



## U74AHC1G09

CMOS IC

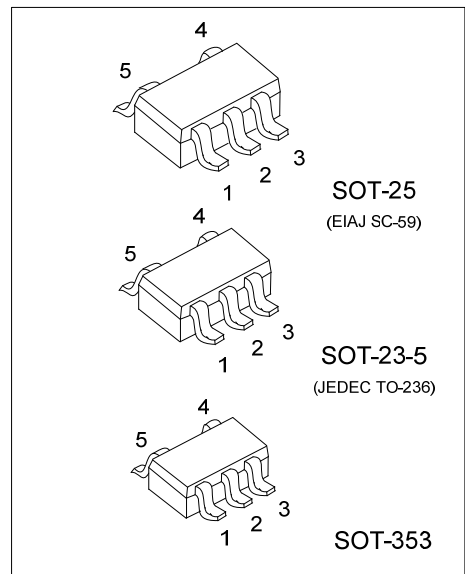
### 2-INPUT AND GATE WITH OPEN DRAIN OUTPUT

#### DESCRIPTION

The **U74AHC1G09** is a 2-input AND gate with open-drain output. And it provides the function  $Y=A \times B$ .

#### FEATURES

- \* Operation Voltage Range: 2~5.5V
- \* Low Quiescent Current:  $I_{CC}=1\mu A(\text{Max})$
- \* High Speed:  $t_{PD}=6\text{ns}@5V(\text{Max})$

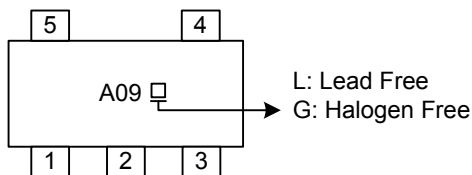


#### ORDERING INFORMATION

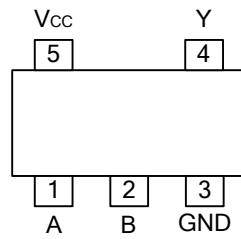
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC1G09L-AE5-R	U74AHC1G09G-AE5-R	SOT-23-5	Tape Reel
U74AHC1G09L-AF5-R	U74AHC1G09G-AF5-R	SOT-25	Tape Reel
U74AHC1G09L-AL5-R	U74AHC1G09G-AL5-R	SOT-353	Tape Reel

<p>U74AHC1G09G-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, L: Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

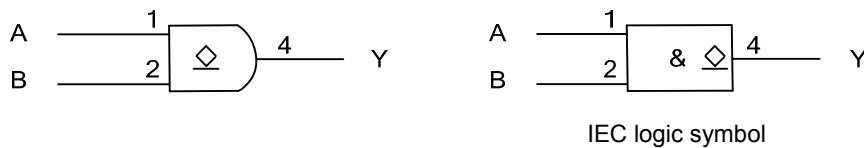


■ FUNCTION TABLE

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

Note: High impedance output state. Requires a pull-up resistor to get a high.

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified) (Note 1 Note 2 )

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		$I_{OK}$	$\pm 20$	mA
Output Current		$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ or GND Current		$I_{CC}$	$\pm 50$	mA
Power Dissipation	SOT-23-5	$P_D$	300	mW
	SOT-25		360	mW
	SOT-353		250	mW
Storage Temperature		$T_{STG}$	-65 ~ +150	$^{\circ}C$

Notes 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.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER		SYMBOL	RATINGS	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	$V_{CC}=3.3\pm 0.3V$	$\Delta t/\Delta V$	100	ns/V
	$V_{CC}=5.0\pm 0.5V$		20	
Operating Temperature		$T_A$	-40 ~ +125	$^{\circ}C$

■ ELECTRICAL 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		
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2.0V$	$I_{OL}=50\mu A$			0.1	V
		$V_{CC}=3.0V$				0.1	
		$V_{CC}=4.5V$				0.1	
		$V_{CC}=3.0V, I_{OL}=4mA$				0.36	
		$V_{CC}=4.5V, I_{OL}=8mA$				0.36	
Input Leakage Current	$I_{(LEAK)}$	$V_{IN}=V_{CC}$ or GND, $V_{CC}=0V$ to 5.5V			$\pm 0.1$	$\mu A$	
Quiescent Supply Current	$I_Q$	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ , $V_{CC}=5.5V$			1	$\mu A$	
Input Capacitance	$C_{IN}$	$V_{IN}=V_{CC}$ or GND, $V_{CC}=5.0V$		4	10	pF	

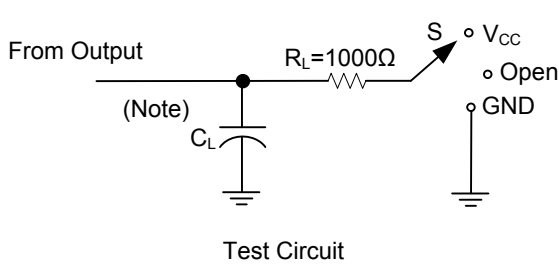
■ SWITCHING CHARACTERISTICS (Input:  $t_R, t_F \leq 3\text{ns}$ ;  $\text{PRR} \leq 1\text{MHz}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output(Y)	$t_{PZL}$	$V_{CC} = 3.3 \pm 0.3 \text{ V}$	$C_L = 15 \text{ pF}$		3.6	7.0	ns
			$C_L = 50 \text{ pF}$		6.5	11.0	
	$t_{PLZ}$		$C_L = 15 \text{ pF}$		3.6	7.0	
			$C_L = 50 \text{ pF}$		6.5	11.0	
	$t_{PZL}$	$V_{CC} = 5 \pm 0.5 \text{ V}$	$C_L = 15 \text{ pF}$		2.5	5.0	ns
			$C_L = 50 \text{ pF}$		4.6	7.5	
			$C_L = 15 \text{ pF}$		2.5	5.0	
			$C_L = 50 \text{ pF}$		4.6	7.5	

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

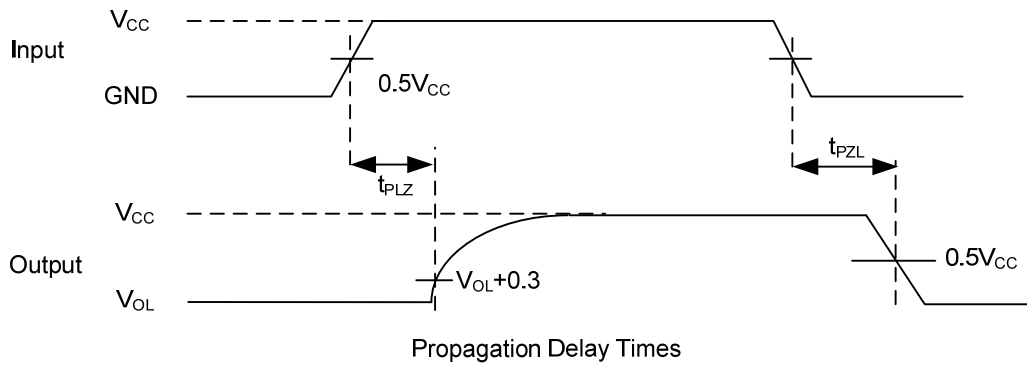
PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load, $f = 1\text{MHz}$ , $V_{CC} = 5\text{V}$	5	pF

■ TEST CIRCUIT AND WAVEFORMS



TEST	S
$t_{PLH}/t_{PHL}$	Open
$t_{PHZ}/t_{PZH}$	GND
$t_{PLZ}/t_{PZL}$	$V_{CC}$

Note:  $C_L$  includes probe and jig capacitance.



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