

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/HCT20 Dual 4-input NAND gate

Product specification
File under Integrated Circuits, IC06

December 1990

Dual 4-input NAND gate

74HC/HCT20

FEATURES

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

GENERAL DESCRIPTION

The 74HC/HCT20 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/HCT20 provide the 4-input NAND function.

QUICK REFERENCE DATA

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

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t_{PHL}/t_{PLH}	propagation delay nA, nB, nC, nD to nY	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	8	13	ns
C_I	input capacitance		3.5	3.5	pF
C_{PD}	power dissipation capacitance per package	notes 1 and 2	22	17	pF

Notes

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

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

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

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

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

ORDERING INFORMATION

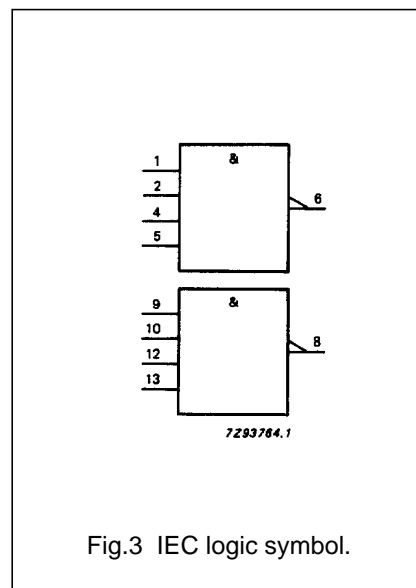
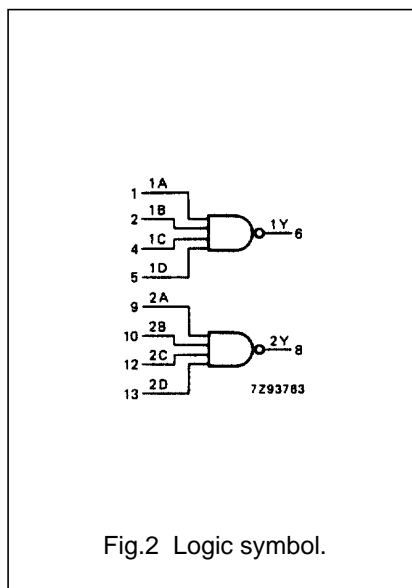
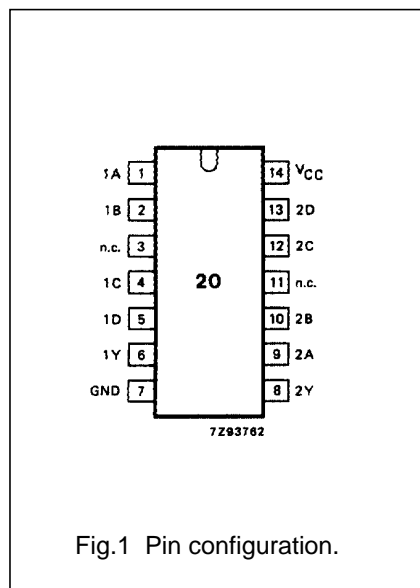
See "74HC/HCT/HCU/HCMOS Logic Package Information".

Dual 4-input NAND gate

74HC/HCT20

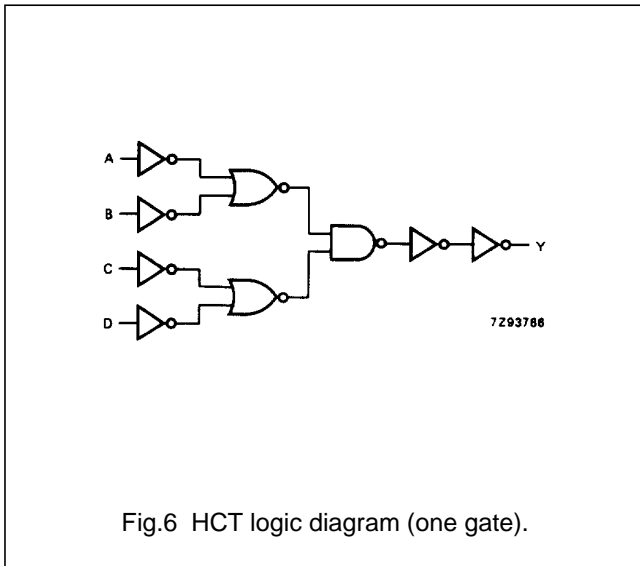
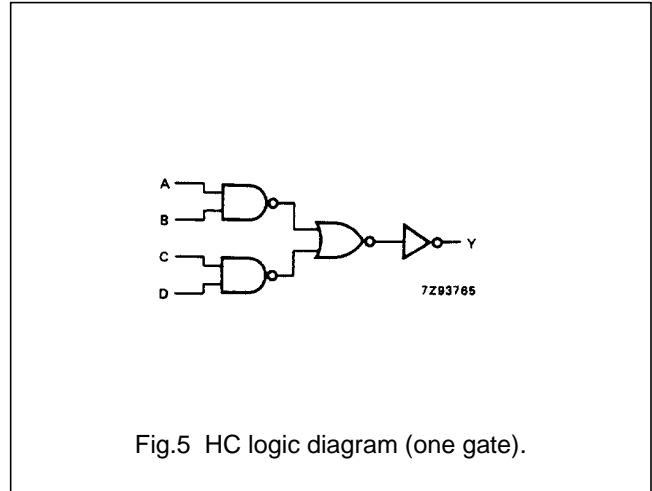
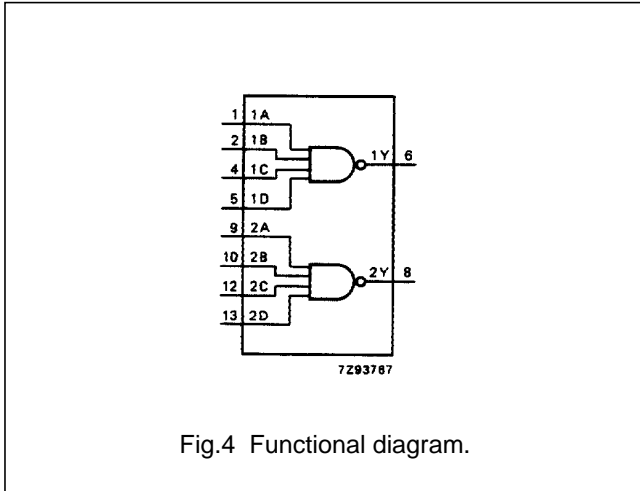
PIN DESCRIPTION

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



Dual 4-input NAND gate

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FUNCTION TABLE

INPUTS				OUTPUT
nA	nB	nC	nD	nY
L	X	X	X	H
X	L	X	X	H
X	X	L	X	H
X	X	X	L	H
H	H	H	H	L

Notes

1. H = HIGH voltage level
L = LOW voltage level
X = don't care

Dual 4-input NAND gate

74HC/HCT20

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)							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 nA, nB, nC, nD to nY		28 10 8	90 18 15		115 23 20		135 27 23	ns	2.0 4.5 6.0	Fig.7
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.7

Dual 4-input NAND gate

74HC/HCT20

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

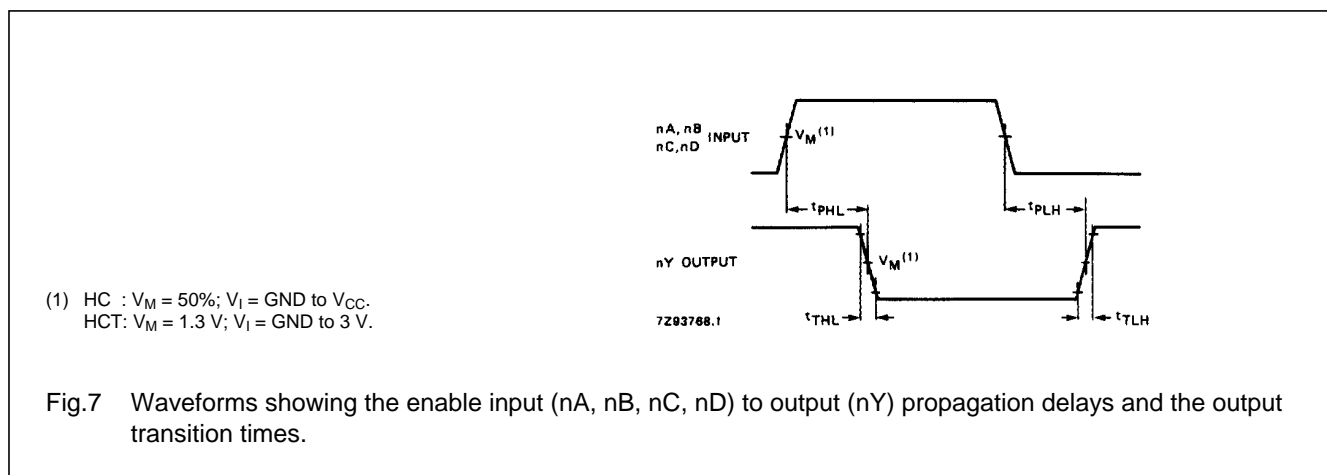
The value of additional quiescent supply current (ΔI_{CC}) for a unit load of 1 is given in the family specifications. To determine ΔI_{CC} per input, multiply this value by the unit load coefficient shown in the table below.

INPUT	UNIT LOAD COEFFICIENT
nA, nB, nC, nD	0.3

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 nA, nB, nC, nD to nY		16	28		35		42	ns	4.5	Fig.7	
t_{THL} / t_{TLH}	output transition time		7	15		19		22	ns	4.5	Fig.7	

AC WAVEFORMS**PACKAGE OUTLINES**

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

74HC/HCT20; Dual 4-input NAND gate

Information as of 2003-04-22

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General description


The 74HC/HCT20 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/HCT20 provide the 4-input NAND function.

Features




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

Datasheet

Type number	Title	Publication release date	Datasheet status	Page count	File size (kB)	Datasheet
74HC/HCT20	Dual 4-input NAND gate	12/1/1990	Product specification	6	35	 Download

Additional datasheet info

To complete the device datasheet with package and family information, also download the following PDF files. The "Logic Package Information" document is required to determine in which package(s) this device is available.

Document	Description
1  HCT_FAMILY_SPECIFICATIONS	HC/T Family Specifications, The IC06 74HC/HCT/HCMOS Logic Family Specifications
2  HCT_PACKAGE_INFO	HC/T Package Info, The IC06 74HC/HCT/HCMOS Logic Package Information
3  HCT_PACKAGE_OUTLINES	HC/T Package Outlines, The IC06 74HC/HCT/HCMOS Logic Package Outlines

□ Parametrics

Type number	Package	Description	Propagation Delay(ns)	Voltage	No. of Pins	Power Dissipation Considerations	Logic Switching Levels	Output Drive Capability
74HC20D	SOT108-1 (SO14)	Dual 4-Input NAND Gate	15	5 Volts +	14	Low Power or Battery Applications	CMOS	Low
74HC20DB	SOT337-1 (SSOP14)	Dual 4-Input NAND Gate	15	5 Volts +	14	Low Power or Battery Applications	CMOS	Low
74HC20N	SOT27-1 (DIP14)	Dual 4-Input NAND Gate	15	5 Volts +	14	Low Power or Battery Applications	CMOS	Low
74HC20PW	SOT402-1 (TSSOP14)	Dual 4-Input NAND Gate	15	5 Volts +	14	Low Power or Battery Applications	CMOS	Low
74HCT20D	SOT108-1 (SO14)	Dual 4-Input NAND Gate; TTL Enabled	15	5 Volts +	14	Low Power or Battery Applications	TTL	Low
74HCT20DB	SOT337-1 (SSOP14)	Dual 4-Input NAND Gate; TTL Enabled	15	5 Volts +	14	Low Power or Battery Applications	TTL	Low
74HCT20N	SOT27-1 (DIP14)	Dual 4-Input NAND Gate; TTL Enabled	15	5 Volts +	14	Low Power or Battery Applications	TTL	Low

□ Products, packages, availability and ordering

<u>Type number</u>	<u>North American type number</u>	<u>Ordering code (12NC)</u>	<u>Marking/Packing</u> Discretes packing info	<u>Package</u>	<u>Device status</u>	<u>Buy online</u>
74HC20D	74HC20D	9337 143 00652	Standard Marking * Bulk Pack, CECC	SOT108-1 (SO14)	Full production	order this <input type="checkbox"/>
	74HC20D-T	9337 143 00653	Standard Marking * Reel Pack, SMD, 13", CECC	SOT108-1 (SO14)	Full production	order this <input type="checkbox"/>
74HC20DB	74HC20DB	9351 886 20112	Standard Marking * Bulk Pack	SOT337-1 (SSOP14)	Full production	order this <input type="checkbox"/>
	74HC20DB-T	9351 886 20118	Standard Marking * Reel Pack, SMD, 13"	SOT337-1 (SSOP14)	Full production	order this <input type="checkbox"/>
74HC20N	74HC20N	9336 688 10652	Standard Marking * Bulk Pack, CECC	SOT27-1 (DIP14)	Full production	order this <input type="checkbox"/>

74HC20PW	74HC20PW	9351 889 90112	Standard Marking * Bulk Pack	SOT402-1 (TSSOP14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
	74HC20PW-T	9351 889 90118	Standard Marking * Reel Pack, SMD, 13"	SOT402-1 (TSSOP14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
74HCT20D	74HCT20D	9337 143 80652	Standard Marking * Bulk Pack, CECC	SOT108-1 (SO14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
	74HCT20D-T	9337 143 80653	Standard Marking * Reel Pack, SMD, 13", CECC	SOT108-1 (SO14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
74HCT20DB	74HCT20DB	9351 897 70112	Standard Marking * Bulk Pack	SOT337-1 (SSOP14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
	74HCT20DB-T	9351 897 70118	Standard Marking * Reel Pack, SMD, 13"	SOT337-1 (SSOP14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>
74HCT20N	74HCT20N	9336 689 40652	Standard Marking * Bulk Pack, CECC	SOT27-1 (DIP14)	Full production	<input type="text" value="order this"/> <input type="text" value="-"/>

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[74HC/HCT20](#) links to the similar products page containing an overview of products that are similar in function or related to the type number(s) as listed on this page. The similar products page includes products from the same catalog tree(s), relevant selection guides and products from the same functional category.

Support & tools

[HC/T Family Specifications, The IC06 74HC/HCT/HCMOS Logic Family Specifications](#)(date 01-Mar-98)

[HC/T User Guide](#)(date 01-Nov-97)

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