



## U74AUC1G86

CMOS IC

### SINGLE 2-INPUT EXCLUSIVE-OR GATE

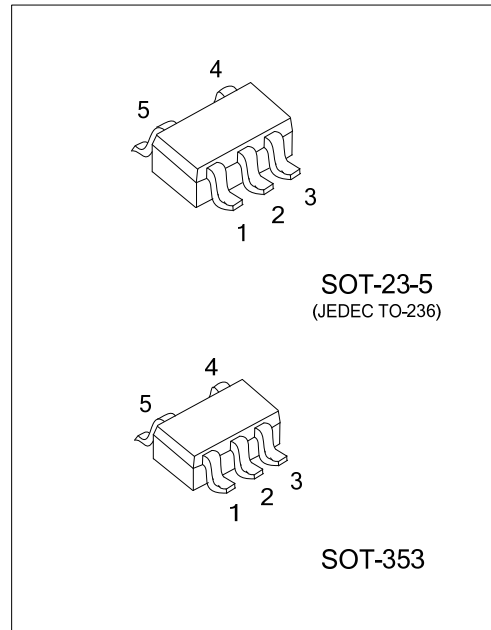
#### DESCRIPTION

The **U74AUC1G86** is a single 2-input exclusive-OR gate which provides the Function  $Y = A \oplus B$  or  $Y = \overline{A}B + A\overline{B}$  in positive logic.

This device has power-down protective circuit, preventing device destruction when it is powered down.

#### FEATURES

- \* Operate from 0.8V to 2.7V
- \* Low power dissipation :  $I_{CC}=10\mu A$  (Max.)
- \*  $\pm 8mA$  Output Driver :  $V_{CC}=1.8V$
- \*  $I_{off}$  Supports partial-Power-Down Mode Operation

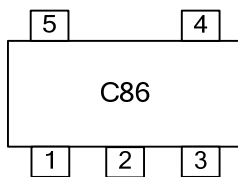


#### ORDERING INFORMATION

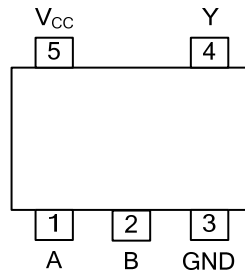
Ordering Number	Package	Packing
U74AUC1G86G-AE5-R	SOT-23-5	Tape Reel
U74AUC1G86G-AL5-R	SOT-353	Tape Reel

<p>U74AUC1G86G-AE5-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) AE5: SOT-23-5, AL5: SOT-353</p> <p>(3) G: Halogen Free and Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

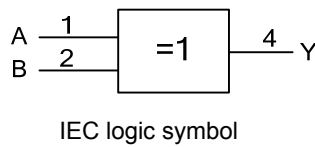
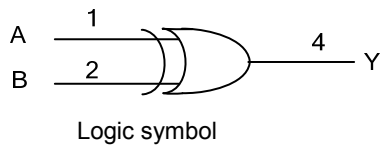


■ FUNCTION TABLE

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

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

■ LOGIC DIAGRAM (positive logic)



## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ +3.6	V
Input Voltage	$V_{IN}$		-0.5 ~ +3.6	V
Output Voltage	$V_{OUT}$	Output in the high or low state	-0.5 ~ $V_{CC}$ +0.5	V
		Output in the power-off state	-0.5 ~ +3.6	V
$V_{CC}$ or GND Current	$I_{CC}$		±100	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT}=0 \sim V_{CC}$	±20	mA
Input Clamp Current	$I_{IK}$	$V_{IN}<0$	-50	mA
Output Clamp Current	$I_{OK}$	$V_O>V_{CC}$ or $V_{OUT}<0$	-50	mA
Storage Temperature Range	$T_{STG}$		-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	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	0.8		2.7	V
Input Voltage	$V_{IN}$		0		3.6	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
Operating Temperature	$T_A$		-40		85	°C
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=0.8V \sim 1.95V$			20	ns/V
		$V_{CC}=2.3V \sim 2.7V$			10	ns/V

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-level Input Voltage	$V_{IH}$	$V_{CC}=0.8V$	$V_{CC}$			
		$V_{CC}=1.1V \sim 1.95V$	$0.65 \times V_{CC}$			
		$V_{CC}=2.3V \sim 2.7V$	1.7			
Low-level Input Voltage	$V_{IL}$	$V_{CC}=0.8V$			0	
		$V_{CC}=1.1V \sim 1.95V$			$0.35 \times V_{CC}$	
		$V_{CC}=2.3V \sim 2.7V$			0.7	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=0.8 \sim 2.7V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			V
		$V_{CC}=0.8V, I_{OH}=-700\mu A$		0.55		V
		$V_{CC}=1.1V, I_{OH}=-3mA$	0.8			V
		$V_{CC}=1.4V, I_{OH}=-5mA$	1			V
		$V_{CC}=1.65V, I_{OH}=-8mA$	1.2			V
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2.3V, I_{OH}=-9mA$	1.8			V
		$V_{CC}=0.8 \sim 2.7V, I_{OL}=100\mu A$			0.2	V
		$V_{CC}=0.8V, I_{OL}=700\mu A$		0.25		V
		$V_{CC}=1.1V, I_{OL}=3mA$			0.3	V
		$V_{CC}=1.4V, I_{OL}=5mA$			0.4	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0 \sim 2.7V, V_{IN}=V_{CC}$ or GND		±0.1	±5	μA
		$V_{CC}=0V, V_{IN}$ or $V_{OUT}=2.7V$		±0.1	±10	μA
Quiescent Supply Current	$I_{CC}$	$V_{CC}=0.8 \sim 2.7V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$		0.1	10	μA
Input Capacitance	$C_I$	$V_{CC}=2.5V, V_{IN}=V_{CC}$ or GND		2.5		pF

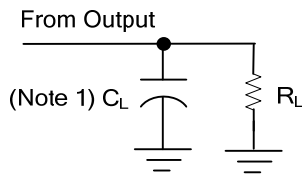
■ SWITCHING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input to output	$t_{PLH} / t_{PHL}$	$C_L = 15\text{pF}$ , $R_L = 2\text{k}\Omega$	$V_{CC} = 0.8\text{V}$		5.5		ns
			$V_{CC} = 1.2 \pm 0.1\text{V}$	0.8			ns
			$V_{CC} = 1.5 \pm 0.1\text{V}$	0.5			ns
			$V_{CC} = 1.8 \pm 0.15\text{V}$	0.4	1		ns
			$V_{CC} = 2.5 \pm 0.2\text{V}$	0.3			ns
		$C_L = 30\text{pF}$ , $R_L = 1\text{k}\Omega$	$V_{CC} = 1.8 \pm 0.15\text{V}$	0.8	1.5		ns
	$C_L = 30\text{pF}$ , $R_L = 500\Omega$	$V_{CC} = 2.5 \pm 0.2\text{V}$	0.7			ns	

■ OPERATING CHARACTERISTICS ( $f = 10\text{MHz}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise specified)

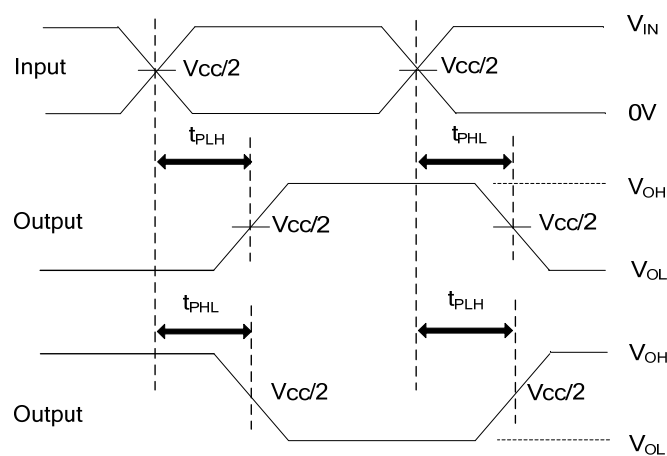
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$V_{CC} = 0.8\text{V}$		16		pF
		$V_{CC} = 1.2\text{V}$		16		pF
		$V_{CC} = 1.5\text{V}$		16.5		pF
		$V_{CC} = 1.8\text{V}$		17		pF
		$V_{CC} = 2.5\text{V}$		18.5		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

$V_{CC}$	$C_L$	$R_L$	$V_M$
0.8V	15pF	2k $\Omega$	$V_{CC}/2$
1.2V $\pm$ 0.1V	15pF	2k $\Omega$	$V_{CC}/2$
1.5V $\pm$ 0.1V	15pF	2k $\Omega$	$V_{CC}/2$
1.8V $\pm$ 0.15V	15pF	2k $\Omega$	$V_{CC}/2$
2.5V $\pm$ 0.2V	15pF	2k $\Omega$	$V_{CC}/2$
1.8V $\pm$ 0.15V	30pF	1k $\Omega$	$V_{CC}/2$
2.5V $\pm$ 0.2V	30pF	500 $\Omega$	$V_{CC}/2$



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  $\leq$  10MHz,  $Z_o = 50\Omega$ .

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