

# 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

## **HEF4556B**

## **MSI**

## **Dual 1-of-4 decoder/demultiplexer**

Product specification  
File under Integrated Circuits, IC04

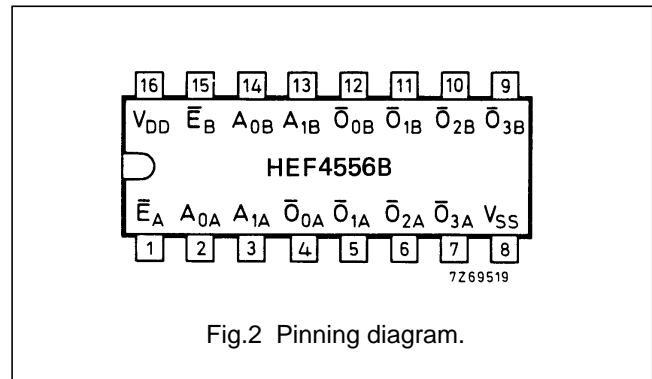
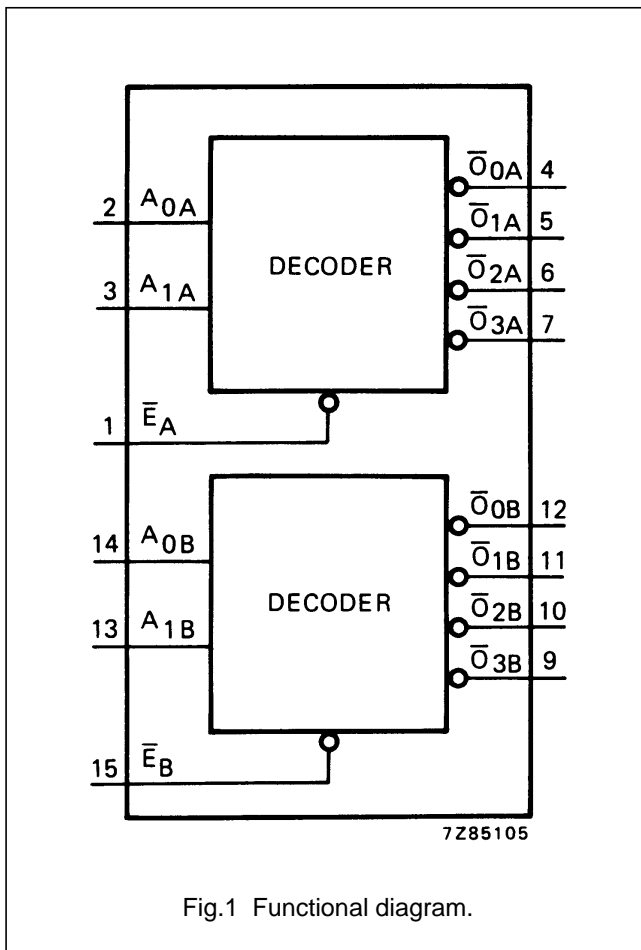
January 1995

# Dual 1-of-4 decoder/demultiplexer

# HEF4556B MSI

### DESCRIPTION

The HEF4556B is a dual 1-of-4 decoder/demultiplexer. Each has two address inputs ( $A_0$  and  $A_1$ ), an active LOW enable input ( $\bar{E}$ ) and four mutually exclusive outputs which are active LOW ( $\bar{O}_0$  to  $\bar{O}_3$ ). When used as a decoder,  $\bar{E}$  when HIGH, forces  $\bar{O}_0$  to  $\bar{O}_3$  HIGH. When used as a demultiplexer, the appropriate output is selected by the information on  $A_0$  and  $A_1$  with  $\bar{E}$  as data input. All unselected outputs are HIGH.



- HEF4556BP(N): 16-lead DIL; plastic (SOT38-1)
  - HEF4556BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
  - HEF4556BT(D): 16-lead SO; plastic (SOT109-1)
- ( ): Package Designator North America

### PINNING

- $\bar{E}$  enable inputs (active LOW)
- $A_0$  and  $A_1$  address inputs
- $\bar{O}_0$  to  $\bar{O}_3$  outputs (active LOW)

### FAMILY DATA, I<sub>DD</sub> LIMITS category MSI

See Family Specifications

Dual 1-of-4 decoder/demultiplexer

HEF4556B  
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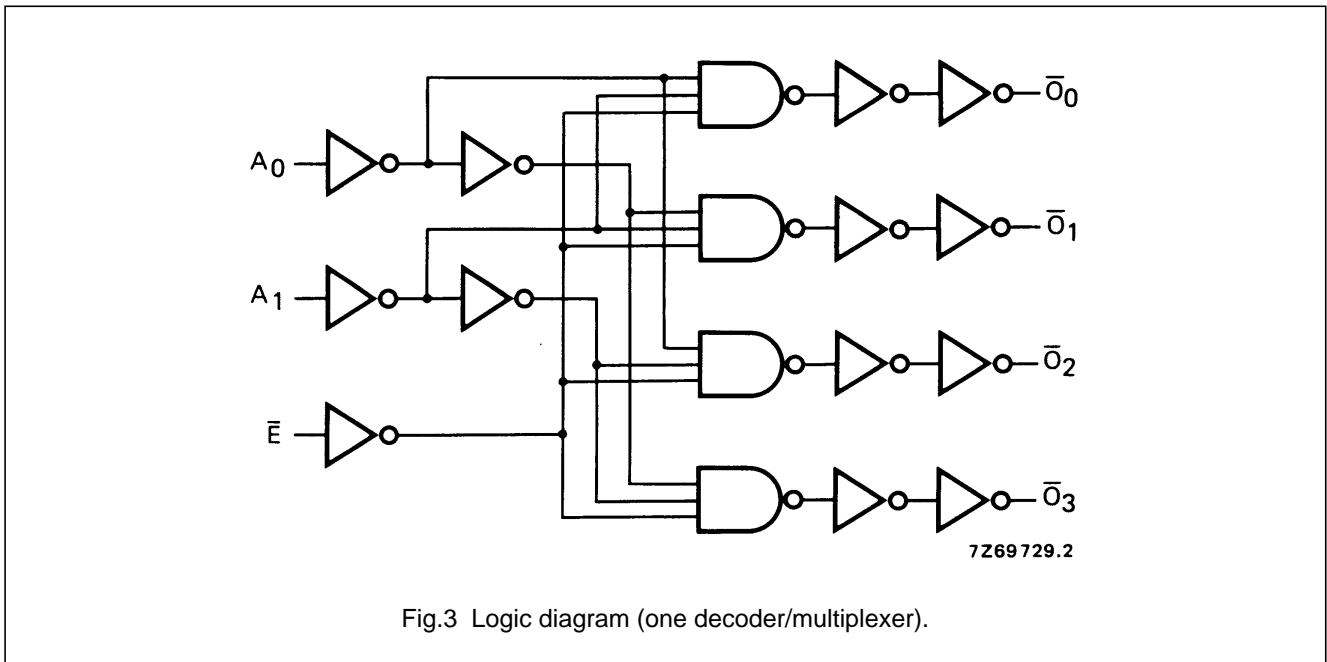


Fig.3 Logic diagram (one decoder/multiplexer).

TRUTH TABLE

| INPUTS    |       |       | OUTPUTS     |             |             |             |
|-----------|-------|-------|-------------|-------------|-------------|-------------|
| $\bar{E}$ | $A_0$ | $A_1$ | $\bar{O}_0$ | $\bar{O}_1$ | $\bar{O}_2$ | $\bar{O}_3$ |
| L         | L     | L     | L           | H           | H           | H           |
| L         | H     | L     | H           | L           | H           | H           |
| L         | L     | H     | H           | H           | L           | H           |
| L         | H     | H     | H           | H           | H           | L           |
| H         | X     | X     | H           | H           | H           | H           |

Notes

1. H = HIGH state (the more positive voltage)
2. L = LOW state (the less positive voltage)
3. X = state is immaterial

## Dual 1-of-4 decoder/demultiplexer

HEF4556B  
MSI**AC CHARACTERISTICS** $V_{SS} = 0$  V;  $T_{amb} = 25$  °C;  $C_L = 50$  pF; input transition times  $\leq 20$  ns

|                    | $V_{DD}$<br>V | SYMBOL    | MIN.      | TYP.      | MAX. | TYPICAL EXTRAPOLATION<br>FORMULA |                                             |             |    |    |     |    |                                            |    |    |
|--------------------|---------------|-----------|-----------|-----------|------|----------------------------------|---------------------------------------------|-------------|----|----|-----|----|--------------------------------------------|----|----|
| Propagation delays | 5             | $t_{PHL}$ |           | 130       | 255  | ns                               | $103 \text{ ns} + (0,55 \text{ ns/pF}) C_L$ |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | HIGH to LOW | 10 | 50 | 100 | ns | $39 \text{ ns} + (0,23 \text{ ns/pF}) C_L$ |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 35 |
|                    | 5             |           |           | $t_{PLH}$ |      | 105                              | 210                                         |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | LOW to HIGH | 10 | 40 | 85  | ns | $29 \text{ ns} + (0,23 \text{ ns/pF}) C_L$ |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 30 |
|                    | 5             | $t_{PHL}$ |           | 120       | 240  | ns                               | $93 \text{ ns} + (0,55 \text{ ns/pF}) C_L$  |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | HIGH to LOW | 10 | 45 | 90  | ns | $34 \text{ ns} + (0,23 \text{ ns/pF}) C_L$ |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 30 |
|                    | 5             |           |           | $t_{PLH}$ |      | 105                              | 205                                         |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | LOW to HIGH | 10 | 40 | 80  | ns | $29 \text{ ns} + (0,23 \text{ ns/pF}) C_L$ |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 30 |
| 5                  | $t_{THL}$     |           | 60        |           |      | 120                              | ns                                          |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | HIGH to LOW | 10 | 30 | 60  | ns | $9 \text{ ns} + (0,42 \text{ ns/pF}) C_L$  |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 20 |
| 5                  |               |           | $t_{TLH}$ |           | 60   | 120                              | ns                                          |             |    |    |     |    |                                            |    |    |
|                    |               |           |           |           |      |                                  |                                             | LOW to HIGH | 10 | 30 | 60  | ns | $9 \text{ ns} + (0,42 \text{ ns/pF}) C_L$  |    |    |
|                    |               |           |           |           |      |                                  |                                             |             |    |    |     |    |                                            | 15 | 20 |

|                                                 | $V_{DD}$<br>V | TYPICAL FORMULA FOR P ( $\mu$ W)               |                                                                                                                                                                         |
|-------------------------------------------------|---------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dynamic power<br>dissipation per<br>package (P) | 5             | $4400 f_i + \sum (f_o C_L) \times V_{DD}^2$    | 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            | $18\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$ |                                                                                                                                                                         |
|                                                 | 15            | $43\,300 f_i + \sum (f_o C_L) \times V_{DD}^2$ |                                                                                                                                                                         |

**APPLICATION INFORMATION**

Some examples of applications for the HEF4556B are:

- Code conversion.
- Address decoding.
- Demultiplexing: when using the enable input as data input.