



U74AC86

Advance

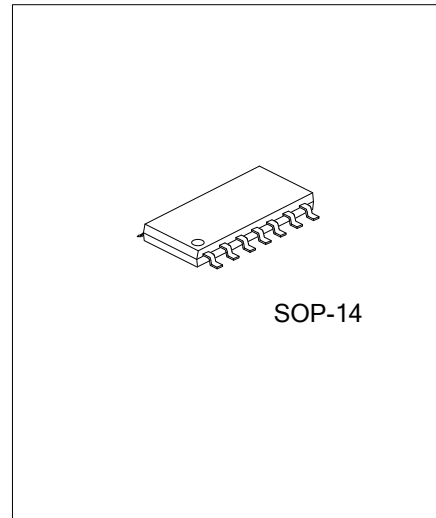
CMOS IC

QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

DESCRIPTION

The **U74AC86** devices are quadruple 2-input exclusive-OR gates. The devices perform the Boolean function $Y=A\oplus B$ or $Y=\overline{A}B+A\overline{B}$ in positive logic.

A common application is as a true/complement element. If one of the inputs is low, the other input is reproduced in true form at the output. If one of the inputs is high, the signal on the other input is reproduced inverted at the output.



SOP-14

FEATURES

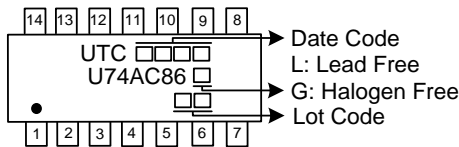
- * Operation Voltage Range: 2~6V
- * Inputs Accept Voltages to 6V
- * Max t_{pd} of 9 ns at 5V

ORDERING INFORMATION

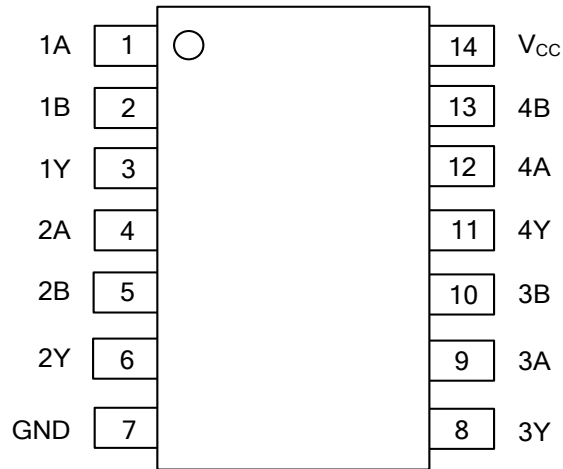
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AC86L-S14-R	U74AC86G-S14-R	SOP-14	Tape Reel

<p>U74AC86G-S14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) S14: SOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ PIN CONFIGURATION

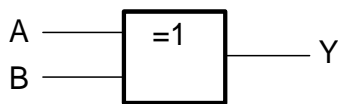


■ FUNCTION TABLE(EACH GATE)

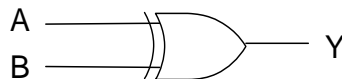
INPUTS		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

L: low voltage level; H: high voltage level

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.5 ~ 7	V
Input Voltage (Note 2)	V _{IN}	-0.5 ~ V _{CC} +0.5	V
Output Voltage (Note 2)	V _{OUT}	-0.5 ~ V _{CC} +0.5	V
Continuous Output Current	I _{OUT}	±50	mA
Continuous Current Through V _{CC} or GND	I _{CC}	±200	mA
Input Clamp Current	I _{IK}	±20	mA
Output Clamp Current	I _{OK}	±20	mA
Storage Temperature Range	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. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	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
Operating free-air temperature	T _A	-40		+85	°C
Input Transition Rise or Fall Rate	Δt/Δv			8	ns/V

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	86	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
HIGH-level input voltage	V _{IH}	V _{CC} =3V	2.1			V
		V _{CC} =4.5V	3.15			
		V _{CC} =5.5V	3.85			
LOW-level output voltage	V _{IL}	V _{CC} =3V			0.9	V
		V _{CC} =4.5V			1.35	
		V _{CC} =5.5V			1.65	
High-Level Output Voltage	V _{OH}	V _{CC} =3V, I _{OH} =-50μA	2.9			V
		V _{CC} =4.5V, I _{OH} =-50μA	4.4			
		V _{CC} =5.5V, I _{OH} =-50μA	5.4			
		V _{CC} =3V, I _{OH} =-12mA	2.56			
		V _{CC} =4.5V, I _{OH} =-24mA	3.86			
Low-Level Output Voltage	V _{OL}	V _{CC} =3V, I _{OL} =50μA		0.002	0.1	V
		V _{CC} =4.5V, I _{OL} =50μA		0.001	0.1	
		V _{CC} =5.5V, I _{OL} =50μA		0.001	0.1	
		V _{CC} =3V, I _{OL} =12mA			0.36	
		V _{CC} =4.5V, I _{OL} =24mA			0.36	
Input Leakage Current (A or B Ports)	I _I	V _{CC} =5.5V, V _I =V _{CC} or GND			±0.1	μA
		V _{CC} =5.5V, V _I =V _{CC} or GND, I _O =0			2	
Quiescent Supply Current	I _{CC}	V _{CC} =5.5V, V _I =V _{CC} or GND, I _O =0			2	μA
Input Capacitance	C _I	V _{CC} =5V, V _I =V _{CC} or GND		2.6		pF

■ DYNAMIC CHARACTERISTICS

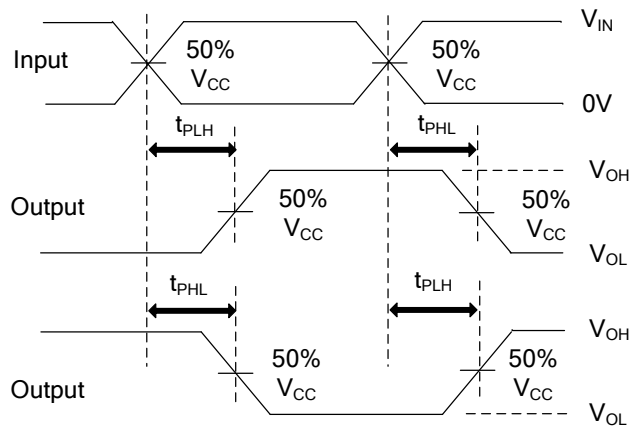
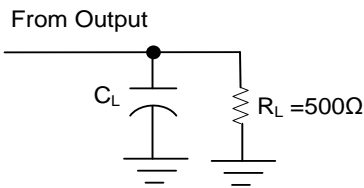
($C_L=50\text{pF}$, $R_L=500\Omega$, $T_A=25^\circ\text{C}$, unless otherwise specified) (see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t_{PLH}	$V_{CC}=3.3V\pm 0.3V$	2.0	6.5	11.5	ns
		$V_{CC}=5V\pm 0.5V$	1.5	4.5	8.5	ns
	t_{PHL}	$V_{CC}=3.3V\pm 0.3V$	2.0	6.0	11.5	ns
		$V_{CC}=5V\pm 0.5V$	1.5	4.5	8.5	ns

■ OPERATING CHARACTERISTICS ($V_{CC}=5V$, $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$C_L=50\text{pF}$, $f = 1\text{MHz}$		25		pF

■ TEST CIRCUIT AND WAVEFORMS



PROPAGATION DELAY TIMES

- Notes: 1. C_L includes probe and jig capacitance.
 2. All input pulses are supplied by generators having the following characteristics:
 $PRR \leq 1\text{MHz}$, $Z_O = 50\Omega$, $t_r \leq 2.5\text{ns}$, $t_f \leq 2.5\text{ns}$.
 3. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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