{CC}=6.0V, I_{OH}=-20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$	5.9	5.999		
		$V_{CC}=4.5V, I_{OH}=-4mA, V_{IN}=V_{IH}$ or $V_{IL}$	3.98	4.3		
		$V_{CC}=6.0V, I_{OH}=-5.2mA, V_{IN}=V_{IH}$ or $V_{IL}$	5.48	5.8		
Output Voltage Low-Level	$V_{OL}$	$V_{CC}=2.0V, I_{OL}=20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$		2	100	mV
		$V_{CC}=4.5V, I_{OL}=20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$		1	100	
		$V_{CC}=6.0V, I_{OL}=20\mu A, V_{IN}=V_{IH}$ or $V_{IL}$		1	100	
		$V_{CC}=4.5V, I_{OL}=4mA, V_{IN}=V_{IH}$ or $V_{IL}$		170	260	
		$V_{CC}=6.0V, I_{OL}=5.2mA, V_{IN}=V_{IH}$ or $V_{IL}$		150	260	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or 0		$\pm 0.1$	$\pm 100$	nA
Quiescent Supply Current	$I_Q$	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or 0, $I_{OUT}=0$			2	$\mu A$
Input Capacitance	$C_I$	$V_{CC}=2.0V\sim 6.0V$		3	10	pF

■ SWITCHING CHARACTERISTICS (see test circuit and waveforms)

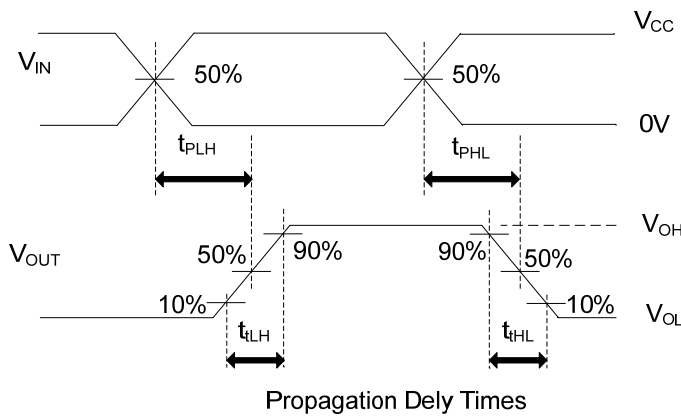
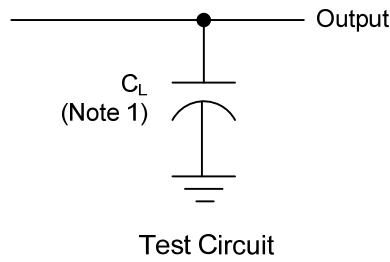
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input (A or B) to Output(Y)	$t_{PLH}/t_{PHL}$	$V_{CC}=2.0V, C_L=50pF$		40	100	ns
		$V_{CC}=4.5V, C_L=50pF$		12	20	
		$V_{CC}=6.0V, C_L=50pF$		10	17	
To Output(Y)	$t_t$	$V_{CC}=2.0V, C_L=50pF$		28	75	ns
		$V_{CC}=4.5V, C_L=50pF$		8	15	
		$V_{CC}=6.0V, C_L=50pF$		6	13	

■ OPERATING CHARACTERISTICS ( $T_a=25^{\circ}C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load		35		pF

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■ TEST CIRCUIT AND WAVEFORMS(Cont.)



- Note: 1.  $C_L$  includes probe and jig capacitance.  
 2.  $PRR \leq 1\text{MHz}$ ,  $Z_o = 50\Omega$ ,  $t_R = 6\text{ns}$ ,  $t_F \leq 6\text{ns}$ .

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