

**U74LVC1G14B**

Preliminary

CMOS IC

**SINGLE SCHMITT-TRIGGER
INVERTER****DESCRIPTION**

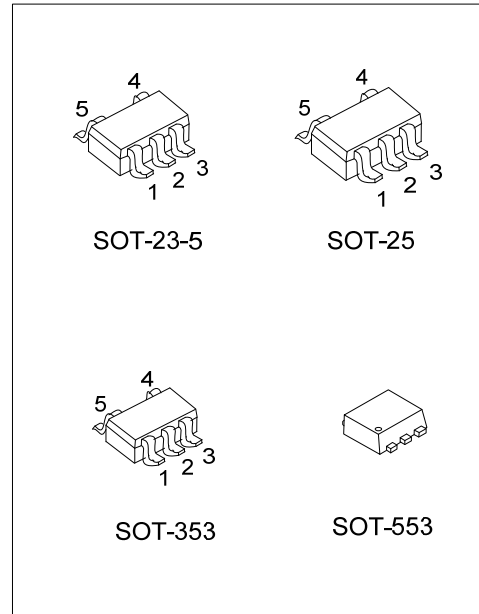
The UTC **U74LVC1G14B** is a single Schmitt-trigger inverter, it provides the function $Y = \overline{A}$.

The device have different input threshold levels for positive-going (V_{T+}) and negative-going (V_{T-}) signals because of the Schmitt-trigger action in the input.

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

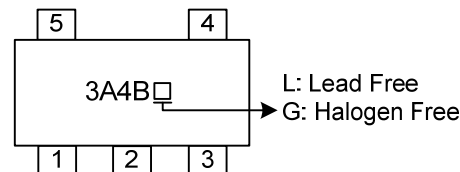
FEATURES

- * Operation Voltage Range: 1.65V ~ 5.5V
- * Low Power Current: $I_{CC}=10\mu A$ (Max.)
- * $\pm 24mA$ Output Drive ($V_{CC}=3.0V$)
- * Power Down Protection

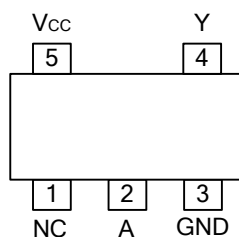
**ORDERING INFORMATION**

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G14BL-AE5-R	U74LVC1G14BG-AE5-R	SOT-23-5	Tape Reel
U74LVC1G14BL-AF5-R	U74LVC1G14BG-AF5-R	SOT-25	Tape Reel
U74LVC1G14BL-AL5-R	U74LVC1G14BG-AL5-R	SOT-353	Tape Reel
U74LVC1G14BL-AN5-R	U74LVC1G14BG-AN5-R	SOT-553	Tape Reel

U74LVC1G14BG-AE5-R	(1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 AN5: SOT-553 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

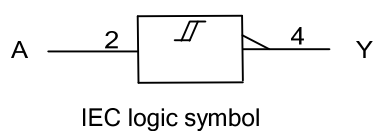
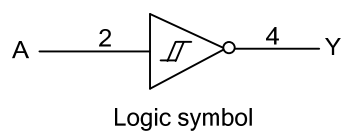
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	H
H	L

■ LOGIC DIAGRAM



■ **ABSOLUTE MAXIMUM RATING** (T_A=25°C, unless otherwise specified) (Note 2)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V _{CC}		-0.5 ~ 6.5	V
Input Voltage	V _{IN}		-0.5 ~ 6.5	V
Output Voltage	V _{OUT}	Output in the high or low state	-0.5 ~ V _{CC} +0.5	V
		Output in the power-off state	-0.5 ~ 6.5	V
Continuous V _{CC} or GND Current	I _{CC}		±100	mA
Continuous Output Current	I _{OUT}		±50	mA
Input Clamp Current	I _{IK}	V _{IN} <0	-50	mA
Output Clamp Current	I _{OK}	V _{OUT} <0	-50	mA
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	SOT-23-5	θ _{JA}	280	°C/W
	SOT-25		230	°C/W
	SOT-353		350	°C/W
	SOT-553		370	°C/W

■ **RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	V _{IN}		0		5.5	V
Output Voltage	V _{OUT}	High or low state	0		V _{CC}	V
Ambient Operating Temperature	T _A		-40		+125	°C

■ **ELECTRICAL CHARACTERISTICS**

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-Going Input Threshold Voltage	V _{T+}	V _{CC} =1.65V	0.79		1.16	0.76		1.16	V
		V _{CC} =2.3V	1.11		1.56	1.07		1.56	V
		V _{CC} =3.0V	1.5		1.87	1.47		1.87	V
		V _{CC} =4.5V	2.16		2.74	2.13		2.74	V
		V _{CC} =5.5V	2.61		3.33	2.58		3.33	V
Negative-Going Input Threshold Voltage	V _{T-}	V _{CC} =1.65V	0.39		0.62	0.39		0.65	V
		V _{CC} =2.3V	0.58		0.87	0.58		0.9	V
		V _{CC} =3.0V	0.84		1.14	0.84		1.17	V
		V _{CC} =4.5V	1.41		1.79	1.41		1.82	V
		V _{CC} =5.5V	1.87		2.29	1.87		2.31	V
Hysteresis Voltage (V _{T+} -V _{T-})	ΔV _T	V _{CC} =1.65V	0.37		0.62	0.3		0.62	V
		V _{CC} =2.3V	0.48		0.77	0.42		0.77	V
		V _{CC} =3.0V	0.56		0.87	0.5		0.87	V
		V _{CC} =4.5V	0.71		1.04	0.65		1.04	V
		V _{CC} =5.5V	0.71		1.11	0.65		1.11	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Output Voltage	V _{OH}	V _{CC} = 1.65V ~ 5.5V, I _{OH} = -100μA	V _{CC} -0.1			V _{CC} -0.1			V
		V _{CC} = 1.65V, I _{OH} = -4mA	1.2	1.54		0.95			V
		V _{CC} = 2.3V, I _{OH} = -8mA	1.9	2.15		1.7			V
		V _{CC} = 2.7V, I _{OH} = -12mA	2.2	2.5		1.9			V
		V _{CC} = 3.0V, I _{OH} = -24mA	2.3	2.62		2			V
		V _{CC} = 4.5V, I _{OH} = -32mA	3.8	4.11		3.4			V
Low-Level Output Voltage	V _{OL}	V _{CC} = 1.65V ~ 5.5V, I _{OL} = 100μA			0.1			0.1	V
		V _{CC} = 1.65V, I _{OL} = 4mA		0.07	0.45			0.7	V
		V _{CC} = 2.3V, I _{OL} = 8mA		0.12	0.3			0.45	V
		V _{CC} = 2.7V, I _{OL} = 12mA		0.17	0.4			0.6	V
		V _{CC} = 3.0V, I _{OL} = 24mA		0.33	0.55			0.8	V
		V _{CC} = 4.5V, I _{OL} = 32mA		0.39	0.55			0.8	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} = 0V ~ 5.5V V _{IN} = V _{CC} or GND		±0.1	±5			±5	μA
Power OFF Leakage Current	I _{OFF}	V _{CC} = 0V, V _{IN} or V _{CC} = 5.5V		±0.1	±10			±10	μA
Quiescent Supply Current	I _Q	V _{CC} = 1.65V ~ 5.5V, V _{IN} = 5.5V or GND, I _{OUT} = 0		0.1	10			10	μA
Additional Quiescent Supply Current	ΔI _Q	V _{CC} = 2.3~5.5V, One input at V _{CC} -0.6V, other inputs at V _{CC} or GND		5	500			500	μA

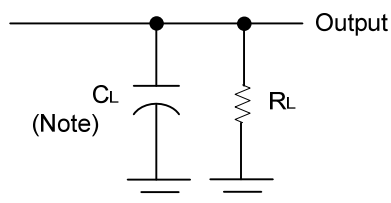
■ DYNAMIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A or B) to output(Y)	t _{PLH} / t _{PHL}	V _{CC} = 1.65~1.95V, C _L = 30pF, R _L = 1kΩ	1	7	13			15	ns
		V _{CC} = 2.3~2.7V, C _L = 30pF, R _L = 500Ω	0.7	4.5	9			11	ns
		V _{CC} = 2.7V, C _L = 50pF, R _L = 500Ω	0.7	4	8			10	ns
		V _{CC} = 3.0~3.6V, C _L = 50pF, R _L = 500Ω	0.7	3.5	7			9	ns
		V _{CC} = 4.5~5.5V, C _L = 50pF, R _L = 500Ω	0.7	3	6			8	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A=25°C, unless otherwise specified)

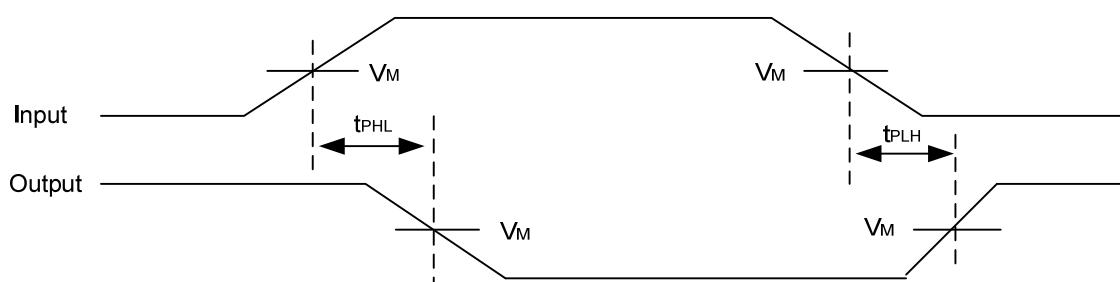
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}	V _{CC} = 3.3V, V _{IN} = V _{CC} or GND		5		pF
Power Dissipation Capacitance	C _{PD}	V _{CC} = 3.3V, V _{IN} = GND to V _{CC}		15.4		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R, t_F	V_M	C_L	R_L
1.65V~1.95V	V_{CC}	$\leq 2\text{ns}$	$\frac{V_{CC}}{2}$	30pF	1k Ω
2.3V~2.7V	V_{CC}	$\leq 2\text{ns}$	$\frac{V_{CC}}{2}$	30pF	500 Ω
2.7V	2.7V	$\leq 2.5\text{ns}$	1.5V	50pF	500 Ω
3.0V~3.6V	2.7V	$\leq 2.5\text{ns}$	1.5V	50pF	500 Ω
4.5V~5.5V	V_{CC}	$\leq 2.5\text{ns}$	$\frac{V_{CC}}{2}$	50pF	500 Ω



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