



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.

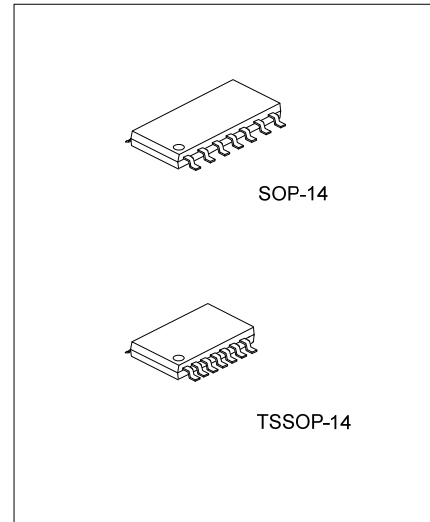
This device has power-down protective circuit preventing destruction of the device when it is powered down.

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

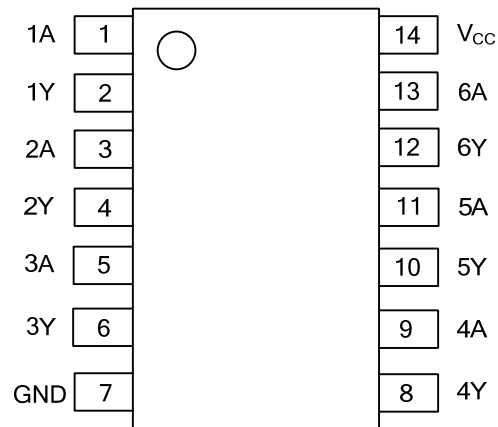
ORDERING INFORMATION

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



U74LVC14AG-P14-R	(1) Packing Type (2) Package Type (3) Halogen Free	(1) R: Tape Reel (2) P14: TSSOP-14, S14: SOP-14 (3) G: Halogen Free L: Lead Free
------------------	--	--

■ PIN CONFIGURATION

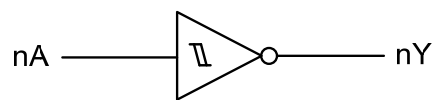


■ FUNCTION TABLE (Each Inverter)

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

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

■ LOGIC DIAGRAM (Each Inverter)



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	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	500	mW
	SOP-14	600	mW
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	113	$^{\circ}\text{C}/\text{W}$
	SOP-14	76	$^{\circ}\text{C}/\text{W}$

■ 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}	$I_{OH}=-100\mu A$	$V_{CC}=1.65 \sim 3.6V$	$V_{CC}-0.2$			V
		$I_{OH}=-4mA$	$V_{CC}=1.65V$	1.29			V
		$I_{OH}=-8mA$	$V_{CC}=2.3V$	1.9			V
		$I_{OH}=-12mA$	$V_{CC}=2.7V$	2.2			V
		$I_{OH}=-12mA$	$V_{CC}=3.0V$	2.4			V
		$I_{OH}=-24mA$	$V_{CC}=3V$	2.3			V
Low-Level Output Voltage	V_{OL}	$I_{OL}=100\mu A$	$V_{CC}=1.65 \sim 3.6V$			0.1	V
		$I_{OL}=4mA$	$V_{CC}=1.65V$			0.24	V
		$I_{OL}=8mA$	$V_{CC}=2.3V$			0.3	V
		$I_{OL}=12mA$	$V_{CC}=2.7V$			0.4	V
		$I_{OL}=24mA$	$V_{CC}=3.0V$			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

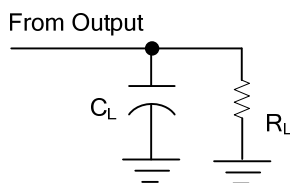
■ SWITCHING CHARACTERISTICS ($T_A=25^\circ C$)

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 ($T_A=25^\circ C$)

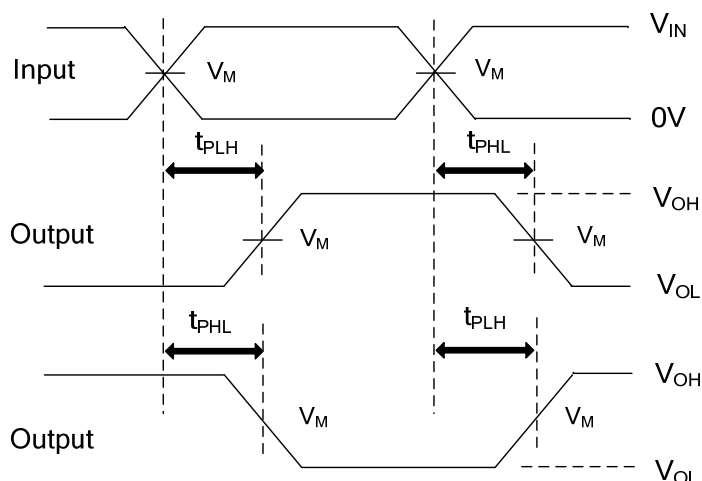
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Power Dissipation Capacitance Per Inverter	C_{PD}	$f=10MHz$	$V_{CC}=1.8V$		11		pF
			$V_{CC}=2.5V$		12		pF
			$V_{CC}=3.3V$		15		pF

■ 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 $\leq 10MHz$, $Z_o = 50\Omega$.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.