

## 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  $\mu\text{W}$ ):

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

$f_i$  = 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  $V_{CC} - 1.5 \text{ V}$

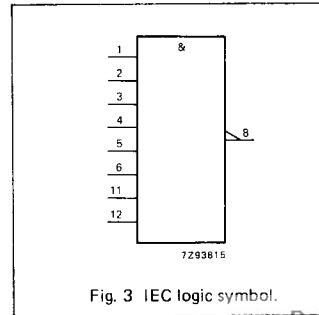
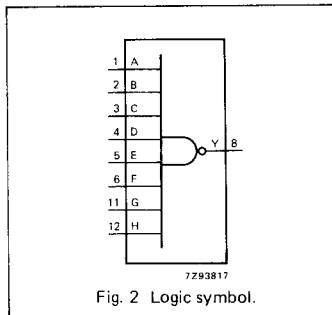
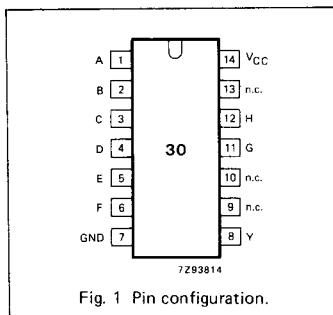
## PACKAGE OUTLINES

14-lead DIL; plastic (SOT27).

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

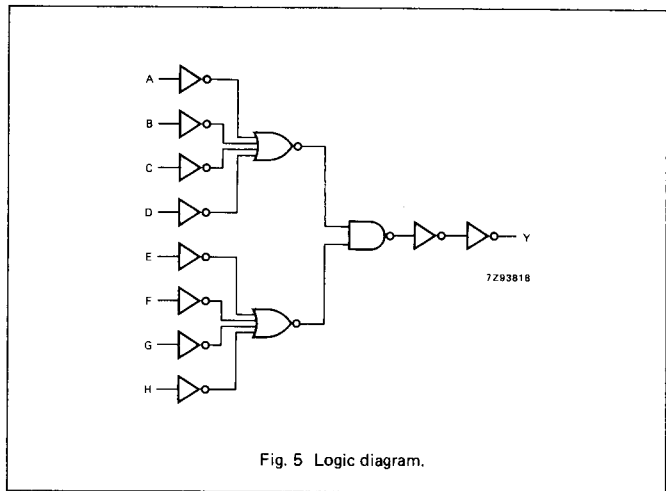
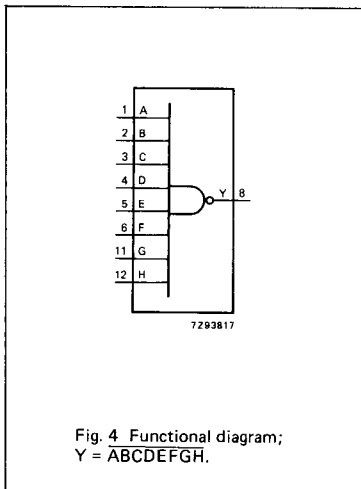
## PIN DESCRIPTION

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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## 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

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## DC CHARACTERISTICS FOR 74 HC

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

Output capability: standard

I<sub>CC</sub> category: SSI

## AC CHARACTERISTICS FOR 74HC

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)						UNIT	TEST CONDITIONS		
		74HC							V <sub>CC</sub> V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t <sub>PHL</sub> / t <sub>PLH</sub>	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 <sub>THL</sub> / t <sub>TLH</sub>	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".

Output capability: standard

I<sub>CC</sub> category: SSI

## Note to HCT types

The value of additional quiescent supply current (ΔI<sub>CC</sub>) for a unit load of 1 is given in the family specifications.To determine ΔI<sub>CC</sub> 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

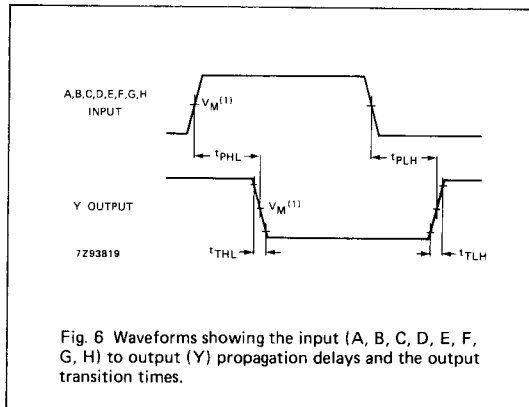
## AC CHARACTERISTICS FOR 74HCT

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

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