



# U74LVC1G32

**CMOS IC**

## SINGLE 2-INPUT POSITIVE-OR GATE

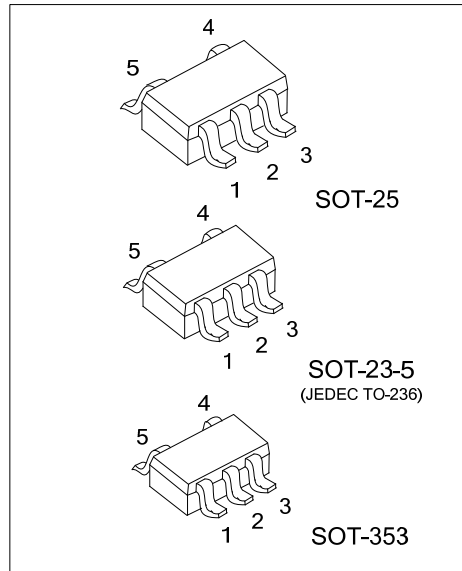
### DESCRIPTION

The **U74LVC1G32** is a single 2-input OR gate which provides the Function  $Y=A+B$  in positive logic circuit.

This device has power-down protective circuit to prevent the device from destruction when it is powered down.

### FEATURES

- \* Operation Voltage Range: 1.6V ~ 5.5V
- \* Low Power Current:  $I_{CC}=10\mu A$  (Max.)
- \*  $\pm 24mA$  Output Drive ( $V_{CC}=3.0V$ )
- \* Power Down Protection

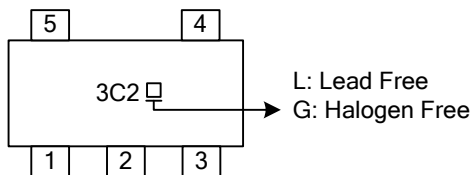


### ORDERING INFORMATION

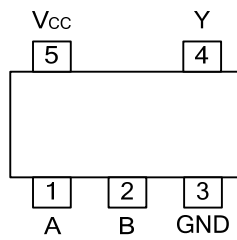
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G32L-AE5-R	U74LVC1G32G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G32L-AF5-R	U74LVC1G32G-AF5-R	SOT-25	Tape Reel
U74LVC1G32L-AL5-R	U74LVC1G32G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G32G-AF5-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING



■ PIN CONFIGURATION

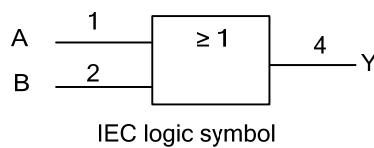
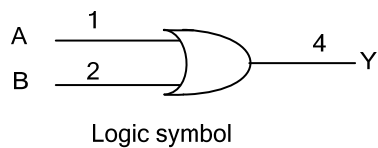


■ FUNCTION TABLE

INPUT(A)	INPUT(B)	OUTPUT(Y)
H	X	H
X	H	H
L	L	L

Note: H: HIGH voltage level; L: LOW voltage level; X: Don't care.

■ LOGIC DIAGRAM (Positive Logic)



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ +6.5	V
Input Voltage	$V_{IN}$		-0.5 ~ +6.5	V
Output Voltage	$V_{OUT}$	Output in the high or low state	-0.5 ~ $V_{CC}+0.5$	V
		Output in the high-impedance or power-off state	-0.5 ~ +6.5	V
$V_{CC}$ or GND Current	$I_{CC}$		±100	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT}=0 \sim V_{CC}$	±50	mA
Input Clamp Current	$I_{IK}$	$V_{IN}<0$	-50	mA
Output Clamp Current	$I_{OK}$	$V_{OUT}<0$	-50	mA
Operating Temperature	$T_{OPR}$		-40 ~ + 125	°C
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.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junctions to Ambient	SOT-23-5	280	°C/W
	SOT-25	230	
	SOT-353	350	

### ■ 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			V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.8V\pm 0.15V$			20	ns/V
		$V_{CC}=2.5V\pm 0.2V$			10	ns/V
		$V_{CC}=3.3V\pm 0.3V$			5	ns/V
		$V_{CC}=5V\pm 0.5V$				
Operating Temperature	$T_A$		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> =1.65V ~ 1.95V	0.65× V <sub>CC</sub>			0.65× V <sub>CC</sub>			V	
		V <sub>CC</sub> =2.3V ~ 2.7V	1.7			1.7			V	
		V <sub>CC</sub> =3V ~ 3.6V	2			2			V	
		V <sub>CC</sub> =4.5V ~ 5.5V	0.7×V <sub>CC</sub>			0.7×V <sub>CC</sub>			V	
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> =1.65V ~ 1.95V			0.35× V <sub>CC</sub>			0.35× V <sub>CC</sub>	V	
		V <sub>CC</sub> =2.3V ~ 2.7V			0.7			0.7	V	
		V <sub>CC</sub> =3V ~ 3.6V			0.8			0.8	V	
		V <sub>CC</sub> =4.5V ~ 5.5V			0.3×V <sub>CC</sub>			0.3×V <sub>CC</sub>	V	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OH</sub> =-100μA	V <sub>CC</sub> -0.1			V <sub>CC</sub> -0.1			V	
		V <sub>CC</sub> =1.65V, I <sub>OH</sub> =-4mA	1.2			0.95			V	
		V <sub>CC</sub> =2.3V, I <sub>OH</sub> =-8mA	1.9			1.7			V	
		V <sub>CC</sub> =3.0V	I <sub>OH</sub> =-16mA	2.4			2.1			V
			I <sub>OH</sub> =-24mA	2.3			2.0			V
V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-32mA	3.8			3.4			V			
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OL</sub> =100μA			0.1			0.1	V	
		V <sub>CC</sub> =1.65V, I <sub>OL</sub> =4mA			0.45			0.7	V	
		V <sub>CC</sub> =2.3V, I <sub>OL</sub> =8mA			0.3			0.45	V	
		V <sub>CC</sub> =3.0V	I <sub>OL</sub> =16mA			0.4			0.5	V
			I <sub>OL</sub> =24mA			0.55			0.8	V
V <sub>CC</sub> =4.5V, I <sub>OL</sub> =32mA			0.55			0.8	V			
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =0 ~ 5.5V, V <sub>IN</sub> =5.5V or GND			±5			±5	μA	
Power OFF Leakage Current	I <sub>OFF</sub>	V <sub>CC</sub> =0V, V <sub>IN</sub> or V <sub>OUT</sub> =5.5V			±10			±25	μA	
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =1.65 ~ 5.5V, V <sub>IN</sub> =5.5V or GND, I <sub>OUT</sub> =0			10			10	μA	
Additional Quiescent Supply Current Per Input Pin	ΔI <sub>Q</sub>	V <sub>CC</sub> =3 ~ 5.5V, One input at V <sub>CC</sub> -0.6V, Other inputs at V <sub>CC</sub> or GND			500			500	μA	

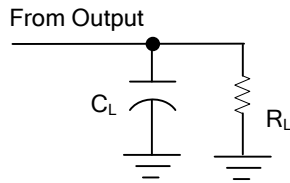
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Propagation Delay From Input (A) to Output (Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	V <sub>CC</sub> =1.8±0.15V	1.9		9			12	ns
			V <sub>CC</sub> =2.5±0.2V	0.8		6.5			9	ns
			V <sub>CC</sub> =3.3±0.3V	0.9		5.5			8	ns
			V <sub>CC</sub> =5±0.5V	0.8		5			7	ns
		C <sub>L</sub> =30pF, R <sub>L</sub> =1KΩ	V <sub>CC</sub> =1.8±0.15V	2.8		9.5			12.5	ns
			V <sub>CC</sub> =2.5±0.2V	1.2		7.5			10	ns
			C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	V <sub>CC</sub> =3.3±0.3V	1.1		6.5			9
V <sub>CC</sub> =5±0.5V	1			6			8	ns		

■ OPERATING CHARACTERISTICS (f=10MHz, T<sub>A</sub>=25°C, unless otherwise specified)

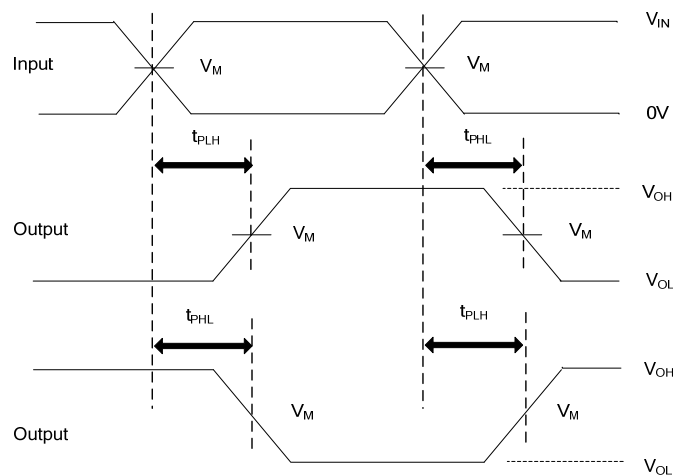
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =3.3V, V <sub>IN</sub> =V <sub>CC</sub> or GND		4		pF
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =1.8V		20		pF
		V <sub>CC</sub> =2.5V		20		pF
		V <sub>CC</sub> =3.3V		21		pF
		V <sub>CC</sub> =5V		22		pF

## ■ TEST CIRCUIT AND WAVEFORMS



**TEST CIRCUIT**

$V_{CC}$	INPUTS		$V_M$	$C_L$	$R_L$
	$V_{IN}$	$t_R, t_F$			
1.8V±0.15V	$V_{CC}$	≤2ns	$V_{CC}/2$	15pF	1MΩ
2.5V±0.2V	$V_{CC}$	≤2ns	$V_{CC}/2$	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	$V_{CC}$	≤2.5ns	$V_{CC}/2$	15pF	1MΩ
1.8V±0.15V	$V_{CC}$	≤2ns	$V_{CC}/2$	30pF	1KΩ
2.5V±0.2V	$V_{CC}$	≤2ns	$V_{CC}/2$	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	$V_{CC}$	≤2.5ns	$V_{CC}/2$	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:  $P_{RR} \leq 10\text{MHz}$ ,  $Z_O = 50\Omega$ .

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