

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/HCT242

Quad bus transceiver; 3-state;
inverting

Product specification
File under Integrated Circuits, IC06

December 1990

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74HC/HCT242

FEATURES

- Inverting 3-state outputs
- 2-way asynchronous data bus communication
- Output capability: bus driver
- I_{CC} category: MSI

GENERAL DESCRIPTION

The 74HC/HCT242 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/HCT242 are quad bus transceivers featuring inverting 3-state bus compatible outputs in both send and receive directions.

They are designed for 4-line asynchronous 2-way data communications between data buses.

The output enable inputs ($\overline{OE}_A$ and OE_B) can be used to isolate the buses.

The “242” is similar to the “243” but has inverting outputs.

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 A_n to B_n ; B_n to A_n	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	7	10	ns
C_I	input capacitance		3.5	3.5	pF
$C_{I/O}$	input/output capacitance		10	10	pF
C_{PD}	power dissipation capacitance per transceiver	notes 1 and 2	29	32	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

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

C_L = output load capacitance in pF

V_{CC} = supply voltage in V

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

ORDERING INFORMATION

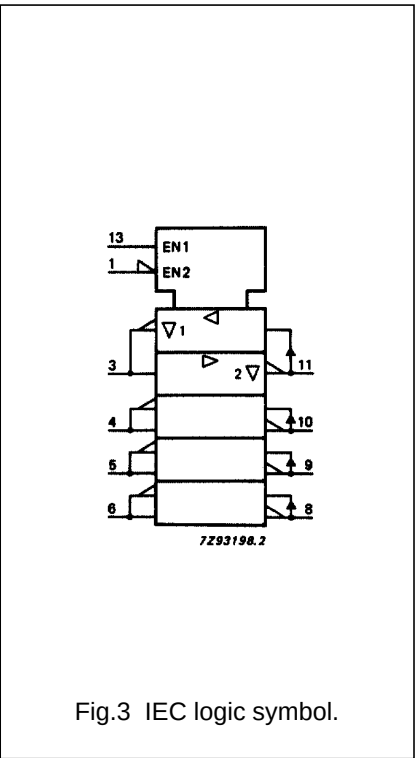
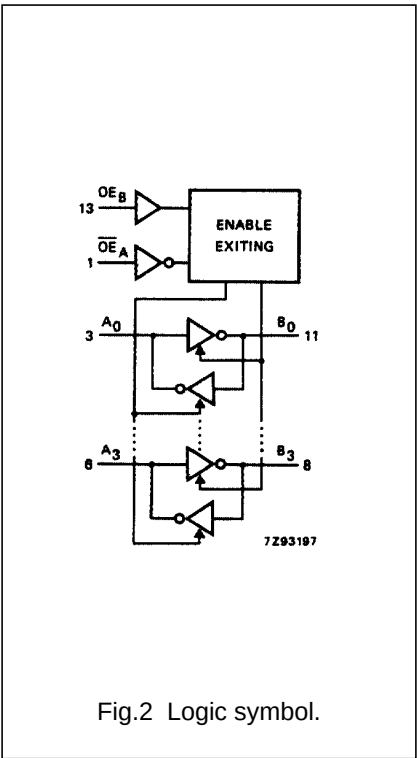
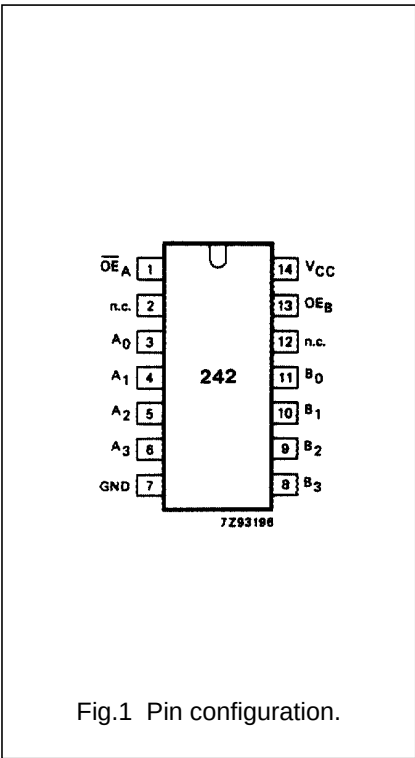
See “74HC/HCT/HCU/HCMOS Logic Package Information”.

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PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1	$\overline{OE_A}$	output enable input (active LOW)
2, 12	n.c.	not connected
3, 4, 5, 6	A_0 to A_3	data inputs/outputs
7	GND	ground (0 V)
11, 10, 9, 8	B_0 to B_3	data inputs/outputs
13	OE_B	output enable input
14	V_{CC}	positive supply voltage



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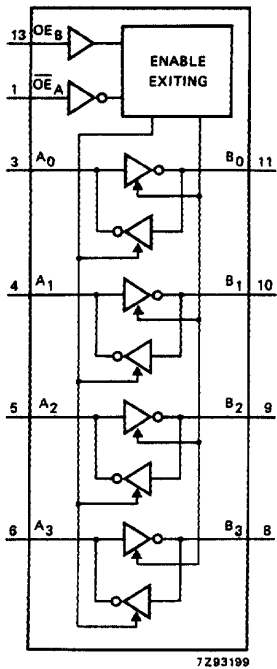


Fig.4 Functional diagram.

FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
$\overline{OE}_A$	OE_B	A_n	B_n
L	L	inputs	$B = \overline{A}$
H	L	Z	Z
L	H	Z	Z
H	H	$A = \overline{B}$	inputs

Note

- 1. H = HIGH voltage level
- L = LOW voltage level
- Z = high impedance OFF-state

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DC CHARACTERISTICS FOR 74HC

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver

I_{CC} category: MSI

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 _n to B _n ; B _n to A _n		25 9 7	90 18 15		115 23 20		135 27 23	ns	2.0 4.5 6.0	Fig.5
t _{PZH} / t _{PZL}	3-state output enable time OE _A to A _n or B _n ; OE _B to A _n or B _n		41 15 12	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Figs 6 and 7
t _{PHZ} / t _{PLZ}	3-state output disable time OE _A to A _n or B _n ; OE _B to A _n or B _n		52 19 15	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Figs 6 and 7
t _{THL} / t _{TLH}	output transition time		14 5 4	60 12 10		75 15 13		90 18 15	ns	2.0 4.5 6.0	Fig.5

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DC CHARACTERISTICS FOR 74HCT

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver

I_{CC} category: MSI

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
A _n	1.10
B _n	1.10
$\overline{OE}_A$	1.00
$\overline{OE}_B$	1.00

AC CHARACTERISTICS FOR 74HCT

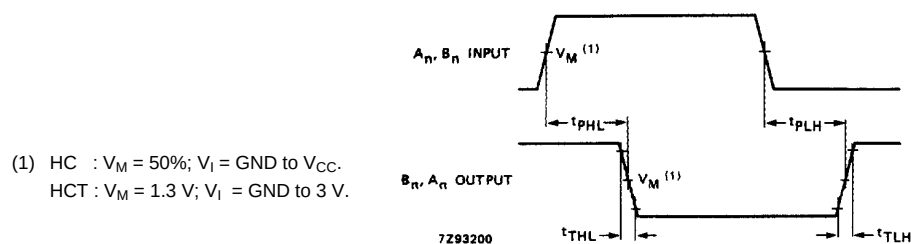
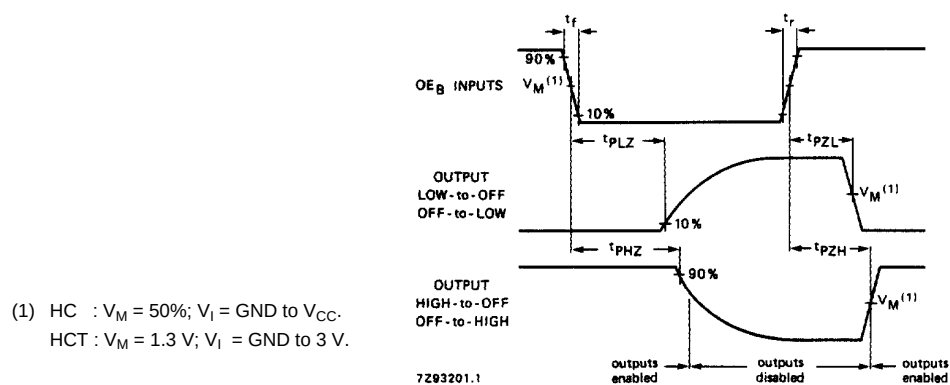
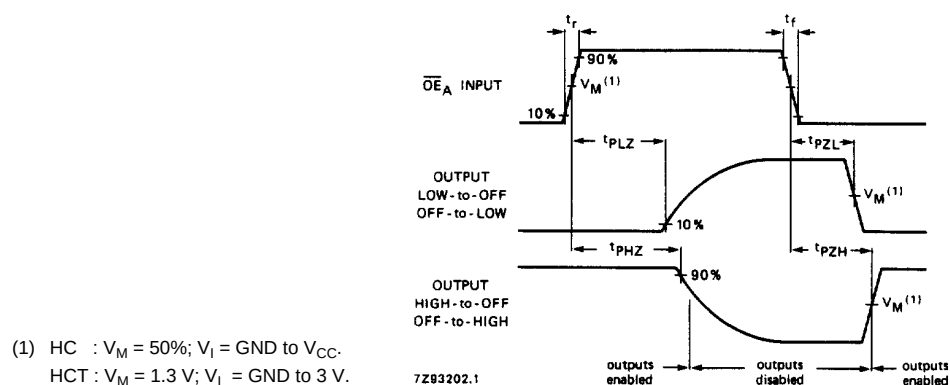
GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

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 _n to B _n ; B _n to A _n		12	20		25		30	ns	4.5	Fig.5
t _{PZH} / t _{PZL}	3-state output enable time OE _A to A _n or B _n ; OE _B to A _n or B _n		16	34		43		51	ns	4.5	Figs 6 and 7
t _{PHZ} / t _{PLZ}	3-state output disable time OE _A to A _n or B _n ; OE _B to A _n or B _n		22	35		44		53	ns	4.5	Figs 6 and 7
t _{THL} / t _{TLH}	output transition time		5	12		15		18	ns	4.5	Fig.5

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AC WAVEFORMS

Fig.5 Waveforms showing the input (A_n , B_n) to output (B_n , A_n) propagation delays and the output transition times.Fig.6 Waveforms showing the 3-state enable and disable times for input OE_B .Fig.7 Waveforms showing the 3-state enable and disable times for input OE_A .

PACKAGE OUTLINES

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