



## U74LVC04A

CMOS IC

### HEX INVERTERS

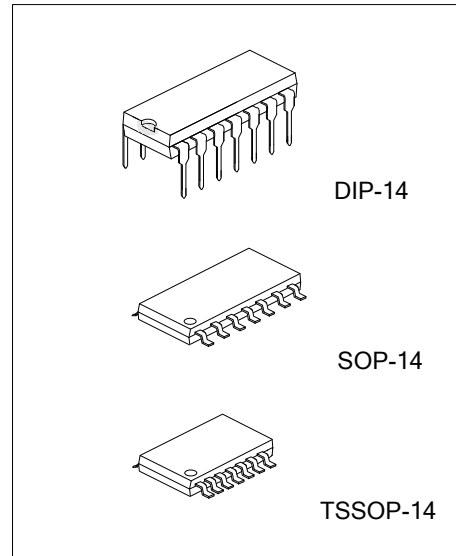
#### DESCRIPTION

The UTC **U74LVC04A** consists of six independent inverters, it provides the function  $Y = \bar{A}$ .

Inputs can be driven from either 3.3V or 5V devices, so the device can be used in a mix 3.3V/5V system.

#### FEATURES

- \* Operation Voltage Range: 1.65~3.6V
- \* Low Power Dissipation
- \* Input accept voltage to 5.5V

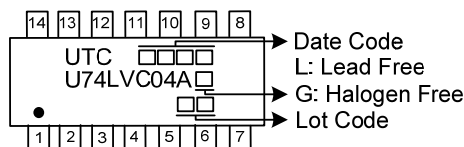


#### ORDERING INFORMATION

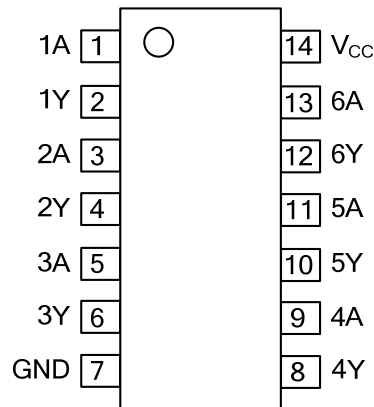
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC04AL-D14-T	U74LVC04AG-D14-T	DIP-14	Tube
U74LVC04AL-S14-R	U74LVC04AG-S14-R	SOP-14	Tape Reel
U74LVC04AL-P14-R	U74LVC04AG-P14-R	TSSOP-14	Tape Reel

<p>U74LVC04AG-D14-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) P14: TSSOP-14, S14: SOP-14, D14: DIP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



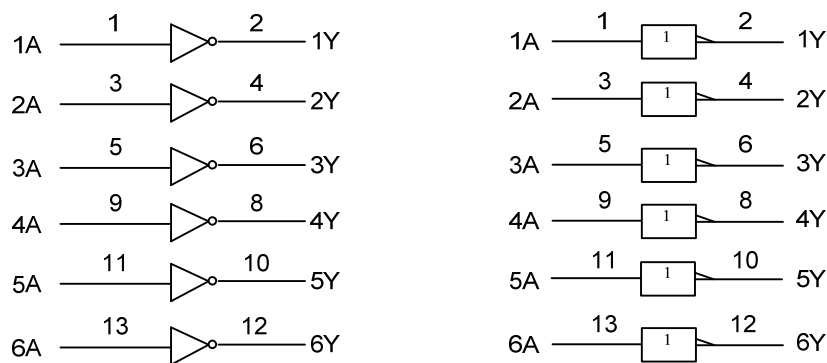
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	H
H	L

■ LOGIC DIAGRAM (positive logic)



IEC logic symbol

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■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.5 ~ 6.5	V
Input Voltage	V <sub>IN</sub>	-0.5 ~ 6.5	V
Output Voltage(active mode)	V <sub>OUT</sub>	-0.5 ~ V <sub>CC</sub> +0.5	V
Input Clamp Current(V <sub>IN</sub> <0)	I <sub>IK</sub>	-50	mA
Output Clamp Current(V <sub>OUT</sub> <0)	I <sub>OK</sub>	-50	mA
Output Current	I <sub>OUT</sub>	±50	mA
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±100	mA
Power Dissipation	P <sub>D</sub>	500	mW
Derated Above 60°C		5.5	mW/°C
Storage Temperature	T <sub>STG</sub>	-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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>	Operating	1.65		3.6	V
		Data retention only	1.5			V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Operating Temperature	T <sub>A</sub>		-40		+125	°C

■ STATIC CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> = 1.65V~1.95V	0.65 × V <sub>CC</sub>			V
		V <sub>CC</sub> =2.3V~2.7V	1.7			V
		V <sub>CC</sub> = 2.7V~3.6V	2			V
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> = 1.65V~1.95V			0.35 × V <sub>CC</sub>	V
		V <sub>CC</sub> =2.3V~2.7V			0.7	V
		V <sub>CC</sub> = 2.7V~3.6V			0.8	V
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> = 1.65V~3.6V, I <sub>OH</sub> =-100μA	V <sub>CC</sub> -0.2			V
		V <sub>CC</sub> = 1.65V, I <sub>OH</sub> =-4mA	1.29			V
		V <sub>CC</sub> = 2.3V, I <sub>OH</sub> =-8mA	1.9			V
		V <sub>CC</sub> = 2.7V, I <sub>OH</sub> =-12mA	2.2			V
		V <sub>CC</sub> = 3V, I <sub>OH</sub> =-12mA	2.4			V
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> = 1.65V~3.6V, I <sub>OL</sub> =100μA			0.1	V
		V <sub>CC</sub> = 1.65V, I <sub>OL</sub> =4mA			0.24	V
		V <sub>CC</sub> = 2.3V, I <sub>OL</sub> =8mA			0.3	V
		V <sub>CC</sub> = 2.7V, I <sub>OL</sub> =12mA			0.4	V
		V <sub>CC</sub> = 3V, I <sub>OL</sub> =24mA			0.55	V
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> = 3.6V, V <sub>IN</sub> =5.5V or GND			±1	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> = 3.6V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			1	μA
Additional quiescent Supply Current	Δ I <sub>Q</sub>	V <sub>CC</sub> = 2.7V ~ 3.6V One input at V <sub>CC</sub> -0.6V, other inputs at V <sub>CC</sub> or GND			500	μA
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> = 3.3V, V <sub>IN</sub> =V <sub>CC</sub> or GND		5		pF

■ DYNAMIC CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

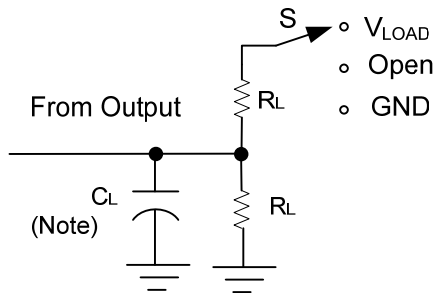
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output(Y)	t <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =1.8V±0.15V	1	4.1	7.5	ns
		V <sub>CC</sub> =2.5V±0.2V	1	3.6	7	ns
		V <sub>CC</sub> =2.7V	1	3	5.3	ns
		V <sub>CC</sub> =3.3V±0.3V	1	2.5	4.3	ns

■ OPERATING CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	V <sub>CC</sub> =1.8V, f=10MHz		6		pF
		V <sub>CC</sub> =2.5V, f=10MHz		7		pF
		V <sub>CC</sub> =3.3V, f=10MHz		8		pF

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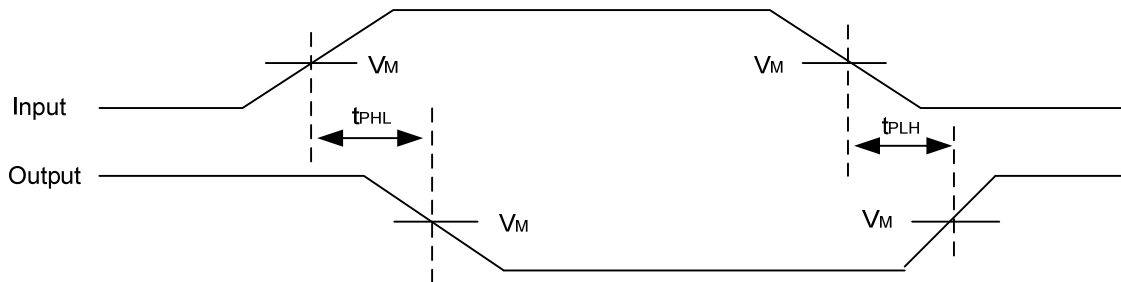
## ■ TEST CIRCUIT AND WAVEFORMS



TEST	S
t <sub>PLH</sub> /t <sub>PHL</sub>	Open
t <sub>PHZ</sub> /t <sub>PZH</sub>	GND
t <sub>PLZ</sub> /t <sub>PZL</sub>	V <sub>LOAD</sub>

Note: C<sub>L</sub> includes probe and jig capacitance.

V <sub>CC</sub>	V <sub>IN</sub>	t <sub>R</sub> /t <sub>F</sub>	V <sub>M</sub>	V <sub>LOAD</sub>	C <sub>L</sub>	R <sub>L</sub>	V <sub>Δ</sub>
1.8V±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	2×V <sub>CC</sub>	30pF	1KΩ	0.15V
2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	2×V <sub>CC</sub>	30pF	500Ω	0.15V
2.7V	2.7V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
3.3V±0.3V	2.7V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V



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