

# 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

## **74HC58** Dual AND-OR gate

Product specification  
File under Integrated Circuits, IC06

December 1990

## Dual AND-OR gate

74HC58

## FEATURES

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

## GENERAL DESCRIPTION

The 74HC58 is a high-speed Si-gate CMOS device and is pin compatible with low power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard no. 7A.

The "58" provides two sections of AND-OR gates. One section contains a 2-wide, 3-input (1A to 1F) AND-OR gate and the second section contains a 2-wide, 2-input (2A to 2D) AND-OR gate.

## QUICK REFERENCE DATA

GND = 0 V;  $T_{amb} = 15\text{ }^{\circ}\text{C}$ ;  $t_r = t_f = 6\text{ ns}$

| SYMBOL            | PARAMETER                              | CONDITIONS                                   | TYPICAL | UNIT |
|-------------------|--|--|---------|------|
|                   |  |  | HC      |      |
| $t_{PHL}/t_{PLH}$ | propagation delay                      | $C_L = 15\text{ pF}$ ; $V_{CC} = 5\text{ V}$ |         |      |
|                   | 1n to 1Y                               |  | 11      | ns   |
|                   | 2n to 2Y                               |  | 9       | ns   |
| $C_I$             | input capacitance                      |  | 3.5     | pF   |
| $C_{PD}$          | power dissipation capacitance per gate | notes 1 and 2                                | 18      | pF   |

## Notes

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ):

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

$f_i$  = input frequency in MHz

$f_o$  = output frequency in MHz

$C_L$  = output load capacitance in pF

$V_{CC}$  = supply voltage in V

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

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

## ORDERING INFORMATION

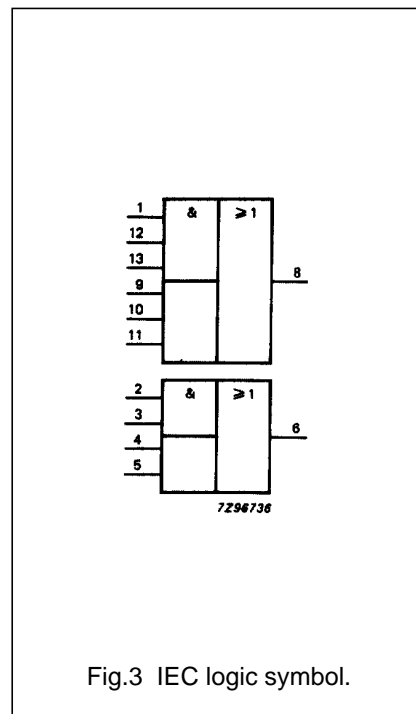
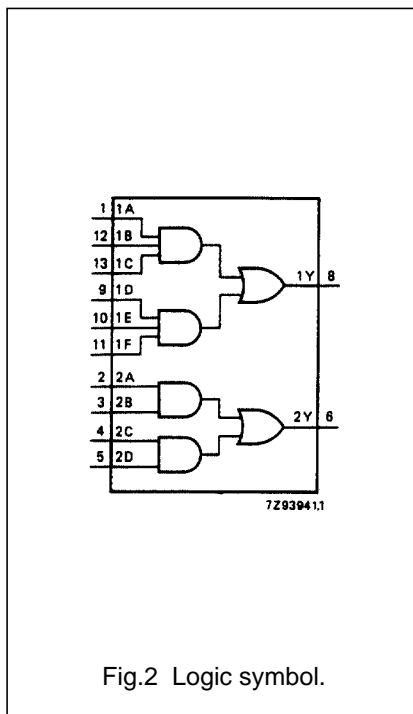
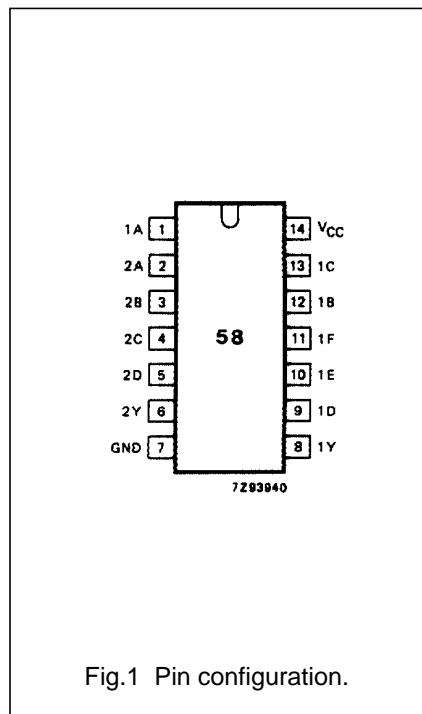
See "74HC/HCT/HCU/HCMOS Logic Package Information".

# Dual AND-OR gate

# 74HC58

## PIN DESCRIPTION

| PIN NO.              | SYMBOL          | NAME AND FUNCTION       |
|----------------------|-----------------|-------------------------|
| 1, 12, 13, 9, 10, 11 | 1A to 1F        | data inputs             |
| 2, 3, 4, 5           | 2A to 2D        | data inputs             |
| 8, 6                 | 1Y, 2Y          | data outputs            |
| 7                    | GND             | ground (0 V)            |
| 14                   | V <sub>CC</sub> | positive supply voltage |



Dual AND-OR gate

74HC58

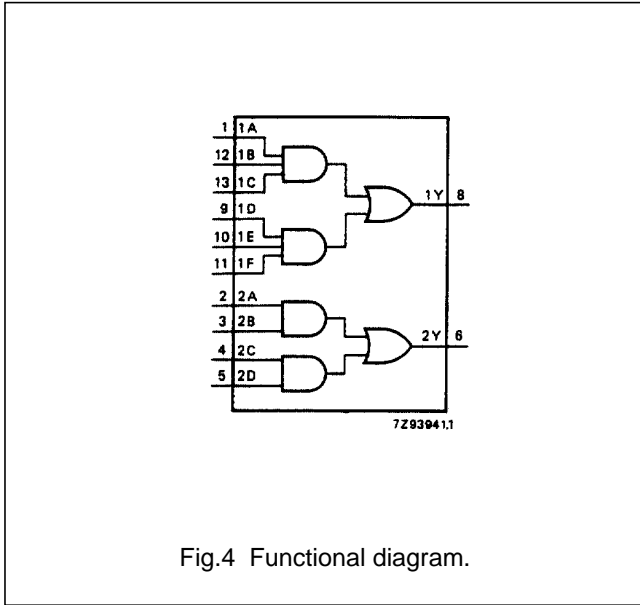


Fig.4 Functional diagram.

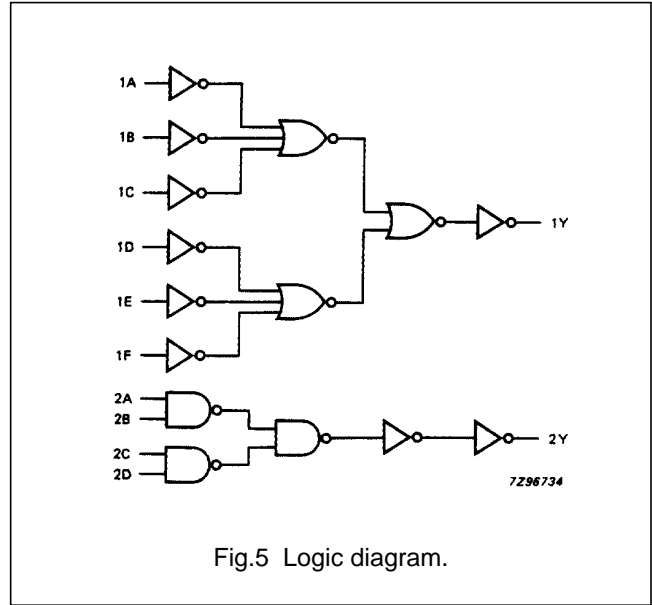


Fig.5 Logic diagram.

FUNCTION TABLE (1)

| INPUTS |    |    |    |    |    | OUTPUT |
|--------|----|----|----|----|----|--------|
| 1A     | 1B | 1C | 1D | 1E | 1F | 1Y     |
| L      | X  | X  | L  | X  | X  | L      |
| L      | X  | X  | X  | L  | X  | L      |
| L      | X  | X  | X  | X  | L  | L      |
| X      | L  | X  | L  | X  | X  | L      |
| X      | L  | X  | X  | L  | X  | L      |
| X      | L  | X  | X  | X  | L  | L      |
| X      | X  | L  | L  | X  | X  | L      |
| X      | X  | L  | X  | L  | X  | L      |
| X      | X  | L  | X  | X  | L  | L      |
| X      | X  | X  | H  | H  | H  | H      |
| X      | X  | X  | H  | H  | H  | H      |
| H      | H  | H  | X  | X  | X  | H      |

| INPUTS |    |    |    | OUTPUT |
|--------|----|----|----|--------|
| 2A     | 2B | 2C | 2D | 2Y     |
| L      | X  | L  | X  | L      |
| L      | X  | X  | L  | L      |
| X      | L  | L  | X  | L      |
| X      | L  | X  | L  | L      |
| X      | X  | H  | H  | H      |
| H      | H  | X  | X  | H      |

Note

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

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## DC CHARACTERISTICS FOR 74HC

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: standard

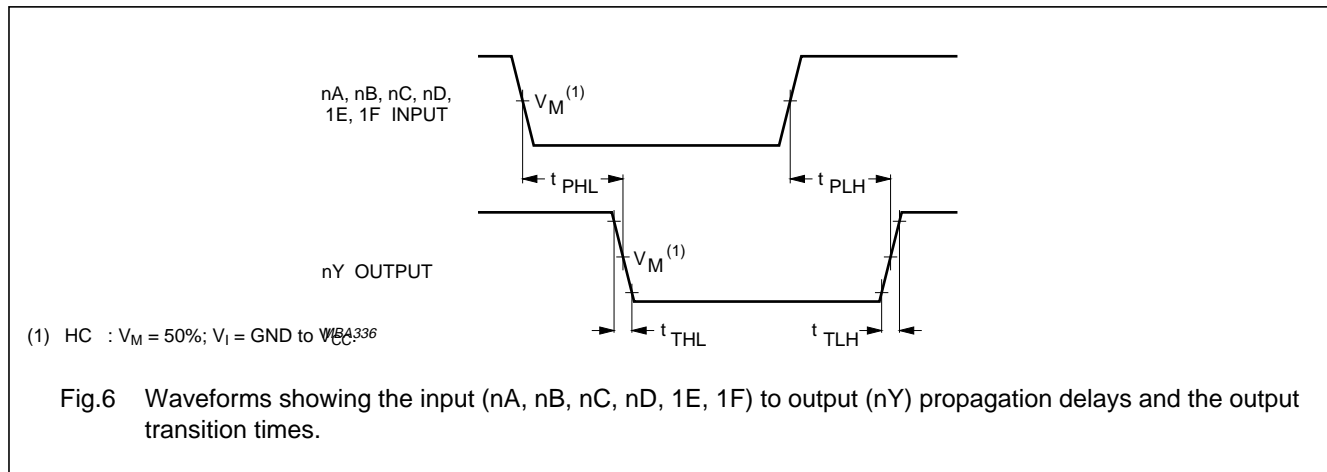
I<sub>CC</sub> category: SSI

## AC CHARACTERISTICS FOR 74HC

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

| SYMBOL                              | PARAMETER  | T <sub>amb</sub> (°C) |                |                 |            |                 |             | UNIT            | TEST CONDITIONS     |                   |       |
|-------------------------------------|--|-----------------------|----------------|-----------------|------------|-----------------|-------------|-----------------|---------------------|-------------------|-------|
|                                     |  | 74HC                  |                |                 |            |                 |             |                 | V <sub>CC</sub> (V) | WAVEFORMS         |       |
|                                     |  | +25                   |                |                 | -40 to +85 |                 | -40 to +125 |                 |                     |                   |       |
|                                     |  | min.                  | typ.           | max.            | min.       | max.            | min.        |                 |                     |                   | max.  |
| t <sub>PHL</sub> / t <sub>PLH</sub> | propagation delay<br>1A,1B,1C,1D,1E,<br>1F to 1Y |                       | 36<br>13<br>10 | 115<br>23<br>20 |            | 145<br>29<br>25 |             | 175<br>35<br>30 | ns                  | 2.0<br>4.5<br>6.0 | Fig.6 |
| t <sub>PHL</sub> / t <sub>PLH</sub> | propagation delay<br>2A,2B,2C,2D to 2Y           |                       | 30<br>11<br>9  | 100<br>20<br>17 |            | 125<br>25<br>21 |             | 150<br>30<br>26 | ns                  | 2.0<br>4.5<br>6.0 | Fig.6 |
| t <sub>THL</sub> / t <sub>TLH</sub> | output transition<br>time                        |                       | 19<br>7<br>6   | 75<br>15<br>13  |            | 95<br>19<br>16  |             | 110<br>22<br>19 | ns                  | 2.0<br>4.5<br>6.0 | Fig.6 |

## AC WAVEFORMS



## PACKAGE OUTLINES

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