D2953, JULY 1986 – REVISED JUNE 1989

- **Inputs are TTL-Voltage Compatible**
- **Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
- **Dependable Texas Instruments Quality and Reliability**

description

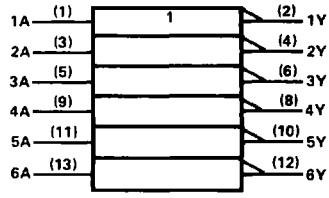
These devices contain six independent inverters. They perform the Boolean function $Y = \overline{A}$.

The SN54HCT04 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74HCT04 is characterized for operation from −40°C to 85°C.

FUNCTION TABLE
(each inverter)

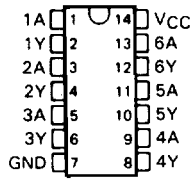
INPUT A	OUTPUT Y
H	L
L	H

logic symbol†

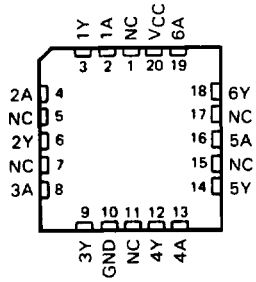


†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, and N packages.

SN54HCT04 . . . J PACKAGE
SN74HCT04 . . . D OR N PACKAGE
(TOP VIEW)



SN54HCT04 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

absolute maximum ratings over operating free-air temperature range†

Supply voltage, V_{CC} . . . . . −0.5 V to 7 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 pins . . . . . ±50 mA
Lead temperature 1,6 mm (1/16 in) from case for 60: FK or J package . . . . . 300°C
Lead temperature 1,6 mm (1/16 in) from case for 10: D or N package . . . . . 260°C
Storage temperature range . . . . . −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.

recommended operating conditions

			SN54HCT04			SN74HCT04			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage		4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 4.5 V to 5.5 V	2			2			V
V_{IL}	Low-level input voltage	V_{CC} = 4.5 V to 5.5 V	0		0.8	0		0.8	V
V_I	Input voltage		0		V_{CC}	0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	0		V_{CC}	V
t_t	Input transition (rise and fall) times		0		500	0		500	ns
T_A	Operating free-air temperature		−55		125	−40		85	°C

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			SN54HCT04		SN74HCT04		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	V_I = V_{IH} or V_{IL}, I_{OH} = −20 μA	4.5 V	4.4	4.499		4.4		4.4		V
	V_I = V_{IH} or V_{IL}, I_{OH} = −4 mA	4.5 V	3.98	4.30		3.7		3.84		
V_{OL}	V_I = V_{IH} or V_{IL}, I_{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	V
	V_I = V_{IH} or V_{IL}, I_{OL} = 4 mA	4.5 V		0.17	0.26		0.4		0.33	
I_I	V_I = V_{CC} or 0	5.5 V		±0.1	±100		±1000		±1000	nA
I_{CC}	V_I = V_{CC} or 0, I_O = 0	5.5 V			2		40		20	μA
ΔI_{CC}‡	One input at 0.5 V or 2.4 V, Other inputs at 0 V or V_{CC}	5.5 V		1.4	2.4		3		2.9	mA
C_i		4.5 to 5.5 V		3	10		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 (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	T_A = 25°C			SN54HCT04		SN74HCT04		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A	Y	4.5 V		14	20		30		25	ns
			5.5 V		13	18		27		23	
t_t		Y	4.5 V		9	15		22		19	ns
			5.5 V		8	14		20		17	

C_{pd}	Power dissipation capacitance per inverter	No load, T_A = 25°C	20 pF typ

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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