DATA SHEET

For a complete data sheet, please also download:

- The IC06 74HC/HCT/HCU/HCMOS Logic Family Specifications
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Information
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Outlines

74HC/HCT00

Quad 2-input NAND gate

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Quad 2-input NAND gate   74HC/HCT00

FEATURES

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

GENERAL DESCRIPTION

The 74HC/HCT00 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/HCT00 provide the 2-input NAND function.

QUICK REFERENCE DATA

GND = 0 V; T_{amb} = 25 °C; t_r = t_f = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t_{PHL}/ t_{PLH}	propagation delay nA, nB to nY	C_L = 15 pF; V_{CC} = 5 V	7	10	ns
C_I	input capacitance		3.5	3.5	pF
C_{PD}	power dissipation capacitance per gate	notes 1 and 2	22	22	pF

Notes

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

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

    f_i = input frequency in MHz

    f_o = output frequency in MHz

    C_L = output load capacitance in pF

    V_{CC} = supply voltage in V

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

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 V

ORDERING INFORMATION

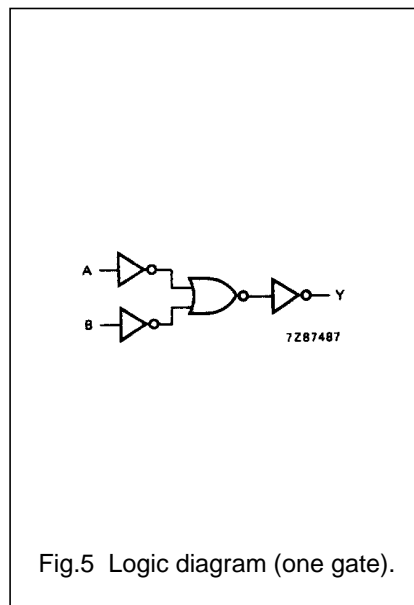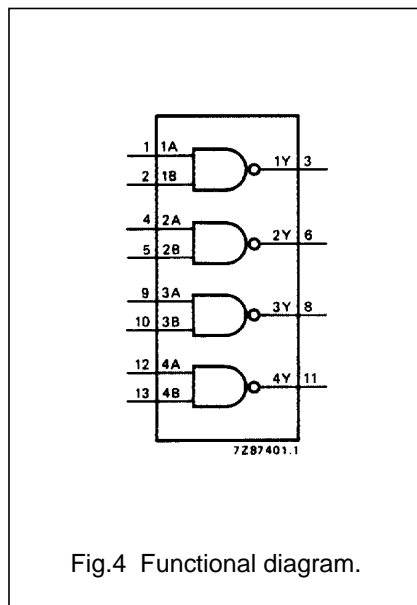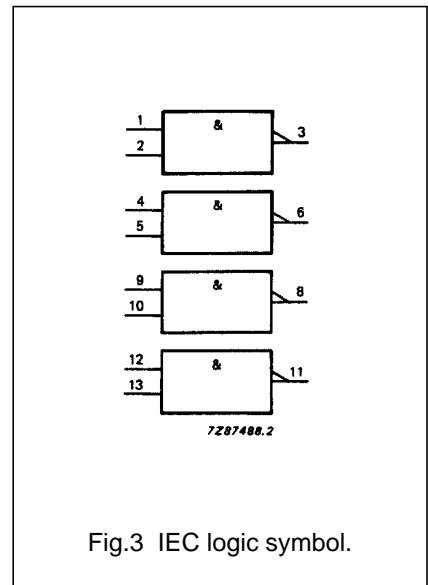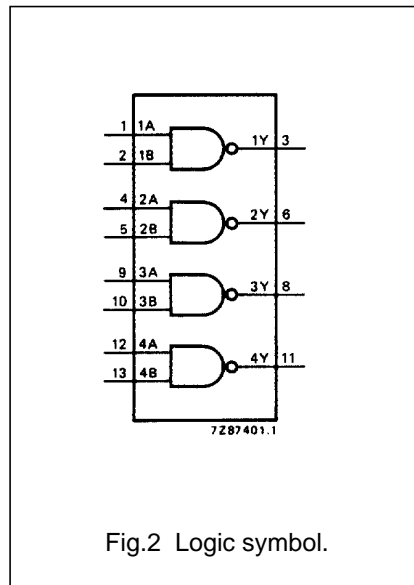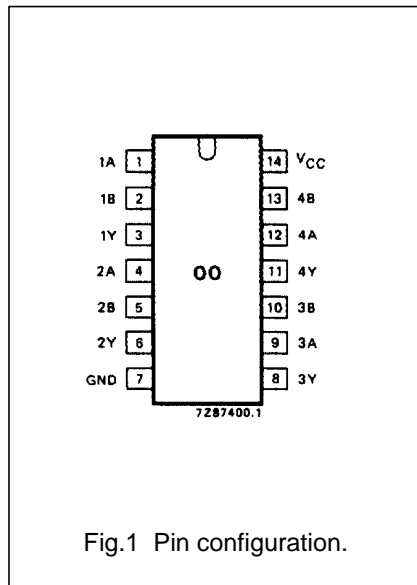See *"74HC/HCT/HCU/HCMOS Logic Package Information"*.

Quad 2-input NAND gate

74HC/HCT00

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1, 4, 9, 12	1A to 4A	data inputs
2, 5, 10, 13	1B to 4B	data inputs
3, 6, 8, 11	1Y to 4Y	data outputs
7	GND	ground (0 V)
14	V_{CC}	positive supply voltage

Fig.1 Pin configuration.

Fig.2 Logic symbol.

Fig.3 IEC logic symbol.

Fig.4 Functional diagram.

Fig.5 Logic diagram (one gate).

FUNCTION TABLE

INPUTS		OUTPUT
nA	nB	nY
L	L	H
L	H	H
H	L	H
H	H	L

Note

1. H = HIGH voltage level
    L = LOW voltage level

Quad 2-input NAND gate

74HC/HCT00

DC CHARACTERISTICS FOR 74HC

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic 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) 74HC							UNIT	V_{CC} (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t_{PHL}/ t_{PLH}	propagation delay nA, nB to nY		25 9 7	90 18 15		115 23 20		135 27 23	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 *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: standard
I_{CC} category: SSI

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
nA, nB	1.50

AC CHARACTERISTICS FOR 74HCT

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

SYMBOL	PARAMETER	T_{amb} (°C) 74HCT							UNIT	V_{CC} (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t_{PHL}/ t_{PLH}	propagation delay nA, nB to nY		12	19		24		29	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

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

Fig.6   Waveforms showing the input (nA, nB) to output (nY) propagation delays and the output transition times.
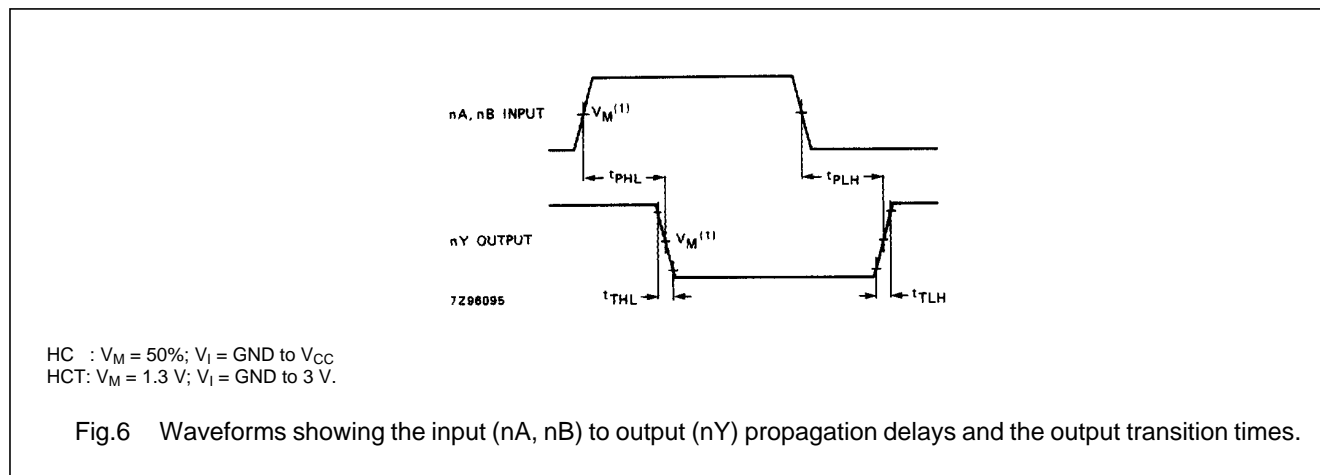
PACKAGE OUTLINES

See *"74HC/HCT/HCU/HCMOS Logic Package Outlines"*.