



U74LVC1G3208

Preliminary

CMOS IC

SINGLE 3-INPUT POSITIVE-OR-AND GATE

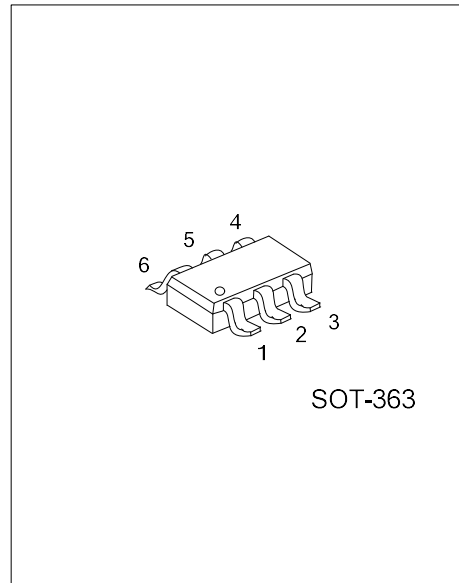
DESCRIPTION

The **U74LVC1G3208** device is designed for 1.65V to 5.5V V_{CC} operation.

The **U74LVC1G3208** device is a single 3-input positive OR-AND gate. It performs the Boolean function $Y=(A+B) \cdot C$ in positive logic.

By tying one input to GND or V_{CC} , the **U74LVC1G3208** device offers two more functions. When C is tied to V_{CC} , this device performs as a 2-input OR gate ($Y=A+B$). When A is tied to GND, the device works as a 2-input AND gate ($Y=B \cdot C$). This device also works as a 2-input AND gate when B is tied to GND ($Y=A \cdot C$).

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.



SOT-363

FEATURES

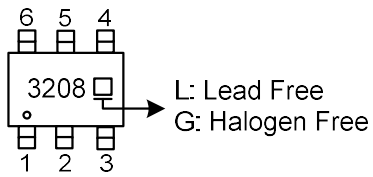
- * Wide supply voltage range from 1.65V to 5.5V
- * Supports 5V V_{CC} operation
- * Inputs accept voltages up to 5.5V
- * I_{OFF} supports partial-power-down mode
- * Low static power consumption; $I_{CC}=10\mu A$ (Max.)
- * $\pm 24mA$ Output Drive at 3.3V

ORDERING INFORMATION

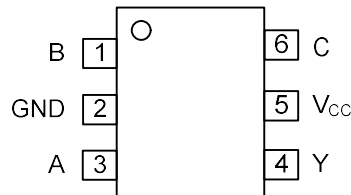
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G3208L-AL6-R	U74LVC1G3208G-AL6-R	SOT-363	Tape Reel

<p>U74LVC1G3208G-AL6-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AL6: SOT-363 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



PIN CONFIGURATION

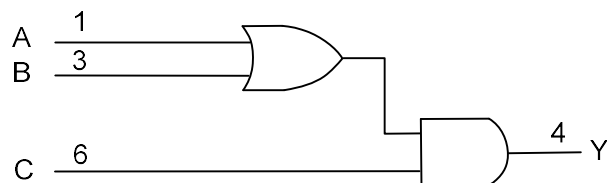


FUNCTION TABLE

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

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

LOGIC DIAGRAM (positive logic)

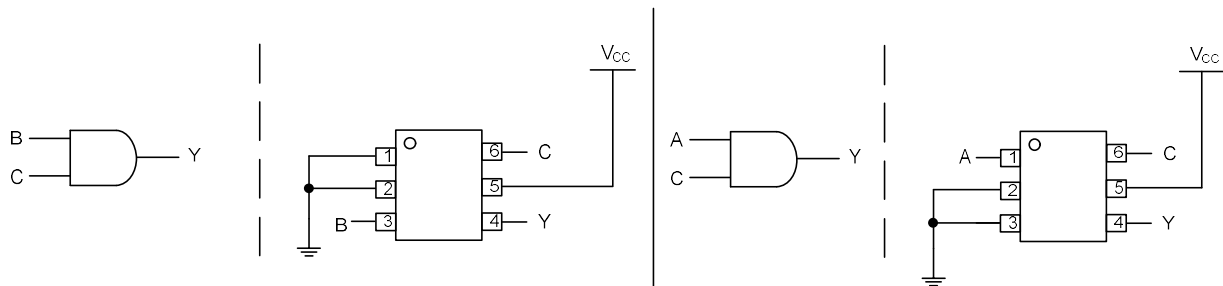


FUNCTION SELECTION TABLE

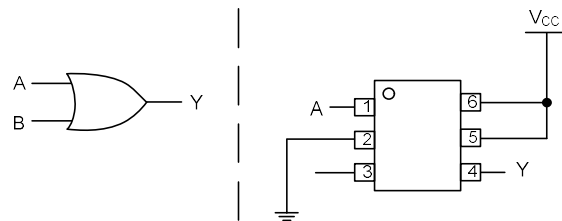
LOGIC FUNCTION
2-Input AND Gate
2-Input OR Gate
$Y = (A + B) \cdot C$

LOGIC FUNCTION

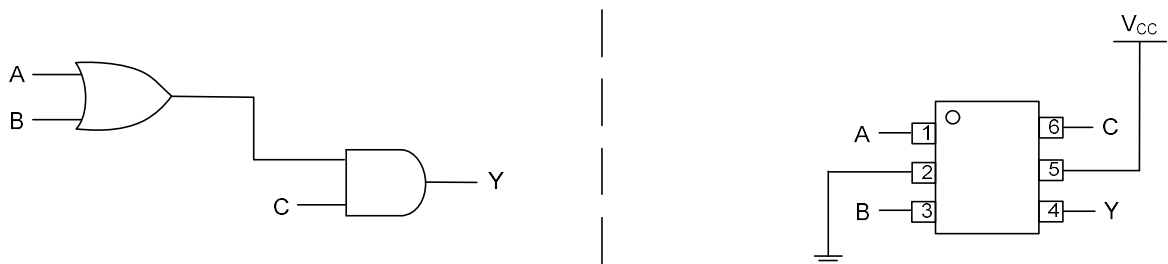
2-Input AND Gate



2-Input OR Gate



$Y = (A + B) \cdot C$



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	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 power-off state	-0.5 ~ +6.5	V
Continuous V _{CC} or GND Current	I _{CC}		±100	mA
Continuous Output Current	I _{OUT}		±50	mA
Input Clamp Current	I _{IK}	V _{IN} <0V	-50	mA
Output Clamp Current	I _{OK}	V _{OUT} <0V	-50	mA
Storage Temperature Range	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.

■ RECOMMENDED OPERATING CONDITIONS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST 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}		0		V _{CC}	V
Input Transition Rise or Fall Rate	Δt/Δv	V _{CC} =1.8V±0.15V, 2.5V±0.2V			20	ns/V
		V _{CC} =3.3V±0.3V			10	ns/V
		V _{CC} =5V±0.5V			5	ns/V
Operating Temperature	T _A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-level Input Voltage	V _{IH}	V _{CC} =1.8±0.15V	0.65×			0.65×			V
		V _{CC} =2.5±0.2V	1.7			1.7			V
		V _{CC} =3.3±0.3V	2			2			V
		V _{CC} =5±0.5V	0.7×			0.7×			V
Low-level Input Voltage	V _{IL}	V _{CC} =1.8±0.15V			0.35×			0.35×	V
		V _{CC} =2.5±0.2V			0.7			0.7	V
		V _{CC} =3.3±0.3V			0.8			0.8	V
		V _{CC} =5±0.5V			0.3×			0.3×	V
High-Level Output Voltage	V _{OH}	V _{CC} =1.65 ~ 5.5V, I _{OH} =-100μA	V _{CC} -0.1			V _{CC} -0.1			V
		V _{CC} =1.65V, I _{OH} =-4mA	1.2			0.95			V
		V _{CC} =2.3V, I _{OH} =-8mA	1.9			1.7			V
		V _{CC} =3.0V, I _{OH} =-16mA	2.4			2.2			V
		V _{CC} =3.0V, I _{OH} =-24mA	2.3			2.0			V
		V _{CC} =4.5V, I _{OH} =-32mA	3.8			3.4			V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65 ~ 5.5V, I _{OL} =100μA			0.1			0.1	V
		V _{CC} =1.65V, I _{OL} =4mA			0.45			0.7	V
		V _{CC} =2.3V, I _{OL} =8mA			0.3			0.45	V
		V _{CC} =3.0V, I _{OH} =16mA			0.4			0.6	V
		V _{CC} =3.0V, I _{OH} =24mA			0.55			0.8	V
		V _{CC} =4.5V, I _{OL} =32mA			0.55			0.8	V
Input Leakage Current (A, B, or C Input)	I _{I(LEAK)}	V _{CC} =0V ~ 5.5V V _{IN} =5.5V or GND			±5			±5	μA
Power Off Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{OUT} =5.5V			±10			±10	μA
Quiescent Supply Current	I _{CC}	V _{CC} =1.65 ~ 5.5V, V _{IN} =5.5V or GND, I _{OUT} =0			10			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI _{CC}	V _{CC} =3 ~ 5.5V, One input at V _{CC} -0.6V, other inputs at V _{CC} or GND			500			500	μA

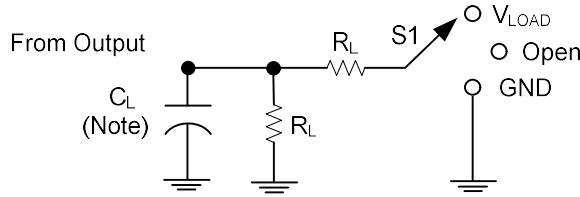
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Propagation delay from input (A, B or C) to output (Y)	t _{PD}	V _{CC} =1.8V±0.15V	C _L =15pF	3.7		14	1		16	ns
		V _{CC} =2.5V±0.2V		2.5		8	1		9.5	ns
		V _{CC} =3.3V±0.3V		1.7		6	1		7.5	ns
		V _{CC} =5V±0.5V		1.3		4.5	1		6	ns
		V _{CC} =1.8V±0.15V	C _L =30pF or 50pF	2.5		17.5	1		19.5	ns
		V _{CC} =2.5V±0.2V		1.8		9	1		10.5	ns
		V _{CC} =3.3V±0.3V		1.8		7.5	1		9	ns
		V _{CC} =5V±0.5V		1.3		5.5	1		6.5	ns

■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}	V _{CC} =3.3V, V _{IN} =V _{CC} or GND		3.5		pF
Power Dissipation Capacitance	C _{PD}	V _{CC} =1.8V, f=10MHz		15		pF
		V _{CC} =2.5V, f=10MHz		15		pF
		V _{CC} =3.3V, f=10MHz		16		pF
		V _{CC} =5V, f=10MHz		17		pF

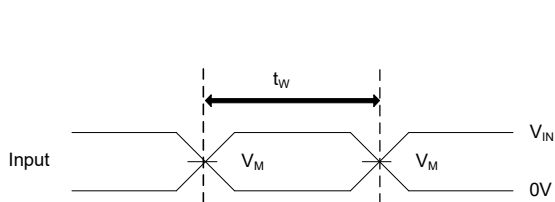
TEST CIRCUIT AND WAVEFORMS



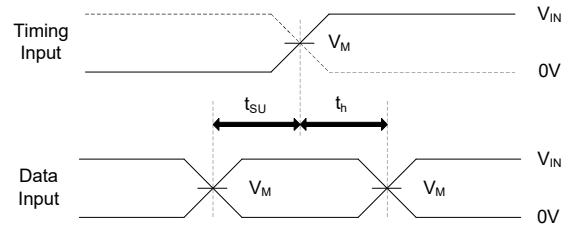
TEST	S1
t_{PLH}/t_{PHL}	V_{LOAD}
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	V_{LOAD}

Note: C_L includes probe and jig capacitance.

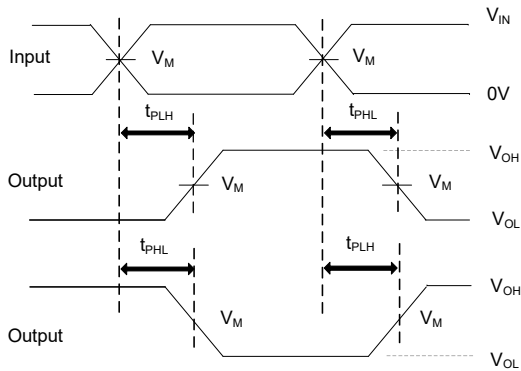
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R / t_F					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	15pF	1M Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq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



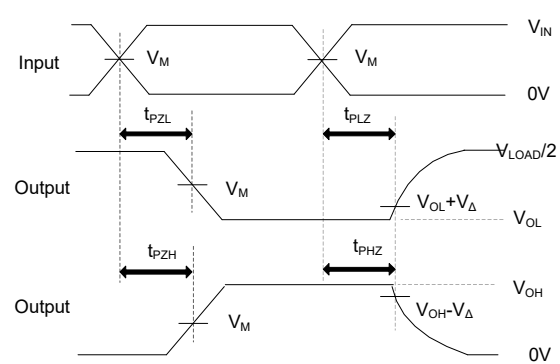
PULSE WIDTH



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES

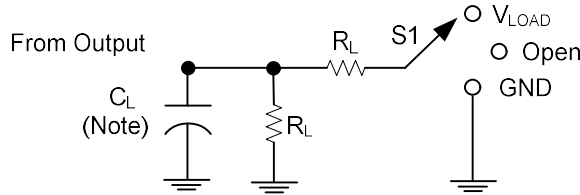


ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.

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

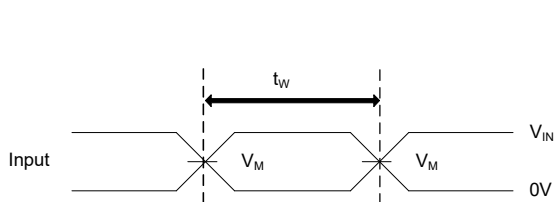
TEST CIRCUIT AND WAVEFORMS (Cont.)



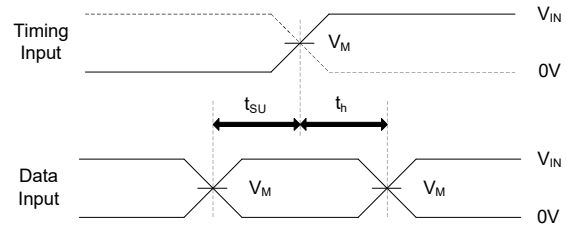
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Note: C_L includes probe and jig capacitance.

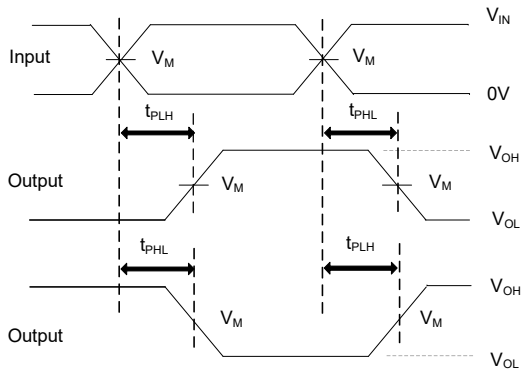
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R / t_F					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1K Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}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



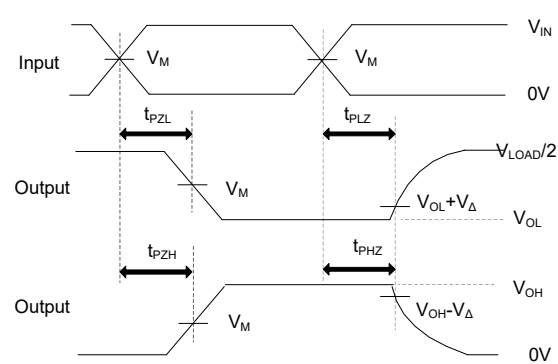
PULSE WIDTH



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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