



U74AHC3G14

CMOS IC

INVERTING SCHMITT TRIGGER

DESCRIPTION

The **U74AHC3G14** is a high-speed inverting Schmitt trigger.

The **U74AHC3G14** provides three inverting buffers with the action of Schmitt trigger. The trigger is capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

FEATURES

- * Low power supply 1.0 μ A at 5.5V
- * Wide supply voltage range from 2V to 5.5V
- * Up to 5.5V inputs accept voltages
- * Max t_{PD} of 8.6 ns at V_{CC} = 4.5 to 5.5V, C_L = 15pF
- * Symmetrical output impedance
- * High noise immunity
- * Balanced propagation delays

APPLICATION

- * Astable multivibrators
- * Monostable multivibrators
- * Wave and pulse shapers

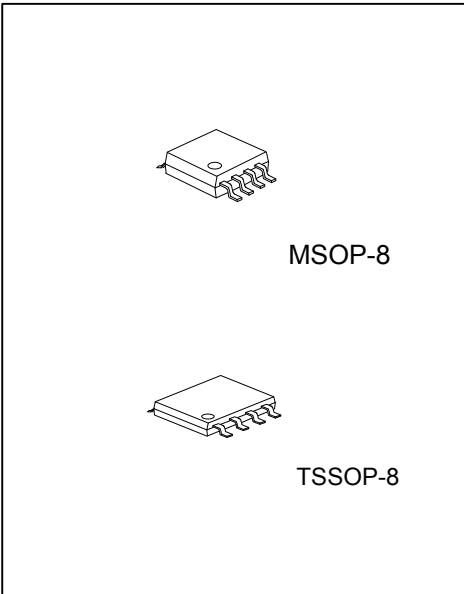
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC3G14L-P08-R	U74AHC3G14G-P08-R	TSSOP-8	Tape Reel
U74AHC3G14L-SM1-R	U74AHC3G14G-SM1-R	MSOP-8	Tape Reel

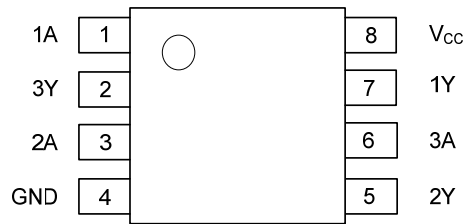
<p>U74AHC3G14G-P08-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) P08: TSSOP-8, SM1: MSOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

MSOP-8	TSSOP-8
<p>8 7 6 5 → Date Code UTC AHC3G14 L: Lead Free G: Halogen Free 1 2 3 4 → Lot Code</p>	<p>8 7 6 5 → Date Code 1 2 3 4 → UTC AHC3G14 L: Lead Free G: Halogen Free 1 2 3 4 → Lot Code</p>



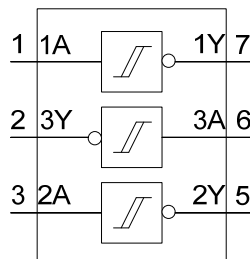
■ PIN CONFIGURATION



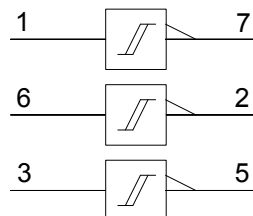
■ FUNCTION TABLE

INPUT	OUTPUT
nA	nY
L	H
H	L

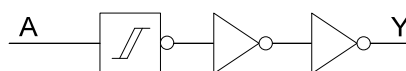
■ LOGIC SYMBOL



■ IEC LOGIC SYMBOL



■ LOGIC DIAGRAM (one driver)



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5~7.0	V
Input Voltage		V_{IN}	-0.5~7.0	V
Output Voltage		V_{OUT}	-0.5 ~ $V_{CC} + 0.5$	V
Input Diode Current ($V_I < -0.5V$)		I_{IK}	-20	mA
Output Diode Current ($V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$)		I_{OK}	± 20	mA
Output source or sink current ($-0.5V < V_O < V_{CC} + 0.5V$)		I_{OUT}	± 25	mA
V_{CC} or GND Current		I_{CC}	± 75	mA
Power Dissipation	TSSOP-8	P_D	350	mW
	MSOP-8		300	mW
Storage Temperature		T_{STG}	-65 ~ +150	$^{\circ}C$

Note: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 2. 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	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CC}	2.0	5.0	5.5	V
Input Voltage		V_{IN}	0		5.5	V
Output Voltage		V_{OUT}	0		V_{CC}	V
Operating Temperature		T_A	-40		+125	$^{\circ}C$

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^{\circ}C$			$T_A=-40\sim+125^{\circ}C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Output Voltage	V_{OH}	$V_{CC}=2.0V$	1.9	2.0		1.9			V
		$V_{CC}=3.0V$							
		$V_{CC}=4.5V$							
		$V_{CC}=3.0V, I_{OH}=-4.0mA$	2.58			2.4			
		$V_{CC}=4.5V, I_{OH}=-8.0mA$	3.94			3.7			
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.0V$		0	0.1			0.1	V
		$V_{CC}=3.0V$							
		$V_{CC}=4.5V$							
		$V_{CC}=3.0V, I_{OL}=4.0mA$			0.36		0.55		
		$V_{CC}=4.5V, I_{OL}=8.0mA$			0.36		0.55		
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=V_{CC}$ or GND, $V_{CC}=5.5V$, $I_{OUT}=0A$			0.1			2.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			1.0			40	μA

■ TRANSFER CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^{\circ}C$			$T_A=-40\sim+125^{\circ}C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-Going Threshold	V_{T+}	$V_{CC}=3.0V$			2.2			2.2	V
		$V_{CC}=4.5V$			3.15			3.15	V
		$V_{CC}=5.5V$			3.85			3.85	V
Negative-Going Threshold	V_{T-}	$V_{CC}=3.0V$	0.9			0.9			V
		$V_{CC}=4.5V$	1.35			1.35			V
		$V_{CC}=5.5V$	1.65			1.65			V
Hysteresis ($V_{T+} - V_{T-}$)	ΔV_T	$V_{CC}=3.0V$	0.3		1.2	0.25		1.2	V
		$V_{CC}=4.5V$	0.4		1.4	0.35		1.4	V
		$V_{CC}=5.5V$	0.5		1.6	0.45		1.6	V

■ AC CHARACTERISTICS (GND = 0V, $t_R = t_F \leq 3.0$ ns, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay from Input (nA) to Output (nY)	t _{PLH} / t _{PHL} (t _{PD})	V _{CC} =3.3V, C _L =15pF		4.2		1		17	ns
		V _{CC} =3.3V, C _L =50pF		6.0		1		20.5	ns
		V _{CC} =3.0 to 3.6V, C _L =15pF			12.8	1		17	ns
		V _{CC} =3.0 to 3.6V, C _L =50pF			16.3	1		20.5	ns
		V _{CC} =5.0V, C _L =15pF		3.2		1		11.5	ns
		V _{CC} =5.0V, C _L =50pF		4.6		1		13.5	ns
		V _{CC} =4.5 to 5.5V, C _L =15pF			8.6	1		11.5	ns
		V _{CC} =4.5 to 5.5V, C _L =50pF			10.6	1		13.5	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}			3.5		pF
Power dissipation capacitance per gate	C _{PD}	C _L = 15 pF, f=10MHz (Note1, 2)		15		pF

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in Volts;

N = number of inputs switching;

$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

2. The condition is V_I = GND to V_{CC}.

■ WAVEFORMS

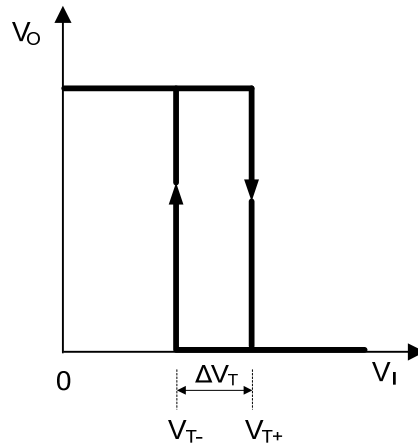


Fig.1 Transfer characteristic

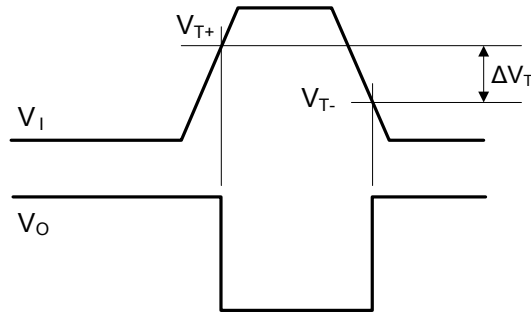
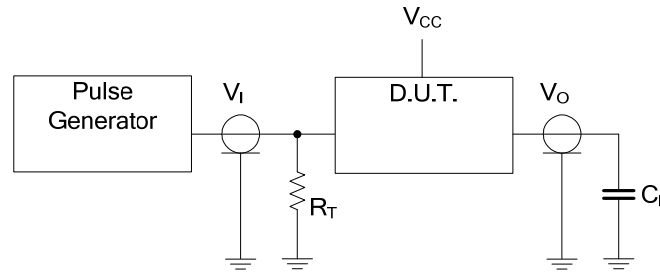


Fig.2 Definitions of V_{T+} , V_{T-} and V_H

■ TEST CIRCUIT AND WAVEFORMS

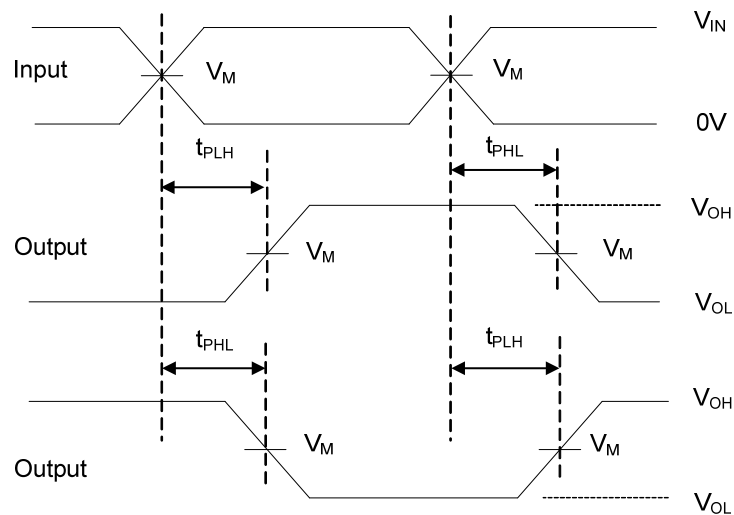


Definitions for test circuit:

C_L = Load capacitance including jig and probe capacitance.

R_T = Termination resistance should be equal to the output impedance Z_O of the pulse generator.

V_{CC}	Inputs		V_M	C_L
	V_{IN}	t_R, t_F		
3.3V	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	15pF
	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	50pF
3.0 to 3.6V	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	15pF
	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	50pF
5.0V	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	15pF
	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	50pF
4.5 to 5.5V	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	15pF
	GND to V_{CC}	$\leq 3ns$	$V_{CC}/2$	50pF



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