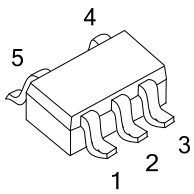
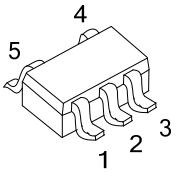
U74AUC1G86

CMOS IC

SINGLE 2-INPUT EXCLUSIVE-OR GATE



SOT-23-5
(JEDEC TO-236)



SOT-353

■ DESCRIPTION

The U**74AUC1G86** 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

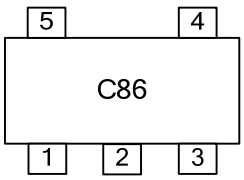
* Operate from 0.8V to 2.7V
* Low power dissipation : I_{CC}=10μA (Max.)
* ±8mA Output Driver : V_{CC}=1.8V
* I_{off} Supports partial-Power-Down Mode Operation

■ ORDERING INFORMATION

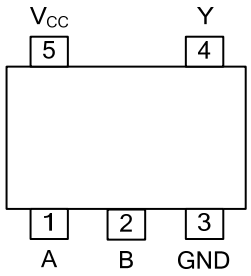
Ordering Number	Package	Packing
U74AUC1G86G-AE5-R	SOT-23-5	Tape Reel
U74AUC1G86G-AL5-R	SOT-353	Tape Reel

U74AUC1G86G-AE5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE5: SOT-23-5, AL5: SOT-353 (3) G: Halogen Free and Lead Free

■ MARKING



■ PIN CONFIGURATION

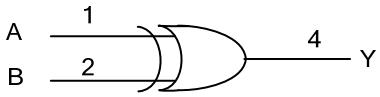


■ FUNCTION TABLE

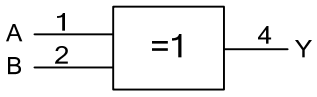
INPUT(A)	INPUT(B)	OUTPUT(Y)
L	L	L
H	L	H
L	H	H
H	H	L

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ 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 ~ 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	Δt/Δv	V_{CC}=0.8V ~ 1.95V			20	ns/V
		V_{CC}=2.3V ~ 2.7V			10	ns/V

■ 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}=0.8V	V_{CC}			
		V_{CC}=1.1 V ~ 1.95 V	0.65×V_{CC}			
		V_{CC}=2.3 V ~ 2.7 V	1.7			
Low-level Input Voltage	V_{IL}	V_{CC}=0.8V			0	
		V_{CC}=1.1 V ~ 1.95 V			0.35×V_{CC}	
		V_{CC}=2.3 V ~ 2.7 V			0.7	
High-Level Output Voltage	V_{OH}	V_{CC}=0.8 ~ 2.7V, I_{OH}=-100μA	V_{CC}-0.1			V
		V_{CC}=0.8V, I_{OH}=-700μA		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
		V_{CC}=2.3V, I_{OH}=-9mA	1.8			V
Low-Level Output Voltage	V_{OL}	V_{CC}=0.8~ 2.7V, I_{OL}=100μA			0.2	V
		V_{CC}=0.8V, I_{OL}=700μA		0.25		V
		V_{CC}=1.1V, I_{OL}=3mA			0.3	V
		V_{CC}=1.4V, I_{OL}=5mA			0.4	V
		V_{CC}=1.65V, I_{OL}=8mA			0.45	V
		V_{CC}=2.3V, I_{OL}=9mA			0.6	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 2.7V, V_{IN}=V_{CC} or GND		±0.1	±5	μA
Power OFF Leakage Current	I_{off}	V_{CC}=0V, V_{IN} or V_{OUT}=2.7V		±0.1	±10	μA
Quiescent Supply Current	I_{CC}	V_{CC}=0.8 ~ 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

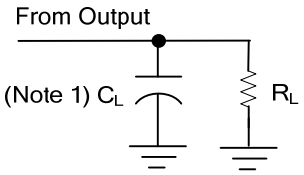
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

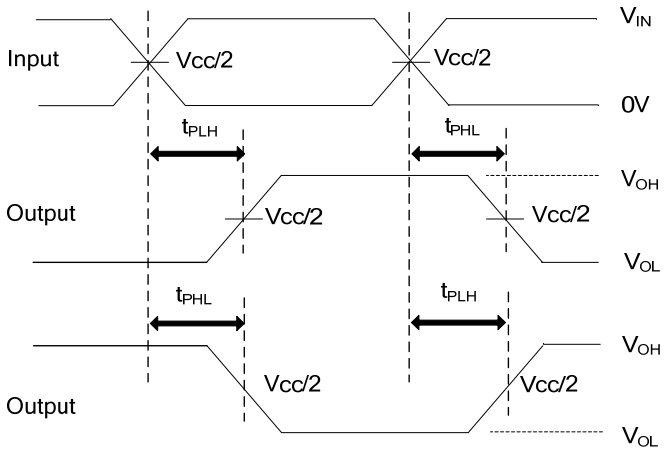
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=0.8V		16		pF
		V_{CC}=1.2V		16		pF
		V_{CC}=1.5V		16.5		pF
		V_{CC}=1.8V		17		pF
		V_{CC}=2.5V		18.5		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	C_L	R_L	V_M
0.8V	15pF	2kΩ	$V_{CC}/2$
1.2V±0.1V	15pF	2kΩ	$V_{CC}/2$
1.5V±0.1V	15pF	2kΩ	$V_{CC}/2$
1.8V±0.15V	15pF	2kΩ	$V_{CC}/2$
2.5V±0.2V	15pF	2kΩ	$V_{CC}/2$
1.8V±0.15V	30pF	1kΩ	$V_{CC}/2$
2.5V±0.2V	30pF	500Ω	$V_{CC}/2$



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 ≤10MHz, Z_O = 50Ω.