



## U74LVC2G04

CMOS IC

### DUAL INVERTER GATE

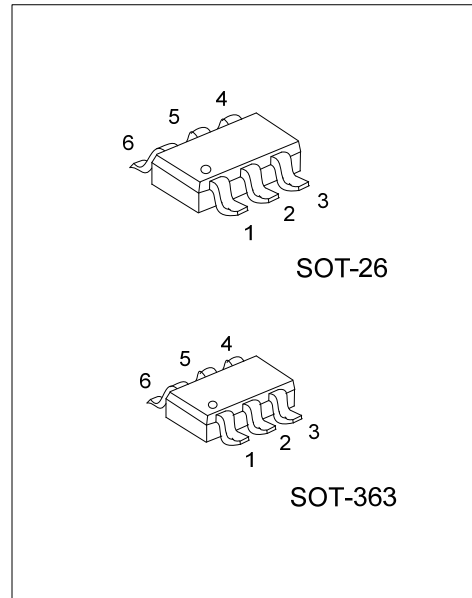
#### DESCRIPTION

The **U74LVC2G04** is a dual inverter gate and it provides the Boolean function  $Y = \overline{A}$  in positive logic.

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

#### FEATURES

- \* Operate from 1.65V To 5.5V
- \* Inputs accept voltages To 5.5V
- \* High noise immunity
- \* Low power dissipation
- \* Max  $t_{PD}$  of 3.2 ns at 5V

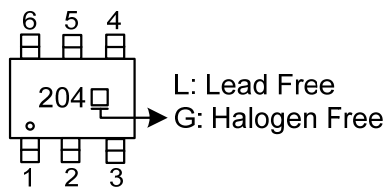


#### ORDERING INFORMATION

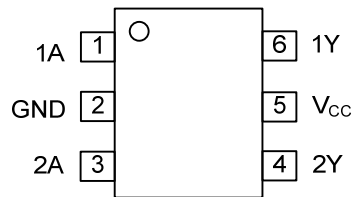
Ordering Number		Package	Packing
U74LVC2G04L-AG6-R	U74LVC2G04G-AG6-R	SOT-26	Tape Reel
U74LVC2G04L-AL6-R	U74LVC2G04G-AL6-R	SOT-363	Tape Reel

<p>U74LVC2G04G-AG6-R</p>	<p>(1) R: Tape Reel</p> <p>(2) AG6: SOT-26, AL6: SOT-363</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

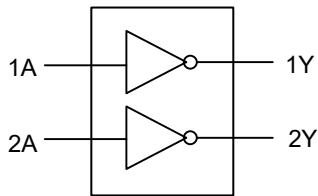


■ FUNCTION TABLE

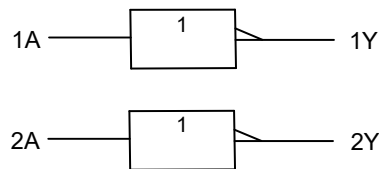
INPUT(nA)	OUTPUT(nY)
H	L
L	H

Note: H: HIGH voltage level; L: LOW voltage level.

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

## ■ 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	Active Mode	$V_{OUT}$	-0.5 ~ $V_{CC} + 0.5$	V
	Power-Down Mode		-0.5 ~ +6.5	V
$V_{CC}$ or GND Current		$I_{CC}$	±100	mA
Continuous Output Current ( $V_{OUT}=0$ to $V_{CC}$ )		$I_{OUT}$	±50	mA
Input Clamp Current ( $V_{IN}<0$ )		$I_{IK}$	-50	mA
Output Clamp Current ( $V_{OUT}>V_{CC}$ or $V_{OUT}<0$ )		$I_{OK}$	-50	mA
Power Dissipation ( $T_A=-40^{\circ}C \sim +125^{\circ}C$ )		$P_D$	300	mW
Operating Junction Temperature		$T_J$	-40 ~ +125	$^{\circ}C$
Storage Temperature		$T_{STG}$	-65 ~ +150	$^{\circ}C$

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

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage		$V_{CC}$	1.65		5.5	V
Input Voltage		$V_{IN}$	0		5.5	V
Output Voltage	Active Mode	$V_{OUT}$	0		$V_{CC}$	V
	Power-Down Mode		0		5.5	V
Input Transition Rise or Fall Rate	$V_{CC}=1.65V$ to $2.7V$	$t_R / t_F$	0		20	ns/V
	$V_{CC}=2.7V$ to $5.5V$		0		10	ns/V

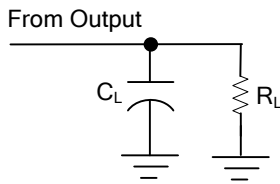
## ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-level Input Voltage	$V_{IH}$	$V_{CC}=1.65V \sim 1.95V$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3V \sim 2.7V$	1.7			V
		$V_{CC}=2.7V \sim 3.6V$	2			V
		$V_{CC}=4.5V \sim 5.5V$	$0.7 \times V_{CC}$			V
Low-level Input Voltage	$V_{IL}$	$V_{CC}=1.65V \sim 1.95V$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V \sim 2.7V$			0.7	V
		$V_{CC}=2.7V \sim 3.6V$			0.8	V
		$V_{CC}=4.5V \sim 5.5V$			$0.3 \times V_{CC}$	V
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65 \sim 5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			V
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			V
		$V_{CC}=2.7V, I_{OH}=-12mA$	2.2			V
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3			V
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8			V
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65 \sim 5.5V, I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.45	V
		$V_{CC}=2.3V, I_{OL}=8mA$			0.3	V
		$V_{CC}=2.7V, I_{OL}=12mA$			0.4	V
		$V_{CC}=3.0V, I_{OL}=24mA$			0.55	V
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=5.5V, V_{IN}=5.5V$ or GND		±0.1	±5	$\mu A$
Power OFF Leakage Current	$I_{OFF}$	$V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$		±0.1	±10	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$		0.1	10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=2.3 \sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND		5	500	$\mu A$

■ SWITCHING CHARACTERISTICS (T<sub>A</sub> =25°C , unless otherwise specified)

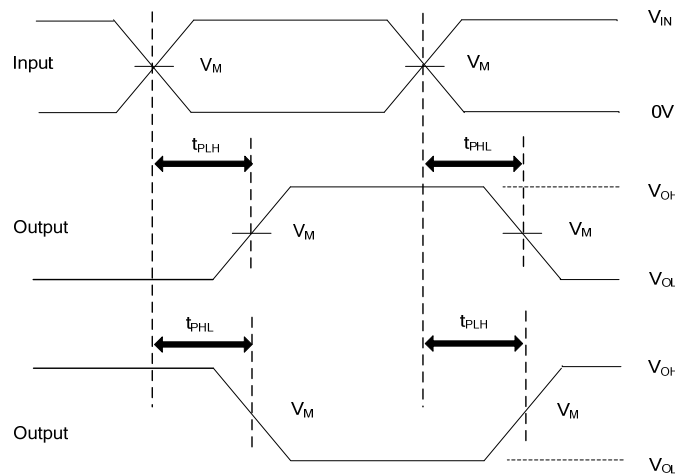
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A) to output(Y)	t <sub>PLH</sub> t <sub>PHL</sub>	C <sub>L</sub> =30pF	V <sub>CC</sub> =1.8±0.15V, R <sub>L</sub> =1KΩ	1.0	3.5	8.0	ns
			V <sub>CC</sub> =2.5±0.2V, R <sub>L</sub> =500Ω	1.0	2.2	4.4	ns
		C <sub>L</sub> =50pF	V <sub>CC</sub> =2.7V, R <sub>L</sub> =500Ω	1.0	2.7	5.2	ns
			V <sub>CC</sub> =3.3±0.3V, R <sub>L</sub> =500Ω	0.5	2.7	4.1	ns
			V <sub>CC</sub> =5±0.5V, R <sub>L</sub> =500Ω	1.0	1.9	3.2	ns
				1.0	1.9	3.2	ns

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

$V_{CC}$	Inputs		$V_M$	$C_L$	$R_L$
	$V_{IN}$	$t_R, t_F$			
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	1K $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500 $\Omega$
2.7V	2.7V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 $\Omega$



PROPAGATION DELAY 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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