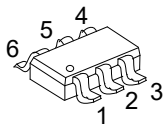
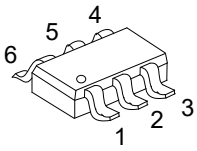
U74LVC2G14B

CMOS IC

DUAL SCHMITT-TRIGGER INVERTER WITH 5V TOLERANT INPUT



SOT-363



SOT-26

■ DESCRIPTION

The UTC **U74LVC2G14B** is a high-performance, low-power, low-voltage, Si-gate CMOS device which provides two inverters with Schmitt trigger action. It is capable of transforming slowly changed input signals into sharply defined, jitter-free output signals.

■ FEATURES

* Operate From 1.65V to 5.5V
* 5V Tolerant Input/Output for Interfacing with 5V logic
*±24mA Output Drive (V_{CC} =3.3V)
* CMOS Low-Power Consumption and High Noise Immunity

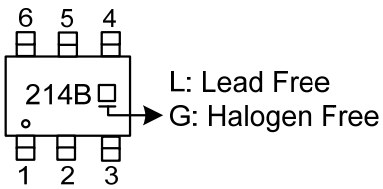
■ ORDERING INFORMATION

Ordering Number		Package	Packing
U74LVC2G14BL-AL6-R	U74LVC2G14BG-AL6-R	SOT-363	Tape Reel
U74LVC2G14BL-AG6-R	U74LVC2G14BG-AG6-R	SOT-26	Tape Reel

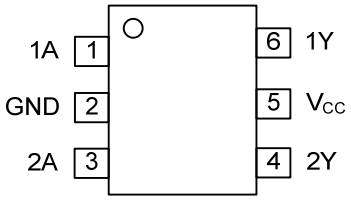
U74LVC2G14BG-AL6-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AL6: SOT-363, AG6: SOT-26
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

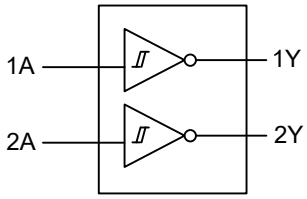


■ FUNCTION TABLE

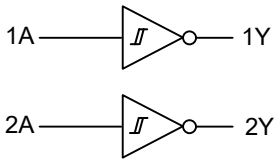
INPUT(A)	OUTPUT(Y)
L	H
H	L

H=High level
L=Low Level

■ LOGIC SYMBOL



■ FUNCTIONAL DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	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}	High-impedance	-0.5 ~ 6.5	V
		Power-off state		
		High state	-0.5 ~ V_{CC}+0.5	V
		Low state		
V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_O		±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0	-50	mA
Electrostatic Discharge	$V_{(ESD)}$	Human-Body Model(HBM) Per JESD22-A114/115	2000	V
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-363	θ_{JA}	350	°C/W
	SOT-26		230	°C/W

■ RECOMMENDED OPERATING CONDITIONS (Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		1.65		5.5	V
Control Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
High Level Output Current	I_{OH}	V_{CC} =1.65V			-4	mA
		V_{CC} =2.3V			-8	mA
		V_{CC} =3V			-16	mA
		V_{CC} =3V			-24	mA
		V_{CC} =4.5V			-32	mA
Low Level Output Current	I_{OL}	V_{CC} =1.65V			4	mA
		V_{CC} =2.3V			8	mA
		V_{CC} =3V			16	mA
		V_{CC} =3V			24	mA
		V_{CC} =4.5V			32	mA
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

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	0.7		1.5	0.7		1.7	V
		V_{CC}=2.3V	1.0		1.8	1.0		2.0	V
		V_{CC}=3V	1.3		2.2	1.3		2.4	V
		V_{CC}=4.5V	1.9		3.1	1.9		3.3	V
		V_{CC}=5.5V	2.2		3.7	2.2		3.8	V
Negative-Going Input Threshold Voltage	V_{T-}	V_{CC}=1.65V	0.25		0.9	0.25		1.1	V
		V_{CC}=2.3V	0.4		1.15	0.4		1.35	V
		V_{CC}=3V	0.6		1.5	0.6		1.7	V
		V_{CC}=4.5V	1.0		2.0	1.0		2.2	V
		V_{CC}=5.5V	1.2		2.5	1.2		2.5	V
Hysteresis Voltage (V_{T+} - V_{T-})	ΔV_T	V_{CC}=1.65V	0.15		1.0	0.15		1.2	V
		V_{CC}=2.3V	0.25		1.1	0.25		1.3	V
		V_{CC}=3V	0.4		1.2	0.4		1.4	V
		V_{CC}=4.5V	0.6		1.5	0.6		1.7	V
		V_{CC}=5.5V	0.7		1.7	0.7		1.9	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V~5.5V, I_{OH}=-100uA	V_{CC} -0.1			V_{CC} -0.1			V
		V_{CC}=1.65V, I_{OH}=-4mA	1.2			0.95			V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9			1.7			V
		V_{CC}=3V, I_{OH}=-16mA	2.2			1.9			V
		V_{CC}=3V, I_{OH}=-24mA	2.3			2.0			V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8			3.4			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65V~5.5V, I_{OL}=100uA			0.1			0.1	V
		V_{CC}=1.65V, I_{OL}=4mA			0.45			0.7	V
		V_{CC}=2.3V, I_{OL}=8mA			0.3			0.45	V
		V_{CC}=3V, I_{OL}=16mA			0.4			0.6	V
		V_{CC}=3V, I_{OL}=24mA			0.55			0.8	V
		V_{CC}=4.5V, I_{OL}=32mA			0.55			0.8	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0V to 5.5V, V_{IN}=0 or 5.5V			±5			±5	μA
Power OFF Leakage Current	I_{OFF}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V,			±10			±10	μA
Quiescent Supply Current	I_Q	V_{CC}=1.65V to 5.5V, I_{OUT}=0 V_{IN}=5.5V or GND			10			10	μA
Additional Quiescent Supply Current Per Pin	ΔI_Q	V_{CC}=3V to 5.5V One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND, I_{OUT} =0			500			500	μA

■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

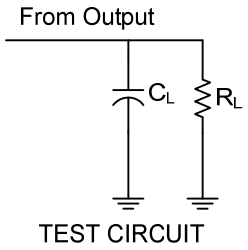
(see TEST CIRCUIT AND WAVEFORMS)

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 (nA) to Output (nY)	t_{PLH} / t_{PHL}	V_{CC} =1.8V±0.15V, V_{IN}=V_{CC} C_L=30pF, R_L=1KΩ	1		13	1		15	ns
		V_{CC}=2.5V±0.2V, V_{IN}=V_{CC} C_L=30pF, R_L=500Ω	0.5		6.5	0.5		8.5	ns
		V_{CC} =3.3V±0.3V, V_{IN}=3V C_L=50pF, R_L=500Ω	0.5		6.1	0.5		8.1	ns
		V_{CC}=5V±0.5V, V_{IN}=V_{CC} C_L=50pF, R_L=500Ω	0.5		5	0.5		6	ns

■ OPERATING CHARACTERISTICS (Unless otherwise specified)

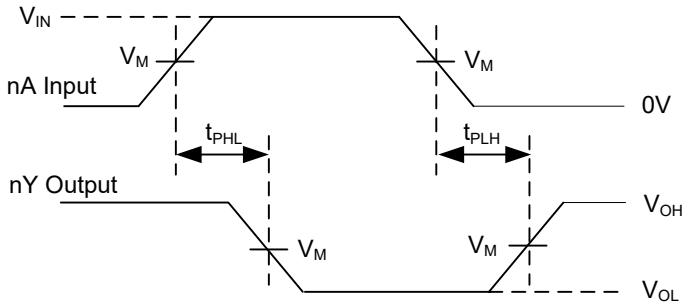
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	V_{CC}=3.3V, V_{IN} =V_{CC} or GND		4		pF
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V,f=10MHz		16		pF
		V_{CC}=2.5V,f=10MHz		17		pF
		V_{CC}=3.3V,f=10MHz		18		pF
		V_{CC}=5V,f=10MHz		21		pF

■ TEST CIRCUITS 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
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	50pF	500Ω



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics:
P_{RR} ≤ 1MHz, Z_O = 50Ω: t_R ≤ 2ns, t_F ≤ 2ns (V_{CC}=1.8V±0.15V and V_{CC}=2.5V±0.2V)
t_R ≤ 2.5ns, t_F ≤ 2.5ns (V_{CC} =3.3V±0.3V and V_{CC}=5V±0.5V)