

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/HCT243

Quad bus transceiver; 3-state

Product specification
File under Integrated Circuits, IC06

December 1990

Quad bus transceiver; 3-state

74HC/HCT243

FEATURES

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

GENERAL DESCRIPTION

The 74HC/HCT243 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/HCT243 are quad bus transceivers featuring non-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 "243" is similar to the "242" but has non-inverting (true) outputs.

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 A _n to B _n ; B _n to A _n | C _L = 15 pF; V _{CC} = 5 V | 6 | 11 | 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 | 26 | 34 | 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 = GND to V_{CC}
For HCT the condition is V_I = GND to V_{CC} - 1.5 V

ORDERING INFORMATION

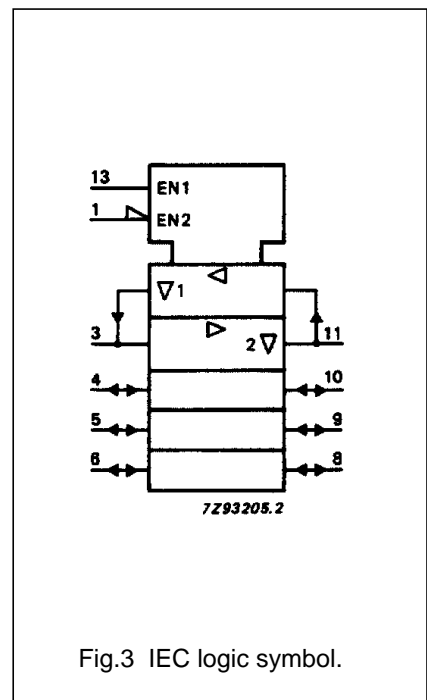
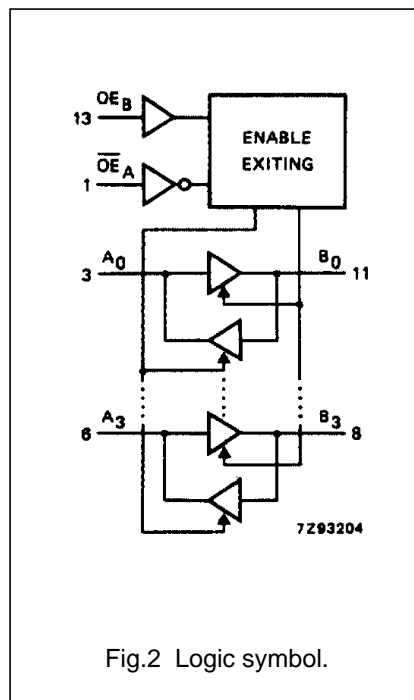
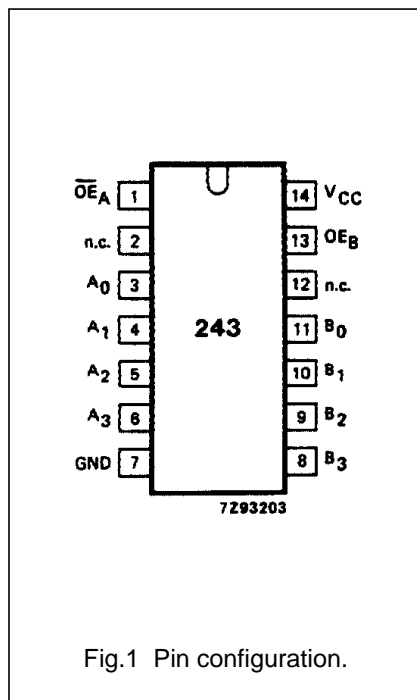
See "74HC/HCT/HCU/HCMOS Logic Package Information".

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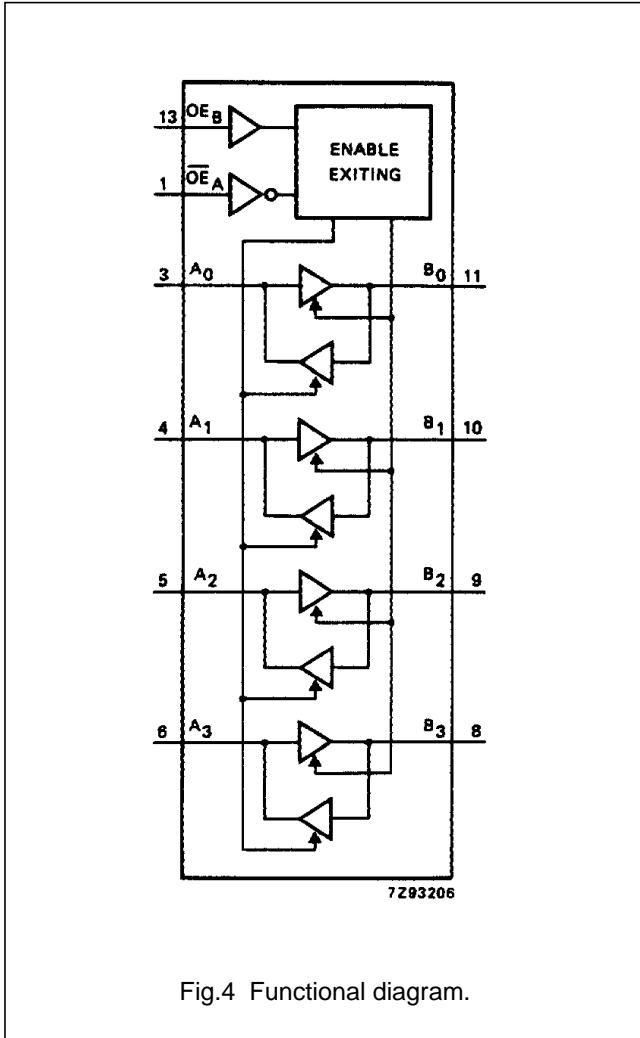
PIN DESCRIPTION

| 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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FUNCTION TABLE

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

Notes

- 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 | | 22 8 6 | 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 \overline{OE}_A to A _n or B _n ; OE _B to A _n or B _n | | 50 18 14 | 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 \overline{OE}_A to A _n or B _n ; OE _B to A _n or B _n | | 61 22 18 | 165 33 28 | | 205 41 35 | | 250 50 43 | 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

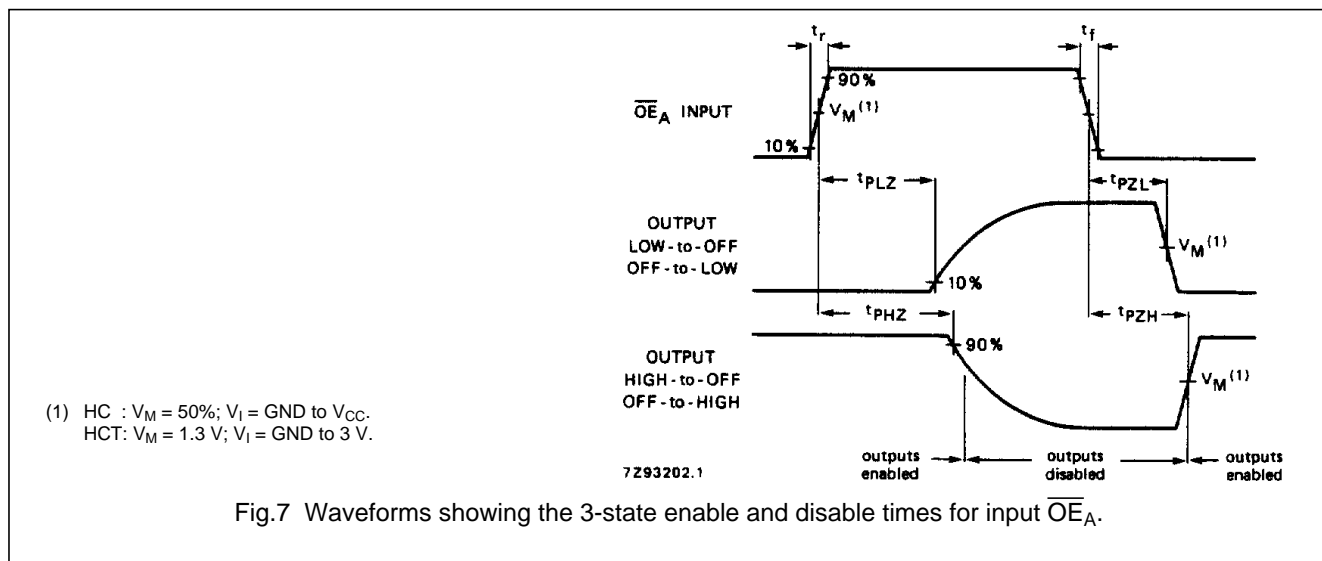
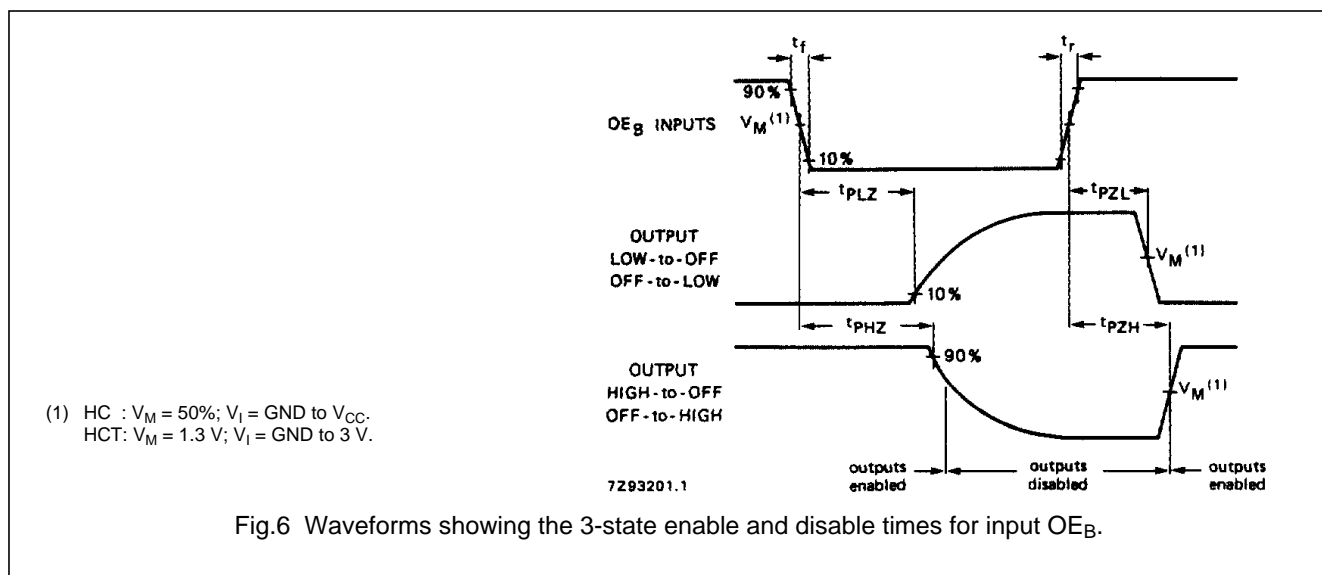
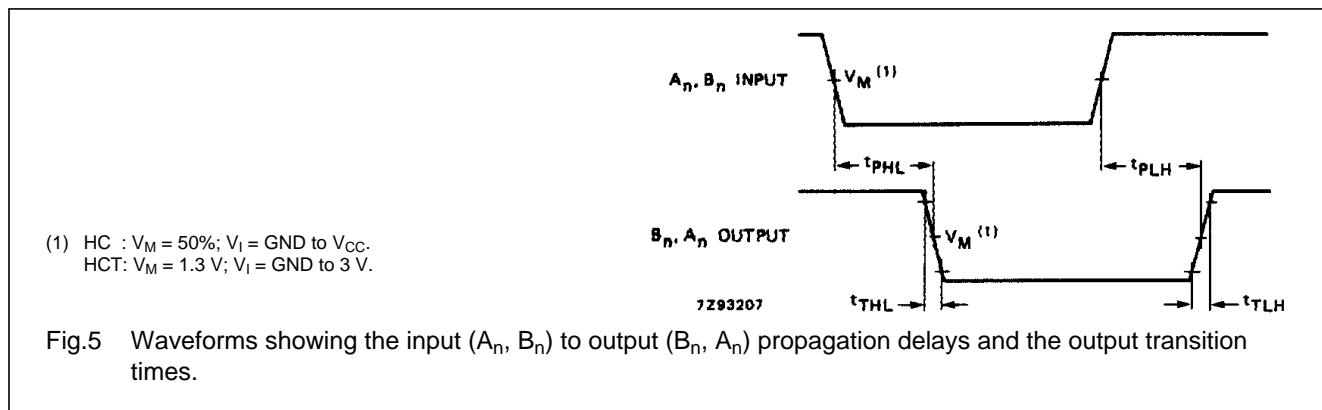
GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

| 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 | | 13 | 22 | | 28 | | 33 | ns | 4.5 | Fig.5 |
| t _{PZH} / t _{PZL} | 3-state output enable time \overline{OE}_A to A _n or B _n ; \overline{OE}_B to A _n or B _n | | 18 | 34 | | 43 | | 51 | ns | 4.5 | Figs 6 and 7 |
| t _{PHZ} / t _{PLZ} | 3-state output disable time \overline{OE}_A to A _n or B _n ; \overline{OE}_B to A _n or B _n | | 23 | 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



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PACKAGE OUTLINES

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