

SN54HCU04, SN74HCU04 HEX INVERTERS

D2804, MARCH 1984 - REVISED JUNE 1989

- Package Options Include Both Plastic and Ceramic Chip Carriers In Addition to Plastic and Ceramic DIPs
- Unbuffered Outputs
- Dependable Texas Instruments Quality and Reliability

description

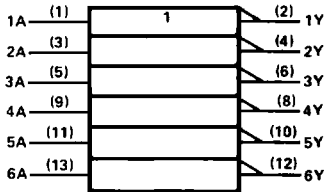
These devices contain six independent inverters. They perform the Boolean function $Y = \bar{A}$.

The SN54HCU04 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HCU04 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE
(each inverter)

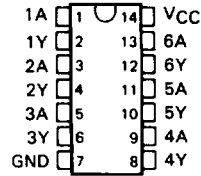
INPUT A	OUTPUT Y
H	L
L	H

logic symbol†

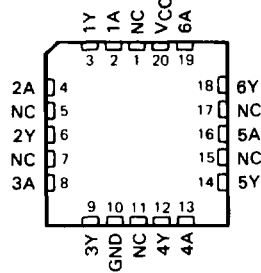


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers are for D, J, and N packages.

SN54HCU04 . . . J PACKAGE
SN74HCU04 . . . D OR N PACKAGE
(TOP VIEW)

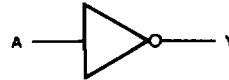


SN54HCU04 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

logic diagram (positive logic)



2

HCMOS Devices

PRODUCTION DATA documents contain information 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

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

Copyright © 1989, Texas Instruments Incorporated

2-29

SN54HCU04, SN74HCU04 HEX INVERTERS

absolute maximum ratings over operating free-air temperature†

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 s: FK or J package	300°C
Lead temperature 1,6 mm (1/16 in.) from case for 10 s: 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

		SN54HCU04			SN74HCU04			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage		2	5	6	2	5	6	V
V_{IH} High-level input voltage	$V_{CC} = 2$ V	1.7			1.7			V
	$V_{CC} = 4.5$ V	3.6			3.6			
	$V_{CC} = 6$ V	4.8			4.8			
V_{IL} Low-level input voltage	$V_{CC} = 2$ V	0	0.3		0	0.3	V	
	$V_{CC} = 4.5$ V	0	0.8		0	0.8		
	$V_{CC} = 6$ V	0	1.1		0	1.1		
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	$V_{CC} = 2$ V	0	1000		0	1000	ns	
	$V_{CC} = 4.5$ V	0	500		0	500		
	$V_{CC} = 6$ V	0	400		0	400		
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}	$T_A = 25^\circ\text{C}$			SN54HCU04		SN74HCU04		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	$V_I = V_{IH}$ or V_{IL} , $I_{OH} = -20$ μA	2 V	1.8			1.8		1.8	V	
		4.5 V	4			4		4		
		6 V	5.5			5.5		5.5		
	4.5 V	3.98			3.7		3.84			
	$V_I = V_{IH}$ or V_{IL} , $I_{OH} = -5.2$ mA	6 V	5.48			5.2		5.34		
V_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 20$ μA	2 V		0.2		0.2		0.2	V	
		4.5 V		0.5		0.5		0.5		
		6 V		0.5		0.5		0.5		
	4.5 V		0.26		0.4		0.33			
	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 5.2$ mA	6 V		0.26		0.4		0.33		
I_I	$V_I = V_{CC}$ or 0	6 V		± 100		± 1000		± 1000	nA	
I_{CC}	$V_I = V_{CC}$ or 0, $I_O = 0$	6 V		2		40		20	μA	
C_i		2 to 6 V		3	10		10	10	pF	

**SN54HCU04, SN74HCU04
HEX INVERTERS**

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			SN54HCU04		SN74HCU04		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A	Y	2 V		40	80		120		100	ns
			4.5 V		8	16		24		20	
			6 V		7	14		20		17	
t _t		Y	2 V		38	75		110		95	ns
			4.5 V		8	15		22		19	
			6 V		6	13		19		16	

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.

2

HCMOS Devices