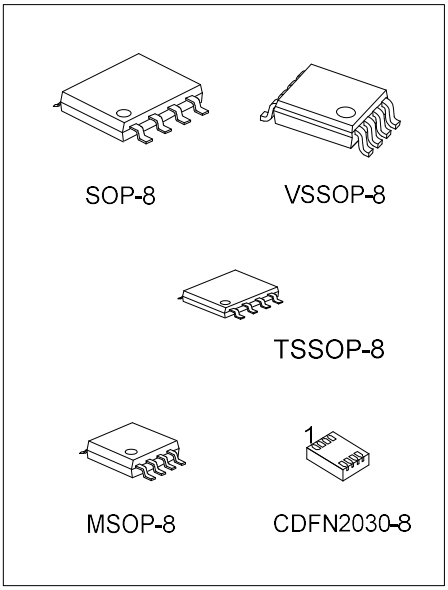
U74LVC2G08B

CMOS IC

DUAL 2-INPUT AND GATE



■ DESCRIPTION

The **U74LVC2G08B** is a dual 2-input AND gate which performs the function Y=A*B or $Y=\overline{\overline{A}+\overline{B}}$. It is designed for 1.65V to 5.5V operation.

■ FEATURES

* Wide Supply Voltage Range from 1.65V to 5.5V
* Up to 5V Inputs Accept Voltages
* Low Power Consumption, I_{CC} = 10 μA (Max.)
* ±24 mA Output Driver at 3V
* Direct Interface with TTL Levels

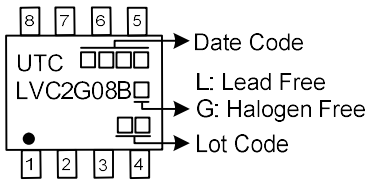
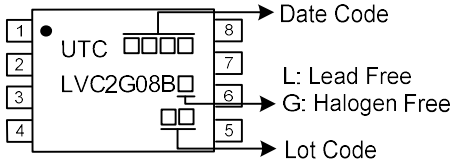
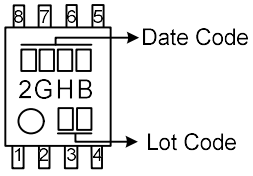
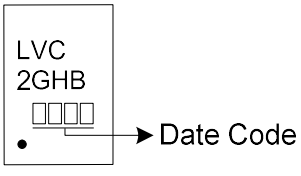
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC2G08BL-S08-R	U74LVC2G08BG-S08-R	SOP-8	Tape Reel
U74LVC2G08BL-SM1-R	U74LVC2G08BG-SM1-R	MSOP-8	Tape Reel
U74LVC2G08BL-P08-R	U74LVC2G08BG-P08-R	TSSOP-8	Tape Reel
U74LVC2G08BL-V08-R	U74LVC2G08BG-V08-R	VSSOP-8	Tape Reel
U74LVC2G08BL-CK08-2030-R	U74LVC2G08BG-CK08-2030-R	CDFN2030-8	Tape Reel

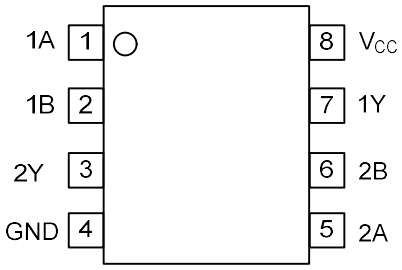
U74LVC2G08BG-S08-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) S08: SOP-8, SM1: MSOP-8, P08: TSSOP-8
V08: VSSOP-8, CK08-2030: CDFN2030-8
(3) G: Halogen Free and Lead Free, L: Lead Free

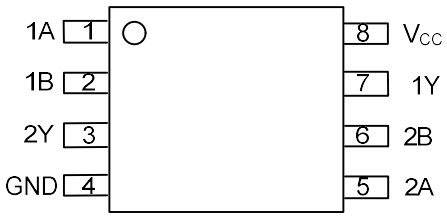
■ MARKING

SOP-8 / MSOP-8	TSSOP-8
	
VSSOP-8	**CDFN2030-8**
	

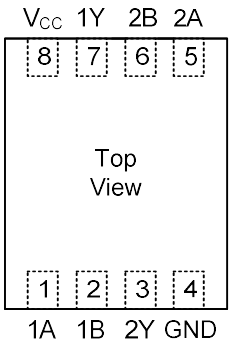
■ PIN CONFIGURATION



SOP-8/MSOP-8/TSSOP-8



VSSOP-8

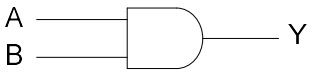


CDFN2030-8

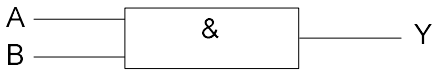
■ FUNCTION TABLE (Each Gate)

INPUTS		OUTPUT
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

■ LOGIC DIAGRAM (Positive Logic)



Logic symbol



IEC symbol

■ ABSOLUTE MAXIMUM RATING (Note1、2、3)

PARAMETER		SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage		V_{CC}		-0.5 ~ 6.5	V
Input Voltage		V_{IN}		-0.5 ~ 6.5	V
Output Voltage		V_{OUT}	Active Mode	-0.5 ~ V_{CC}+0.5	V
Output Voltage		V_{OUT}	Power-Down Mode	-0.5 ~ +6.5	V
Input Clamp Current		I_{IK}	V_{IN} < 0V	-50	mA
Output Clamp Current		I_{OK}	V_{OUT} < 0V or V_{OUT} > V_{CC}	±50	mA
Output Current		I_{OUT}	V_{OUT} = 0 V to V_{CC}	±50	mA
V_{CC} or GND Current		I_{CC}		±100	mA
Power Dissipation	SOP-8	P_D		400	mW
	MSOP-8 TSSOP-8 VSSOP-8			300	mW
	CDFN2030-8			250	mW
Storage Temperature		T_{STG}		-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.
3. It is guarantee by design, this parameter is not production tested.

■ RECOMMENDED OPERATING CONDITIONS (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	Active Mode	0		V_{CC}	V
		Power-Down Mode; V_{CC} = 0V;	0		5.5	V
Input Transition Rise or Fall Rate	t_R / t_F	V_{CC}=1.65V ~ 2.7V			20	ns/V
		V_{CC}=2.7V ~ 5.5V			10	ns/V
Operating Temperature	T_{OPR}		-40		+125	°C

Note: It is guarantee by design, this parameter is not production tested.

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+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	2.0			2.0			V
		V_{CC}=4.5V~5.5V	0.7 ×V_{CC}			0.7 ×V_{CC}			V
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	V
		V_{CC}=4.5V~5.5V			0.3 ×V_{CC}			0.3 ×V_{CC}	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V~5.5V, I_{OH}=-100μA	V_{CC} -0.1			V_{CC} -0.1			V
		V_{CC}=1.65V, I_{OH}=-4mA	1.2			0.95			V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9			1.7			V
		V_{CC}=2.7V, I_{OH}=-12mA	2.2			1.9			V
		V_{CC}=3V, I_{OH}=-24mA	2.3			2.0			V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8			3.4			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65V~5.5V, I_{OL}=100μA			0.1			0.1	V
		V_{CC}=1.65V, I_{OL}=4mA			0.45			0.7	V
		V_{CC}=2.3V, I_{OL}=8mA			0.3			0.45	V
		V_{CC}=2.7V, I_{OL}=12mA			0.4			0.6	V
		V_{CC}=3.0V, I_{OL}=24mA			0.55			0.8	V
		V_{CC}=4.5V, I_{OL}=32mA			0.55			0.8	V
Input Leakage Current	$I_{I(LEAK)}$	V_{IN}=5.5V or GND, V_{CC}=5.5V			±5			±5	μA
OFF-state Current	I_{OFF}	V_{IN} or V_O = 5.5V, V_{CC}=0V			±10			±10	μA
Quiescent Supply Current	I_Q	V_{IN}=V_{CC} or GND, I_{OUT}=0, V_{CC}=5.5V			10			10	μA
Additional Quiescent Supply Current	Δ I_Q	One input at V_{CC} – 0.6V; other inputs at V_{CC} or GND; V_{CC}=2.3V~5.5V			500			500	μA

Note: It is guarantee by design, this parameter is not production tested.

■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40°C~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A or B) to Output (Y)	t_{PLH} / t_{PHL}	V_{CC}=1.8V±0.15V, R_L=1KΩ	C_L=30pF	1.0		9.9	1.0		12.5	ns
		V_{CC}=2.5V±0.2V, R_L=500Ω		0.5		5.9	0.5		7.5	ns
		V_{CC}=2.7V, R_L=500Ω	C_L=50pF	1.0		6.2	1.0		7.6	ns
		V_{CC}=3.3V±0.3V, R_L=500Ω		0.5		5.6	0.5		7.0	ns
		V_{CC}=5.0V±0.5V, R_L=500Ω		0.5		4.9	0.5		6.0	ns

Note: It is guarantee by design, this parameter is not production tested.

■ OPERATING CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}			2.5		pF
Power Dissipation Capacitance	C_{PD}	V_{CC} = 3.3V		16		pF

Notes: 1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum (C_L \times V_{CC}^2 \times f_O)$, where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

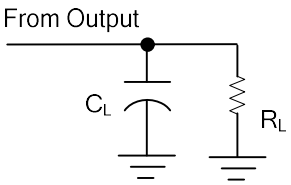
V_{CC} = supply voltage in Volts;

N = total load switching outputs;

$\sum (C_L \times V_{CC}^2 \times f_O)$ = sum of outputs.

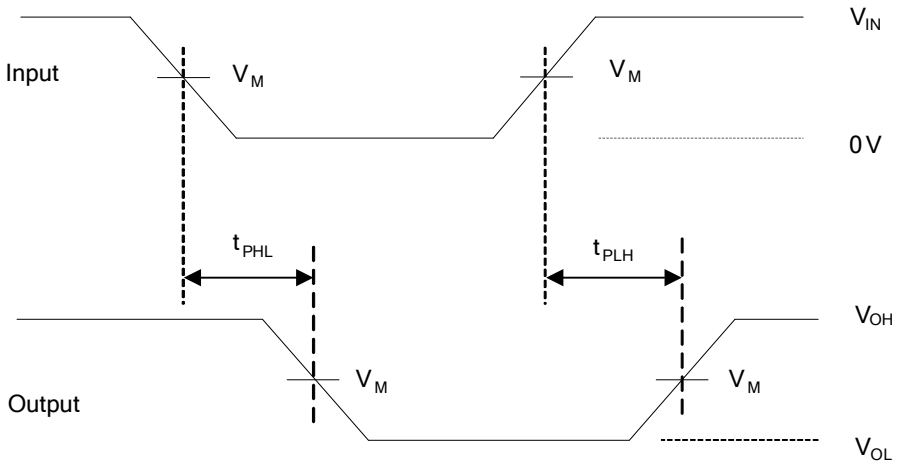
2. The condition is V_I = GND to V_{CC}.

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
1.65 V to 1.95 V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1KΩ
2.3 V to 2.7 V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	500Ω
2.7 V	2.7V	≤2.5ns	1.5V	50pF	500Ω
3.0 V to 3.6 V	2.7V	≤2.5ns	1.5V	50pF	500Ω
4.5 V to 5.5 V	V_{CC}	≤2.5ns	$V_{CC}/2$	50pF	500Ω



Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: P_{RR} ≤ 1 MHz, Z_O = 50 Ω, t_R ≤ 3 ns, t_F ≤ 3 ns.