

TRIPLE 3-INPUT OR GATE

FEATURES

- Output capability: standard
- I_{CC} category: SSI

GENERAL DESCRIPTION

The 74HC/HCT4075 are high-speed Si-gate CMOS devices and are pin compatible with the "4075" of the "4000B" series. They are specified in compliance with JEDEC standard no. 7A. The 74HC/HCT4075 provide the 3-input OR function.

| SYMBOL | PARAMETER | CONDITIONS | TYPICAL | | UNIT |
|--|---|---|---------|-----|------|
| | | | HC | HCT | |
| t _{PHL} / t _{PLH} | propagation delay nA, nB, nC to nY | C _L = 15 pF V _{CC} = 5 V | 8 | 10 | ns |
| C _I | input capacitance | | 3.5 | 3.5 | pF |
| C _{PD} | power dissipation capacitance per gate | notes 1 and 2 | 28 | 32 | pF |

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

Notes

1. P_D 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
 ∑ (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 |
|----------|-----------------|-------------------------|
| 3, 1, 11 | 1A to 3A | data inputs |
| 4, 2, 12 | 1B to 3B | data inputs |
| 5, 8, 13 | 1C to 3C | data inputs |
| 6, 9, 10 | 1Y to 3Y | data outputs |
| 7 | GND | ground (0 V) |
| 14 | V _{CC} | positive supply voltage |

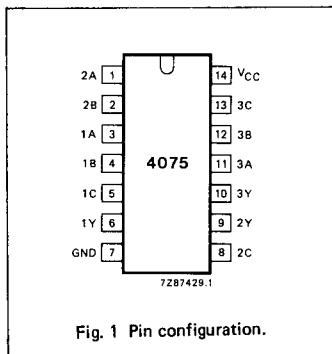


Fig. 1 Pin configuration.

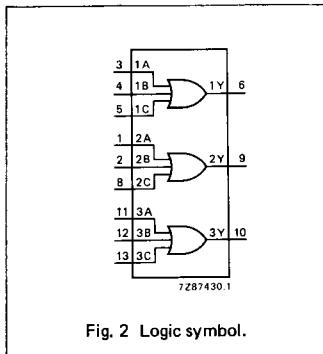


Fig. 2 Logic symbol.

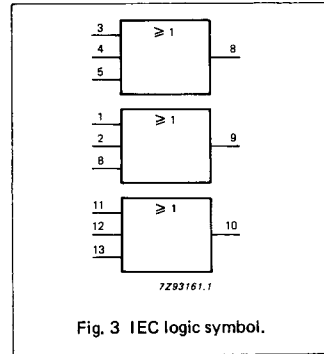


Fig. 3 IEC logic symbol.

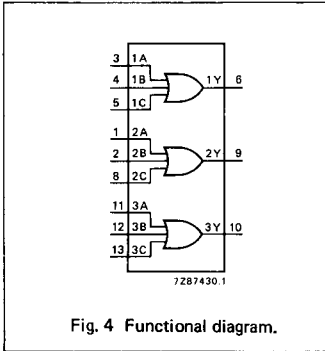


Fig. 4 Functional diagram.

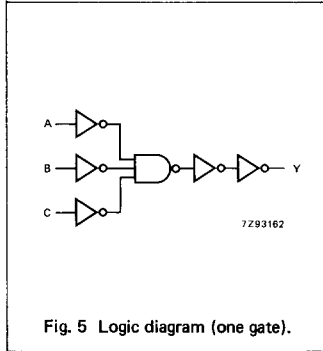


Fig. 5 Logic diagram (one gate).

FUNCTION TABLE

| INPUTS | | | OUTPUT |
|--------|----|----|--------|
| nA | nB | nC | nY |
| L | L | L | L |
| H | X | X | H |
| X | H | X | H |
| X | X | H | H |

H = HIGH voltage level
L = LOW voltage level
X = don't care

DC CHARACTERISTICS FOR 74HC

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

Output capability: standard
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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, nB, nC to nY | | 28 10 8 | 100 20 17 | | 125 25 21 | | 150 30 26 | ns | 2.0 4.5 6.0 | Fig. 6 |
| t _{THL} / t _{TLH} | output transition time | | 19 7 6 | 75 15 13 | | 95 19 16 | | 110 22 19 | 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: standard

I_{CC} category: SSI

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, nB, nC | 1.50 |

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, nB, nC to nY | | 12 | 24 | | 30 | | 36 | ns | 4.5 | Fig. 6 |
| t _{THL} / t _{TLH} | output transition time | | 7 | 15 | | 19 | | 22 | ns | 4.5 | Fig. 6 |

AC WAVEFORMS

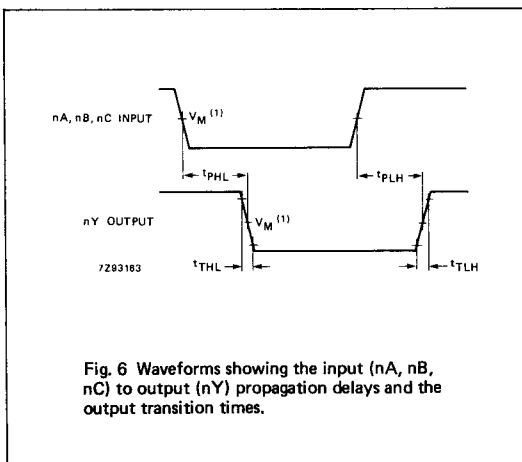


Fig. 6 Waveforms showing the input (nA, nB, nC) to output (nY) propagation delays and the output transition times.

Note to AC waveforms

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