



U74LVC2G00

CMOS IC

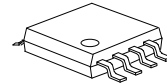
DUAL 2-INPUT POSITIVE-NAND GATE

DESCRIPTION

The **U74LVC2G00** is a dual 2-input NAND gate which performs the function $Y = \overline{A \cdot B}$ or $Y = \overline{A} + \overline{B}$. It is designed for 1.65V to 5.5V operation.

FEATURES

- * Wide Supply Voltage Range from 1.65V to 5.5V
- * Max t_{PD} of 4.3 ns at 3.3V
- * Up to 5.5V Inputs Accept Voltages
- * Low Power Consumption, $I_{CC} = 10 \mu A$ (Max.)
- * ± 24 mA Output Driver at 3.3V
- * Typical V_{OLP} (Output Ground Bounce) $< 0.8V$,
 $V_{CC} = 3.3 V$, $T_A = 25^\circ C$
- * Typical V_{OHV} (Output V_{OH} Undershoot) $> 2V$,
 $V_{CC} = 3.3 V$, $T_A = 25^\circ C$



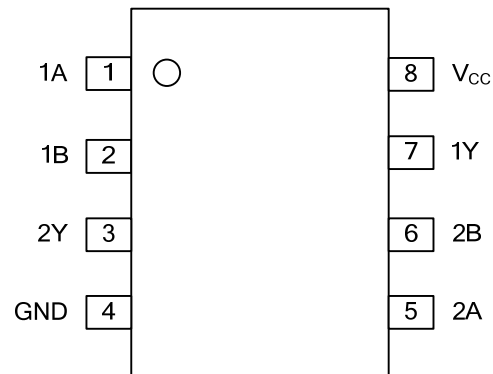
MSOP-8

ORDERING INFORMATION

Ordering Number	Package	Packing
U74LVC2G08G-SM1-R	MSOP-8	Tape Reel

U74LVC2G08G-SM1-R	(1) Packing Type (2) Package Type (3) Halogen Free	(1) R: Tape Reel (2) SM1: MSOP-8 (3) G: Halogen Free
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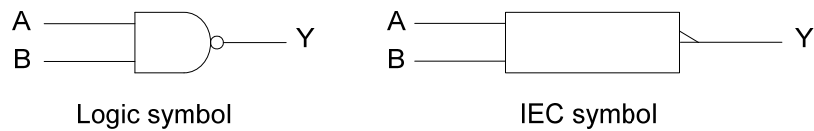
PIN CONFIGURATION



FUNCTION TABLE (Each Gate)

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

LOGIC DIAGRAM (Positive Logic)



■ 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 (any output in the high-impedance or power-off state)	V_{OUT}	-0.5~6.5	V
Output Voltage (any output in the high or low state)	V_{OUT}	-0.5~ V_{CC} +0.5	V
Input Clamp Current	I_{IK}	-50	mA
Output Clamp Current	I_{OK}	-50	mA
Output Current	I_{OUT}	±50	mA
V_{CC} or GND Current	I_{CC}	±100	mA
Storage Temperature	T_{STG}	-65 ~ +150	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	220	°C /W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			
High-Level Input Voltage	V_{IH}	$V_{CC} = 1.65V$ to $1.95V$	$0.65 \cdot V_{CC}$			V
		$V_{CC} = 2.3V$ to $2.7V$	1.7			
		$V_{CC} = 3V$ to $3.6V$	2			
		$V_{CC} = 4.5V$ to $5.5V$	$0.7 \cdot V_{CC}$			
Low-Level Input Voltage	V_{IL}	$V_{CC} = 1.65V$ to $1.95V$			$0.35 \cdot V_{CC}$	V
		$V_{CC} = 2.3V$ to $2.7V$			0.7	
		$V_{CC} = 3V$ to $3.6V$			0.8	
		$V_{CC} = 4.5V$ to $5.5V$			$0.3 \cdot V_{CC}$	
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
High-level Output Current	I_{OH}	$V_{CC}=1.65V$			-4	mA
		$V_{CC}=2.3V$			-8	
		$V_{CC}=3V$			-16	
		$V_{CC}=4.5V$			-24	
Low-level Output Current	I_{OL}	$V_{CC}=1.65V$			4	mA
		$V_{CC}=2.3V$			8	
		$V_{CC}=3V$			16	
		$V_{CC}=4.5V$			24	
Input Transition Rise or Fall Rate	t_R / t_F	$V_{CC}=1.8\pm0.15V, 2.5\pm0.2V$			20	ns/V
		$V_{CC}=3.3\pm0.3V$			10	
		$V_{CC}=5.0\pm0.5V$			5	
Ambient Operating Temperature	T_{OPR}		-40		85	°C

■ ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = 3.3 V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V _{OH}	I _{OH} = -100 µA V _{CC} = 1.65V to 5.5V	V _{CC} - 0.1			V
		I _{OH} = -4 mA V _{CC} = 1.65V	1.2			
		I _{OH} = -8 mA V _{CC} = 2.3V	1.9			
		I _{OH} = -16 mA V _{CC} = 3V	2.4			
		I _{OH} = -24 mA V _{CC} = 3V	2.3			
		I _{OH} = -32 mA V _{CC} = 4.5V	3.8			
Low-Level Output Voltage	V _{OL}	I _{OL} = 100 µA V _{CC} = 1.65V to 5.5V			0.1	V
		I _{OL} = 4 mA V _{CC} = 1.65V			0.45	
		I _{OL} = 8 mA V _{CC} = 2.3V			0.3	
		I _{OL} = 16 mA V _{CC} = 3V			0.4	
		I _{OL} = 24 mA V _{CC} = 3V			0.55	
		I _{OL} = 32 mA V _{CC} = 4.5V			0.55	
Input Leakage Current	I _{I(LEAK)}	V _{IN} = 5.5V or GND, V _{CC} = 0 to 5.5V			±5	µA
OFF-State Current	I _{OFF}	V _{IN} or V _O = 5.5V, V _{CC} = 0V			±10	µA
Quiescent Supply Current	I _Q	V _{IN} = 5.5V or GND, I _{OUT} = 0, V _{CC} = 1.65V to 5.5V			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} = 3V to 5.5V			500	µA
Input Capacitance	C _{IN}	V _{IN} = V _{CC} or GND, V _{CC} = 3.3V		5		pF

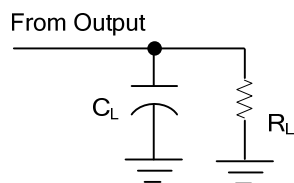
■ SWITCHING CHARACTERISTICS (T_A = 25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output (Y)	t _{PLH} / t _{PHL}	V _{CC} = 1.8 ± 0.15V, R _L = 1KΩ	C _L = 30pF	3.7	8.6	ns
		V _{CC} = 2.5 ± 0.2V, R _L = 500Ω		1.6	4.8	
		V _{CC} = 3.3 ± 0.3V, R _L = 500Ω	C _L = 50pF	1.1	4.3	
		V _{CC} = 5 ± 0.5V, R _L = 500Ω		1	3.3	

■ OPERATING CHARACTERISTICS (T_A = 25°C)

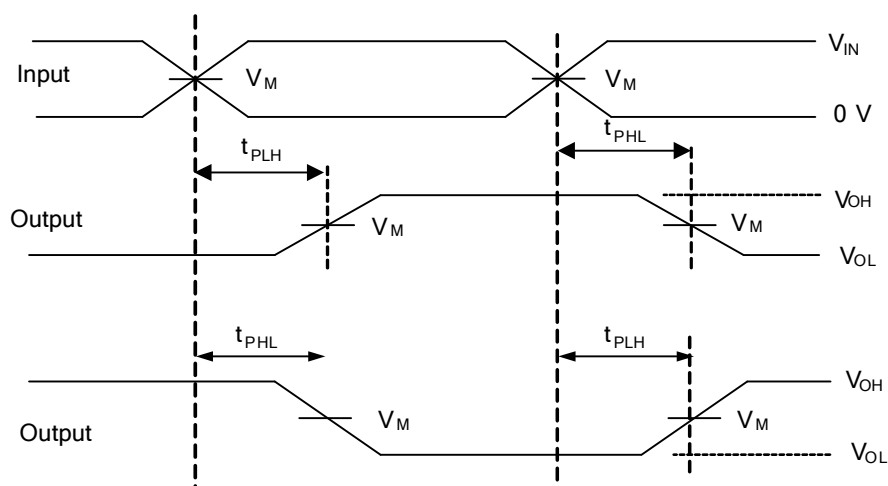
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} = 1.8V	f = 10MHz	19		pF
		V _{CC} = 2.5V		19		
		V _{CC} = 3.3V		20		
		V _{CC} = 5V		22		

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	1K Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	500 Ω
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500 Ω
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 Ω



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 $\leq 10MHz$, $Z_O = 50\Omega$.

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