



## U74AHC3G17

CMOS IC

### NON-INVERTING SCHMITT TRIGGER

#### DESCRIPTION

The **U74AHC3G17** is a high-speed triple Schmitt-trigger buffer. It provides three Schmitt-trigger buffers with the function  $Y=A$ . The trigger is capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

#### FEATURES

- \* Low power supply 1.0µA at 5.5V
- \* Wide supply voltage range from 2V to 5.5V
- \* Up to 5.5V inputs accept voltages
- \* Symmetrical output impedance
- \* High noise immunity
- \* Balanced propagation delays

#### APPLICATION

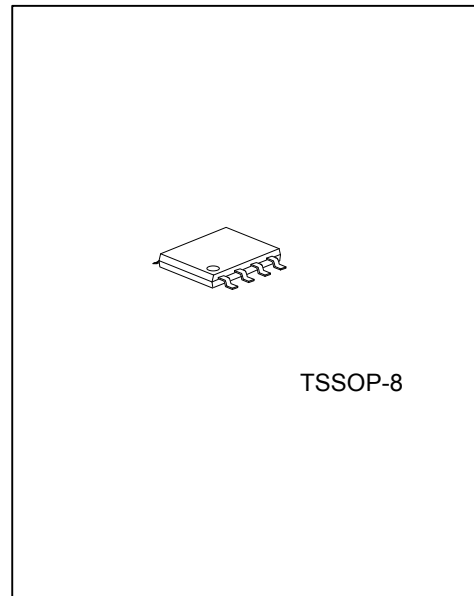
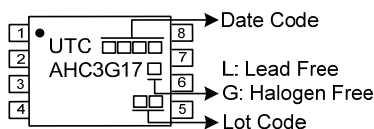
- \* Astable multivibrators
- \* Monostable multivibrators
- \* Wave and pulse shapers

#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC3G17L-P08-R	U74AHC3G17G-P08-R	TSSOP-8	Tape Reel

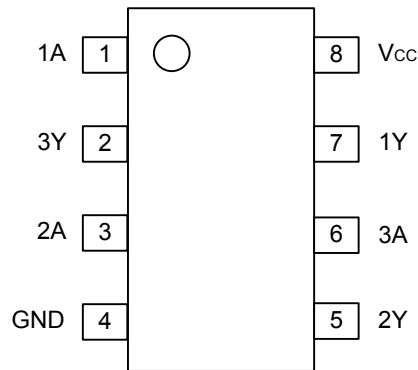
<p>U74AHC3G17G-P08-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P08: TSSOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



TSSOP-8

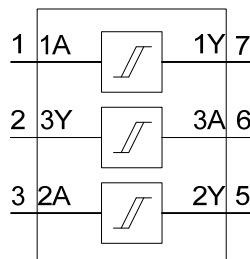
■ PIN CONFIGURATION



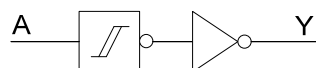
■ FUNCTION TABLE

INPUT	OUTPUT
nA	nY
L	L
H	H

■ 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~ $V_{CC}$	V
Input Diode Current ( $V_I < -0.5V$ )	$I_{IK}$	-20	mA
Output Diode Current ( $V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$ )	$I_{OK}$	$\pm 20$	mA
Output Source or Sink Current ( $-0.5V < V_O < V_{CC} + 0.5V$ )	$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 75$	mA
Power Dissipation	$P_D$	250	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	$V_I$	0		5.5	V
Output Voltage	$V_O$	0		$V_{CC}$	V
Operating Temperature	$T_A$	-40	+25	+125	$^{\circ}C$

■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$ , $I_O = -50\mu A$ , $V_{CC} = 2.0V$	1.9	2.0		V
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = -50\mu A$ , $V_{CC} = 3.0V$	2.9	3.0		
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = -50\mu A$ , $V_{CC} = 4.5V$	4.4	4.5		
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = -4.0mA$ , $V_{CC} = 3.0V$	2.58			
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = -8.0mA$ , $V_{CC} = 4.5V$	3.94			
Low-Level Output Voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$ , $I_O = 50\mu A$ , $V_{CC} = 2.0V$		0	0.1	V
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = 50\mu A$ , $V_{CC} = 3.0V$		0	0.1	
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = 50\mu A$ , $V_{CC} = 4.5V$		0	0.1	
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = 4.0mA$ , $V_{CC} = 3.0V$			0.36	
		$V_I = V_{IH}$ or $V_{IL}$ , $I_O = 8.0mA$ , $V_{CC} = 4.5V$			0.36	
Input Leakage Current	$I_{I(LEAK)}$	$V_I = V_{CC}$ or GND, $V_{CC} = 5.5V$ , $I_O = 0 A$			0.1	$\mu A$
Quiescent Supply Current	$I_{CC}$	$V_I = V_{CC}$ or GND, $I_O = 0 A$			1.0	$\mu A$
Input Capacitance	$C_{IN}$			1.5	10	pF

■ TRANSFER CHARACTERISTICS ( $T_A = 25^{\circ}C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-going Threshold	$V_{T+}$	$V_{CC} = 3.0V$			2.2	V
		$V_{CC} = 4.5V$			3.15	
		$V_{CC} = 5.5V$			3.85	
Negative-going Threshold	$V_{T-}$	$V_{CC} = 3.0V$	0.9			V
		$V_{CC} = 4.5V$	1.35			
		$V_{CC} = 5.5V$	1.65			
Hysteresis ( $V_{T+} - V_{T-}$ )	$V_H$	$V_{CC} = 3.0V$	0.3		1.2	V
		$V_{CC} = 4.5V$	0.4		1.4	
		$V_{CC} = 5.5V$	0.5		1.6	

■ AC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ ,  $\text{GND} = 0\text{V}$ ,  $t_R = t_F \leq 3.0 \text{ ns}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input (nA) to Output (nY)	$t_{PLH}/t_{PHL}$ ( $t_{PD}$ )	$V_{CC} = 3.0 \text{ to } 3.6\text{V}$ , $C_L = 15\text{pF}$		4.2	12.8	ns
		$V_{CC} = 3.0 \text{ to } 3.6\text{V}$ , $C_L = 50\text{pF}$		6.0	16.3	
		$V_{CC} = 4.5 \text{ to } 5.5\text{V}$ , $C_L = 15\text{pF}$		3.2	8.6	
		$V_{CC} = 4.5 \text{ to } 5.5\text{V}$ , $C_L = 50\text{pF}$		4.6	10.6	

■ OPERATING CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power Dissipation Capacitance Per Gate	$C_{PD}$	$C_L = 15\text{pF}$ , $f = 10\text{MHz}$ (Note 1, 2)	10	pF

Notes:

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

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

$f_i$  = 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  $V_I = \text{GND}$  to  $V_{CC}$ .

■ WAVEFORMS

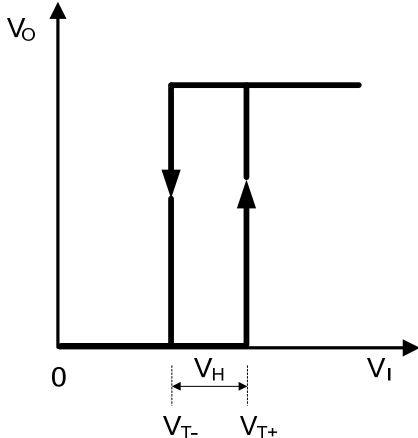


Fig.1 Transfer characteristic

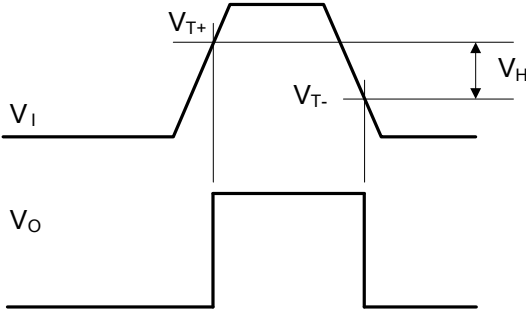
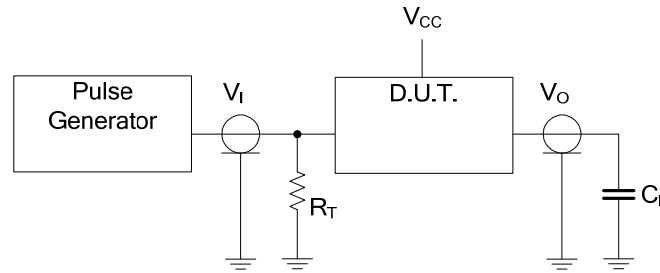


Fig.2 Definitions of  $V_{T+}$ ,  $V_{T-}$  and  $V_H$

## ■ TEST CIRCUIT AND WAVEFORMS

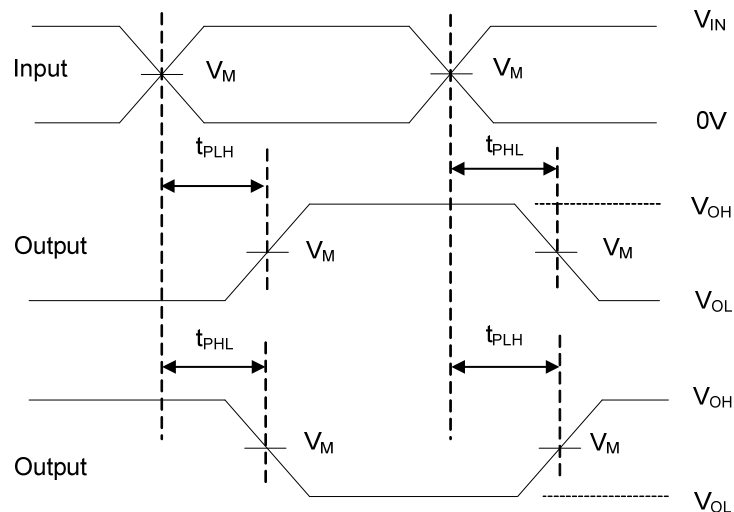


Definitions for test circuit:

$C_L$  = 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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