

## INTEGRATED CIRCUITS

# DATA SHEET

For a complete data sheet, please also download:

- The IC04 LOCMOS HE4000B Logic Family Specifications HEF, HEC
- The IC04 LOCMOS HE4000B Logic Package Outlines/Information HEF, HEC

## HEF4011B

### gates

### Quadruple 2-input NAND gate

Product specification  
File under Integrated Circuits, IC04

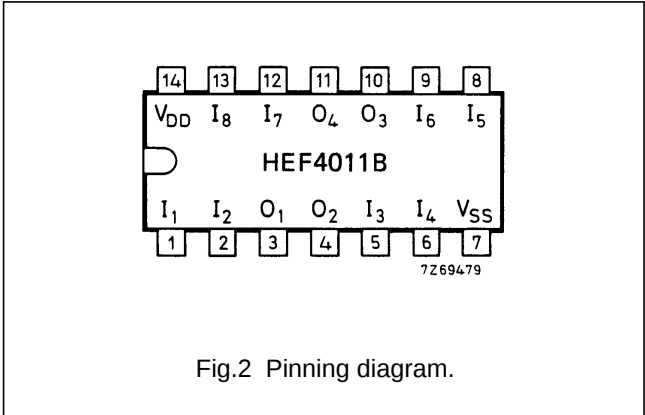
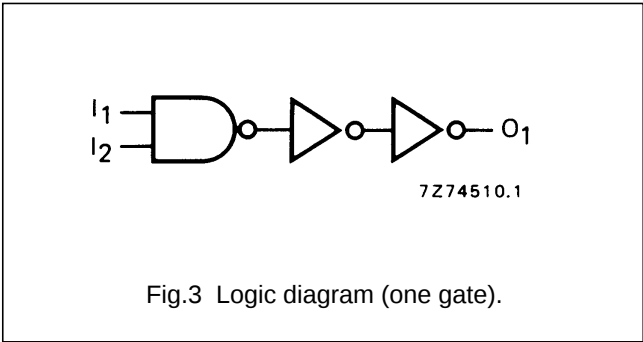
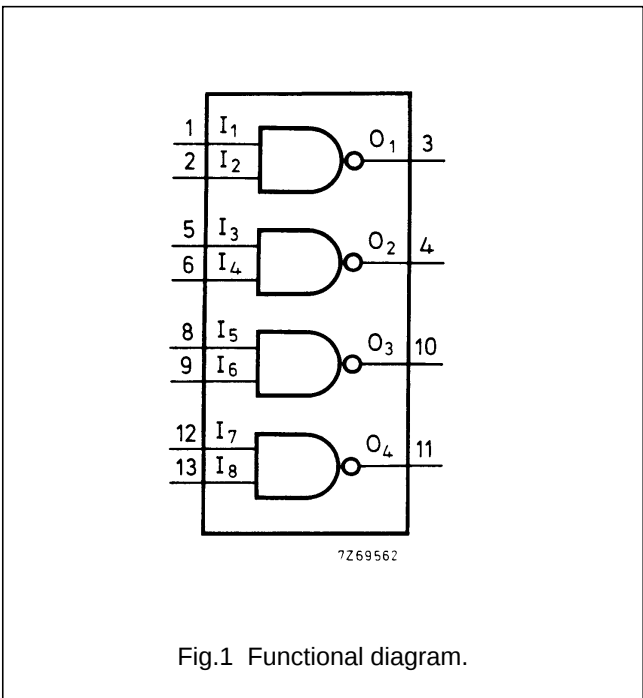
January 1995

Quadruple 2-input NAND gate

HEF4011B gates

DESCRIPTION

The HEF4011B provides the positive quadruple 2-input NAND function. The outputs are fully buffered for highest noise immunity and pattern insensitivity of output impedance.



- HEF4011BP(N): 14-lead DIL; plastic (SOT27-1)
- HEF4011BD(F): 14-lead DIL; ceramic (cerdip) (SOT73)
- HEF4011BT(D): 14-lead SO; plastic (SOT108-1)
- ( ): Package Designator North America

FAMILY DATA, I<sub>DD</sub> LIMITS category GATES

See Family Specifications

# Quadruple 2-input NAND gate

## HEF4011B gates

### AC CHARACTERISTICS

$V_{SS} = 0\text{ V}$ ;  $T_{amb} = 25\text{ °C}$ ;  $C_L = 50\text{ pF}$ ; input transition times  $\leq 20\text{ ns}$

|                                             | $V_{DD}$<br>V | SYMBOL             | TYP | MAX |    | TYPICAL EXTRAPOLATION<br>FORMULA         |
|---------------------------------------------|---------------|--------------------|-----|-----|----|------------------------------------------|
| Propagation delays<br>$I_n \rightarrow O_n$ | 5             | $t_{PHL}; t_{PLH}$ | 55  | 110 | ns | $28\text{ ns} + (0,55\text{ ns/pF}) C_L$ |
|                                             | 10            |                    | 25  | 45  | ns | $14\text{ ns} + (0,23\text{ ns/pF}) C_L$ |
|                                             | 15            |                    | 20  | 35  | ns | $12\text{ ns} + (0,16\text{ ns/pF}) C_L$ |
| Output transition times<br>HIGH to LOW      | 5             | $t_{THL}$          | 60  | 120 | ns | $10\text{ ns} + (1,0\text{ ns/pF}) C_L$  |
|                                             | 10            |                    | 30  | 60  | ns | $9\text{ ns} + (0,42\text{ ns/pF}) C_L$  |
|                                             | 15            |                    | 20  | 40  | ns | $6\text{ ns} + (0,28\text{ ns/pF}) C_L$  |
| LOW to HIGH                                 | 5             | $t_{TLH}$          | 60  | 120 | ns | $10\text{ ns} + (1,0\text{ ns/pF}) C_L$  |
|                                             | 10            |                    | 30  | 60  | ns | $9\text{ ns} + (0,42\text{ ns/pF}) C_L$  |
|                                             | 15            |                    | 20  | 40  | ns | $6\text{ ns} + (0,28\text{ ns/pF}) C_L$  |

|                                                 | $V_{DD}$<br>V | TYPICAL FORMULA FOR P ( $\mu\text{W}$ )        |                                                                                                                                                                         |
|-------------------------------------------------|---------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dynamic power<br>dissipation per<br>package (P) | 5             | $1300 f_i + \sum (f_o C_L) \times V_{DD}^2$    | where<br>$f_i$ = input freq. (MHz)<br>$f_o$ = output freq. (MHz)<br>$C_L$ = load capacitance (pF)<br>$\sum (f_o C_L)$ = sum of outputs<br>$V_{DD}$ = supply voltage (V) |
|                                                 | 10            | $6000 f_i + \sum (f_o C_L) \times V_{DD}^2$    |                                                                                                                                                                         |
|                                                 | 15            | $20\ 100 f_i + \sum (f_o C_L) \times V_{DD}^2$ |                                                                                                                                                                         |