



## U74AHC1G86

CMOS IC

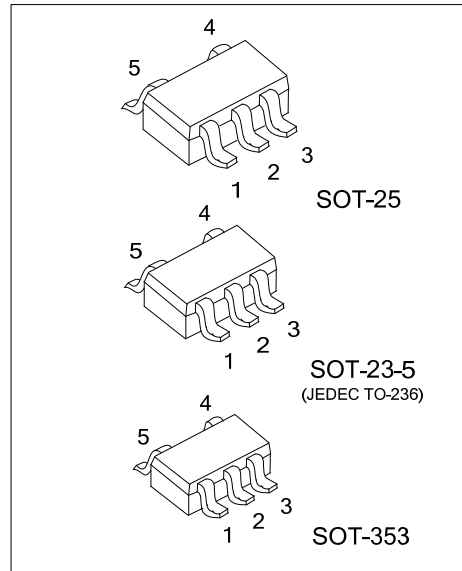
### 2-INPUT EXCLUSIVE-OR GATE

#### DESCRIPTION

The **U74AHC1G86** is a 2-input EXCLUSIVE-OR gate, it provides the Function  $Y=A\oplus B$ .

#### FEATURES

- \* Operation voltage range: 2 ~ 5.5V
- \* Low power current:  $I_{CC}=10\text{Ma}$  (Max)
- \* High speed:  $t_{PD}=4.3\text{ns}$ (Typ)

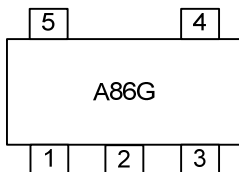


#### ORDERING INFORMATION

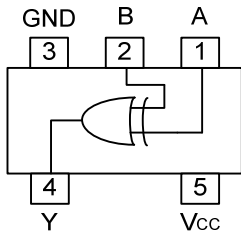
Ordering Number	Package	Packing
U74AHC1G86G-AE5-R	SOT-23-5	Tape Reel
U74AHC1G86G-AF5-R	SOT-25	Tape Reel
U74AHC1G86G-AL5-R	SOT-353	Tape Reel

<p>U74AHC1G86G-AE5-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free</p>
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#### MARKING



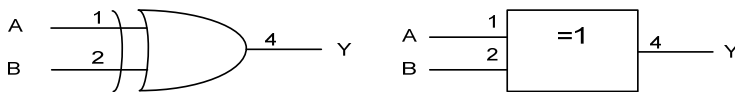
■ PIN CONFIGURATION



■ FUNCTION TABLE (Each Gate)

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

■ LOGIC DIAGRAM (Positive Logic)



## ■ ABSOLUTE MAXIMUM RATINGS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~7	V
Input Voltage	$V_{IN}$	-0.5~7	V
Output Voltage	$V_{OUT}$	-0.5~ $V_{CC}+0.5$	V
Input Clamp Current	$I_{IK}$	-20	mA
Output Clamp Current	$I_{OK}$	±20	mA
Output Current	$I_{OUT}$	±25	mA
$V_{CC}$ or GND Current	$I_{CC}$	±50	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Note 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. 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	RATING	UNIT
Junction to Ambient	SOT-23-5	280	°C/W
	SOT-25	230	°C/W
	SOT-353	350	°C/W

## ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2		5.5	V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$t_R, t_F$	$V_{CC}=3.3+0.3V$			100	ns/V
		$V_{CC}=5.0+0.5V$			20	
Ambient Operating Temperature	$T_{OPR}$		-40		85	°C

## ■ STATIC CHARACTERISTICS ( $T_A=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=3.0V$	2.1			
		$V_{CC}=5.5V$	3.85			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2.0V$			0.5	V
		$V_{CC}=3.0V$			0.9	
		$V_{CC}=5.5V$			1.65	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2.0V, I_{OH}=-50\mu A$	1.9	2.0		V
		$V_{CC}=3.0V, I_{OH}=-50\mu A$	2.9	3.0		
		$V_{CC}=4.5V, I_{OH}=-50\mu A$	4.4	4.5		
		$V_{CC}=3.0V, I_{OH}=-4mA$	2.58			
		$V_{CC}=4.5V, I_{OH}=-8mA$	3.94			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2.0V, I_{OL}=50\mu A$			0.1	V
		$V_{CC}=3.0V, I_{OL}=50\mu A$			0.1	
		$V_{CC}=4.5V, I_{OL}=50\mu A$			0.1	
		$V_{CC}=3.0V, I_{OL}=4mA$			0.36	
		$V_{CC}=4.5V, I_{OL}=8mA$			0.36	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0 \sim 5.5V, V_{IN}=V_{CC}$ or GND			±0.1	μA
Quiescent Supply Current	$I_Q$	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			1	μA
Input Capacitance	$C_{IN}$	$V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND		4	10	pF

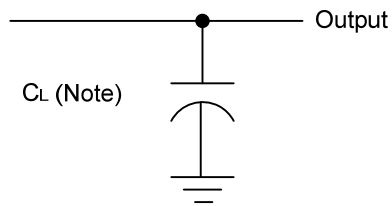
■ DYNAMIC CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , Input:  $t_R, t_F \leq 3\text{ns}$ ;  $\text{PRR} \leq 1\text{MHz}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A and B) to output(Y)	$t_{PLH}$	$V_{CC} = 3.3\text{V} \pm 0.3\text{V}, C_L = 15\text{pF}$		7	11	ns
	$t_{PHL}$			7	11	
	$t_{PLH}$	$V_{CC} = 3.3\text{V} \pm 0.3\text{V}, C_L = 50\text{pF}$		9.5	14.5	
	$t_{PHL}$			9.5	14.5	
Propagation delay from input (A and B) to output(Y)	$t_{PLH}$	$V_{CC} = 5\text{V} \pm 0.5\text{V}, C_L = 15\text{pF}$		4.8	6.8	ns
	$t_{PHL}$			4.8	6.8	
	$t_{PLH}$	$V_{CC} = 5\text{V} \pm 0.5\text{V}, C_L = 50\text{pF}$		6.3	8.8	
	$t_{PHL}$			6.3	8.8	

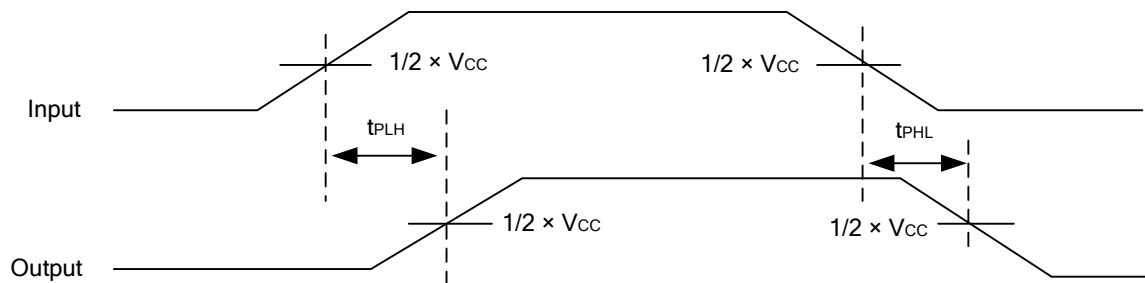
■ OPERATING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load, $f=1\text{MHz}, V_{CC}=5\text{V}$		18		pF

## ■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.



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