



U74LVC32A

CMOS IC

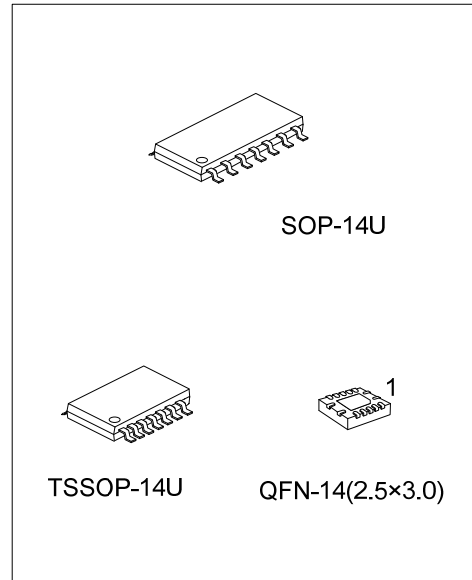
QUAD 2-INPUT POSITIVE-OR GATE

DESCRIPTION

The **U74LVC32A** is a quad 2-input positive-OR gate which performs the function $Y=A+B$ or $Y=\overline{A} \bullet \overline{B}$. It is designed for 1.65V to 3.6V operation.

FEATURES

- * Wide supply voltage range from 1.65V to 3.6V
- * 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.)
- * ± 24 mA output driver at 3V



ORDERING INFORMATION

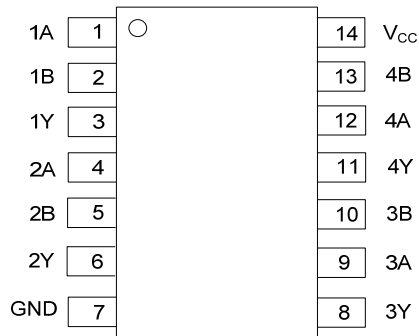
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC32AL-UEA-R	U74LVC32AG-UEA-R	SOP-14U	Tape Reel
U74LVC32AL-UEB-R	U74LVC32AG-UEB-R	TSSOP-14U	Tape Reel
U74LVC32AL-QAF-R	U74LVC32AG-QAF-R	QFN-14(2.5x3.0)	Tape Reel

<p>U74LVC32AG-UEA-R</p>	<p>(1) R: Tape Reel (2) UEA: SOP-14U, UEB: TSSOP-14U QAF: QFN-14(2.5x3.0) (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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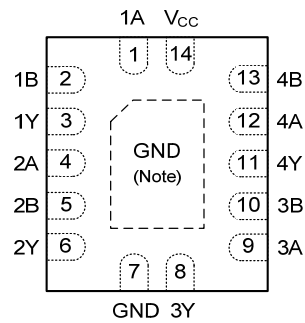
MARKING

SOP-14U / TSSOP-14U	QFN-14(2.5x3.0)

■ PIN CONFIGURATION



SOP-14U / TSSOP-14U



QFN-14(2.5x3.0)
(TOP View)

Note: Connect exposed pad to GND

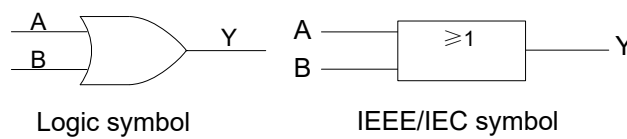
■ PIN DESCRIPTION

PIN	SYMBOL	FUNCTION
1, 4, 9, 12	1A-4A	Data inputs
2, 5, 10, 13	1B-4B	Data inputs
3, 6, 8, 11	1Y-4Y	Data outputs
7	GND	Ground (0V)
14	V _{CC}	Positive supply voltage

■ FUNCTION TABLE (each gate)

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

■ LOGIC SYMBOL (one gate)



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 6.5	V
Input Voltage (Note 2)	V_{IN}		-0.5 ~ 6.5	V
Output Voltage (Note 2)	V_{OUT}		-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}	$V_{IN}<0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT}<0$	-50	mA
Output Current	I_{OUT}		± 50	mA
V_{CC} or GND Current	I_{CC}		± 100	mA
Power Dissipation	P_D	$T_A = -40^{\circ}\text{C} \sim +125^{\circ}\text{C}$	500	mW
Storage Temperature	T_{STG}		-65 ~ +150	$^{\circ}\text{C}$

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.

■ RECOMMENDED OPERATING CONDITIONS (Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
		Data retention only	1.5			V
High-Level Input Voltage	V_{IH}	$V_{CC}=1.65\text{V to }1.95\text{V}$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3\text{V to }2.7\text{V}$	1.7			V
		$V_{CC}=2.7\text{V to }3.6\text{V}$	2			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=1.65\text{V to }1.95\text{V}$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3\text{V to }2.7\text{V}$			0.7	V
		$V_{CC}=2.7\text{V to }3.6\text{V}$			0.8	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta V$				7	ns/V
Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14U	125	$^{\circ}\text{C/W}$
	TSSOP-14U	150	$^{\circ}\text{C/W}$
	QFN-14(2.5×3.0)	130	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V _{OH}	V _{CC} =1.65V to 3.6V, I _{OH} =-100μA	V _{CC} -0.2			V
		V _{CC} =1.65V, I _{OH} =-4mA	1.2			V
		V _{CC} =2.3V, I _{OH} =-8mA	1.7			V
		V _{CC} =2.7V, I _{OH} =-12mA	2.2			V
		V _{CC} =3V, I _{OH} =-12mA	2.4			V
		V _{CC} =3V, I _{OH} =-24mA	2.2			V
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65V to 3.6V, I _{OL} =100μA			0.2	V
		V _{CC} =1.65V, I _{OL} =4mA			0.45	V
		V _{CC} =2.3V, I _{OL} =8mA			0.7	V
		V _{CC} =2.7V, I _{OL} =12mA			0.4	V
		V _{CC} =3V, I _{OL} =24mA			0.55	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0V to 3.6V, V _{IN} =5.5V or GND			±5	μA
Quiescent Supply Current	I _{CC}	V _{IN} =V _{CC} or GND, I _{OUT} =0			10	μA
Additional quiescent Supply Current	ΔI _{CC}	One input at V _{CC} -0.6V Other input sat V _{CC} or GND			500	μA
Input Capacitance	C _{IN}	V _{CC} =3.3V, V _{IN} =V _{CC} or GND		5		pF

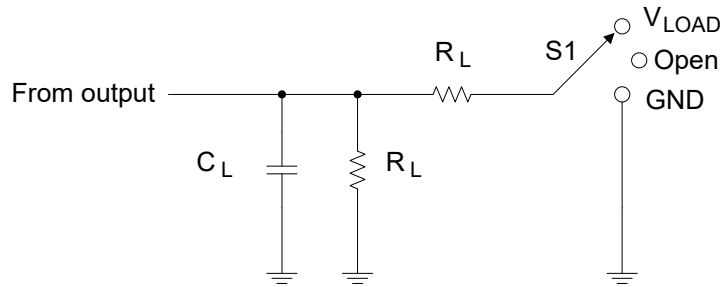
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A or B) to Output (Y)	t _{PLH} /t _{PHL}	V _{CC} =1.8V±0.15V, C _L =30pF, R _L =1KΩ	1		9	ns
		V _{CC} =2.5V±0.2V, C _L =30pF, R _L =500Ω	1		5.4	ns
		V _{CC} =2.7V, C _L =50pF, R _L =500Ω	1		4.4	ns
		V _{CC} =3.3V±0.3V, C _L =50pF, R _L =500Ω	1		3.8	ns
Skew Between Any Two Outputs of the Same Package Switching In the Same Direction	t _{sk(o)}	V _{CC} =3.3V±0.3V, C _L =50pF, R _L =500Ω			1	ns

■ OPERATING CHARACTERISTICS (f=10MHz, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance Per Gate	C _{PD}	V _{CC} =1.8V		7.5		pF
		V _{CC} =2.5V		10.6		pF
		V _{CC} =3.3V		12.5		pF

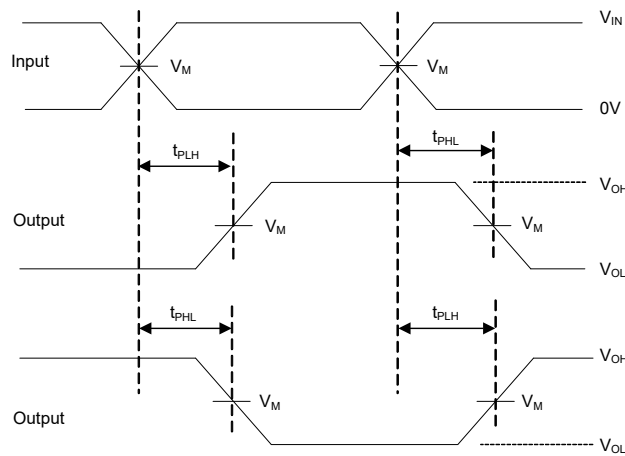
■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L
	V_{IN}	t_r, t_f				
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1K Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω
2.7V	V_{CC}	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω



Propagation delay times
Inverting and noninverting outputs

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 10MHz$, $Z_O = 50\Omega$.

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