

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/HCT368

Hex buffer/line driver; 3-state;
inverting

Product specification
File under Integrated Circuits, IC06

December 1990

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74HC/HCT368

FEATURES

- Inverting outputs
- Output capability: bus driver
- I_{CC} category: MSI

The 74HC/HCT368 are hex inverting buffer/line drivers with 3-state outputs. The 3-state outputs (\overline{nY}) are controlled by the output enable inputs ($\overline{1OE}$, $\overline{2OE}$).

A HIGH on \overline{nOE} causes the outputs to assume a high impedance OFF-state.

The "368" is identical to the "367" but has inverting outputs.

GENERAL DESCRIPTION

The 74HC/HCT368 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.

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 to \overline{nY} | $C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$ | 9 | 11 | ns |
| C_I | input capacitance | | 3.5 | 3.5 | pF |
| C_{PD} | power dissipation capacitance per buffer | notes 1 and 2 | 30 | 30 | 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

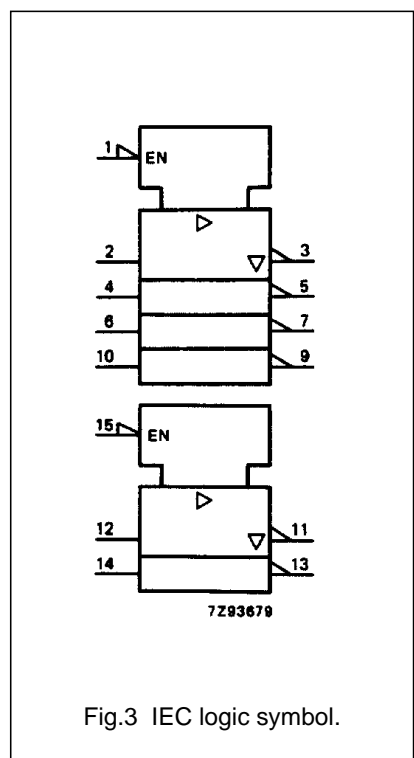
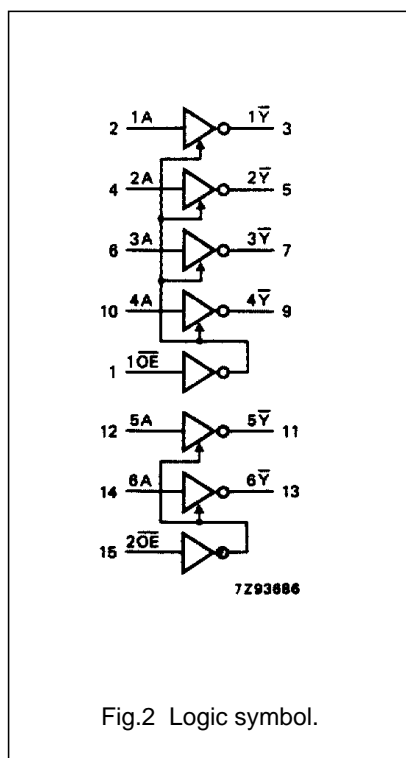
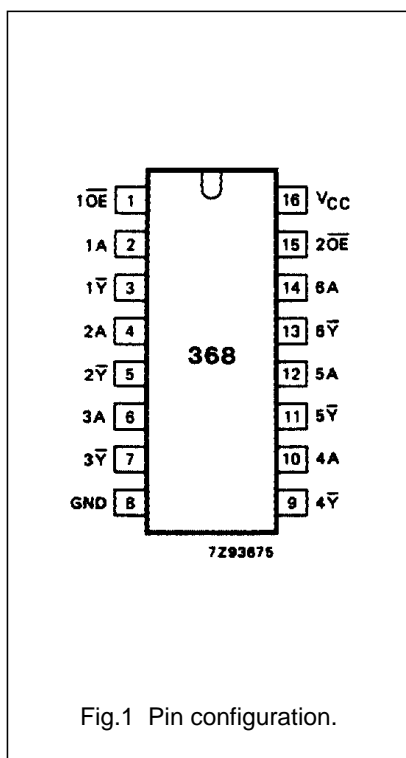
See "74HC/HCT/HCU/HCMOS Logic Package Information".

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PIN DESCRIPTION

| PIN NO. | SYMBOL | NAME AND FUNCTION |
|---------------------|------------------------------------|-----------------------------------|
| 1, 15 | $\overline{1OE}, \overline{2OE}$ | output enable inputs (active LOW) |
| 2, 4, 6, 10, 12, 14 | 1A to 6A | data inputs |
| 3, 5, 7, 9, 11, 13 | $1\overline{Y}$ to $6\overline{Y}$ | data outputs |
| 8 | GND | ground (0 V) |
| 16 | V_{CC} | positive supply voltage |



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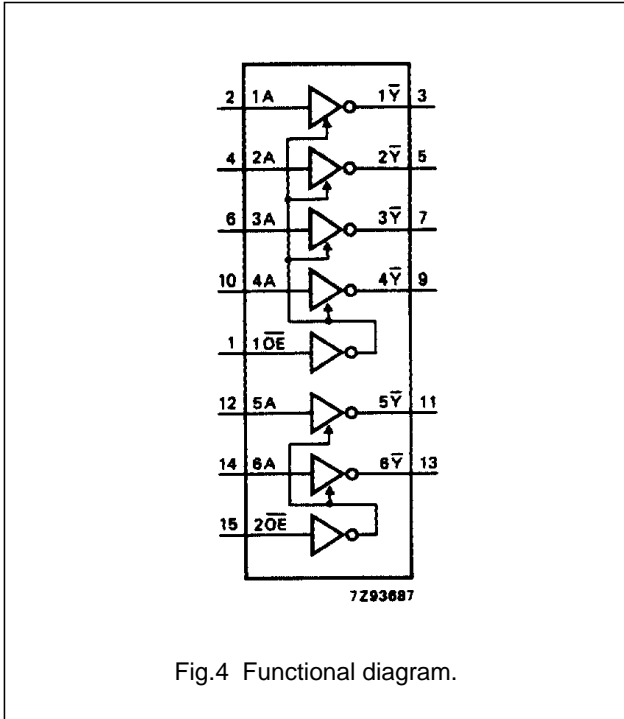


Fig.4 Functional diagram.

FUNCTION TABLE

| INPUTS | | OUTPUTS |
|------------------|----|-----------------|
| \overline{nOE} | nA | \overline{nY} |
| L | L | H |
| L | H | L |
| H | X | Z |

Note

1. H = HIGH voltage level
 L = LOW voltage level
 X = don't care
 Z = high impedance OFF-state

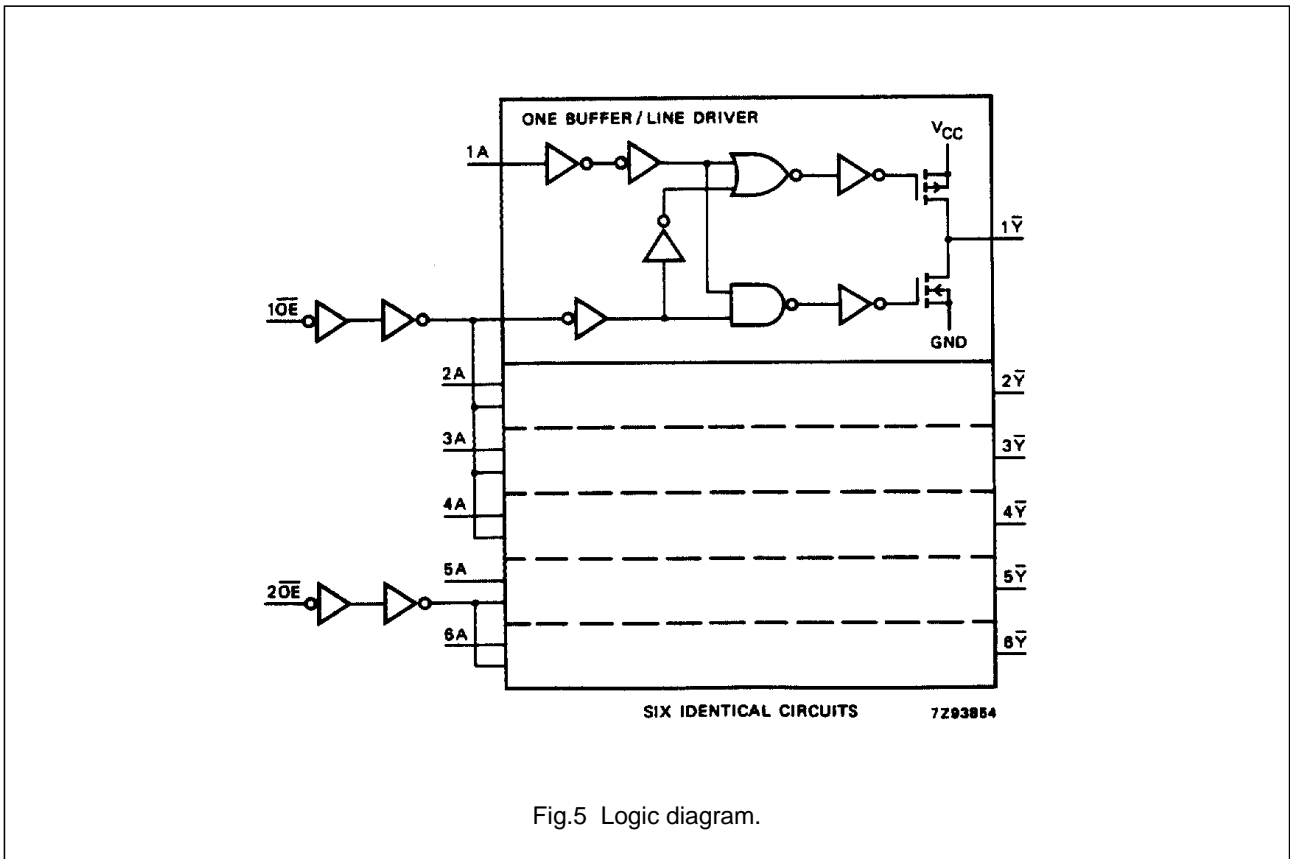


Fig.5 Logic diagram.

Hex buffer/line driver; 3-state; inverting

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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 nA to nY | | 30 11 9 | 95 19 16 | | 120 24 20 | | 145 29 25 | ns | 2.0 4.5 6.0 | Fig.6 |
| t _{PZH} / t _{PZL} | 3-state output enable time nOE to nY | | 41 15 12 | 150 30 26 | | 190 38 33 | | 225 45 38 | ns | 2.0 4.5 6.0 | Fig.7 |
| t _{PHZ} / t _{PLZ} | 3-state output disable time nOE to nY | | 55 20 16 | 150 30 26 | | 190 38 33 | | 225 45 38 | ns | 2.0 4.5 6.0 | Fig.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.6 |

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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 |
|------------------|-----------------------|
| $\overline{1OE}$ | 1.00 |
| $\overline{2OE}$ | 0.90 |
| nA | 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 nA to n \bar{Y} | | 13 | 24 | | 30 | | 36 | ns | 4.5 | Fig.6 |
| t _{PZH} / t _{PZL} | 3-state output enable time n \overline{OE} to n \bar{Y} | | 17 | 35 | | 44 | | 53 | ns | 4.5 | Fig.7 |
| t _{PHZ} / t _{PLZ} | 3-state output disable time n \overline{OE} to n \bar{Y} | | 20 | 35 | | 44 | | 53 | ns | 4.5 | Fig.7 |
| t _{THL} / t _{TLH} | output transition time | | 5 | 12 | | 15 | | 18 | ns | 4.5 | Fig.6 |

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AC WAVEFORMS

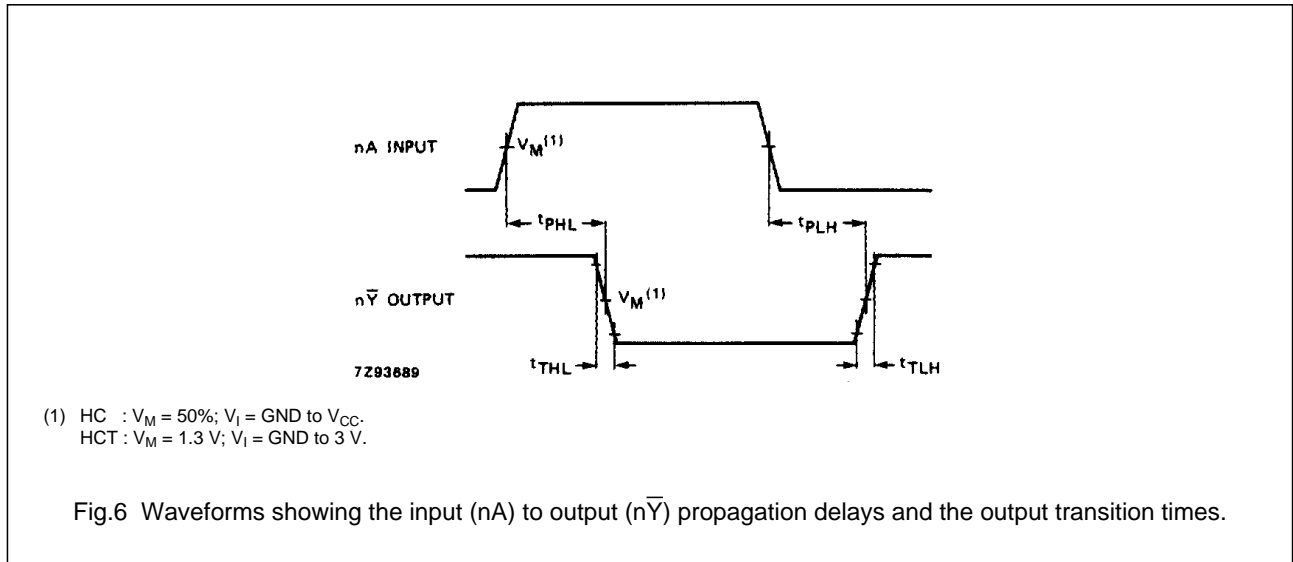


Fig.6 Waveforms showing the input (nA) to output (nY) propagation delays and the output transition times.

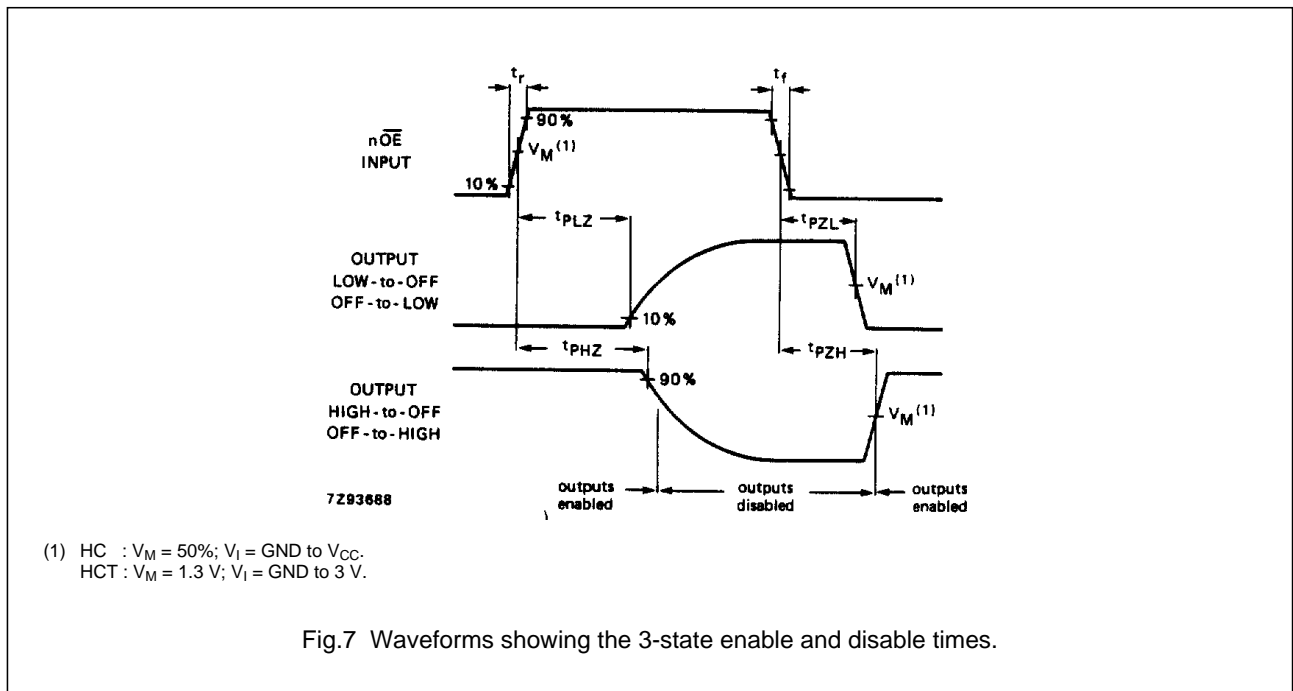


Fig.7 Waveforms showing the 3-state enable and disable times.

PACKAGE OUTLINES

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