



## U74LVC1G332

Preliminary

CMOS IC

### SINGLE 3-INPUT POSITIVE-OR GATE

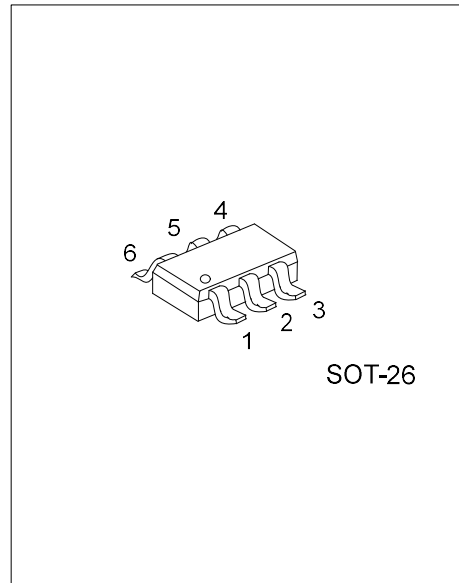
#### DESCRIPTION

The **U74LVC1G332** device performs the Boolean function in  $Y=A+B+C$  or  $Y=\overline{A}\overline{B}\overline{C}$  positive logic.

This device is fully specified for partial-power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

#### FEATURES

- \* Wide supply voltage range from 1.65V to 5.5V
- \* Inputs accept voltages up to 5.5V
- \*  $I_{OFF}$  supports live insertion, partial-power-down mode, back-drive protection
- \* Supports Down Translation to  $V_{CC}$
- \* Low static power consumption;  $I_{CC}=\pm 10\mu A$  (Max.)
- \*  $\pm 24mA$  Output Drive at 3.3V

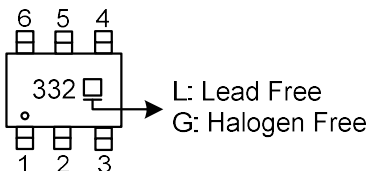


#### ORDERING INFORMATION

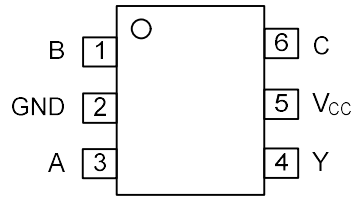
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G332L-AG6-R	U74LVC1G332G-AG6-R	SOT-26	Tape Reel

<p>U74LVC1G332G-AG6-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



## ■ PIN CONFIGURATION

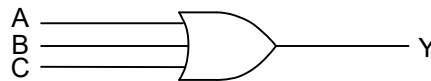


## ■ FUNCTION TABLE

INPUT			OUTPUT
A	B	C	Y
H	X	X	H
X	H	X	H
X	X	H	H
L	L	L	L

Note: H: HIGH voltage level, L: LOW voltage level, X = Valid H or L

## ■ LOGIC DIAGRAM (positive logic)



### ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>		-0.5 ~ +6.5	V
Input Voltage	V <sub>IN</sub>		-0.5 ~ +6.5	V
Output Voltage	V <sub>OUT</sub>	Output in the high or low state	-0.5 ~ V <sub>CC</sub> +0.5	V
		Output in the power-off state	-0.5 ~ +6.5	V
Continuous V <sub>CC</sub> or GND Current	I <sub>CC</sub>		±100	mA
Continuous Output Current	I <sub>OUT</sub>		±50	mA
Input Clamp Current	I <sub>IK</sub>	V <sub>IN</sub> <0V	-50	mA
Output Clamp Current	I <sub>OK</sub>	V <sub>OUT</sub> <0V	-50	mA
Storage Temperature Range	T <sub>STG</sub>		-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.

### ■ RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Input Transition Rise or Fall Rate	Δt/Δv	V <sub>CC</sub> =1.8V±0.15V, 2.5V±0.2V			20	ns/V
		V <sub>CC</sub> =3.3V±0.3V			10	ns/V
		V <sub>CC</sub> =5V±0.5V			10	ns/V
Operating Temperature	T <sub>A</sub>		-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> =1.8±0.15V	0.65× V <sub>CC</sub>			0.65× V <sub>CC</sub>			V
		V <sub>CC</sub> =2.5±0.2V	1.7			1.7			V
		V <sub>CC</sub> =3.3±0.3V	2			2			V
		V <sub>CC</sub> =5±0.5V	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> =1.8±0.15V			0.35× V <sub>CC</sub>			0.35× V <sub>CC</sub>	V
		V <sub>CC</sub> =2.5±0.2V			0.7			0.7	V
		V <sub>CC</sub> =3.3±0.3V			0.8			0.8	V
		V <sub>CC</sub> =5±0.5V			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			2.2			V
		V <sub>CC</sub> =3.0V, 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

### ■ ELECTRICAL CHARACTERISTICS (Cont.)

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	
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>OH</sub> =16mA			0.4			0.6	V
		V <sub>CC</sub> =3.0V, I <sub>OH</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 (All Input)	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =0V ~ 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			±10	μA
Quiescent Supply Current	I <sub>CC</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>CC</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

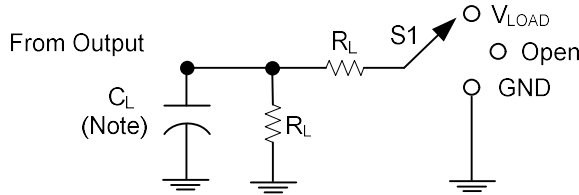
### ■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

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, B or C) to output (Y)	t <sub>PD</sub>	V <sub>CC</sub> =1.8V±0.15V	C <sub>L</sub> =15pF	2.4		17	1		19	ns
		V <sub>CC</sub> =2.5V±0.2V		1.4		7	1		8.5	ns
		V <sub>CC</sub> =3.3V±0.3V		1.2		5.5	1		7	ns
		V <sub>CC</sub> =5V±0.5V		0.8		4	0.5		5	ns
		V <sub>CC</sub> =1.8V±0.15V	C <sub>L</sub> =30pF or 50pF	2.8		17.2	1		20	ns
		V <sub>CC</sub> =2.5V±0.2V		1.5		7.5	1		9	ns
		V <sub>CC</sub> =3.3V±0.3V		1.4		6	1		7.5	ns
		V <sub>CC</sub> =5V±0.5V		1		5	1		6	ns

### ■ OPERATING CHARACTERISTICS (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		3.5		pF
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =1.8V, f=10MHz		18		pF
		V <sub>CC</sub> =2.5V, f=10MHz		19		pF
		V <sub>CC</sub> =3.3V, f=10MHz		20		pF
		V <sub>CC</sub> =5V, f=10MHz		23		pF

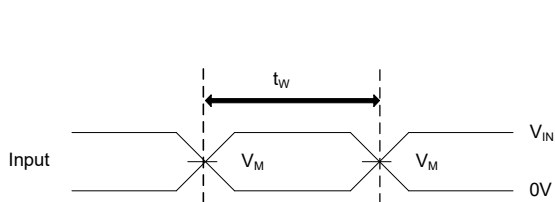
## TEST CIRCUIT AND WAVEFORMS



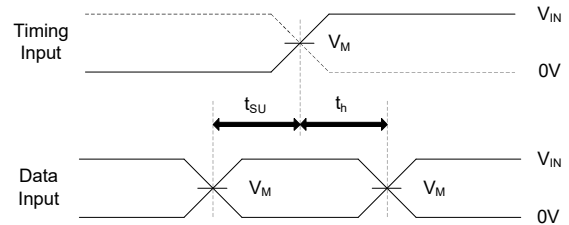
TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

Note:  $C_L$  includes probe and jig capacitance.

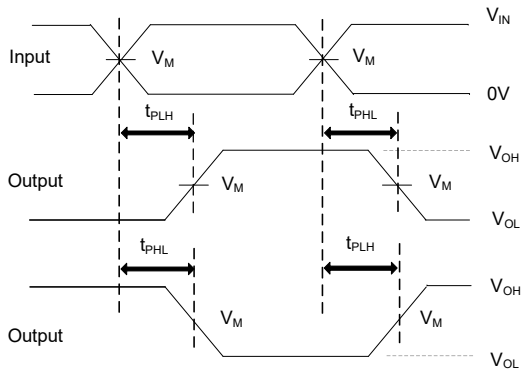
$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_R / t_F$					
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	15pF	1M $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.3V



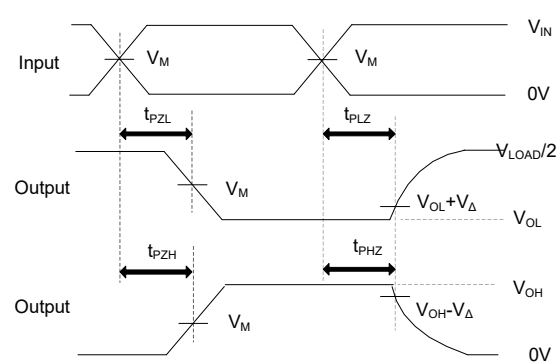
PULSE WIDTH



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES

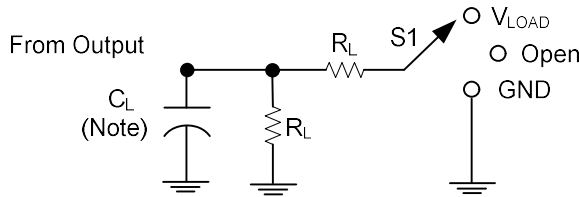


ENABLE AND DISABLE TIMES

Notes: 1.  $C_L$  includes probe and jig capacitance.

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

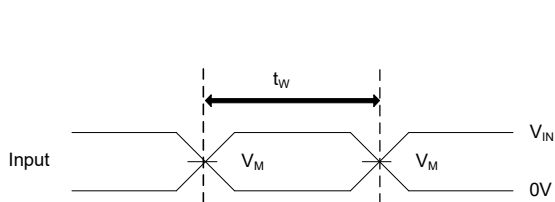
### ■ TEST CIRCUIT AND WAVEFORMS (Cont.)



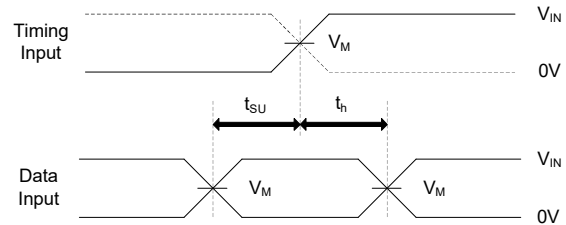
TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

Note:  $C_L$  includes probe and jig capacitance.

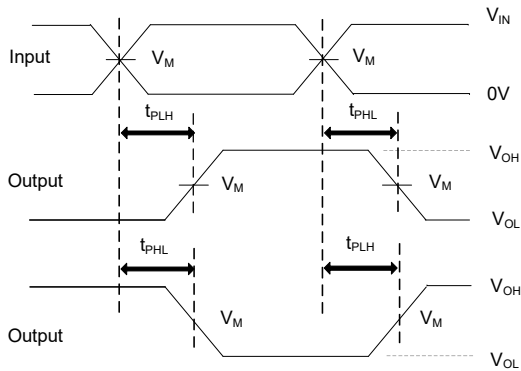
$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_R / t_F$					
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1K $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 $\Omega$	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 $\Omega$	0.3V



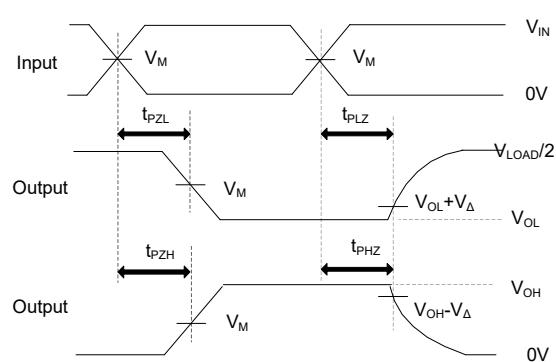
PULSE WIDTH



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES



ENABLE AND DISABLE 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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