



## U74LVC08A

CMOS IC

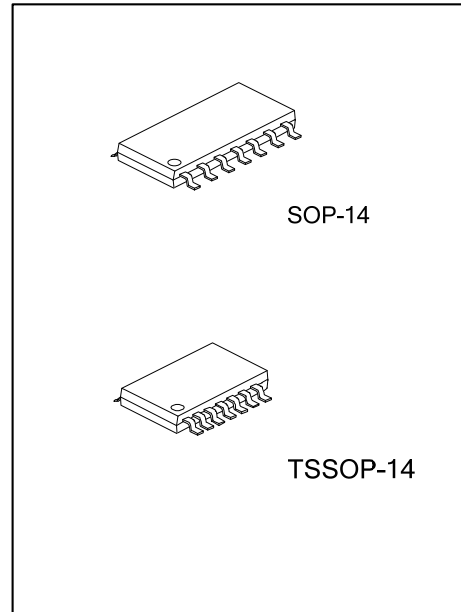
### QUAD 2-INPUT AND GATE

#### DESCRIPTION

The **U74LVC08A** contains four independent 2-input AND gates, perform the Boolean function  $Y = A \cdot B$  in positive logic.

#### FEATURES

- \* Operate From 1.65V to 3.6V
- \* Direct Interface with TTL Levels
- \* Low Power Dissipation
- \* Inputs Accept Voltages up to 5.5V
- \* Partial-Power-Down Mode Operation

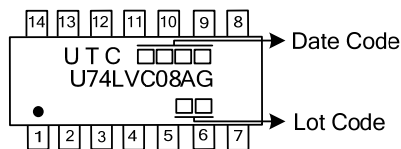


#### ORDERING INFORMATION

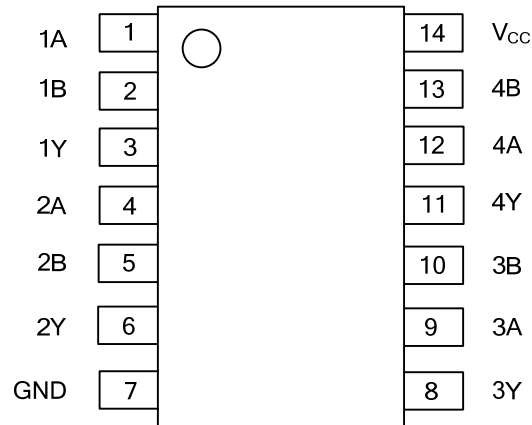
Ordering Number	Package	Packing
U74LVC08AG-S14-R	SOP-14	Tape Reel
U74LVC08AG-P14-R	TSSOP-14	Tape Reel

<p>U74LVC08AG-P14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P14: TSSOP-14, S14: SOP-14 (3) G: Halogen Free and Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

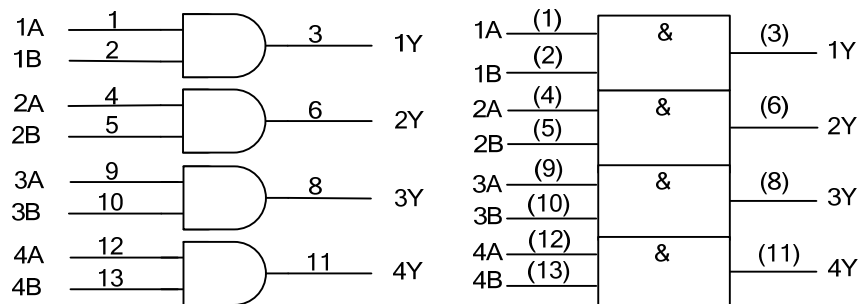


■ FUNCTION TABLE (Each Gate)

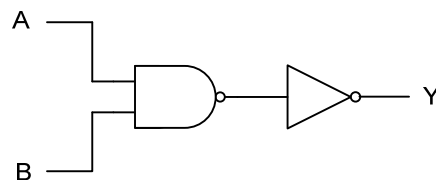
INPUT(nA)	INPUT(nB)	OUTPUT(nY)
H	H	H
H	L	L
L	H	L
L	L	L

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

■ LOGIC DIAGRAM (Positive Logic)



■ LOGIC DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5 ~ +6.5	V
Input Voltage	$V_{IN}$	-0.5 ~ +6.5	V
Output Voltage	$V_{OUT}$	-0.5 ~ $V_{CC} + 0.5$	V
$V_{CC}$ or GND Current	$I_{CC}$	±100	mA
Continuous Output Current ( $V_{OUT}=0$ to $V_{CC}$ )	$I_{OUT}$	±50	mA
Input Clamp Current ( $V_{IN} < 0$ )	$I_{IK}$	-50	mA
Output Clamp Current ( $V_{OUT} < 0$ )	$I_{OK}$	-50	mA
Power Dissipation ( $T_{OPR} = -40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ )	$P_D$	500	mw
Storage Temperature	$T_{STG}$	-65 ~ + 150	$^{\circ}\text{C}$

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	RATINGS	UNIT
Supply Voltage	$V_{CC}$	+1.65 ~ 3.6	V
Input Voltage	$V_{IN}$	0 ~ 5.5	V
Output Voltage (High or Low state)	$V_{OUT}$	0 ~ $V_{CC}$	V
Ambient Operating Temperature	$T_{OPR}$	-40 ~ 85	$^{\circ}\text{C}$
Input Rise or Fall Times	$t_R / t_F$	8	ns/V

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	86	$^{\circ}\text{C}/\text{W}$
		113	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> = 1.65V~1.95V	0.65*V <sub>CC</sub>			V	
		V <sub>CC</sub> = 2.3V ~ 2.7V	1.7			V	
		V <sub>CC</sub> = 2.7V ~ 3.6V	2				
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> = 1.65V~1.95V			0.35*V <sub>CC</sub>	V	
		V <sub>CC</sub> = 2.3V ~ 2.7V			0.7	V	
		V <sub>CC</sub> = 2.7V ~ 3.6V			0.8		
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =-100μA	V <sub>CC</sub> =1.65V~3.6V	V <sub>CC</sub> -0.2		V	
		I <sub>OH</sub> =-4mA	V <sub>CC</sub> =1.65V	1.29		V	
		I <sub>OH</sub> =-8mA	V <sub>CC</sub> =2.3V	1.9			
		I <sub>OH</sub> =-12mA	V <sub>CC</sub> =2.7V	2.2			V
			V <sub>CC</sub> =3.0V	2.4			
I <sub>OH</sub> =-24mA	V <sub>CC</sub> =3.0V	2.3			V		
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OH</sub> =100μA	V <sub>CC</sub> =1.65V~3.6V		0.1	V	
		I <sub>OH</sub> =-4mA	V <sub>CC</sub> =1.65V		0.24		
		I <sub>OH</sub> =-8mA	V <sub>CC</sub> =2.3V		0.3	V	
		I <sub>OH</sub> =12mA	V <sub>CC</sub> =2.7V		0.4		
		I <sub>OH</sub> =24mA	V <sub>CC</sub> =3.0V		0.55	V	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>I</sub> =5.5V or GND	V <sub>CC</sub> =3.6V		±1	μA	
Quiescent Supply Current	I <sub>Q</sub>	V <sub>IN</sub> =5.5V or GND I <sub>OUT</sub> =0	V <sub>CC</sub> =3.6V		1	μA	
Additional Quiescent Supply Current Per Input Pin	ΔI <sub>Q</sub>	One input at V <sub>IN</sub> =V <sub>CC</sub> - 0.6V, other input at V <sub>CC</sub> or GND	V <sub>CC</sub> =2.7V~3.6V		500	μA	
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> = 3.3V		5		pF	

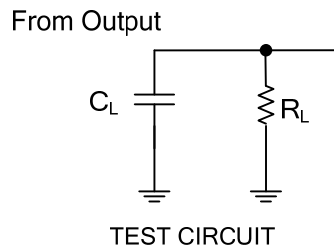
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (nA or nB) to output(nY)	t <sub>PD</sub>	V <sub>CC</sub> =1.8V±0.15V	C <sub>L</sub> =30pF, R <sub>L</sub> =1kΩ	1	5	9.3	ns
		V <sub>CC</sub> =2.5V±0.2V	C <sub>L</sub> =30pF, R <sub>L</sub> =500Ω	1	2.9	6.4	
		V <sub>CC</sub> =2.7V	C <sub>L</sub> =50 pF, R <sub>L</sub> =500Ω	1	3	4.6	
		V <sub>CC</sub> =3.3V±0.3V		1	2.6	3.9	

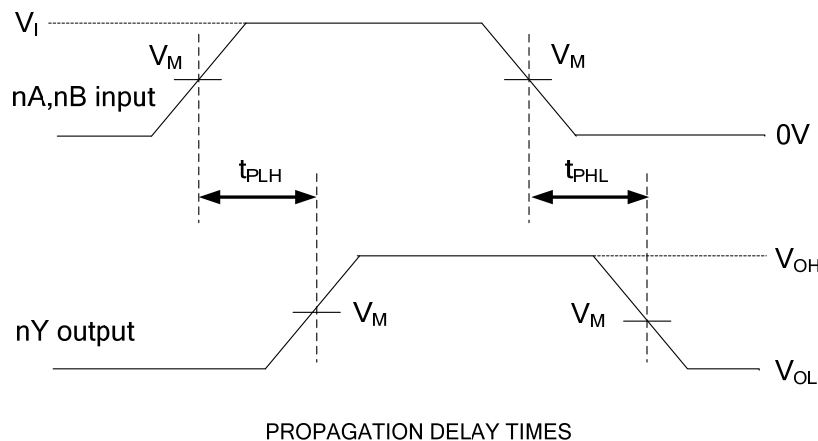
■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	f =1MHz, No load	V <sub>CC</sub> =1.8V		7	pF
			V <sub>CC</sub> =2.5V		9.8	
			V <sub>CC</sub> =3.3V		10	

## ■ TEST CIRCUIT AND WAVEFORMS



V <sub>CC</sub>	Inputs		V <sub>M</sub>	C <sub>L</sub>	R <sub>L</sub>
	V <sub>IN</sub>	t <sub>R</sub> , t <sub>F</sub>			
V <sub>CC</sub> =1.8V±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	1kΩ
V <sub>CC</sub> =2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	500Ω
V <sub>CC</sub> =2.7V	2.7V	≤2.5ns	1.5V	50pF	500Ω
V <sub>CC</sub> =3.3V±0.3V,	2.7V	≤2.5ns	1.5V	50pF	500Ω



- Notes: 1. C<sub>L</sub> includes probe and jig capacitance.  
 2. All input pulses are supplied by generators having the following characteristics:  
 PRR ≤10MHz, Z<sub>o</sub> = 50Ω, t<sub>R</sub> ≤2.5ns, t<sub>F</sub> ≤2.5ns.

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