

U74LVC1G11

CMOS IC

SINGLE 3-INPUT POSITIVE-AND GATE

■ DESCRIPTION

The **U74LVC1G11** performs the Boolean function $Y = A \bullet B \bullet C$ or $Y = \overline{A} + \overline{B} + \overline{C}$ in positive logic.

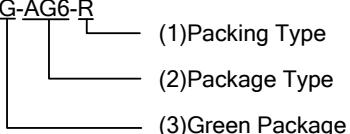
The device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

■ FEATURES

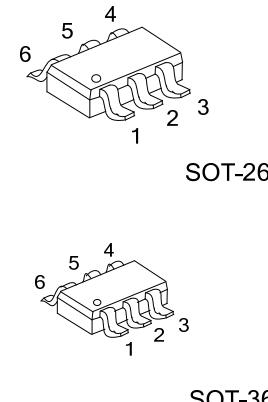
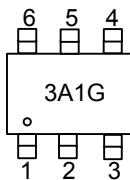
- * Supports 5-V V_{CC} Operation
- * Inputs Accept Voltages to 5.5V
- * Max t_{pd} of 4.1ns at 3.3V
- * Low power consumption, $I_{CC}=10\mu A$ (Max)
- * I_{off} supports Partial-Power-Down Mode
- * $\pm 24mA$ output drive at 3.3V

■ ORDERING INFORMATION

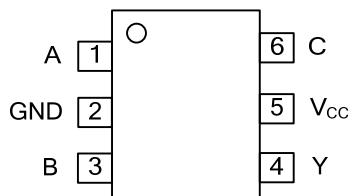
Ordering Number	Package	Packing
U74LVC1G11G-AG6-R	SOT-26	Tape Reel
U74LVC1G11G-AL6-R	SOT-363	Tape Reel

U74LVC1G11G-AG6-R 	(1)R: Tape Reel (2)AG6: SOT-26, AL6: SOT-363 (3)G: Halogen Free and Lead Free
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■ MARKING



■ PIN CONFIGURATION

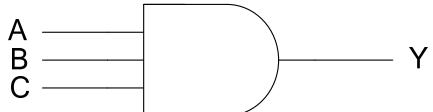


■ FUNCTION TABLE

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

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

■ LOGIC DIAGRAM (positive logic)



■ 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	Output in the high or low state	V _{OUT}	-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 (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} <0)		I _{OK}	±50	mA
Operating Temperature		T _A	-40 ~ +125	°C
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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-26	θ _{JA}	230	°C/W
	SOT-363		350	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}	Operating	1.65		5.5	V
Input Voltage	V _{IN}		0		5.5	V
Output Voltage	V _{OUT}	High or low state	0		V _{CC}	V
High-level input voltage	V _{IH}	V _{CC} =1.65V to 1.95V	0.65V _{CC}			V
		V _{CC} =2.3V to 2.7V	1.7			
		V _{CC} =3V to 3.6V	2			
		V _{CC} =4.5V to 5.5V	0.7V _{CC}			
Low-level input voltage	V _{IL}	V _{CC} =1.65V to 1.95V			0.35V _{CC}	V
		V _{CC} =2.3V to 2.7V			0.7	
		V _{CC} =3V to 3.6V			0.8	
		V _{CC} =4.5V to 5.5V			0.3V _{CC}	
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	
		V _{CC} =5V±0.5V			10	

Note: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

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

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	$I_{OH}=100\mu A$	$V_{CC}=1.65 \sim 5.5V$	$V_{CC}-0.1$			V
		$I_{OH}=4mA$	$V_{CC}=1.65V$	1.2			V
		$I_{OH}=8mA$	$V_{CC}=2.3V$	1.9			V
		$I_{OH}=16mA$	$V_{CC}=3.0V$	2.4			V
		$I_{OH}=24mA$		2.3			V
		$I_{OH}=32mA$	$V_{CC}=4.5V$	3.8			V
Low-Level Output Voltage	V_{OL}	$I_{OL}=100\mu A$	$V_{CC}=1.65 \sim 5.5V$			0.1	V
		$I_{OL}=4mA$	$V_{CC}=1.65V$			0.45	V
		$I_{OL}=8mA$	$V_{CC}=2.3V$			0.30	V
		$I_{OL}=16mA$	$V_{CC}=3.0V$			0.40	V
		$I_{OL}=24mA$				0.55	V
		$I_{OL}=32mA$	$V_{CC}=4.5V$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=5.5V$ or GND, $V_{CC}=0 \sim 5.5V$				± 5	μA
Power OFF Leakage Current	I_{off}	V_{IN} or $V_{OUT}=5.5V$, $V_{CC}=0V$				± 10	μA
Quiescent Supply Current	I_{CC}	$V_{IN}=5.5V$ or GND, $I_{OUT}=0$ $V_{CC}=1.65 \sim 5.5V$				10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	$V_{CC}=3 V \sim 5.5V$, One input at $V_{CC}-0.6V$, Other inputs at V_{CC} or GND				500	μA
Input Capacitance	C_I	$V_{CC}=3.3V$, $V_{IN}=V_{CC}$ or GND			3.5		pF

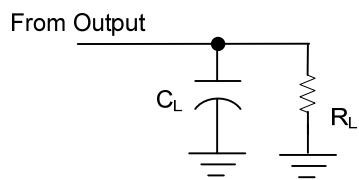
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$)(see Figure 1)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input(A,B or C) to output(Y)	t_{PLH}/t_{PHL}	$V_{CC}=1.8V \pm 0.15V$	$C_L=15pF$	2.6		15.2	ns
			$C_L=30pF$	2.9		17.2	
		$V_{CC}=2.5V \pm 0.2V$	$C_L=15pF$	1.6		5.6	ns
			$C_L=30pF$	1.4		6.2	
		$V_{CC}=3.3V \pm 0.3V$	$C_L=15pF$	1.2		4.1	ns
			$C_L=50pF$	1.3		4.9	
		$V_{CC}=5V \pm 0.5V$, $C_L=50pF$	$C_L=15pF$	1		3.1	ns
			$C_L=50pF$	1		3.5	

■ OPERATING CHARACTERISTICS ($T_A=25^\circ C$)

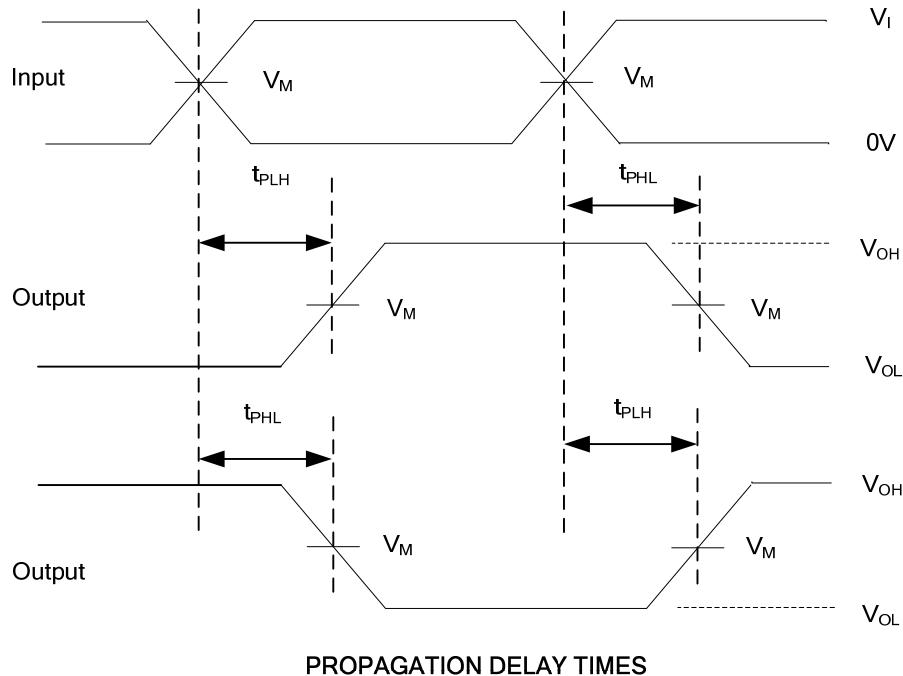
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$f=10MHz$	$V_{CC}=1.8V$		18		pF
			$V_{CC}=2.5V$		19		pF
			$V_{CC}=3.3V$		20		pF
			$V_{CC}=5.0V$		23		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_I	t_r / t_f			
1.8V±0.15V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	1MΩ
				30pF	1KΩ
2.5V±0.2V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	1MΩ
				30pF	500Ω
3.3V±0.3V	3V	$\leq 2.5\text{ns}$	1.5V	15pF	1MΩ
				50pF	500Ω
5V±0.5V	V_{CC}	$\leq 2.5\text{ns}$	$V_{CC}/2$	15pF	1MΩ
				50pF	500Ω



PROPAGATION DELAY TIMES

Figure 1. Test Circuit and Voltage Waveforms

Note: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\text{MHz}$, $Z_0=50\Omega$.

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