



## U74LVC1G08

CMOS IC

### 2-INPUT AND GATE

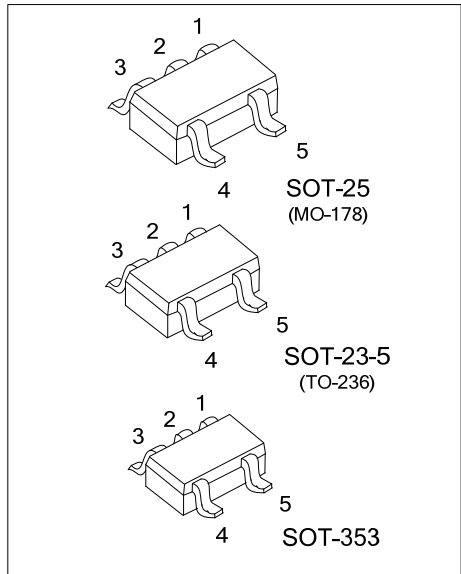
#### DESCRIPTION

The **U74LVC1G08** is a 2-input AND gate which provides the Function  $Y=A*B$ .

This device has power-down protective circuit to prevent device form destruction when it is powered down.

#### FEATURES

- \* Inputs Accept Voltage up to 5.5V
- \* Low Power Current:  $I_{CC}=10\mu A$ (Max)
- \*  $\pm 24mA$  Output Drive( $V_{CC}=3.3V$ )
- \* Power Down Protection

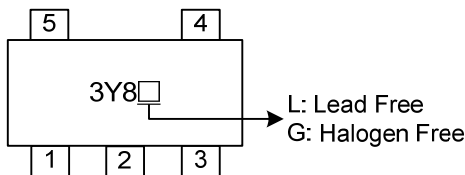


#### ORDERING INFORMATION

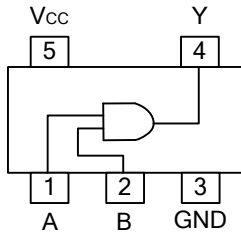
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G08L-AE5-R	U74LVC1G08G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G08L-AF5-R	U74LVC1G08G-AF5-R	SOT-25	Tape Reel
U74LVC1G08L-AL5-R	U74LVC1G08G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G08L-AF5-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free, L: Lead Free</p>
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#### MARKING



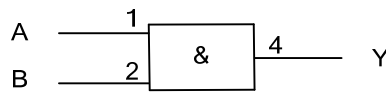
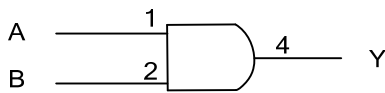
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (positive logic)



IEC logic symbol

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~6.5	V
Input Voltage	$V_{IN}$	-0.5~6.5	V
Output Voltage	active mode	$V_{OUT}$	-0.5~ $V_{CC}+0.5$
	power-down mode	$V_{OUT}$	-0.5~6.5
Input Clamp Current ( $V_{IN}<0$ )	$I_{IK}$	-50	mA
Output Clamp Current ( $V_{OUT}<0$ )	$I_{OK}$	-50	mA
Output Current	$I_{OUT}$	$\pm 50$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 100$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	$^{\circ}C$

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.

### ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	Operating	1.65		5.5	V
	Data retention only	1.5			V
Input Voltage	$V_{IN}$	0		5.5	V
Output Voltage	$V_{OUT}$	0		$V_{CC}$	V
Operating Temperature	$T_A$	-40		85	$^{\circ}C$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=1.65V\sim 1.95V$	$0.65 \cdot V_{CC}$			V
		$V_{CC}=2.3V\sim 2.7V$	1.7			
		$V_{CC}=3.0V\sim 3.6V$	2			
		$V_{CC}=4.5V\sim 5.5V$	$0.7 \cdot V_{CC}$			
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=1.65V\sim 1.95V$			$0.35 \cdot V_{CC}$	V
		$V_{CC}=2.3V\sim 2.7V$			0.7	
		$V_{CC}=3.0V\sim 3.6V$			0.8	
		$V_{CC}=4.5V\sim 5.5V$			$0.3 \cdot V_{CC}$	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65V\sim 5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			
		$V_{CC}=3.0V, I_{OH}=-16mA$	2.4			
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65V\sim 5.5V, I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.45	
		$V_{CC}=2.3V, I_{OL}=8mA$			0.3	
		$V_{CC}=3.0V, I_{OL}=16mA$			0.4	
		$V_{CC}=3.0V, I_{OL}=24mA$			0.55	
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V\sim 5.5V, V_{IN}=5.5V$ or GND			$\pm 5$	$\mu A$
Power OFF Leakage Current	$I_{OFF}$	$V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$			$\pm 10$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=1.65V\sim 5.5V, V_{IN}=5.5V$ or GND $I_{OUT}=0$			10	$\mu A$
Additional Quiescent Supply Current	$\Delta I_Q$	$V_{CC}=3V\sim 5.5V$ , One input at $V_{CC}-0.6V$ , other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND		4		pF

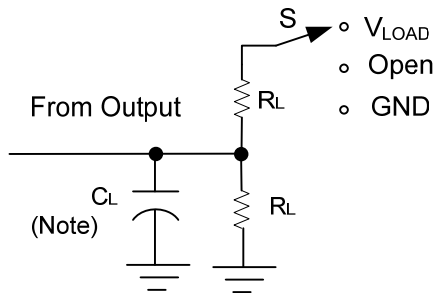
■ DYNAMIC CHARACTERISTICS (T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =15pF	1.5		7.2	ns
		V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =15pF	0.7		4.4	ns
		V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =15pF	0.8		3.6	ns
		V <sub>CC</sub> =5V±0.5V, C <sub>L</sub> =15pF	0.8		3.4	ns
		V <sub>CC</sub> =1.8V±0.15V, C <sub>L</sub> =30 or 50pF	2.4		8	ns
		V <sub>CC</sub> =2.5V±0.2V, C <sub>L</sub> =30 or 50pF	1.1		5.5	ns
		V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =30 or 50pF	1		4.5	ns
		V <sub>CC</sub> =5V±0.5V, C <sub>L</sub> =30 or 50pF	1		4	ns

■ OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =1.8V, f=10MHz		21		pF
		V <sub>CC</sub> =2.5V, f=10MHz		24		pF
		V <sub>CC</sub> =3.3V, f=10MHz		26		pF
		V <sub>CC</sub> =5V, f=10MHz		31		pF

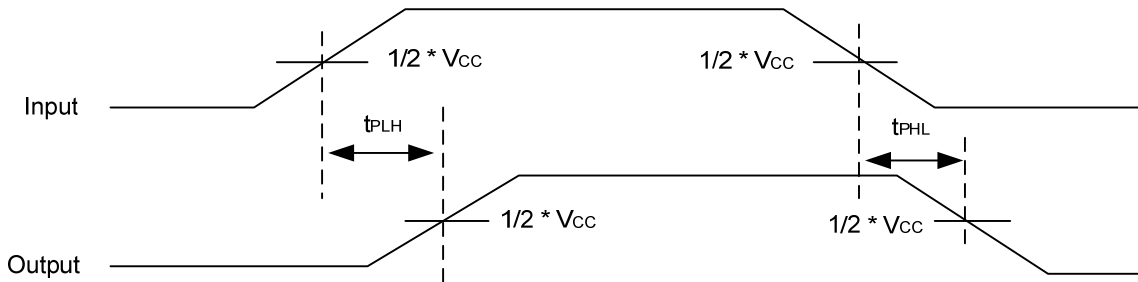
## ■ TEST CIRCUIT AND WAVEFORMS



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

Note:  $C_L$  includes probe and jig capacitance.

$V_{CC}$	$V_{IN}$	$t_R/t_F$	$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	15pF	1M $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	15pF	1M $\Omega$	0.15V
$3.3V \pm 0.3V$	3 V	$\leq 2.5ns$	1.5V	6V	15pF	1M $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 * V_{CC}$	15pF	1M $\Omega$	0.3V
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	30pF	1K $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 * V_{CC}$	30pF	500 $\Omega$	0.15V
$3.3V \pm 0.3V$	3 V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 * V_{CC}$	50pF	500 $\Omega$	0.3V



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