



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

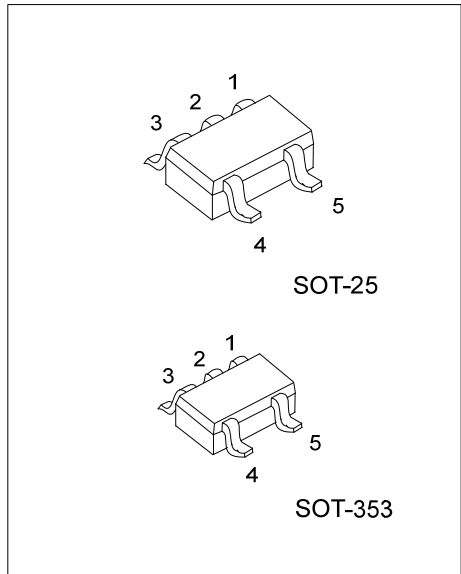
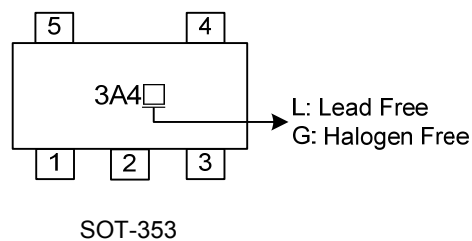
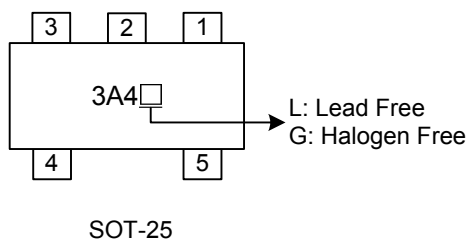
- * Operation Voltage Range: 1.65V~5.5V
- * Low Power Dissipation: $I_{CC}=10\mu A(\text{Max})$
- * 24mA output drive ($V_{CC}=3.0V$)
- * High Noise Immunity
- * Power Down Protection

ORDERING INFORMATION

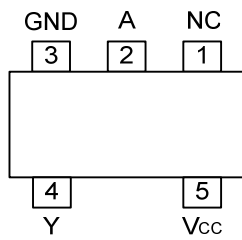
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G14L-AF5-R	U74LVC1G14G-AF5-R	SOT-25	Tape Reel
U74LVC1G14L-AL5-R	U74LVC1G14G-AL5-R	SOT-353	Tape Reel

<p>U74LVC1G14L-AF5-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Plating</p>	<p>(1) R: Tape Reel (2) AF5: SOT-25, AL5: SOT-353 (3) G: Halogen 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)



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~+6.5	V
Input Voltage	V_{IN}	-0.5~+6.5	V
Output Voltage(active mode)	V_{OUT}	-0.5~ V_{CC} +0.5	V
Output Voltage(power-down mode)	V_{OUT}	-0.5~+6.5	V
Input Clamp Current($V_{IN}<0$)	I_{IK}	-50	mA
Output Clamp Current($V_{OUT}<0$)	I_{OK}	±50	mA
Output Current	I_{OUT}	±50	mA
V_{CC} or GND Current	I_{CC}	±100	mA
Storage Temperature	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-25	206	°C/W
	SOT-353	142	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	1.65		5.5	V
Input Voltage	V_{IN}	0		5.5	V
Output Voltage	V_{OUT}	0		V_{CC}	V
Operating Temperature	T_A	-40		+85	°C

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-Going Input Threshold Voltage	V_{T+}	$V_{CC}=1.8V$	0.82	1	1.14	V
		$V_{CC}=2.3V$	1.03	1.2	1.40	V
		$V_{CC}=3.0V$	1.29	1.5	1.71	V
		$V_{CC}=4.5V$	1.84	2.1	2.36	V
		$V_{CC}=5.5V$	2.19	2.5	2.79	V
Negative-Going Input Threshold Voltage	V_{T-}	$V_{CC}=1.8V$	0.46	0.6	0.75	V
		$V_{CC}=2.3V$	0.65	0.8	0.96	V
		$V_{CC}=3.0V$	0.88	1	1.24	V
		$V_{CC}=4.5V$	1.32	1.5	1.84	V
		$V_{CC}=5.5V$	1.58	1.8	2.24	V
Hysteresis Voltage ($V_{T+}-V_{T-}$)	ΔV_T	$V_{CC}=1.8V$	0.26	0.4	0.51	V
		$V_{CC}=2.3V$	0.28	0.4	0.57	V
		$V_{CC}=3.0V$	0.31	0.5	0.64	V
		$V_{CC}=4.5V$	0.40	0.6	0.77	V
		$V_{CC}=5.5V$	0.47	0.6	0.88	V
High-Level Output Voltage	V_{OH}	$V_{CC}=1.65V \sim 5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			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
		$V_{CC}=2.7V, I_{OH}=-12mA$	2.2	2.50		V
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3	2.62		V
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8	4.11		V

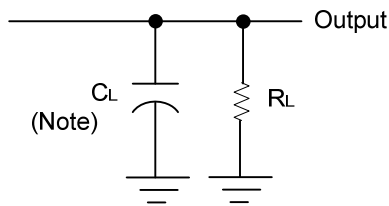
■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Low-Level Output Voltage	V_{OL}	$V_{CC}=1.65V \sim 4.5V, I_{OL}=100 \mu A$			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
		$V_{CC}=2.7V, I_{OL}=12mA$		0.17	0.4	V
		$V_{CC}=3.0V, I_{OL}=24mA$		0.33	0.55	V
		$V_{CC}=4.5V, I_{OL}=32mA$		0.39	0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V \sim 5.5V, V_{IN}=V_{CC}$ 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	$V_{CC}=1.65V \sim 5.5V, V_{IN}=5.5V$ or GND $I_{OUT}=0$		0.1	10	μA
Additional Quiescent Supply Current	ΔI_Q	$V_{CC}=2.3V \sim 5.5V$, 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

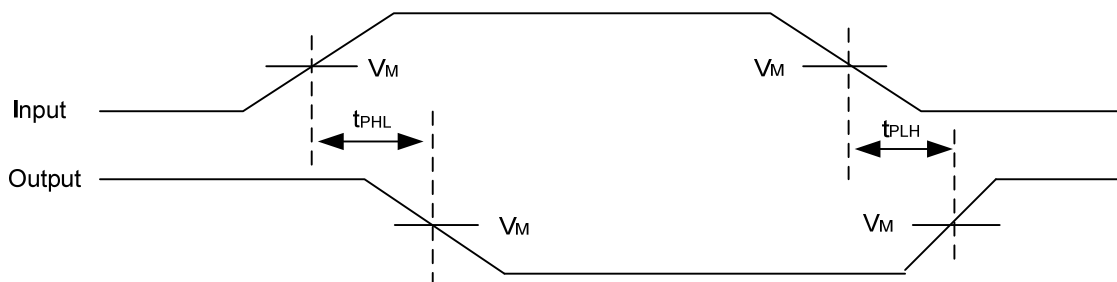
PARAMETER	SYMBOL	$V_{CC}(V)$	C_L	R_L	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t_{PLH}/t_{PHL}	1.65~1.95	30pF	1k Ω	1.0	4.1	11	ns
		2.3~2.7	30pF	500 Ω	0.7	2.8	6.5	ns
		2.7	50pF	500 Ω	0.7	3.2	6.5	ns
		3.0~3.6	50pF	500 Ω	0.7	3.0	5.5	ns
		4.5~5.5	50pF	500 Ω	0.7	2.2	5.0	ns
Operating Characteristics								
Power Dissipation Capacitance	Cpd	3.3	$V_{IN}=GND$ 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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