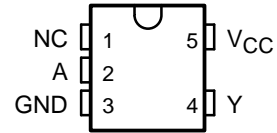


SN74AHCT1G14 SINGLE SCHMITT-TRIGGER INVERTER GATE

SCLS322E – MARCH 1996 – REVISED JUNE 1997

- Inputs Are TTL-Voltage Compatible
- **EPIC™** (Enhanced-Performance Implanted CMOS) Process
- High Latch-Up Immunity Exceeds 250 mA Per JESD 17
- Packaged in Plastic Small-Outline Transistor Package

DBV PACKAGE
(TOP VIEW)



NC – No internal connection

description

The SN74AHCT1G14 contains a single inverter gate. The device performs the Boolean function $Y = \overline{A}$.

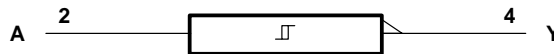
The device functions as an independent inverter gate, but because of the Schmitt action, gates may have different input threshold levels for positive- (V_{T+}) and negative-going (V_{T-}) signals.

The SN74AHCT1G14 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

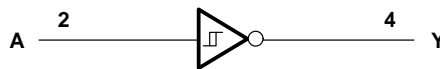
INPUT A	OUTPUT Y
H	L
L	H

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

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SN74AHCT1G14

SINGLE SCHMITT-TRIGGER INVERTER GATE

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–0.5 V to 7 V
Output voltage range, V_O (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$)	–20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±25 mA
Continuous current through V_{CC} or GND	±50 mA
Package thermal impedance, θ_{JA} (see Note 2)	347°C/W
Storage temperature range, T_{stg}	–65°C to 150°C

[†] Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions (see Note 3)

	MIN	MAX	UNIT
V_{CC} Supply voltage	4.5	5.5	V
V_{IH} High-level input voltage	2		V
V_{IL} Low-level input voltage		0.5	V
V_I Input voltage	0	5.5	V
V_O Output voltage	0	V_{CC}	V
I_{OH} High-level output current		–8	mA
I_{OL} Low-level output current		8	mA
$\Delta t/\Delta v$ Input transition rise or fall rate		20	ns/V
T_A Operating free-air temperature	–40	85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
V_{T+} Positive-going input threshold voltage		4.5 V			2		2	V
		5.5 V			2		2	
V_{T-} Negative-going input threshold voltage		4.5 V	0.5			0.5		V
		5.5 V	0.6			0.6		
ΔV_T Hysteresis ($V_{T+} - V_{T-}$)		4.5 V	0.4		1.4	0.4	1.4	V
		5.5 V	0.5		1.6	0.4	1.6	
V_{OH}	$I_{OH} = -50 \mu\text{A}$	4.5 V	4.4	4.5		4.4		V
	$I_{OH} = -8 \text{ mA}$		3.94			3.8		
V_{OL}	$I_{OL} = 50 \mu\text{A}$	4.5 V			0.1		0.1	V
	$I_{OL} = 8 \text{ mA}$				0.36		0.44	
I_I	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1	μA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			1		10	μA
C_i	$V_I = V_{CC}$ or GND	5 V			2	10	10	pF



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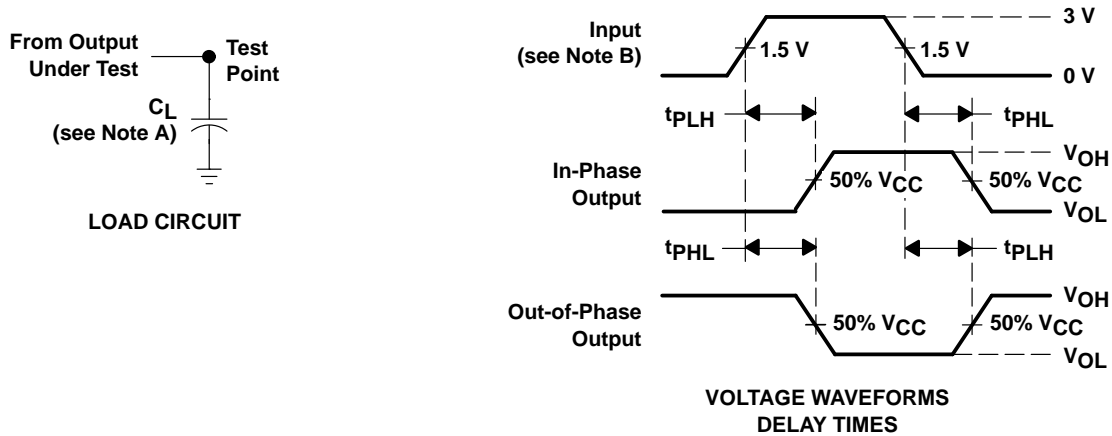
switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
t_{PLH}	A	Y	$C_L = 15\text{ pF}$	4	7	7	1	8	ns
t_{PHL}				4	7	7	1	8	
t_{PLH}	A	Y	$C_L = 50\text{ pF}$	5.5	8	8	1	9	ns
t_{PHL}				5.5	8	8	1	9	

operating characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance	No load, $f = 1\text{ MHz}$	12	pF

PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r = 3\text{ ns}$, $t_f = 3\text{ ns}$.
 - C. The output is measured with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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