

# 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

## HEF40097B

### buffers

### 3-state hex non-inverting buffer

Product specification  
File under Integrated Circuits, IC04

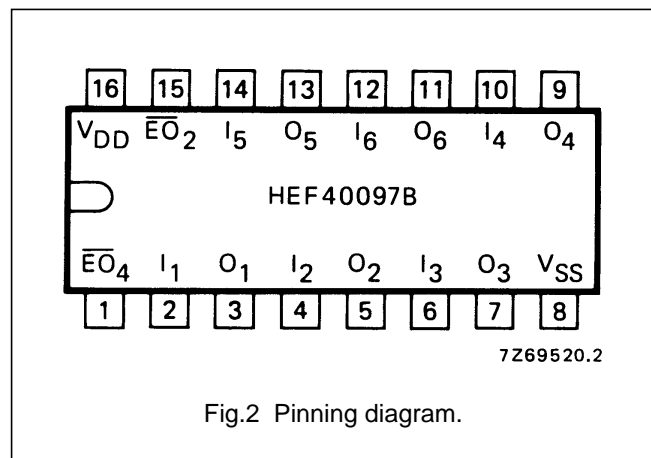
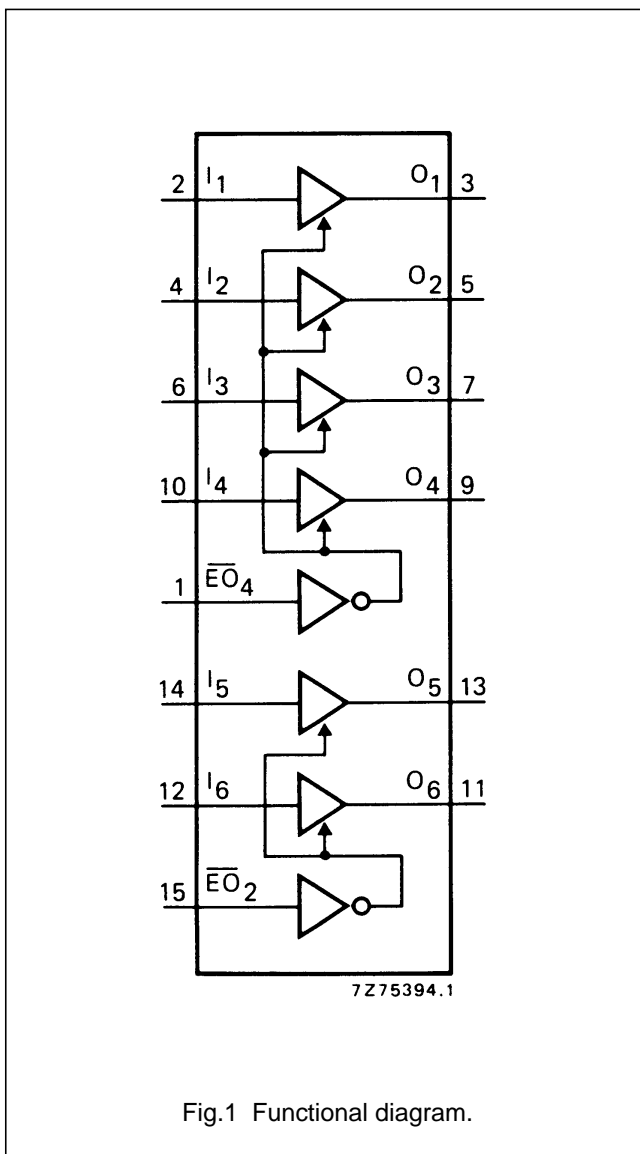
January 1995

### 3-state hex non-inverting buffer

### HEF40097B buffers

**DESCRIPTION**

The HEF40097B is a hex non-inverting buffer with 3-state outputs. The 3-state outputs are controlled by two enable inputs ( $\overline{EO}_4$  and  $\overline{EO}_2$ ). A HIGH on  $\overline{EO}_4$  causes four of the six buffer elements to assume a high impedance or OFF-state, regardless of the other input conditions and a HIGH on  $\overline{EO}_2$  causes the outputs of the remaining two buffer elements to assume a high impedance or OFF-state, regardless of the other input conditions.



- HEF40097BP(N): 16-lead DIL; plastic (SOT38-1)
- HEF40097BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
- HEF40097BT(D): 16-lead SO; plastic (SOT109-1)
- ( ): Package Designator North America

**PINNING**

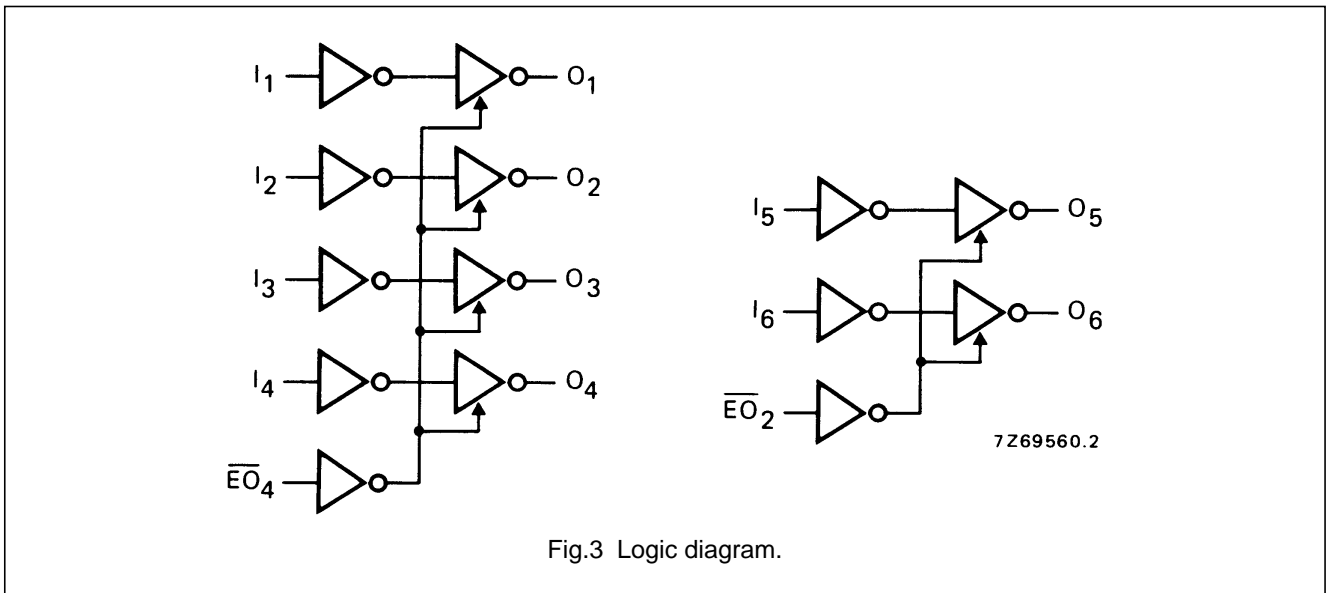
- $I_1$  to  $I_6$  buffer inputs
- $\overline{EO}_4, \overline{EO}_2$  enable inputs (active LOW)
- $O_1$  to  $O_6$  buffer outputs (active HIGH)

**FAMILY DATA,  $I_{DD}$  LIMITS category BUFFERS**

See Family Specifications

3-state hex non-inverting buffer

HEF40097B  
buffers



DC CHARACTERISTICS

V<sub>SS</sub> = 0 V

| HEF                    | V <sub>DD</sub><br>V | V <sub>OH</sub><br>V | V <sub>OL</sub><br>V | SYMBOL           | T <sub>amb</sub> (°C) |      |      |      |      |      |
|------------------------|----------------------|----------------------|----------------------|------------------|-----------------------|------|------|------|------|------|
|                        |                      |                      |                      |                  | -40                   |      | +25  |      | +85  |      |
|                        |                      |                      |                      |                  | MIN.                  | MAX. | MIN. | MAX. | MIN. | MAX. |
| Output current<br>HIGH | 5                    | 4,6                  |                      | -I <sub>OH</sub> | 1,2                   | 1,0  | 0,8  | mA   |      |      |
|                        | 10                   | 9,5                  |                      |                  | 3,8                   | 3,2  | 2,5  | mA   |      |      |
|                        | 15                   | 13,5                 |                      |                  | 12,0                  | 10,0 | 8,0  | mA   |      |      |
| HIGH                   | 5                    | 2,5                  |                      | -I <sub>OH</sub> | 3,8                   | 3,2  | 2,5  | mA   |      |      |
| Output current<br>LOW  | 4,75                 |                      | 0,4                  | I <sub>OL</sub>  | 3,5                   | 2,9  | 2,3  | mA   |      |      |
|                        | 10                   |                      | 0,5                  |                  | 12,0                  | 10,0 | 8,0  | mA   |      |      |
|                        | 15                   |                      | 1,5                  |                  | 24,0                  | 20,0 | 16,0 | mA   |      |      |

| HEC                    | V <sub>DD</sub><br>V | V <sub>OH</sub><br>V | V <sub>OL</sub><br>V | SYMBOL           | T <sub>amb</sub> (°C) |      |      |      |      |      |
|------------------------|----------------------|----------------------|----------------------|------------------|-----------------------|------|------|------|------|------|
|                        |                      |                      |                      |                  | -55                   |      | +25  |      | +125 |      |
|                        |                      |                      |                      |                  | MIN.                  | MAX. | MIN. | MAX. | MIN. | MAX. |
| Output current<br>HIGH | 5                    | 4,6                  |                      | -I <sub>OH</sub> | 1,25                  | 1,0  | 0,6  | mA   |      |      |
|                        | 10                   | 9,5                  |                      |                  | 4,0                   | 3,2  | 2,1  | mA   |      |      |
|                        | 15                   | 13,5                 |                      |                  | 12,5                  | 10,0 | 6,7  | mA   |      |      |
| HIGH                   | 5                    | 2,5                  |                      | -I <sub>OH</sub> | 4,0                   | 3,2  | 2,1  | mA   |      |      |
| Output current<br>LOW  | 4,75                 |                      | 0,4                  | I <sub>OL</sub>  | 3,6                   | 2,9  | 1,9  | mA   |      |      |
|                        | 10                   |                      | 0,5                  |                  | 12,5                  | 10,0 | 6,7  | mA   |      |      |
|                        | 15                   |                      | 1,5                  |                  | 25,0                  | 20,0 | 13,0 | mA   |      |      |

## 3-state hex non-inverting buffer

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buffers

## 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    | TYP. | MAX. |    | TYPICAL EXTRAPOLATION<br>FORMULA           |
|--|---------------|-----------|------|------|----|--|
| Propagation delays<br>$I_n \rightarrow O_n$<br>HIGH to LOW   | 5             | $t_{PHL}$ | 70   | 140  | ns | $60 \text{ ns} + (0,20 \text{ ns/pF}) C_L$ |
|  | 10            |           | 30   | 60   | ns | $26 \text{ ns} + (0,08 \text{ ns/pF}) C_L$ |
|  | 15            |           | 25   | 50   | ns | $22 \text{ ns} + (0,06 \text{ ns/pF}) C_L$ |
| LOW to HIGH  | 5             | $t_{PLH}$ | 60   | 120  | ns | $45 \text{ ns} + (0,30 \text{ ns/pF}) C_L$ |
|  | 10            |           | 25   | 50   | ns | $19 \text{ ns} + (0,13 \text{ ns/pF}) C_L$ |
|  | 15            |           | 20   | 40   | ns | $16 \text{ ns} + (0,09 \text{ ns/pF}) C_L$ |
| Output transition times<br>HIGH to LOW   | 5             | $t_{THL}$ | 30   | 60   | ns | $15 \text{ ns} + (0,30 \text{ ns/pF}) C_L$ |
|  | 10            |           | 15   | 30   | ns | $10 \text{ ns} + (0,11 \text{ ns/pF}) C_L$ |
|  | 15            |           | 10   | 20   | ns | $7 \text{ ns} + (0,07 \text{ ns/pF}) C_L$  |
| LOW to HIGH  | 5             | $t_{TLH}$ | 35   | 70   | ns | $10 \text{ ns} + (0,50 \text{ ns/pF}) C_L$ |
|  | 10            |           | 20   | 40   | ns | $8 \text{ ns} + (0,24 \text{ ns/pF}) C_L$  |
|  | 15            |           | 15   | 30   | ns | $6 \text{ ns} + (0,18 \text{ ns/pF}) C_L$  |
| 3-state propagation delays<br>Output disable times<br>$\overline{EO}_2, \overline{EO}_4 \rightarrow O_n$<br>HIGH | 5             | $t_{PHZ}$ | 45   | 95   | ns |  |
|  | 10            |           | 35   | 70   | ns |  |
|  | 15            |           | 30   | 60   | ns |  |
| LOW  | 5             | $t_{PLZ}$ | 60   | 120  | ns |  |
|  | 10            |           | 35   | 70   | ns |  |
|  | 15            |           | 25   | 55   | ns |  |
| Output enable times<br>$\overline{EO}_2, \overline{EO}_4 \rightarrow O_n$<br>HIGH                                | 5             | $t_{PZH}$ | 75   | 150  | ns |  |
|  | 10            |           | 35   | 70   | ns |  |
|  | 15            |           | 30   | 60   | ns |  |
| LOW  | 5             | $t_{PZL}$ | 95   | 190  | ns |  |
|  | 10            |           | 40   | 80   | ns |  |
|  | 15            |           | 30   | 65   | ns |  |

|   | $V_{DD}$<br>V | TYPICAL FORMULA FOR P ( $\mu$ W)               |  |
|---|---------------|--|--|
| Dynamic power<br>dissipation per<br>package (P) | 5             | $5\,400 f_i + \sum (f_o C_L) \times V_{DD}^2$  | where<br>$f_i$ = input freq. (MHz)<br>$f_o$ = output freq. (MHz)<br>$C_L$ = load cap. (pF)<br>$\sum (f_o C_L)$ = sum of outputs<br>$V_{DD}$ = supply voltage (V) |
|   | 10            | $25\,200 f_i + \sum (f_o C_L) \times V_{DD}^2$ |  |
|   | 15            | $96\,500 f_i + \sum (f_o C_L) \times V_{DD}^2$ |  |