



# U74AHCT1G14

CMOS IC

## SINGLE SCHMITT-TRIGGER INVERTER

### DESCRIPTION

The **U74AHCT1G14** is a single schmitt-trigger inverter providing the function  $Y = \overline{A}$ .

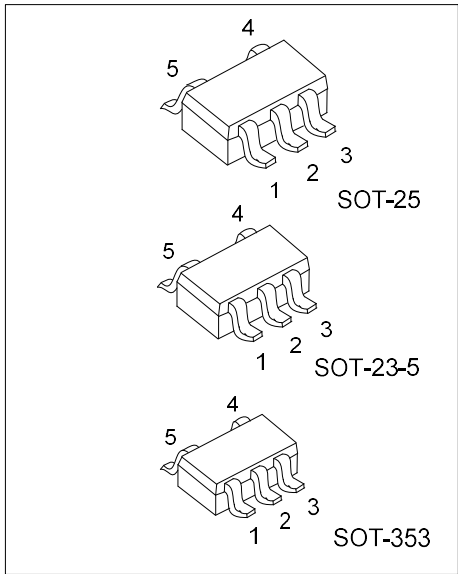
The gates of device have different input threshold levels for positive-going ( $V_{T+}$ ) and negative-going ( $V_{T-}$ ) signals because of the schmitt-trigger action in the input.

### FEATURES

- \* Operation voltage range: 4.5V ~5.5V
- \* Low Power Current:  $I_{CC}=1\mu A$  (Max.)
- \*  $\pm 8mA$  Output Drive at 5V
- \* Inputs are TTL-Voltage Compatible

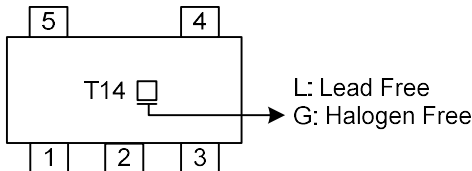
### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHCT1G14L-AE5-R	U74AHCT1G14G-AE5-R	SOT-23-5	Tape Reel
U74AHCT1G14L-AF5-R	U74AHCT1G14G-AF5-R	SOT-25	Tape Reel
U74AHCT1G14L-AL5-R	U74AHCT1G14G-AL5-R	SOT-353	Tape Reel

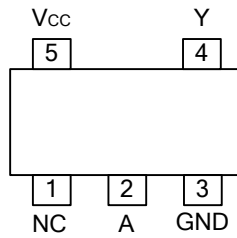


<p>U74AHCT1G14G-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING



■ **PIN CONFIGURATION**

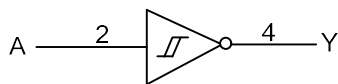


■ **FUNCTION TABLE** (each gate)

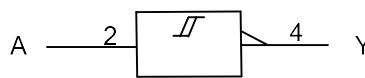
INPUT(A)	OUTPUT(Y)
L	H
H	L

Note: H: high voltage level; L: low voltage level

■ **LOGIC DIAGRAM** (positive logic)



Logic symbol



IEC logic symbol

## ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.5 ~ 7	V
Input Voltage	V <sub>IN</sub>	-0.5 ~ 7	V
Output Voltage	V <sub>OUT</sub>	-0.5 ~ V <sub>CC</sub> +0.5	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±50	mA
Output Current	I <sub>OUT</sub>	±25	mA
Input Clamp Current	I <sub>IK</sub>	-20	mA
Output Clamp Current	I <sub>OK</sub>	±20	mA
Storage Temperature	T <sub>STG</sub>	-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.

## ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		4.5		5.5	V
Input Voltage	V <sub>IN</sub>		0		5.5	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Operating Temperature	T <sub>A</sub>		-40		+125	°C

## ■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-going threshold	V <sub>T+</sub>	V <sub>CC</sub> =4.5V	0.9		2	0.9		2	V
		V <sub>CC</sub> =5.5V	1.1		2	1.1		2	
Negative-going threshold	V <sub>T-</sub>	V <sub>CC</sub> =4.5V	0.5		1.6	0.5		1.6	V
		V <sub>CC</sub> =5.5V	0.6		1.5	0.6		1.5	
Hysteresis Voltage (V <sub>T+</sub> -V <sub>T-</sub> )	ΔV <sub>T</sub>	V <sub>CC</sub> =4.5V	0.4		1.4	0.4		1.4	V
		V <sub>CC</sub> =5.5V	0.5		1.6	0.5		1.6	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =4.5V	I <sub>OH</sub> =-50μA	4.4	4.5		4.4		V
			I <sub>OH</sub> =-8mA	3.94			3.7		
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =4.5V	I <sub>OL</sub> =50μA					0.1	V
			I <sub>OL</sub> =8mA					0.55	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =0 ~ 5.5V, V <sub>IN</sub> =5.5V or GND			±0.1			±1	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			1			10	μA
Additional Quiescent Supply Current	ΔI <sub>Q</sub>	V <sub>CC</sub> =5.5V, V <sub>IN</sub> =3.4V; other input at V <sub>CC</sub> or GND; I <sub>OUT</sub> =0			1.35			1.5	mA

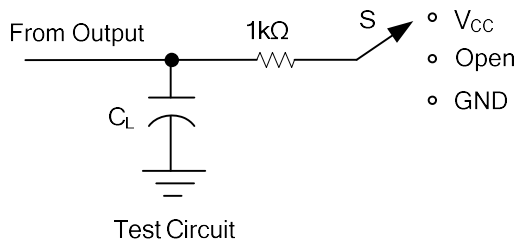
## ■ SWITCHING CHARACTERISTICS (see TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (nA) and (nB) to output (nY)	t <sub>PHL</sub> / t <sub>PLH</sub>	V <sub>CC</sub> =4.5~5.5V, C <sub>L</sub> = 15pF		7	11			11.5	ns
		V <sub>CC</sub> =4.5~5.5V, C <sub>L</sub> = 50pF		8	13			14	ns

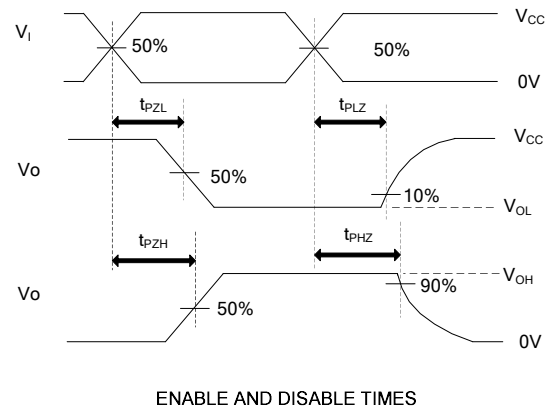
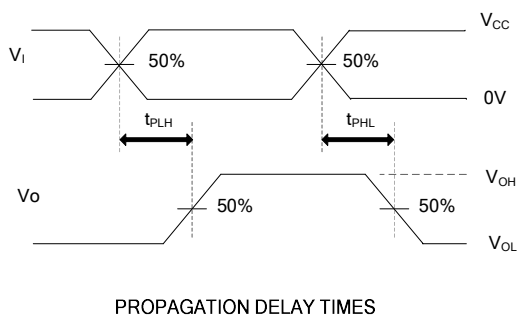
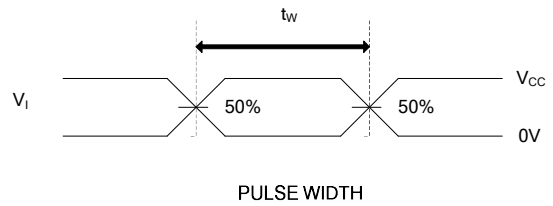
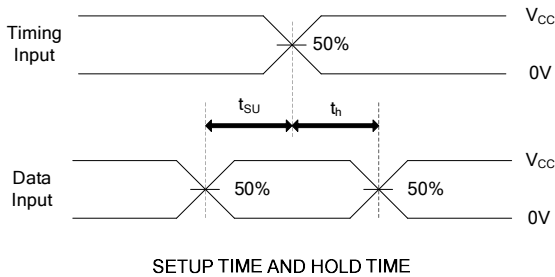
## ■ OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =5V, V <sub>IN</sub> =V <sub>CC</sub> or GND		2	10	pF
Power Dissipation Capacitance	C <sub>PD</sub>	V <sub>CC</sub> =5V, f=1MHz, No load.		12		pF

## TEST CIRCUIT AND WAVEFORMS



TEST	S
t <sub>PLH</sub> /t <sub>PHL</sub>	Open
t <sub>PHZ</sub> /t <sub>PZH</sub>	GND
t <sub>PLZ</sub> /t <sub>PZL</sub>	V <sub>CC</sub>



Note: C<sub>L</sub> includes probe and jig capacitance.  
 P<sub>RR</sub> ≤ 1MHz, Z<sub>O</sub> = 50Ω, t<sub>r</sub> ≤ 3ns, t<sub>f</sub> ≤ 3ns.

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