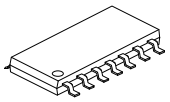
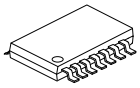
U74LVC14A

CMOS IC

HEX SCHMITT-TRIGGER INVERTERS



SOP-14



TSSOP-14

■ 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

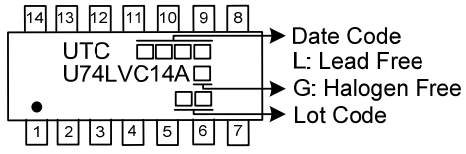
■ ORDERING INFORMATION

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

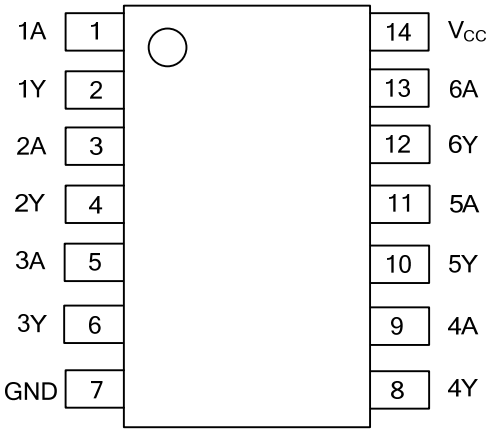
U74LVC14AG-S14-R
(1)Packing Type
(2)Package Type
(3)Green Package

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

■ MARKING



■ PIN CONFIGURATION

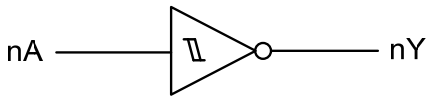


■ FUNCTION TABLE (Each Inverter)

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

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

■ LOGIC DIAGRAM (Each Inverter)



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°C to +125°C)	TSSOP-14	P_D	500	mW
	SOP-14		600	mW
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	TSSOP-14	θ_{JA}	113	°C /W
	SOP-14		76	°C /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}=1.65V			-4	mA
		V_{CC}=2.3V			-8	mA
		V_{CC}=2.7V			-12	mA
		V_{CC}=3V			-24	mA
Low-level Output Current	I_{OL}	V_{CC}=1.65V			4	mA
		V_{CC}=2.3V			8	mA
		V_{CC}=2.7V			12	mA
		V_{CC}=3V			24	mA
Ambient Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	TA=25°C			T_A=--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

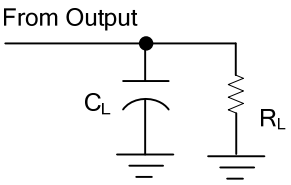
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS			TA=25°C			T_A=--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 (T_A=25°C, unless otherwise specified)

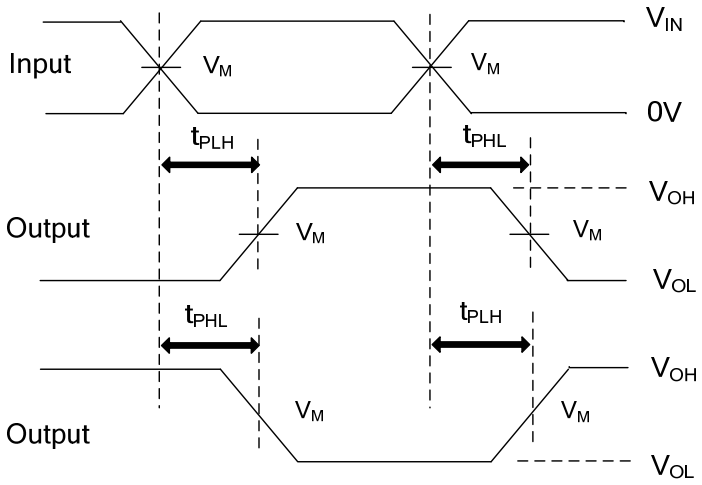
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	V_{IN}= V_{CC} or GND			5		pF
Power Dissipation Capacitance Per Inverter	C_{PD}	f=10MH_Z	V_{CC}=1.8V		11		pF
			V_{CC}=2.5V		12		pF
			V_{CC}=3.3V		15		pF

■ 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, Zo = 50Ω.

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