

## 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  $V_{CC} - 1.5 \text{ V}$

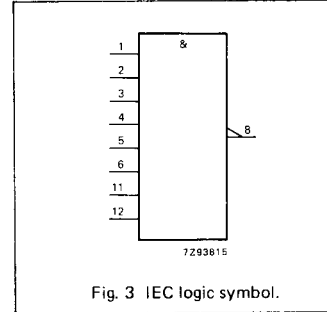
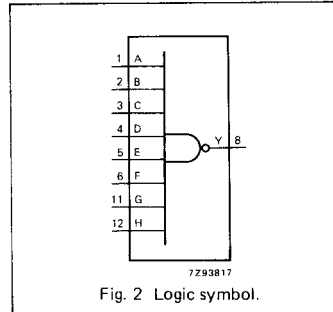
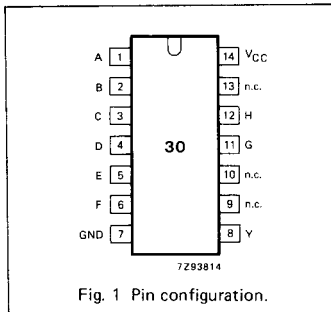
### PACKAGE OUTLINES

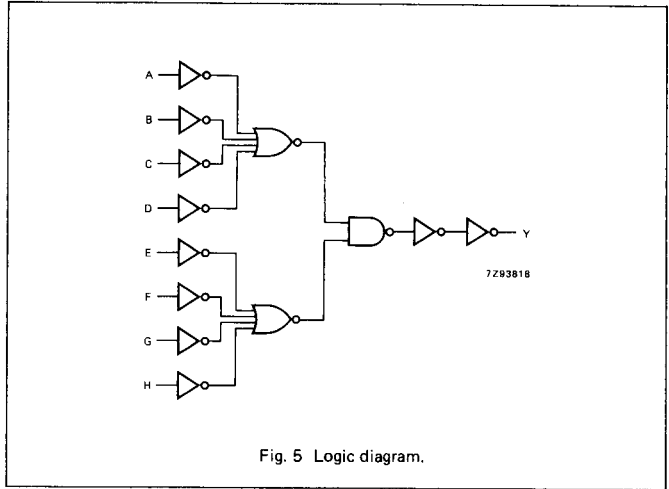
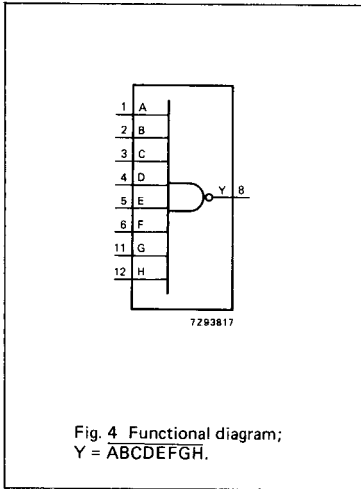
14-lead DIL; plastic (SOT27).

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





**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

**DC CHARACTERISTICS FOR 74 HC**

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

Output capability: standard

 $I_{CC}$  category: SSI**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".

Output capability: standard

 $I_{CC}$  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;  $t_r = t_f = 6$  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

AC WAVEFORMS

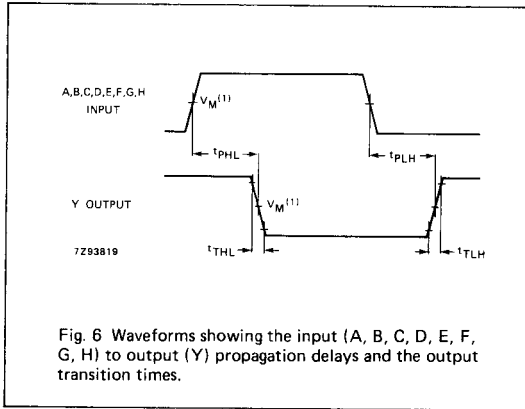


Fig. 6 Waveforms showing the input (A, B, C, D, E, F, G, H) to output (Y) propagation delays and the output transition times.

**Note to AC waveforms**

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