



# U74LVC1G08

**CMOS IC**

## 2-INPUT AND GATE

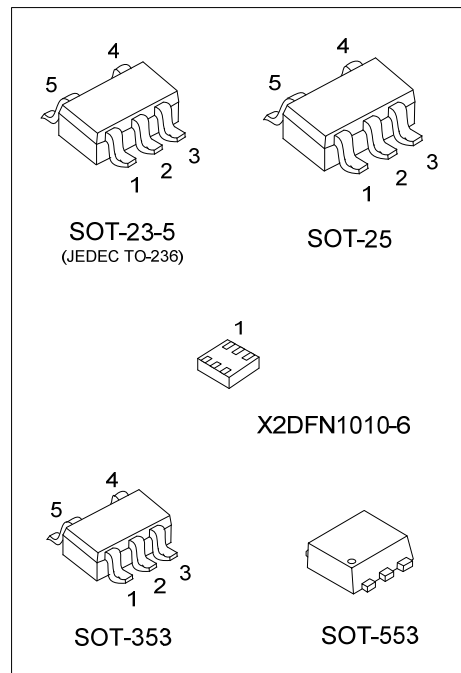
### DESCRIPTION

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

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

### FEATURES

- \* Operation Voltage Range: 1.65V ~ 5.5V
- \* Low Power Current:  $I_{CC}=10\mu A$  (Max.)
- \*  $\pm 24mA$  Output Drive ( $V_{CC}=3.0V$ )
- \* Power Down Protection



### ORDERING INFORMATION

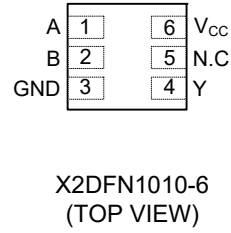
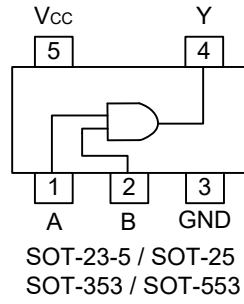
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G08L-AE5-R	U74LVC1G08G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G08L-AF5-R	U74LVC1G08G-AF5-R	SOT-25	Tape Reel
U74LVC1G08L-AL5-R	U74LVC1G08G-AL5-R	SOT-353	Tape Reel
U74LVC1G08L-AN5-R	U74LVC1G08G-AN5-R	SOT-553	Tape Reel
U74LVC1G08L-K06-1010X2-R	U74LVC1G08G-K06-1010X2-R	X2DFN1010-6	Tape Reel

<p>U74LVC1G08G-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 AN5: SOT-553, K06-1010X2: X2DFN1010-6 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING

SOT-23-5 / SOT-25 / SOT-353 / SOT-553	X2DFN1010-6
<p>L: Lead Free G: Halogen Free</p>	

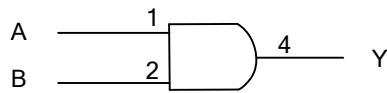
■ PIN CONFIGURATION



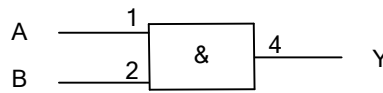
■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified) (Note 2)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>		-0.5 ~ 6.5	V
Input Voltage	V <sub>IN</sub>		-0.5 ~ 6.5	V
Output Voltage	V <sub>OUT</sub>	Output in the high or low state	-0.5 ~ V <sub>CC</sub> +0.5	V
		Output in the power-off state	-0.5 ~ 6.5	V
Continuous V <sub>CC</sub> or GND Current	I <sub>CC</sub>		±100	mA
Continuous Output Current	I <sub>OUT</sub>		±50	mA
Input Clamp Current	I <sub>IK</sub>	V <sub>IN</sub> <0	-50	mA
Output Clamp Current	I <sub>OK</sub>	V <sub>OUT</sub> <0	-50	mA
Storage Temperature Range	T <sub>STG</sub>		-65 ~ +150	°C

Notes: 1. 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.

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

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>	High or low state	0		V <sub>CC</sub>	V
Input Transition Rise or Fall Rate	t <sub>R</sub> / t <sub>F</sub>	V <sub>CC</sub> =1.8V±0.15V			20	ns/V
		V <sub>CC</sub> =2.5V±0.2V				
		V <sub>CC</sub> =3.3V±0.3V			10	ns/V
		V <sub>CC</sub> =5V±0.5V			5	ns/V
Operating Temperature	T <sub>A</sub>		-40		+125	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	280	°C/W
	SOT-25	230	°C/W
	SOT-353	350	°C/W
	SOT-553	370	°C/W
	X2DFN1010-6	420	°C/W

■ STATIC CHARACTERISTICS (unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> =1.65V~1.95V	0.65× V <sub>CC</sub>			0.65× V <sub>CC</sub>			V
		V <sub>CC</sub> =2.3V~2.7V	1.7			1.7			
		V <sub>CC</sub> =3.0V~3.6V	2			2			
		V <sub>CC</sub> =4.5V~5.5V	0.7× V <sub>CC</sub>			0.7× V <sub>CC</sub>			
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> =1.65V~1.95V			0.35× V <sub>CC</sub>			0.35× V <sub>CC</sub>	V
		V <sub>CC</sub> =2.3V~2.7V			0.7			0.7	
		V <sub>CC</sub> =3.0V~3.6V			0.8			0.8	
		V <sub>CC</sub> =4.5V~5.5V			0.3× V <sub>CC</sub>			0.3× V <sub>CC</sub>	

## ■ STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =1.65V ~ 5.5V, I <sub>OH</sub> =-100μA	V <sub>CC</sub> -0.1			V <sub>CC</sub> -0.1			V	
		V <sub>CC</sub> =1.65V, I <sub>OH</sub> =-4mA	1.2			0.95				
		V <sub>CC</sub> =2.3V, I <sub>OH</sub> =-8mA	1.9			1.7				
		V <sub>CC</sub> =3.0V	I <sub>OH</sub> =-16mA	2.4			2.1			
			I <sub>OH</sub> =-24mA	2.3			2			
V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-32mA	3.8			3.4						
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =1.65V ~ 5.5V, I <sub>OL</sub> =100μA			0.1			0.1	V	
		V <sub>CC</sub> =1.65V, I <sub>OL</sub> =4mA			0.45			0.7		
		V <sub>CC</sub> =2.3V, I <sub>OL</sub> =8mA			0.3			0.45		
		V <sub>CC</sub> =3.0V	I <sub>OL</sub> =16mA			0.4				0.6
			I <sub>OL</sub> =24mA			0.55				0.8
V <sub>CC</sub> =4.5V, I <sub>OL</sub> =32mA				0.55			0.8			
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =0V ~ 5.5V, V <sub>IN</sub> =5.5V or GND			±5			±5	μA	
Power OFF Leakage Current	I <sub>OFF</sub>	V <sub>CC</sub> =0V, V <sub>IN</sub> or V <sub>OUT</sub> =5.5V			±10			±10	μA	
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =1.65V~5.5V, V <sub>IN</sub> =5.5V or GND I <sub>OUT</sub> =0			10			10	μA	
Additional Quiescent Supply Current	ΔI <sub>Q</sub>	V <sub>CC</sub> =3V~5.5V, One input at V <sub>CC</sub> -0.6V, other inputs at V <sub>CC</sub> or GND			500			500	μA	

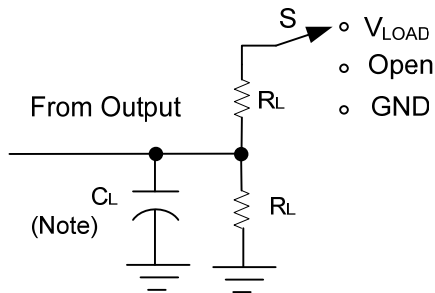
## ■ DYNAMIC CHARACTERISTICS (unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Propagation delay from input (A or B) to output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	C <sub>L</sub> =15pF	V <sub>CC</sub> =1.8V±0.15V	1.5		10			12.5	ns
			V <sub>CC</sub> =2.5V±0.2V	0.7		8			10.5	ns
			V <sub>CC</sub> =3.3V±0.3V	0.8		6			8.5	ns
			V <sub>CC</sub> =5V±0.5V	0.8		4.2			6	ns
		C <sub>L</sub> =30 or 50pF	V <sub>CC</sub> =1.8V±0.15V	2.4		11			13.5	ns
			V <sub>CC</sub> =2.5V±0.2V	1.1		9			11.5	ns
			V <sub>CC</sub> =3.3V±0.3V	1		8			10.5	ns
			V <sub>CC</sub> =5V±0.5V	1		7			9.5	ns

## ■ OPERATING CHARACTERISTICS (f=10MHz, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =3.3V, V <sub>IN</sub> =V <sub>CC</sub> or GND		4		pF
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =1.8V		21		pF
		V <sub>CC</sub> =2.5V		24		pF
		V <sub>CC</sub> =3.3V		26		pF
		V <sub>CC</sub> =5V		31		pF

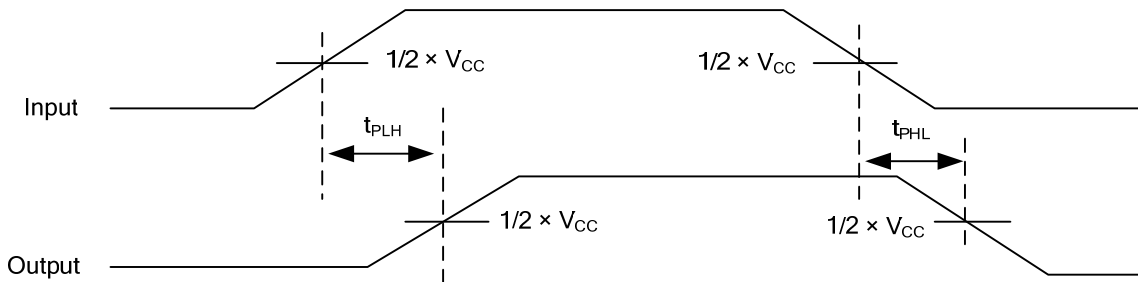
■ TEST CIRCUIT AND WAVEFORMS



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.

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



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