

HEX BUFFER/LINE DRIVER; 3-STATE

FEATURES

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

GENERAL DESCRIPTION

The 74HC/HCT365 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LS TTL). They are specified in compliance with JEDEC standard no. 7A. The 74HC/HCT365 are hex non-inverting buffer/line drivers with 3-state outputs. The 3-state outputs (nY) are controlled by the output enable inputs (\overline{OE}_1 , \overline{OE}_2).

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

The "365" is identical to the "366" but has non-inverting outputs.

| SYMBOL | PARAMETER | CONDITIONS | TYPICAL | | UNIT |
|-------------------|---|---|---------|-----|------|
| | | | HC | HCT | |
| t_{PHL}/t_{PLH} | propagation delay nA to 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 | 40 | 40 | pF |

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

Notes

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

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

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

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

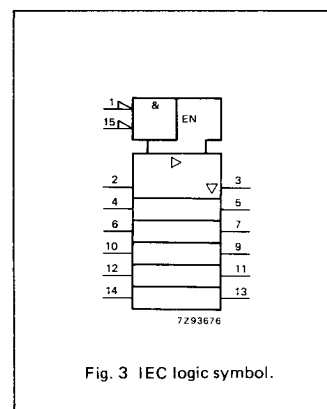
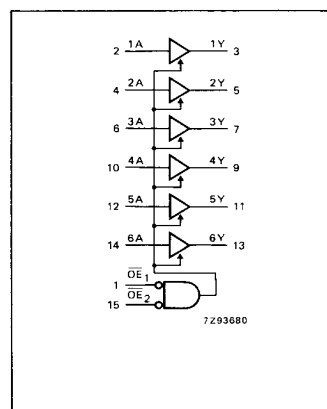
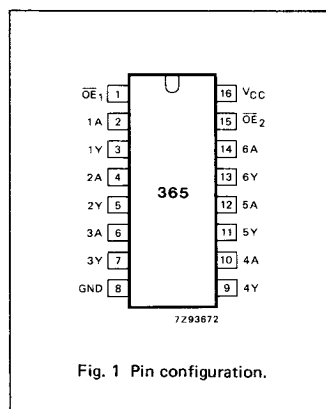
PACKAGE OUTLINES

16-lead DIL; plastic (SOT38Z).

16-lead mini-pack; plastic (SO16; SOT109A).

PIN DESCRIPTION

| PIN NO. | SYMBOL | NAME AND FUNCTION |
|---------------------|---------------------------------------|-----------------------------------|
| 1, 15 | \overline{OE}_1 , \overline{OE}_2 | output enable inputs (active LOW) |
| 2, 4, 6, 10, 12, 14 | 1A to 6A | data inputs |
| 3, 5, 7, 9, 11, 13 | 1Y to 6Y | data outputs |
| 8 | GND | ground (0 V) |
| 16 | V_{CC} | positive supply voltage |



FUNCTION TABLE

| INPUTS | | | OUTPUT |
|-------------------|-------------------|----|--------|
| \overline{OE}_1 | \overline{OE}_2 | nA | nY |
| L | L | L | L |
| L | L | H | H |
| X | H | X | Z |
| H | X | X | Z |

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

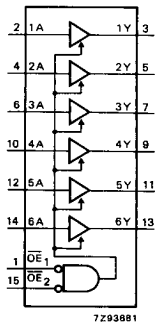


Fig. 4 Functional diagram.

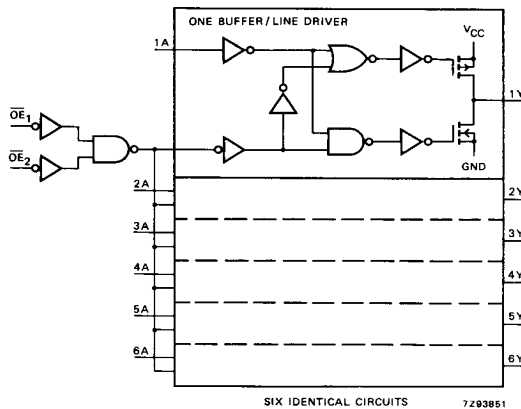


Fig. 5 Logic diagram.

DC CHARACTERISTICS FOR 74HC

For the DC characteristics see chapter "HCMOS family characteristics", section "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 OE _n to nY | | 47 17 14 | 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 OE _n to nY | | 61 22 18 | 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 | |

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.

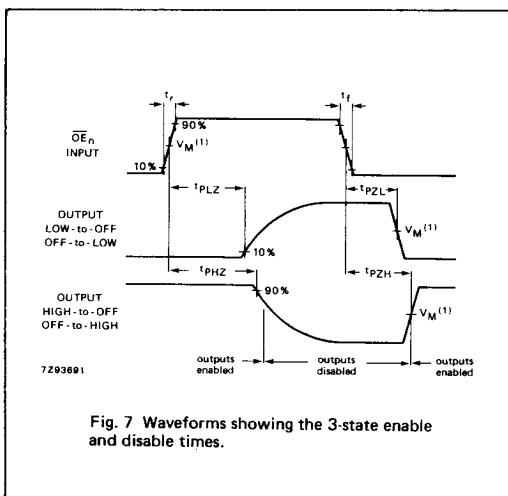
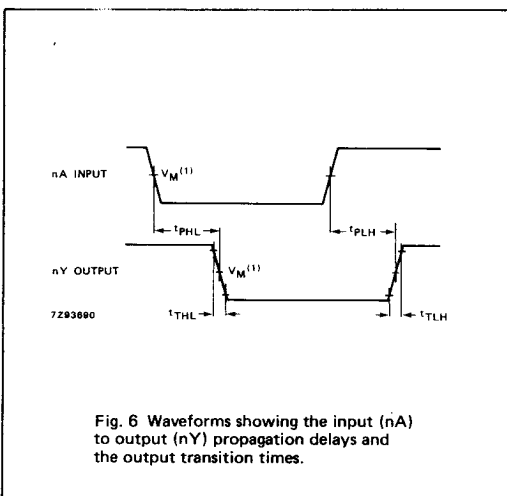
| INPUT | UNIT LOAD COEFFICIENT |
|-----------------|--------------------------|
| OE ₁ | 1.00 |
| OE ₂ | 0.90 |
| nA | 1.00 |

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 nY | | 14 | 25 | | 31 | | 38 | ns | 4.5 | Fig. 6 |
| t _{PZH} / t _{PZL} | 3-state output enable time OE _n to nY | | 18 | 35 | | 44 | | 53 | ns | 4.5 | Fig. 7 |
| t _{PHZ} / t _{PLZ} | 3-state output disable time OE _n to nY | | 23 | 35 | | 44 | | 53 | 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: $V_M = 1.3$ V; $V_I = \text{GND to } 3$ V.