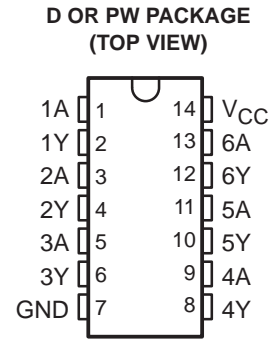


- Qualification in Accordance With AEC-Q100†
- Qualified for Automotive Applications
- Customer-Specific Configuration Control Can Be Supported Along With Major-Change Approval
- Operating Voltage Range of 4.5 V to 5.5 V
- Outputs Can Drive Up To 10 LSTTL Loads
- Low Power Consumption, 20-μA Max I_{CC}
- ±4-mA Output Drive at 5 V
- Low Input Current of 1 μA Max
- Inputs Are TTL-Voltage Compatible



† Contact factory for details. Q100 qualification data available on request.

description/ordering information

The SN74HCT14 device contains six independent inverters. The device performs the Boolean function $Y = \bar{A}$ in positive logic.

ORDERING INFORMATION

T _A	PACKAGE‡		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 125°C	SOIC – D	Reel of 2500	SN74HCT14QDRQ1	HCT14Q
	TSSOP – PW	Reel of 2000	SN74HCT14QPWRQ1	HCT14Q

‡ Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (each inverter)

INPUT A	OUTPUT Y
H	L
L	H

logic diagram (positive logic)



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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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SN74HCT14-Q1

HEX SCHMITT-TRIGGER INVERTER

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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 $V_{CC} + 0.5$ V
Output voltage range, V_O (see Note 1)	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 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): D package	86°C/W
PW package	113°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 51-7.

recommended operating conditions (see Note 3)

	MIN	MAX	UNIT
V_{CC} Supply voltage	4.5	5.5	V
V_I Input voltage	0	V_{CC}	V
V_O Output voltage	0	V_{CC}	V
T_A Operating free-air temperature	-40	125	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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 threshold		4.5 V	1.2	1.5	1.9	1.2	1.9	V
		5.5 V	1.4	1.7	2.1	1.4	2.1	
V_{T-} Negative-going threshold		4.5 V	0.5	0.9	1.2	0.5	1.2	V
		5.5 V	0.6	1	1.4	0.6	1.4	
ΔV_T Hysteresis ($V_{T+} - V_{T-}$)		4.5 V	0.4	0.6	1.4	0.4	1.4	V
		5.5 V	0.4	0.65	1.5	0.4	1.5	
V_{OH}	$I_{OH} = -20 \mu\text{A}$	4.5 V	4.4	4.49		4.4		V
	$I_{OH} = -4 \text{ mA}$	4.5 V	3.98	4.3		3.7		
V_{OL}	$I_{OL} = 20 \mu\text{A}$	4.5 V		0.001	0.1		0.1	V
	$I_{OL} = 4 \text{ mA}$	4.5 V		0.17	0.26		0.4	
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			2		40	μA
ΔI_{CC}^\ddagger	One input at 0.5 V or 2.4 V, Other inputs at GND or V_{CC}	5.5 V		0.2	2.4		3	mA
C_i	$V_I = V_{CC}$ or GND	5 V		3	10		10	pF

‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or V_{CC} .



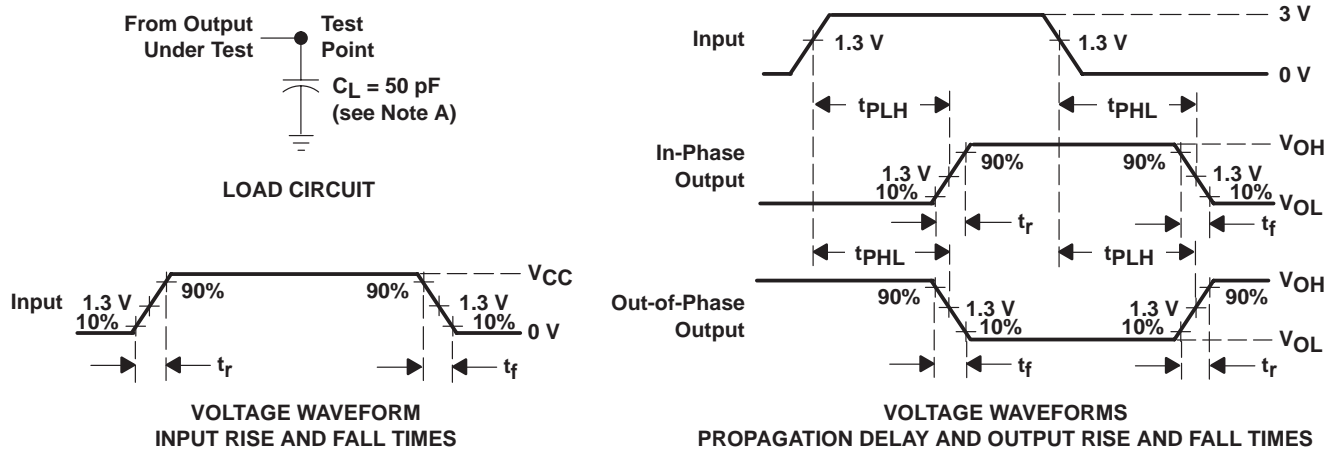
switching characteristics over recommended operating free-air temperature range, $C_L = 50$ pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
t_{pd}	A	Y	4.5 V		20	32		48	ns
			5.5 V		18	30		45	
t_t		Y	4.5 V		7	15		22	ns
			5.5 V		6	14		20	

operating characteristics, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance	No load	10	pF

PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and test-fixture capacitance.
 - B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O = 50 \Omega$, $t_r = 6$ ns, $t_f = 6$ ns.
 - C. The outputs are measured one at a time, with one input transition per measurement.
 - D. t_{PLH} and t_{PHL} are the same as t_{pd} .

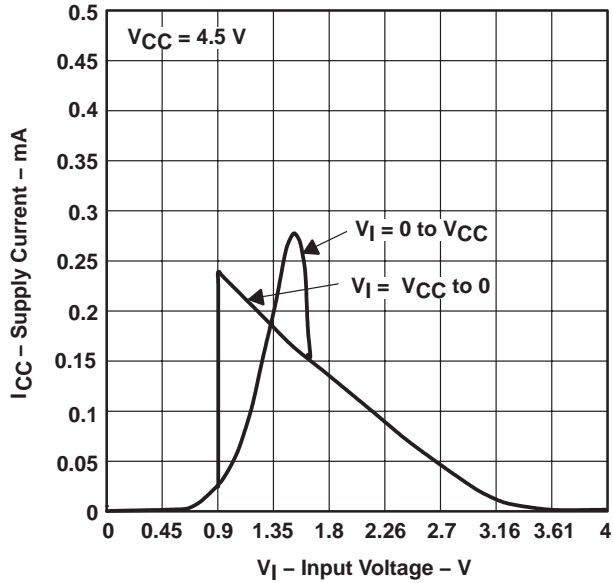
Figure 1. Load Circuit and Voltage Waveforms

SN74HCT14-Q1 HEX SCHMITT-TRIGGER INVERTER

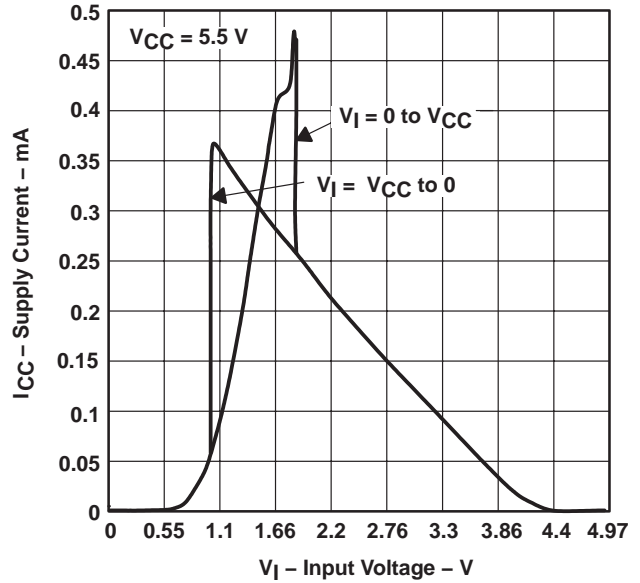
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TYPICAL CHARACTERISTICS

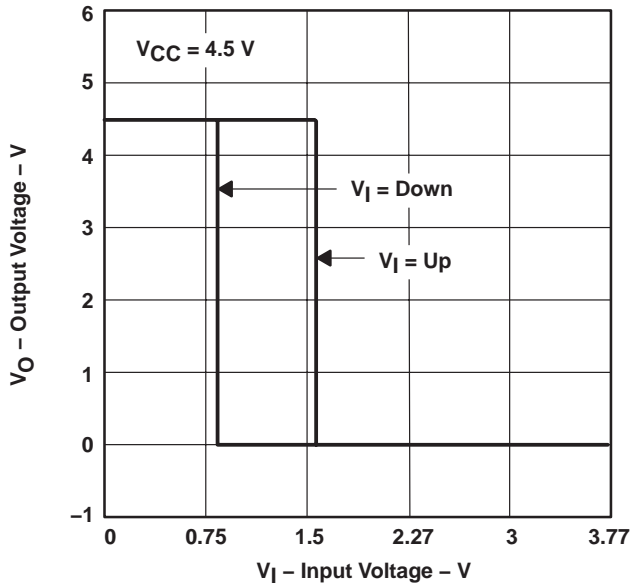
SUPPLY CURRENT
vs
INPUT VOLTAGE



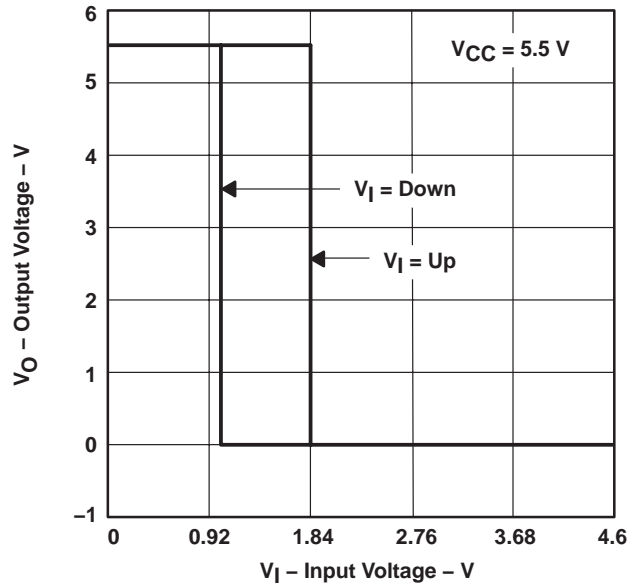
SUPPLY CURRENT
vs
INPUT VOLTAGE



OUTPUT VOLTAGE
vs
INPUT VOLTAGE



OUTPUT VOLTAGE
vs
INPUT VOLTAGE



PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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