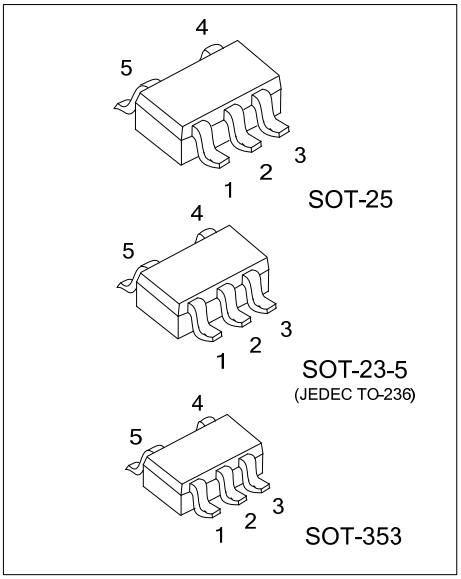
U74LVC1G14

CMOS IC

SINGLE SCHMITT-TRIGGER INVERTER



■ DESCRIPTION

The UTC **U74LVC1G14** 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

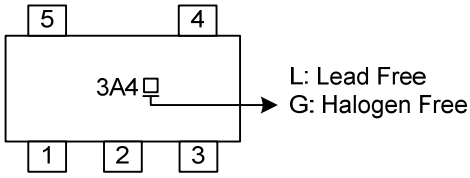
* Operation Voltage Range: 1.6V ~ 5.5V
* Low Power Current: I_{CC}=10μA (Max.)
* ±24mA Output Drive (V_{CC}=3.0V)
* Power Down Protection

■ ORDERING INFORMATION

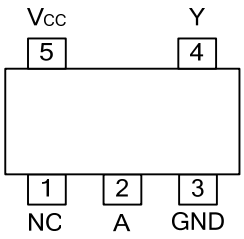
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G14L-AE5-R	U74LVC1G14G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G14L-AF5-R	U74LVC1G14G-AF5-R	SOT-25	Tape Reel
U74LVC1G14L-AL5-R	U74LVC1G14G-AL5-R	SOT-353	Tape Reel

U74LVC1G14G-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 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



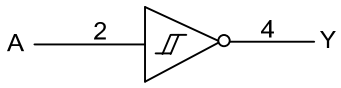
■ PIN CONFIGURATION



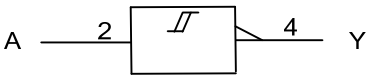
■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	H
H	L

■ LOGIC DIAGRAM



Logic symbol



IEC logic symbol

■ 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	
	SOT-353		350	

■ 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
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=1.8V±0.15V V_{CC}=2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V			10	ns/V
		V_{CC}=5V±0.5V			5	ns/V
Operating Temperature	T_A		-40		125	°C

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Input Threshold Voltage	V_{T+}	V_{CC}=1.65V	0.79		1.16	V
		V_{CC}=2.3V	1.11		1.56	V
		V_{CC}=3.0V	1.5		1.87	V
		V_{CC}=4.5V	2.16		2.74	V
		V_{CC}=5.5V	2.61		3.33	V
Negative-Going Input Threshold Voltage	V_{T-}	V_{CC}=1.65V	0.39		0.62	V
		V_{CC}=2.3V	0.58		0.87	V
		V_{CC}=3.0V	0.84		1.14	V
		V_{CC}=4.5V	1.41		1.79	V
		V_{CC}=5.5V	1.87		2.29	V
Hysteresis Voltage (V_{T+}-V_{T-})	$\triangle V_T$	V_{CC}=1.65V	0.37		0.62	V
		V_{CC}=2.3V	0.48		0.77	V
		V_{CC}=3.0V	0.56		0.87	V
		V_{CC}=4.5V	0.71		1.04	V
		V_{CC}=5.5V	0.71		1.11	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	V_{CC} =1.65V ~ 5.5V, I_{OH}=-100μA		V_{CC}-0.1			V
		V_{CC} =1.65V, I_{OH}=-4mA		1.2	1.54		V
		V_{CC} =2.3V, I_{OH}=-8mA		1.9	2.15		V
		V_{CC} =3.0V	I_{OH}=-12mA	2.2	2.50		V
			I_{OH}=-24mA	2.3	2.62		V
		V_{CC} =4.5V, I_{OH}=-32mA		3.8	4.11		V
Low-Level Output Voltage	V_{OL}	V_{CC} =1.65V ~ 5.5V, I_{OL}=100μA				0.1	V
		V_{CC} =1.65V, I_{OL}=4mA			0.07	0.45	V
		V_{CC} =2.3V, I_{OL}=8mA			0.12	0.3	V
		V_{CC} =3.0V	I_{OL}=-12mA		0.17	0.4	V
			I_{OL}=-24mA		0.33	0.55	V
		V_{CC} =4.5V, I_{OL}=32mA			0.39	0.55	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC} =0V ~ 5.5V, V_{IN}=V_{CC} or GND			±0.1	±5	μA
Power OFF Leakage Current	I_{OFF}	V_{CC} =0V, V_{IN} or V_{CC}=5.5V			±0.1	±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	μA
Additional Quiescent Supply Current	$\triangle I_Q$	V_{CC}=2.3~5.5V, One input at V_{CC}-0.6V, other inputs at V_{CC} or GND			5	500	μA
Input Capacitance	C_{IN}	V_{CC} =3.3V, V_{IN}=V_{CC} or GND			5		pF

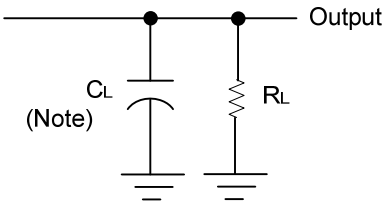
■ DYNAMIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
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	1.0	4.1	11	ns
		V_{CC}=2.3~2.7V, C_L=30pF, R_L=500Ω	0.7	2.8	6.5	ns
		V_{CC}=2.7V, C_L=50pF, R_L=500Ω	0.7	3.2	6.5	ns
		V_{CC}=3.0~3.6V, C_L=50pF, R_L=500Ω	0.7	3.0	5.5	ns
		V_{CC}=4.5~5.5V, C_L=50pF, R_L=500Ω	0.7	2.2	5.0	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
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}	≤2ns	$\frac{V_{CC}}{2}$	30pF	1kΩ
2.3V~2.7V	V_{CC}	≤2ns	$\frac{V_{CC}}{2}$	30pF	500Ω
2.7V	2.7V	≤2.5ns	1.5V	50pF	500Ω
3.0V~3.6V	2.7V	≤2.5ns	1.5V	50pF	500Ω
4.5V~5.5V	V_{CC}	≤2.5ns	$\frac{V_{CC}}{2}$	50pF	500Ω