

## 8-INPUT NAND GATE

### FEATURES

- Output capability: standard
- ICC category: SSI

### GENERAL DESCRIPTION

The 74HC/HCT30 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). 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 <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A, B, C, D, E, F, G, H to Y	C <sub>L</sub> = 15 pF V <sub>CC</sub> = 5 V	12	12	ns
C <sub>I</sub>	input capacitance		3.5	3.5	pF
C <sub>PD</sub>	power dissipation capacitance per gate	notes 1 and 2	15	15	pF

GND = 0 V; T<sub>amb</sub> = 25 °C; t<sub>r</sub> = t<sub>f</sub> = 6 ns

### Notes

1. C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in  $\mu$ 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<sub>i</sub> = input frequency in MHz      C<sub>L</sub> = output load capacitance in pF  
f<sub>o</sub> = output frequency in MHz      V<sub>CC</sub> = supply voltage in V  
 $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs

2. For HC the condition is V<sub>I</sub> = GND to V<sub>CC</sub>.  
For HCT the condition is V<sub>I</sub> = GND to V<sub>CC</sub> – 1.5 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 <sub>CC</sub>	positive supply voltage

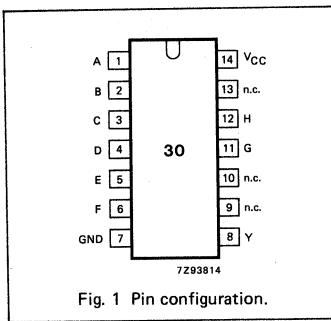


Fig. 1 Pin configuration.

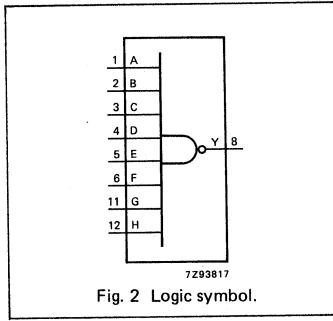


Fig. 2 Logic symbol.

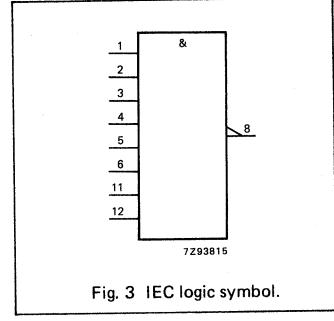
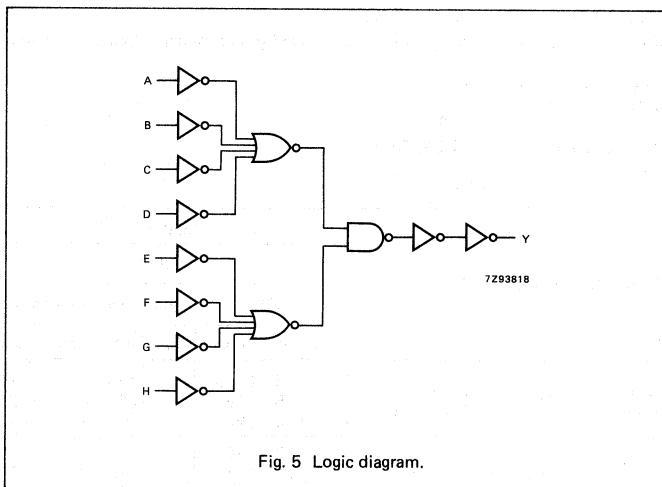
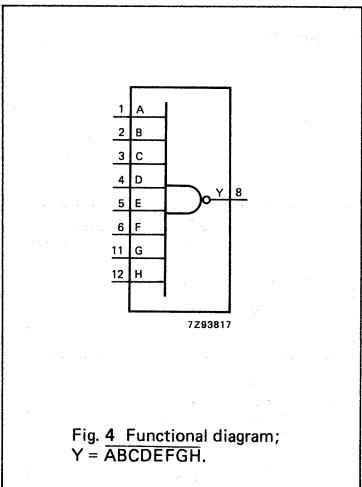


Fig. 3 IEC logic symbol.

**74HC/HCT30**  
SSI



**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	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

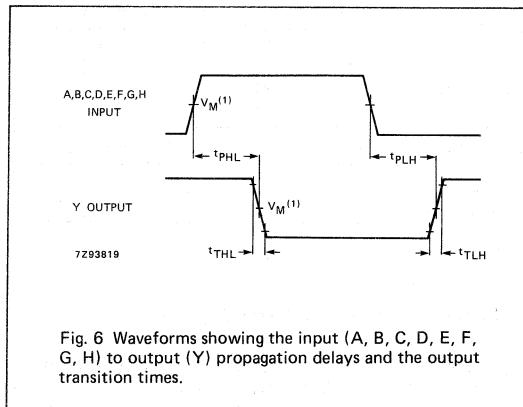
L = LOW voltage level

X = don't care

**Note to AC waveforms**

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

**AC WAVEFORMS**



**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 ( $\Delta I_{CC}$ ) for a unit load of 1 is given in the family specifications.To determine  $\Delta I_{CC}$  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<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			