



# UNISONIC TECHNOLOGIES CO., LTD

## U74LVC1G14

CMOS IC

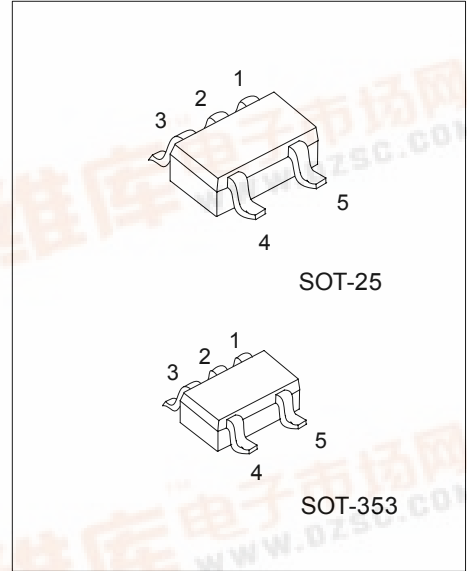
### SINGLE SCHMITT-TRIGGER INVERTER

#### DESCRIPTION

The U74LVC1G14 is a single Schmitt-trigger inverter, it provides the function  $Y=\bar{A}$ .

The device have different input threshold levels for positive-going ( $V_{T+}$ ) and negative-going ( $V_{T-}$ ) signals because of the Schmitt-trigger action in the input.

This device has power-down protective circuit, preventing device destruction when it is powered down.



#### FEATURES

- \* Operation Voltage Range: 1.65~5.5V
- \* Low Power Dissipation:  $I_{CC}=10\mu A(\text{Max})$
- \* 24mA output drive ( $V_{CC}=3.0V$ )
- \* High Noise Immunity
- \* Power Down Protection

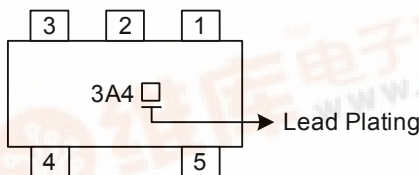
\*Pb-free plating product number:  
U74LVC1G14L

#### ORDERING INFORMATION

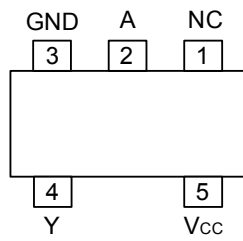
Order Number		Package	Packing
Normal	Lead Free Plating		
U74LVC1G14-AF5-R	U74LVC1G14L-AF5-R	SOT-25	Tape Reel
U74LVC1G14-AL5-R	U74LVC1G14L-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G14L-AF5-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Lead Plating</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AF5: SOT-25, AL5: SOT-353</li> <li>(3) L: Lead Free Plating, Blank: Pb/Sn</li> </ul>
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#### MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	H
H	L

■ LOGIC DIAGRAM (positive logic)



### ■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)(Note 1)

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
Output Voltage(power-down mode)	$V_{OUT}$	-0.5~6.5	V
Input Clamp Current( $V_{IN}<0$ )	$I_{IK}$	-50	mA
Output Clamp Current( $V_{OUT}<0$ )	$I_{OK}$	-50	mA
Output Current	$I_{OUT}$	$\pm 50$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 100$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	

Note 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. 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 COMDITIONS

PARAMETER	SYMBOL	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
Operating Temperature	$T_A$		-40		85	

### ■ STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Input Threshold Voltage	$V_{T+}$	$V_{CC}=1.65V$	0.76		1.16	V
		$V_{CC}=2.3V$	1.08		1.56	
		$V_{CC}=3.0V$	1.48		1.92	
		$V_{CC}=4.5V$	2.16		2.74	
		$V_{CC}=5.5V$	2.61		3.33	
Negative-Going Input Threshold Voltage	$V_{T-}$	$V_{CC}=1.65V$	0.35		0.62	V
		$V_{CC}=2.3V$	0.56		0.88	
		$V_{CC}=3.0V$	0.84		1.2	
		$V_{CC}=4.5V$	1.41		1.97	
		$V_{CC}=5.5V$	1.87		2.4	
Hysteresis Voltage ( $V_{T+}-V_{T-}$ )	$V_T$	$V_{CC}=1.65V$	0.36		0.64	V
		$V_{CC}=2.3V$	0.45		0.78	
		$V_{CC}=3.0V$	0.51		0.87	
		$V_{CC}=4.5V$	0.58		1.04	
		$V_{CC}=5.5V$	0.69		1.11	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65V \sim 4.5V, I_{OH}=-100 \mu A$	$V_{CC}-0.1$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			
		$V_{CC}=3.0V, I_{OH}=-16mA$	2.4			
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3			
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8			

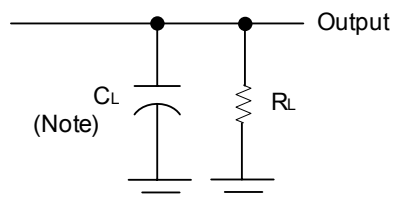
### ■ STATIC CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65V \sim 4.5V, I_{OL}=100 \mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.45	
		$V_{CC}=2.3V, I_{OL}=8mA$			0.3	
		$V_{CC}=3.0V, I_{OL}=16mA$			0.4	
		$V_{CC}=3.0V, I_{OL}=24mA$			0.55	
		$V_{CC}=4.5V, I_{OL}=32mA$			0.55	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V \sim 5.5V, V_{IN}=V_{CC}$ or GND			$\pm 5$	$\mu A$
Power OFF Leakage Current	$I_{OFF}$	$V_{CC}=0V, V_{IN}$ or $V_{CC}=5.5V$			$\pm 10$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=1.65V \sim 5.5V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$			10	$\mu A$
Additional Quiescent Supply Current	$\Delta I_Q$	$V_{CC}=3V \sim 5.5V$ , One input at $V_{CC}-0.6V$ , other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND		4.5		pF

### ■ DYNAMIC CHARACTERISTICS

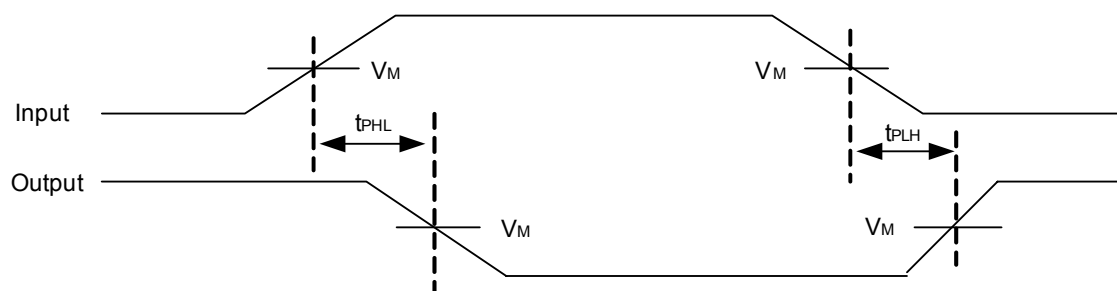
PARAMETER	SYMBOL	$V_{CC}(V)$	$C_L=15 \text{ pF}$		$C_L=30 \text{ or } 50 \text{ pF}$		UNIT
			MIN	MAX	MIN	MAX	
Propagation delay from input (A or B) to output(Y)	$t_{PLH}/t_{PHL}$	$1.8 \pm 0.15$	2.8	9.9	3.8	11	ns
		$2.5 \pm 0.2$	1.6	5.5	2	6.5	
		$3.3 \pm 0.3$	1.5	4.6	1.8	5.5	
		$5 \pm 0.5$	0.9	4.4	1.2	5	
<b>Operating Characteristics</b>							
Power Dissipation Capacitance	Cpd	f=10MHz	20	21	22	25	pF

### ■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.

$V_{CC}$	$V_{IN}$	$t_R, t_F$	$V_M$	$C_L$	$R_L$
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	15pF	1M
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	15pF	1M
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	15pF	1M
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	15pF	1M
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	1K
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50pF	500



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