

8-INPUT NAND GATE

FEATURES

- Output capability: standard
- I_{CC} category: SSI

GENERAL DESCRIPTION

The 74HC/HCT30 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT30 provide the 8-input NAND function.

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t_{PHL}/t_{PLH}	propagation delay A, B, C, D, E, F, G, H to Y	$C_L = 15 \text{ pF}$ $V_{CC} = 5 \text{ V}$	12	12	ns
C_i	input capacitance		3.5	3.5	pF
C_{PD}	power dissipation capacitance per gate	notes 1 and 2	15	15	pF

$GND = 0 \text{ V}$; $T_{amb} = 25 \text{ }^\circ\text{C}$; $t_r = t_f = 6 \text{ ns}$

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i = input frequency in MHz

f_o = output frequency in MHz

$\sum (C_L \times V_{CC}^2 \times f_o)$ = sum of outputs

C_L = output load capacitance in pF

V_{CC} = supply voltage in V

2. For HC the condition is $V_I = GND$ to V_{CC}
For HCT the condition is $V_I = GND$ to $V_{CC} - 1.5 \text{ V}$

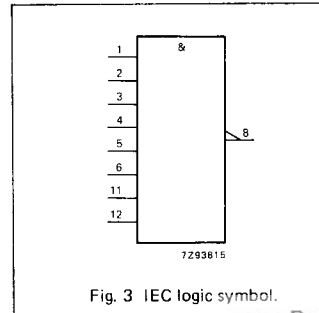
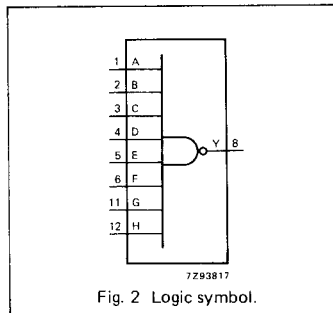
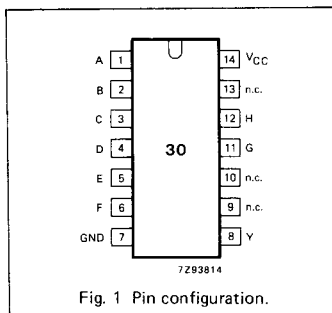
PACKAGE OUTLINES

14-lead DIL; plastic (SOT27).

14-lead mini-pack; plastic (SO14; SOT108A).

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1	A	data input
2	B	data input
3	C	data input
4	D	data input
5	E	data input
6	F	data input
7	GND	ground (0 V)
8	Y	data output
9, 10, 13	n.c.	not connected
11	G	data input
12	H	data input
14	V_{CC}	positive supply voltage



74HC/HCT30

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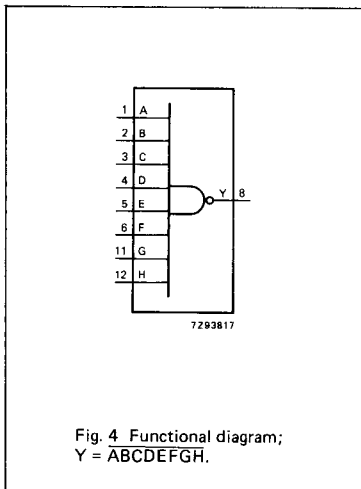


Fig. 4 Functional diagram;
Y = ABCDEFGH.

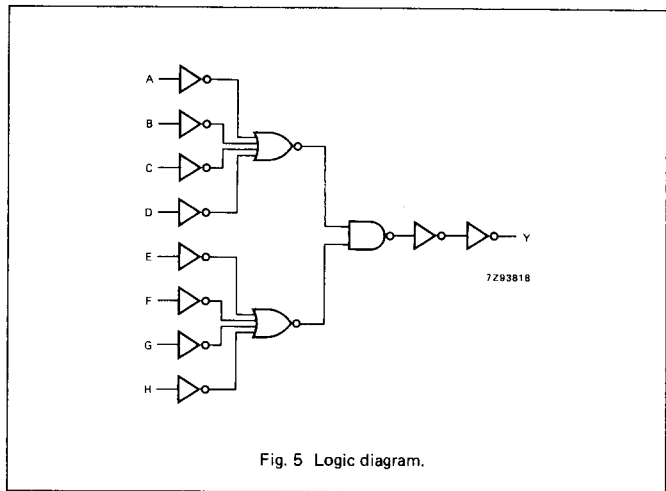


Fig. 5 Logic diagram.

FUNCTION TABLE

INPUTS								OUTPUT
A	B	C	D	E	F	G	H	Y
L	X	X	X	X	X	X	X	H
X	L	X	X	X	X	X	X	H
X	X	L	X	X	X	X	X	H
X	X	X	L	X	X	X	X	H
X	X	X	X	L	X	X	X	H
X	X	X	X	X	L	X	X	H
X	X	X	X	X	X	L	X	H
X	X	X	X	X	X	X	L	H
H	H	H	H	H	H	H	H	L

H = HIGH voltage level

L = LOW voltage level

X = don't care

8-input NAND gate

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DC CHARACTERISTICS FOR 74 HC

For the DC characteristics see chapter "HCMOS family characteristics", section "Family specifications".

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AC CHARACTERISTICS FOR 74HC

GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

SYMBOL	PARAMETER	T _{amb} (°C)						UNIT	TEST CONDITIONS		
		74HC							V _{CC} V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t _{PHL} / t _{PLH}	propagation delay A, B, C, D, E, F, G, H to Y		41 15 12	130 26 22		165 33 28		195 39 33	ns	2.0 4.5 6.0	Fig. 6
t _{THL} / t _{TLH}	output transition time		19 7 6	75 15 13		95 19 16		110 22 19	ns	2.0 4.5 6.0	Fig. 6

DC CHARACTERISTICS FOR 74HCT

For the DC characteristics see chapter "HCMOS family characteristics", section "Family specifications".

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Note to HCT types

The value of additional quiescent supply current (ΔI_{CC}) for a unit load of 1 is given in the family specifications.To determine ΔI_{CC} per input, multiply this value by the unit load coefficient shown in the table below.

INPUT	UNIT LOAD COEFFICIENT
A, B, C, D, E, F, G, H	0.60

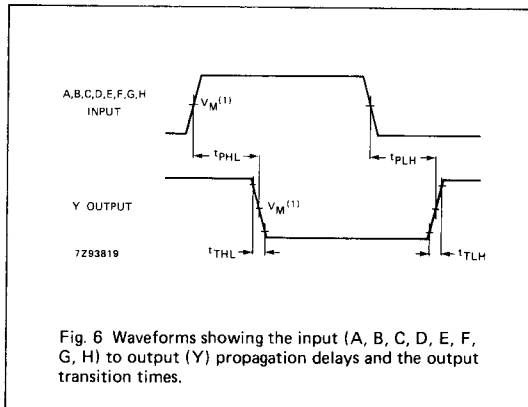
AC CHARACTERISTICS FOR 74HCT

GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

SYMBOL	PARAMETER	T _{amb} (°C)						UNIT	TEST CONDITIONS		
		74HCT							V _{CC} V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t _{PHL} / t _{PLH}	propagation delay A, B, C, D, E, F, G, H to Y		16	28		35		42	ns	4.5	Fig. 6
t _{THL} / t _{TLH}	output transition time		7	15		19		22	ns	4.5	Fig. 6

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AC WAVEFORMS



Note to AC waveforms

(1) HC : $V_M = 50\%$; $V_I = \text{GND to } V_{CC}$.
HCT: $V_M = 1.3 \text{ V}$; $V_I = \text{GND to } 3 \text{ V}$.

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