



# U74LVC2G32

CMOS IC

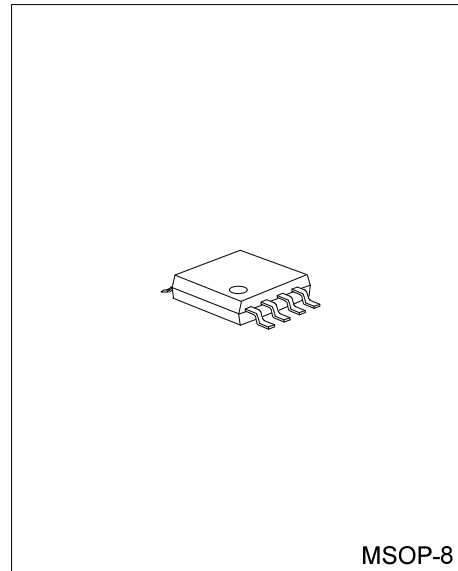
## DUAL 2-INPUT POSITIVE-OR GATE

### DESCRIPTION

The **U74LVC2G32** is a dual 2-input OR 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
- \* Max  $t_{PD}$  of 3.8 ns at 3.3V
- \* Up to 5.5V Inputs Accept Voltages
- \* Low Power Consumption,  $I_{CC} = 10 \mu A$  (Max.)
- \*  $\pm 24$  mA Output Driver at 3.3V
- \* Typical  $V_{OLP}$  (Output Ground Bounce) < 0.8V,  $V_{CC} = 3.3$  V,  $T_A = 25$  °C
- \* Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot) > 2V,  $V_{CC} = 3.3$  V,  $T_A = 25$  °C

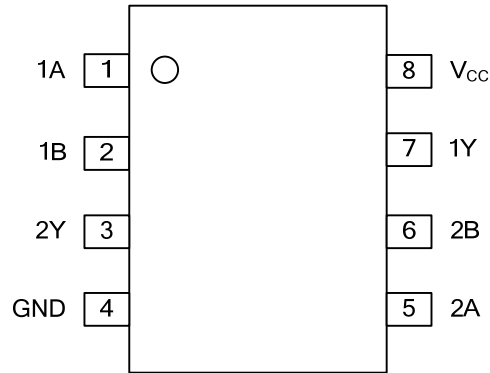


### ORDERING INFORMATION

Ordering Number	Package	Packing
U74LVC2G32G-SM1-R	MSOP-8	Tape Reel

<p>U74LVC2G32G-SM1-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) R: Tape Reel</p> <p>(2) SM1: MSOP-8</p> <p>(3) G: Halogen Free</p>
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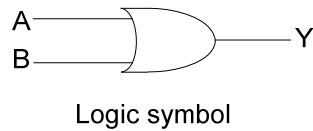
■ PIN CONFIGURATION



■ FUNCTION TABLE (Each Gate)

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

■ 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	$\theta_{JA}$	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 $1.95V$	$0.65 * V_{CC}$			V
		$V_{CC} = 2.3V$ to $2.7V$	1.7			
		$V_{CC} = 3V$ to $3.6V$	2			
		$V_{CC} = 4.5V$ to $5.5V$	$0.7 * V_{CC}$			
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 1.65V$ to $1.95V$			$0.35 * V_{CC}$	V
		$V_{CC} = 2.3V$ to $2.7V$			0.7	
		$V_{CC} = 3V$ to $3.6V$			0.8	
		$V_{CC} = 4.5V$ to $5.5V$			$0.3 * V_{CC}$	
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	
		$V_{CC}=4.5V$			-32	
Low-level Output Current	$I_{OL}$	$V_{CC}=1.65V$			4	mA
		$V_{CC}=2.3V$			8	
		$V_{CC}=3V$			16	
		$V_{CC}=4.5V$			32	
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	
Operating Temperature	$T_A$		-40		85	°C

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> =25°C, V<sub>CC</sub> = 3.3 V , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP <sup>(1)</sup>	MAX	UNIT
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -100 μA V <sub>CC</sub> = 1.65V to 5.5V	V <sub>CC</sub> -0.1			V
		I <sub>OH</sub> = -4 mA V <sub>CC</sub> = 1.65V	1.2			
		I <sub>OH</sub> = -8 mA V <sub>CC</sub> = 2.3V	1.9			
		I <sub>OH</sub> = -16 mA V <sub>CC</sub> = 3V	2.4			
		I <sub>OH</sub> = -24 mA V <sub>CC</sub> = 3V	2.3			
		I <sub>OH</sub> = -32 mA V <sub>CC</sub> = 4.5V	3.8			
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 100 μA V <sub>CC</sub> = 1.65V to 5.5V			0.1	V
		I <sub>OL</sub> = 4 mA V <sub>CC</sub> = 1.65V			0.45	
		I <sub>OL</sub> = 8 mA V <sub>CC</sub> = 2.3V			0.3	
		I <sub>OL</sub> = 16 mA V <sub>CC</sub> = 3V			0.4	
		I <sub>OL</sub> = 24 mA V <sub>CC</sub> = 3V			0.55	
		I <sub>OL</sub> = 32 mA V <sub>CC</sub> = 4.5V			0.55	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>IN</sub> = 5.5V or GND, V <sub>CC</sub> = 0 to 5.5V			±5	μA
OFF-state Current	I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>O</sub> = 5.5V, V <sub>CC</sub> = 0V			±10	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> = 1.65V to 5.5V			10	μA
Additional quiescent Supply Current	Δ I <sub>Q</sub>	One input at V <sub>CC</sub> - 0.6V; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> =3V to 5.5V			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

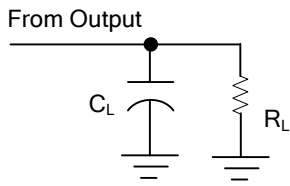
■ SWITCHING CHARACTERISTICS (T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output (Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> =1.8±0.15V, R <sub>L</sub> =1KΩ	C <sub>L</sub> =30pF	2.4		8	ns
		V <sub>CC</sub> =2.5±0.2V, R <sub>L</sub> =500Ω		1		4.4	
		V <sub>CC</sub> =3.3±0.3V, R <sub>L</sub> =500Ω	C <sub>L</sub> =50pF	1		3.8	
		V <sub>CC</sub> =5±0.5V, R <sub>L</sub> =500Ω		1		3.2	

■ OPERATING CHARACTERISTICS (T<sub>A</sub> =25°C)

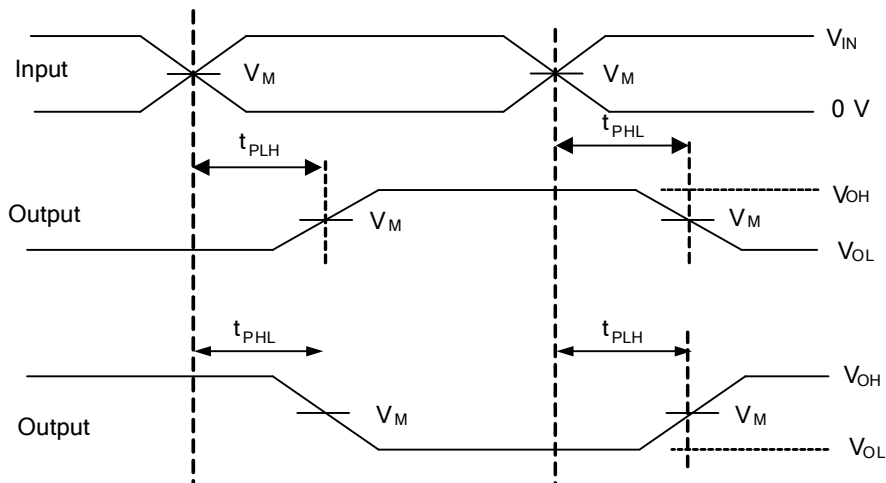
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> = 1.8V	f=10MHz		17	pF
		V <sub>CC</sub> = 2.5V			17	
		V <sub>CC</sub> = 3.3V			17	
		V <sub>CC</sub> = 5V			19	

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

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>			
1.8V±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	1KΩ
2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V <sub>CC</sub>	≤2.5ns	V <sub>CC</sub> /2	50pF	500Ω



PROPAGATION DELAY TIMES

- 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.

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