

QUAD BUFFER/LINE DRIVER; 3-STATE

FEATURES

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

GENERAL DESCRIPTION

The 74HC/HCT126 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 HC/HCT126 are four non-inverting buffer/line drivers with 3-state outputs. The 3-state outputs (nY) are controlled by the output enable input (nOE). A LOW at nOE causes the outputs to assume a HIGH impedance OFF-state.

The "126" is identical to the "125" but has active HIGH enable inputs.

| SYMBOL | PARAMETER | CONDITIONS | TYPICAL | | UNIT |
|--|---|---|---------|-----|------|
| | | | HC | HCT | |
| t _{pHL} / t _{pLH} | propagation delay nA to nY | C _L = 15 pF V _{CC} = 5 V | 9 | 11 | ns |
| C _I | input capacitance | | 3.5 | 3.5 | pF |
| C _{PD} | power dissipation capacitance per buffer | notes 1 and 2 | 23 | 24 | pF |

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

Notes

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

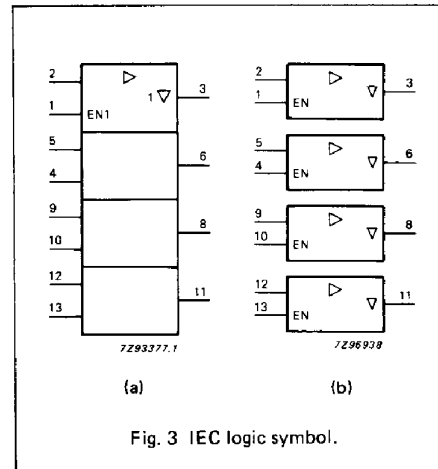
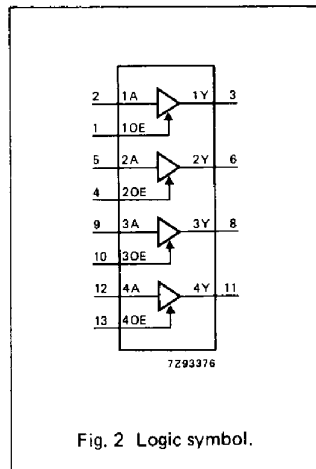
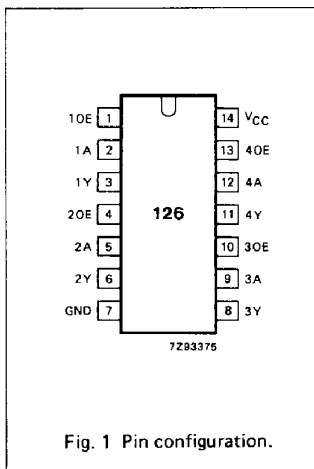
$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$$
 where:
 f_i = input frequency in MHz C_L = output load capacitance in pF
 f_o = output frequency in MHz V_{CC} = supply voltage in V
 Σ (C_L × V_{CC}² × f_o) = sum of outputs
2. For HC the condition is V_I = GND to V_{CC}
 For HCT the condition is V_I = GND to V_{CC} - 1.5 V

PACKAGE OUTLINES

- 14-lead DIL; plastic (SOT27)
- 14-lead mini pack; plastic (SO14; SOT108A)

PIN DESCRIPTION

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



74HC/HCT126
MSI

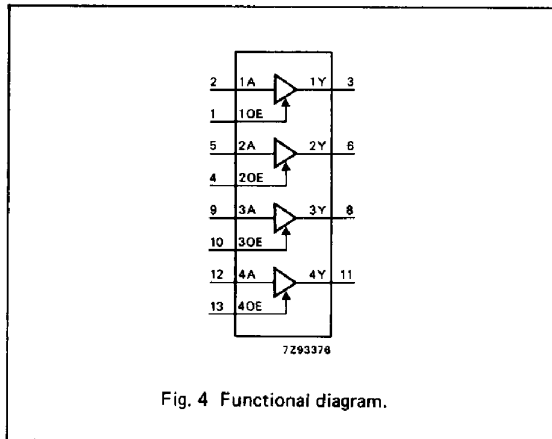


Fig. 4 Functional diagram.

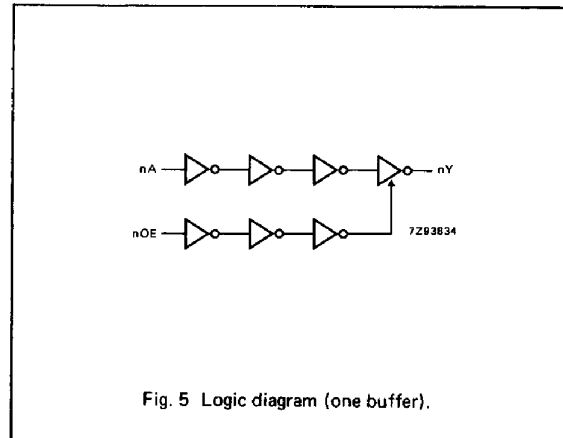


Fig. 5 Logic diagram (one buffer).

FUNCTION TABLE

| INPUTS | | OUTPUT |
|--------|----|--------|
| nOE | nA | nY |
| H | L | L |
| H | H | H |
| L | X | Z |

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

DC CHARACTERISTICS FOR 74HC

For the DC characteristics see chapter "HCMOS family characteristics", section "Family specifications".

Output capability: bus driver

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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 | 100 20 17 | | 125 25 21 | | 150 30 26 | ns | 2.0 4.5 6.0 | Fig. 6 | |
| t _{PZH} / t _{PZL} | 3-state output enable time nOE to nY | | 41 15 12 | 125 25 21 | | 155 31 26 | | 190 38 32 | ns | 2.0 4.5 6.0 | Fig. 7 | |
| t _{PHZ} / t _{PLZ} | 3-state output disable time nOE to nY | | 41 15 12 | 125 25 21 | | 155 31 26 | | 190 38 32 | 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 | |

DC CHARACTERISTICS FOR 74HCT

For the DC characteristics see chapter "HCMOS family characteristics", section "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.

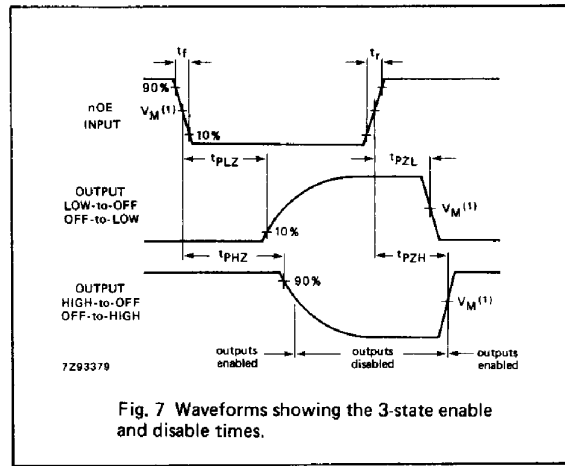
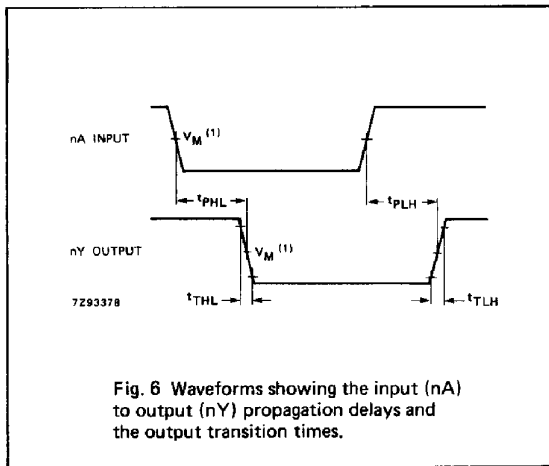
| INPUT | UNIT LOAD COEFFICIENT |
|---------|-----------------------|
| nA, nOE | 1.00 |

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 nY | | 14 | 24 | | 30 | | 36 | ns | 4.5 | Fig. 6 |
| t _{PZH} / t _{PZL} | 3-state output enable time nOE to nY | | 13 | 25 | | 31 | | 38 | ns | 4.5 | Fig. 7 |
| t _{PHZ} / t _{PLZ} | 3-state output disable time nOE to nY | | 18 | 28 | | 35 | | 42 | ns | 4.5 | Fig. 7 |
| t _{THL} / t _{TLH} | output transition time | | 5 | 12 | | 15 | | 18 | ns | 4.5 | Fig. 6 |

AC WAVEFORMS



Note to AC waveforms

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