



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.

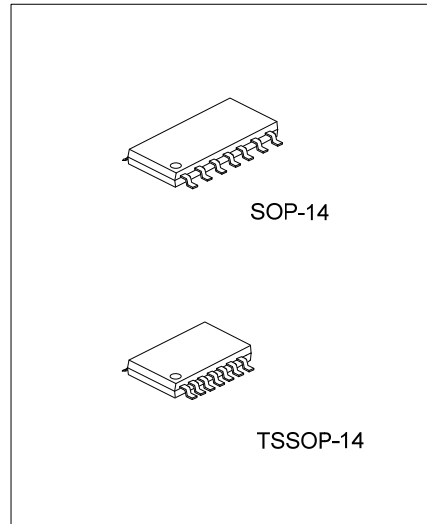
This device has power-down protective circuit preventing destruction of the device when it is powered down.

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

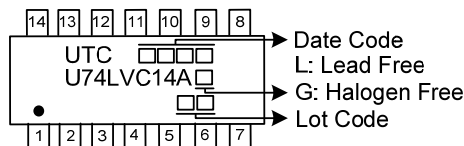
ORDERING INFORMATION

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

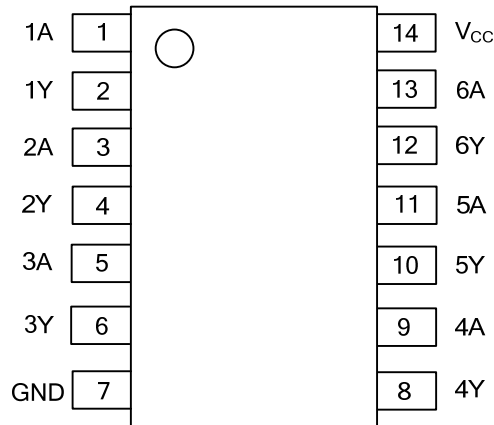


<p>U74LVC14AG-S14-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) S14:SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ PIN CONFIGURATION

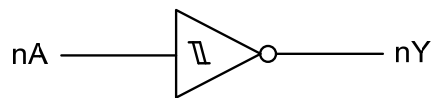


■ FUNCTION TABLE (Each Inverter)

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

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

■ LOGIC DIAGRAM (Each Inverter)



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	P_D	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	θ_{JA}	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
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
Ambient Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	TA=25°C			TA=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-Going Threshold	V _{T+}	V _{CC} =1.65V	0.4		1.3	0.4		1.3	V
		V _{CC} =1.95V	0.6		1.5	0.6		1.5	V
		V _{CC} =2.3V	0.8		1.7	0.8		1.7	V
		V _{CC} =2.5V	0.8		1.7	0.8		1.7	V
		V _{CC} =2.7V	0.8		2	0.8		2	V
		V _{CC} =3V	0.9		2	0.9		2	V
		V _{CC} =3.6V	1.1		2	1.1		2	V
Negative-Going Threshold	V _{T-}	V _{CC} =1.65V	0.15		0.85	0.15		0.85	V
		V _{CC} =1.95V	0.25		0.95	0.25		0.95	V
		V _{CC} =2.3V	0.4		1.2	0.4		1.2	V
		V _{CC} =2.5V	0.4		1.2	0.4		1.2	V
		V _{CC} =2.7V	0.4		1.4	0.4		1.4	V
		V _{CC} =3V	0.6		1.5	0.6		1.5	V
		V _{CC} =3.6V	0.8		1.7	0.8		1.7	V
Hysteresis(V _{T+} - V _{T-})	ΔV _T	V _{CC} =1.65V	0.1		1.15	0.1		1.15	V
		V _{CC} =1.95V	0.15		1.25	0.15		1.25	V
		V _{CC} =2.3V	0.25		1.3	0.25		1.3	V
		V _{CC} =2.5V	0.25		1.3	0.25		1.3	V
		V _{CC} =2.7V	0.3		1.1	0.3		1.1	V
		V _{CC} =3V	0.3		1.2	0.3		1.2	V
		V _{CC} =3.6V	0.3		1.2	0.3		1.2	V
High-Level Output Voltage	V _{OH}	V _{CC} =1.65 ~ 3.6V, I _{OH} =-100μA	V _{CC} -0.2			V _{CC} -0.3			V
		V _{CC} =1.65V, I _{OH} =-4mA	1.29			1.05			V
		V _{CC} =2.3V, I _{OH} =-8mA	1.9			1.65			V
		V _{CC} =2.7V, I _{OH} =-12mA	2.2			2.05			V
		V _{CC} =3.0V, I _{OH} =-12mA	2.4			2.25			V
		V _{CC} =3V, I _{OH} =-24mA	2.3			2.0			V
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65 ~ 3.6V, I _{OL} =100μA			0.1			0.3	V
		V _{CC} =1.65V, I _{OL} =4mA			0.24			0.65	V
		V _{CC} =2.3V, I _{OL} =8mA			0.3			0.8	V
		V _{CC} =2.7V, I _{OL} =12mA			0.4			0.6	V
		V _{CC} =3.0V, I _{OL} =24mA			0.55			0.8	V
Input Leakage Current	I _{I(LEAK)}	V _{IN} =5.5V or GND, V _{CC} =3.6V			±1			±20	μA
Quiescent Supply Current	I _Q	V _{IN} = V _{CC} or GND, I _{OUT} =0, V _{CC} =3.6V			1			40	μA
Additional Quiescent Supply Current Per Input Pin	ΔI _Q	V _{CC} =2.7 ~ 3.6V, I _{OUT} =0 One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			500			5000	μA

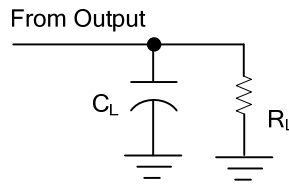
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS			TA=25°C			TA=-40~+125°C			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (nA) to Output (nY)	t _{PLH} / t _{PHL}	V _{CC} =1.8 ±0.15V	R _L =1KΩ	C _L =30pF	1.0	8	14			16	ns
		V _{CC} =2.5 ±0.2V	R _L =500Ω		1.0	6	10			12	ns
		V _{CC} =2.7 V	R _L =500Ω	C _L =50pF	1.0	6	10			12	ns
		V _{CC} =3.3 ±0.3V	R _L =500Ω		1.0	5	9			11	ns

■ OPERATING CHARACTERISTICS (TA=25°C, unless otherwise specified)

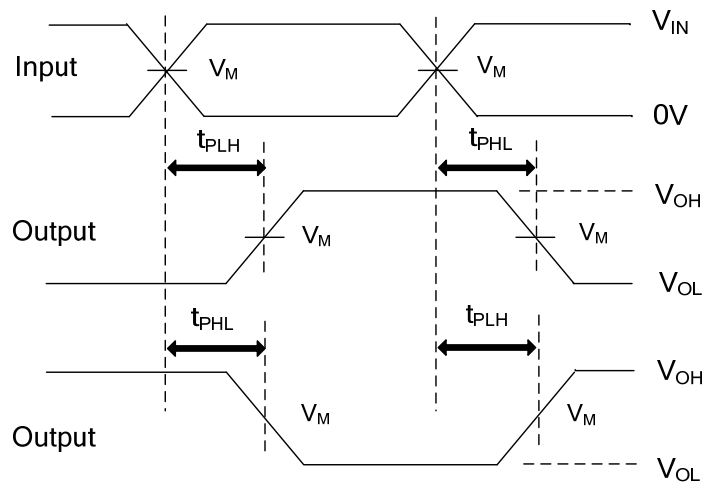
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}	V _{IN} = V _{CC} or GND		5		pF
Power Dissipation Capacitance Per Inverter	C _{PD}	f=10MHz	V _{CC} =1.8V		11	pF
			V _{CC} =2.5V		12	pF
			V _{CC} =3.3V		15	pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V _{CC}	INPUTS		V _M	C _L	R _L
	V _{IN}	t _R , t _F			
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	30pF	1KΩ
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	30pF	500Ω
2.7V	2.7V	≤2.5ns	1.5V	50pF	500Ω
3.3V±0.3V	2.7V	≤2.5ns	1.5V	50pF	500Ω



PROPAGATION DELAY TIMES

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Z_o = 50Ω.

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