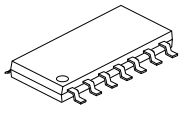
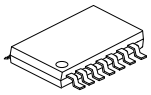
U74LVC08A

CMOS IC

QUAD 2-INPUT AND GATE



SOP-14U



TSSOP-14U

■ DESCRIPTION

The **U74LVC08A** contains four independent 2-input AND gates, perform the Boolean function Y = A • 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

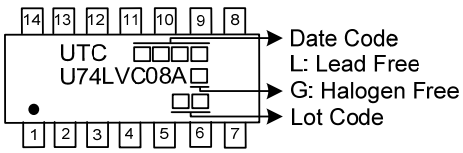
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC08AL-UEA-R	U74LVC08AG-UEA-R	SOP-14U	Tape Reel
U74LVC08AL-UEB-R	U74LVC08AG-UEB-R	TSSOP-14U	Tape Reel

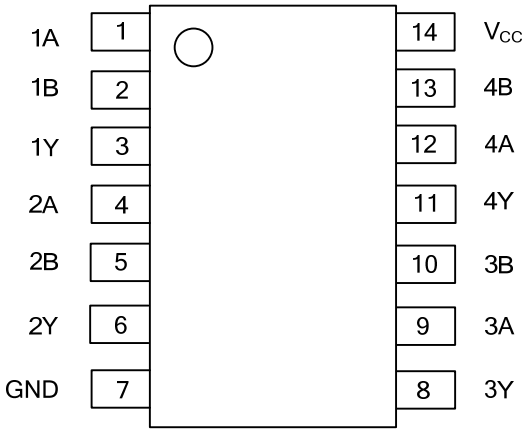
U74LVC08AG-UEA-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) UEA: SOP-14U, UEB: TSSOP-14U
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

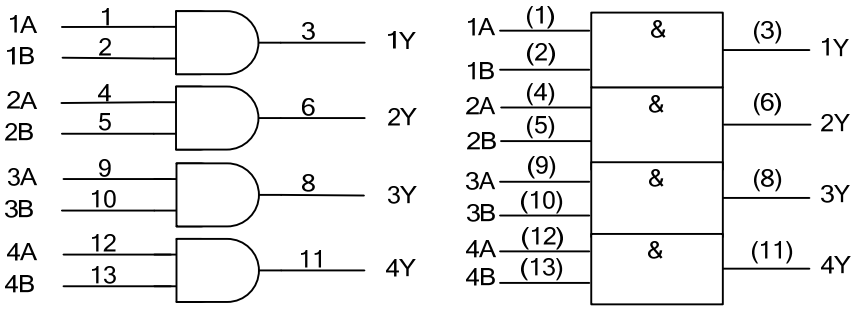


■ FUNCTION TABLE (Each Gate)

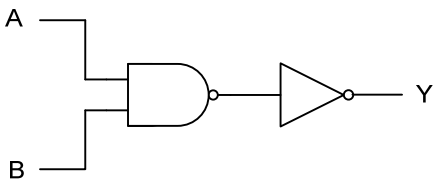
INPUT(nA)	INPUT(nB)	OUTPUT(nY)
H	H	H
H	L	L
L	H	L
L	L	L

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
Storage Temperature	T_{STG}	-65 ~ + 150	°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
Input Rise or Fall Times	t_R / t_F	8	ns/V
Ambient Operating Temperature	T_A	-40 ~ +125	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14U	θ_{JA}	125	°C/W
	TSSOP-14U		150	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	V_{CC} = 1.65V~1.95V	0.65×V_{CC}			0.65×V_{CC}			V
		V_{CC} = 2.3V ~ 2.7V	1.7			1.7			V
		V_{CC} = 2.7V ~ 3.6V	2			2			
Low-Level Input Voltage	V_{IL}	V_{CC} = 1.65V~1.95V			0.35×V_{CC}			0.35×V_{CC}	V
		V_{CC} = 2.3V ~ 2.7V			0.7			0.7	V
		V_{CC} = 2.7V ~ 3.6V			0.8			0.8	
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V~3.6V, I_{OH}=-100μA	V_{CC} -0.2			V_{CC} -0.3			V
		V_{CC}=1.65V, I_{OH}=-4mA	1.29			1.05			V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9			1.55			
		V_{CC}=2.7V, I_{OH}=-12mA	2.2		2.2	2.05			V
		V_{CC}=3.0V, I_{OH}=-12mA	2.4		2.4	2.25			V
		V_{CC}=3.0V, I_{OH}=-24mA	2.3			2			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65V~3.6V, I_{OL}=100μA			0.1			0.3	V
		V_{CC}=1.65V, I_{OL}=-4mA			0.24			0.65	V
		V_{CC}=2.3V, I_{OL}=-8mA			0.3			0.8	
		V_{CC}=2.7V, I_{OL}=12mA			0.4			0.6	
		V_{CC}=3.0V, I_{OL}=24mA			0.55			0.8	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=3.6V, V_I=5.5V or GND			±1			±20	μA
Quiescent Supply Current	I_Q	V_{CC}=3.6V, V_{IN}=5.5V or GND I_{OUT}=0			1			40	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_Q	V_{CC}=2.7V~3.6V, One input at V_{IN}=V_{CC} – 0.6V, other input at V_{CC} or GND			500			5000	μA

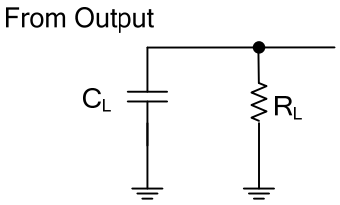
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (nA or nB) to output(nY)	t_{PD}	V_{CC}=1.8V±0.15V, C_L=30pF, R_L=1kΩ	1	7	13	1		15	ns
		V_{CC}=2.5V±0.2V, C_L=30pF, R_L=500Ω	1	5.9	9.8	1		11	ns
		V_{CC}=2.7V, C_L=50 pF, R_L=500Ω	1	5	7.6	1		9	ns
		V_{CC}=3.3V±0.3V, C_L=50 pF, R_L=500Ω	1	4.1	5.9	1		7	ns

■ OPERATING CHARACTERISTICS

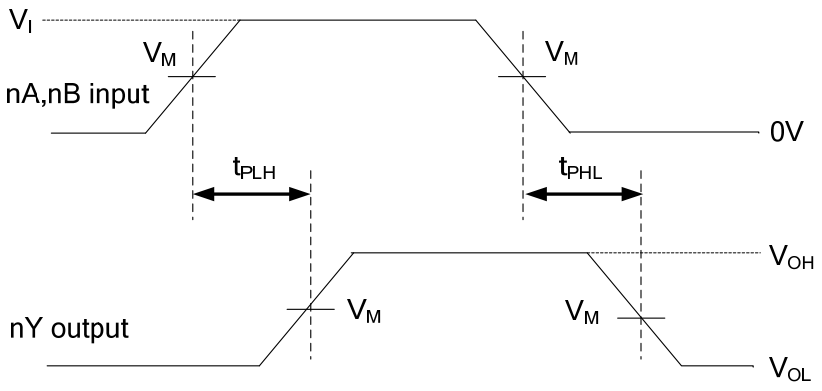
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	V_{IN} = V_{CC} or GND, V_{CC} = 3.3V			5		pF
Power Dissipation Capacitance	C_{PD}	f =1MHz, No load	V_{CC}=1.8V		7		pF
			V_{CC}=2.5V		9.8		pF
			V_{CC}=3.3V		10		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	Inputs		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
V_{CC}=1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1kΩ
V_{CC}=2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	500Ω
V_{CC}=2.7V	2.7V	≤2.5ns	1.5V	50pF	500Ω
V_{CC}=3.3V±0.3V,	2.7V	≤2.5ns	1.5V	50pF	500Ω



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics:
PRR ≤10MHz, Zo = 50Ω, t_R ≤2.5ns, t_F ≤2.5ns.