

**U74LVC14A****CMOS IC****HEX SCHMITT-TRIGGER
INVERTERS****DESCRIPTION**

The **U74LVC14A** devices contain six independent inverters with Schmitt-trigger action which perform the Boolean function $Y = \overline{A}$ in positive logic.

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

FEATURES

- * Operate From 1.65V to 3.6V
- * Inputs Accept Voltages to 5.5V
- * I_{OFF} Supports Partial-Power-Down Mode
- * Low Power Dissipation
- * Max t_{PD} of 6.4 ns at 3.3V

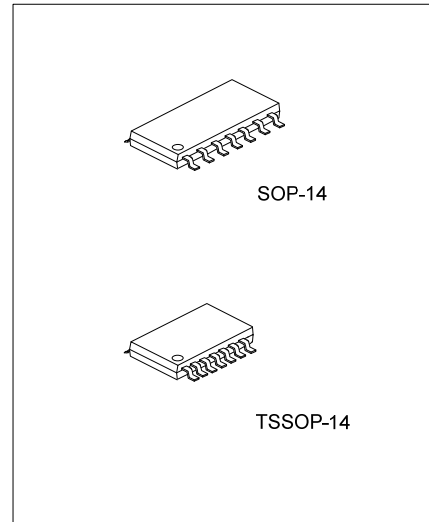
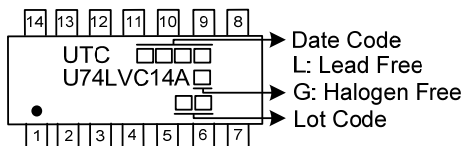
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC14AL-S14-R	U74LVC14AG-S14-R	SOP-14	Tape Reel
U74LVC14AL-P14-R	U74LVC14AG-P14-R	TSSOP-14	Tape Reel

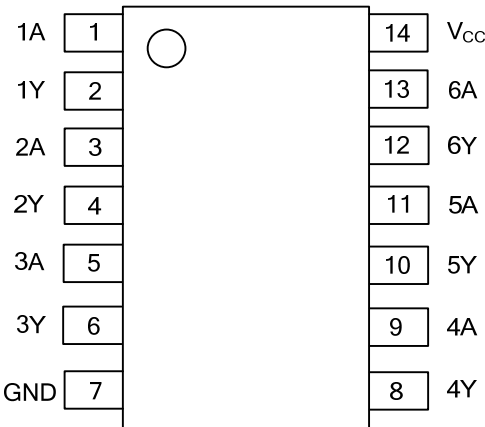
U74LVC14AG-S14-R

- (1) Packing Type
- (2) Package Type
- (3) Green Package

- (1) R: Tape Reel
- (2) P14: TSSOP-14, S14: SOP-14
- (3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

PIN CONFIGURATION

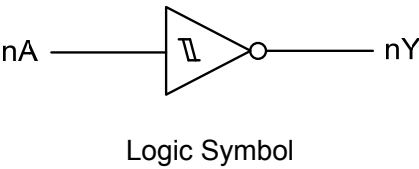


FUNCTION TABLE (Each Inverter)

INPUT(A)	OUTPUT(Y)
H	L
L	H

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

LOGIC DIAGRAM (Each Inverter)



■ 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	V_{OUT}	-0.5 ~ $V_{CC}+0.5$	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
Power Dissipation ($T_A=-40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$)	TSSOP-14	P_D	500
	SOP-14		600
Storage Temperature Range	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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	TSSOP-14	θ_{JA}	113
	SOP-14		76

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Ambient Operating Temperature	T_{OPR}		-40		+125	$^{\circ}\text{C}$
High-level Output Current	I_{OH}	$V_{CC}=1.65\text{V}$			-4	mA
		$V_{CC}=2.3\text{V}$			-8	mA
		$V_{CC}=2.7\text{V}$			-12	mA
		$V_{CC}=3\text{V}$			-24	mA
Low-level Output Current	I_{OL}	$V_{CC}=1.65\text{V}$			4	mA
		$V_{CC}=2.3\text{V}$			8	mA
		$V_{CC}=2.7\text{V}$			12	mA
		$V_{CC}=3\text{V}$			24	mA

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Threshold	V_{T+}	$V_{CC}=1.65\text{V}$	0.4		1.3	V
		$V_{CC}=1.95\text{V}$	0.6		1.5	V
		$V_{CC}=2.3\text{V}$	0.8		1.7	V
		$V_{CC}=2.5\text{V}$	0.8		1.7	V
		$V_{CC}=2.7\text{V}$	0.8		2	V
		$V_{CC}=3\text{V}$	0.9		2	V
		$V_{CC}=3.6\text{V}$	1.1		2	V
Negative-Going Threshold	V_{T-}	$V_{CC}=1.65\text{V}$	0.15		0.85	V
		$V_{CC}=1.95\text{V}$	0.25		0.95	V
		$V_{CC}=2.3\text{V}$	0.4		1.2	V
		$V_{CC}=2.5\text{V}$	0.4		1.2	V
		$V_{CC}=2.7\text{V}$	0.4		1.4	V
		$V_{CC}=3\text{V}$	0.6		1.5	V
		$V_{CC}=3.6\text{V}$	0.8		1.7	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Hysteresis($V_{T+} - V_{T-}$)	ΔV_T	$V_{CC}=1.65V$	0.1		1.15	V
		$V_{CC}=1.95V$	0.15		1.25	V
		$V_{CC}=2.3V$	0.25		1.3	V
		$V_{CC}=2.5V$	0.25		1.3	V
		$V_{CC}=2.7V$	0.3		1.1	V
		$V_{CC}=3V$	0.3		1.2	V
		$V_{CC}=3.6V$	0.3		1.2	V
High-Level Output Voltage	V_{OH}	$V_{CC}=1.65 \sim 3.6V, I_{OH}=-100\mu A$	$V_{CC}-0.2$			V
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.29			V
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			V
		$V_{CC}=2.7V, I_{OH}=-12mA$	2.2			V
		$V_{CC}=3.0V, I_{OH}=-12mA$	2.4			V
		$V_{CC}=3V, I_{OH}=-24mA$	2.3			V
Low-Level Output Voltage	V_{OL}	$V_{CC}=1.65 \sim 3.6V, I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V, I_{OL}=4mA$			0.24	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
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=5.5V$ or GND, $V_{CC}=3.6V$			± 1	μA
Quiescent Supply Current	I_Q	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$, $V_{CC}=3.6V$			1	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_Q	$V_{CC}=2.7 \sim 3.6V, I_{OUT}=0$ One input at $V_{CC}-0.6V$, Other inputs at V_{CC} or GND			500	μA
Input Capacitance	C_{IN}	$V_{IN}=V_{CC}$ or GND		5		pF

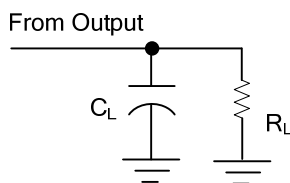
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS			MIN	TYP	MAX	UNIT
Propagation delay from input (nA) to output(nY)	t_{PLH} / t_{PHL}	$V_{CC}=1.8\pm 0.15V$	$R_L=1K\Omega$	$C_L=30pF$	1.0	5	10.5	ns
		$V_{CC}=2.5\pm 0.2V$	$R_L=500\Omega$		1.0	3.4	7.3	ns
		$V_{CC}=2.7V$	$R_L=500\Omega$	$C_L=50pF$	1.0	3.6	7.3	ns
		$V_{CC}=3.3\pm 0.3V$	$R_L=500\Omega$		1.0	3.2	6.2	ns

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

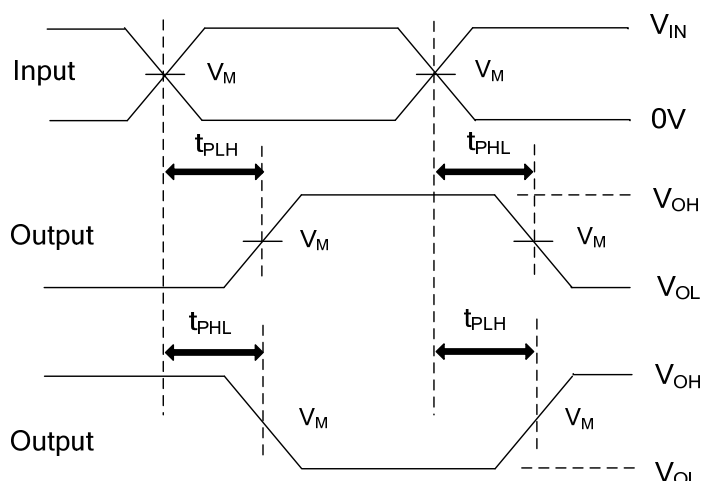
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Power Dissipation Capacitance Per Inverter	C_{PD}	$f=10MHz$	$V_{CC}=1.8V$		11		pF
			$V_{CC}=2.5V$		12		pF
			$V_{CC}=3.3V$		15		pF

■ 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 Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	500 Ω
2.7V	2.7V	$\leq 2.5ns$	1.5V	50pF	500 Ω
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	50pF	500 Ω



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

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

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