

# 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

## **HEF40244B**

### **buffers**

### **Octal buffers with 3-state outputs**

Product specification  
File under Integrated Circuits, IC04

January 1995

# Octal buffers with 3-state outputs

# HEF40244B buffers

### DESCRIPTION

The HEF40244B is an octal non-inverting buffer with 3-state outputs. It features output stages with high current output capability suitable for driving highly capacitive loads.

The 3-state outputs are controlled by the output enable inputs  $\overline{EO}_A$  and  $\overline{EO}_B$ . A HIGH on  $\overline{EO}$  causes the outputs to assume a high impedance OFF-state. The device also features hysteresis on all inputs to improve noise immunity.

Schmitt-trigger action in the inputs makes the circuit highly tolerant to slower input rise and fall times.

The HEF40244B is pin and functionally compatible with the TTL '244' device.

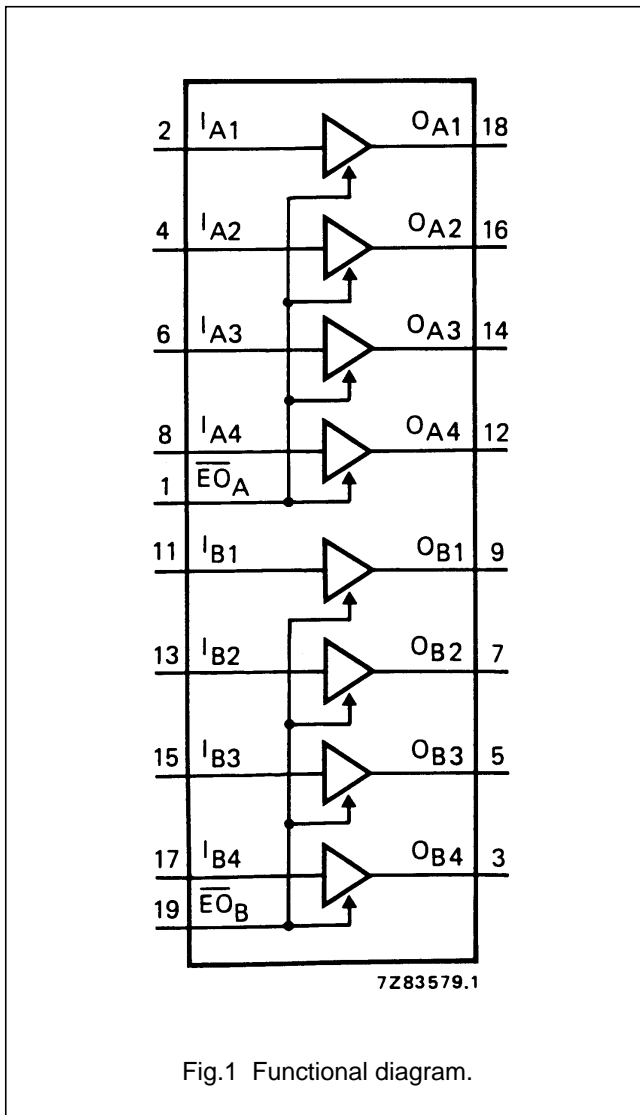


Fig.1 Functional diagram.

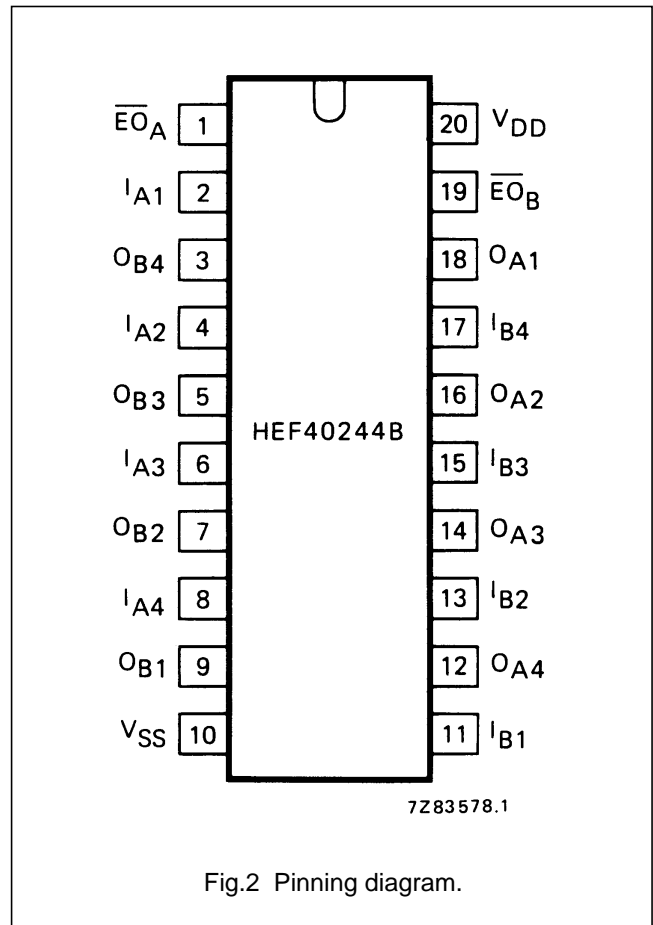


Fig.2 Pinning diagram.

- HEF40244BP(N): 20-lead DIL; plastic (SOT146-1)
- HEF40244BD(F): 20-lead DIL; ceramic (cerdip) (SOT152)
- HEF40244BT(D): 20-lead SO; plastic (SOT163-1)
- ( ): Package Designator North America

### PINNING

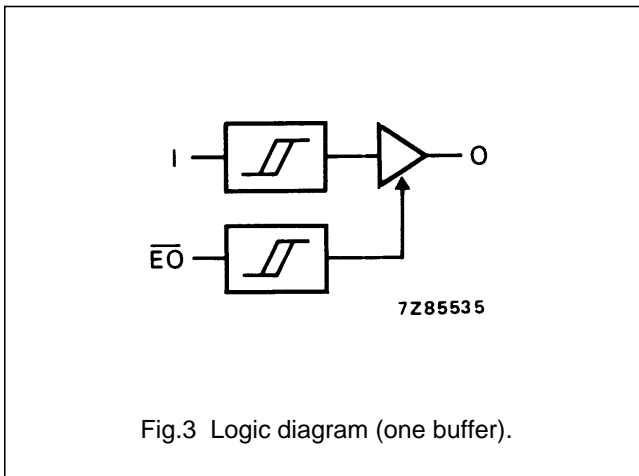
- $I_{A1}$  to  $I_{A4}$  inputs
- $I_{B1}$  to  $I_{B4}$  inputs
- $O_{A1}$  to  $O_{A4}$  bus outputs
- $O_{B1}$  to  $O_{B4}$  bus outputs
- $\overline{EO}_A, \overline{EO}_B$  output enable inputs (active LOW)

### FAMILY DATA, $I_{DD}$ LIMITS category buffers

See Family Specifications

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TRUTH TABLE

INPUTS		OUTPUT
I <sub>n</sub>	$\overline{EO}$	O <sub>n</sub>
H	L	H
L	L	L
X	H	Z

Notes

- H = HIGH state (the more positive voltage)  
L = LOW state (the less positive voltage)  
X = state is immaterial  
Z = high impedance off state

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134).

See Family Specifications, except for:

D.C. current into any input	$\pm I_i$	max.	10 mA
D.C. source or sink current into any output	$\pm I_o$	max.	25 mA
D.C. current into the supply terminals	$\pm I$	max.	100 mA

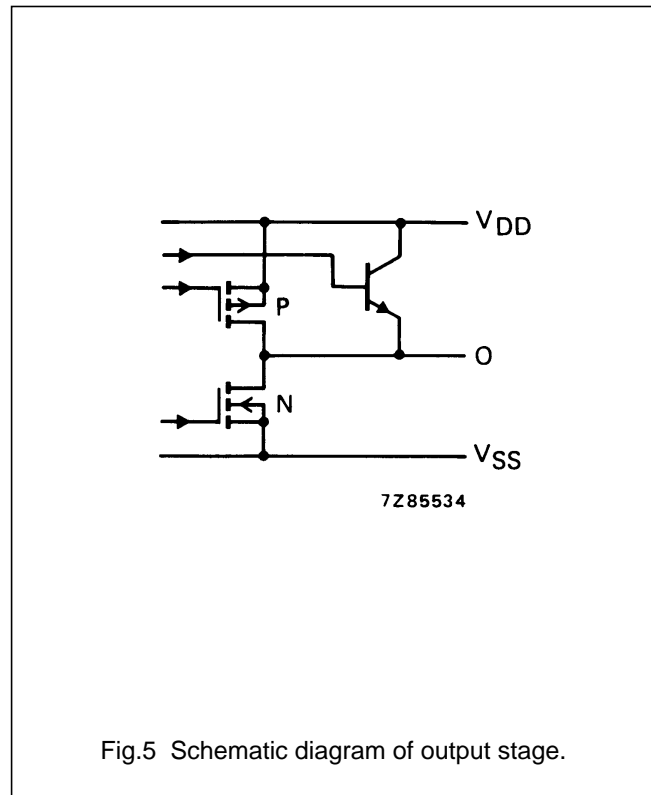
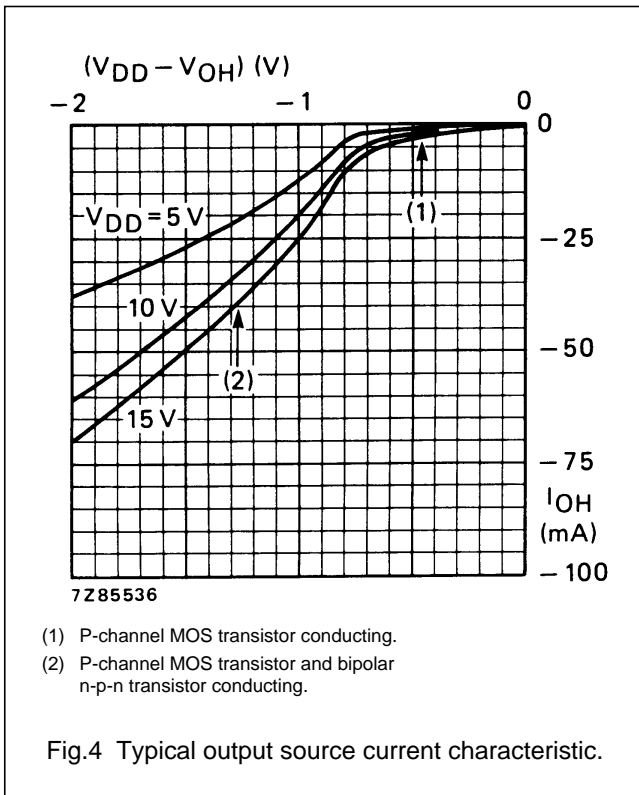
DC CHARACTERISTICS

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

	V <sub>DD</sub> V	V <sub>OH</sub> V	V <sub>OL</sub> V	SYMBOL	T <sub>amb</sub> (°C)						
					-40		+25		+85		
					MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	
Output current HIGH	5	4,6		-I <sub>OH</sub>	0,75		0,6	1,2	0,45		mA
	10	9,5			1,85		1,5	3,0	1,1		
	15	13,5			14,5		15	50	15,5		
Output current HIGH	5	3,6		-I <sub>OH</sub>	9,3		10	24	10,7		mA
	10	8,4			14,4		15	46	15,0		
	15	13,2			19,5		20	62	19,8		
Output current LOW	5		0,4	I <sub>OL</sub>	2,9		2,3	5,4	1,75		mA
	10		0,5		9,5		7,6	17	5,50		
	15		1,5		30,0		25	45	19,0		
Hysteresis voltage (any input)	5			V <sub>H</sub>				220			mV
	10							250			
	15							320			

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AC CHARACTERISTICS

$V_{SS} = 0\text{ V}$ ;  $T_{amb} = 25\text{ }^\circ\text{C}$ ; input transition times  $\leq 20\text{ ns}$

ALL BUFFERS SWITCHING	$V_{DD}$ V	TYPICAL FORMULA FOR P ( $\mu\text{W}$ )	
Dynamic power dissipation per package (P)	5 10 15	$4\,250 f_i + \sum (f_o C_L) \times V_{DD}^2$ $17\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$ $46\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	where $f_i$ = input freq. (MHz) $f_o$ = output freq. (MHz) $C_L$ = load capacitance (pF) $\sum (f_o C_L)$ = sum of outputs $V_{DD}$ = supply voltage (V)

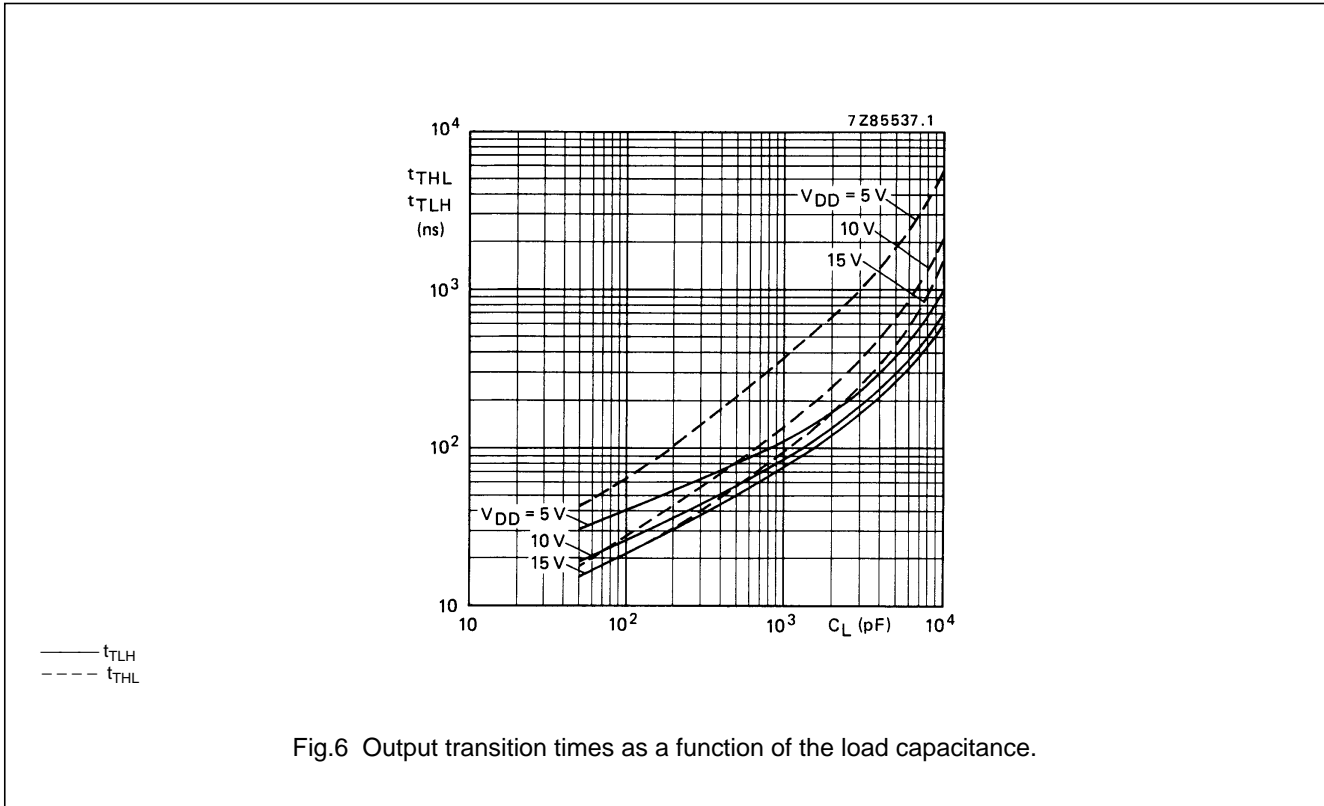
## Octal buffers with 3-state outputs

HEF40244B  
buffers**AC CHARACTERISTICS** $V_{SS} = 0\text{ V}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $C_L = 50\text{ pF}$ ; input transition times  $\leq 20\text{ ns}$ 

	$V_{DD}$ V	SYMBOL	MIN.	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA		
Propagation delays $I_{An/Bn} \rightarrow O_{An/Bn}$ HIGH to LOW	5	$t_{PHL}$		95	190	ns	83 ns + (0,24 ns/pF) $C_L$ 35 ns + (0,10 ns/pF) $C_L$ 26 ns + (0,07 ns/pF) $C_L$	
	10			40	80	ns		
	15			30	60	ns		
	$I_{An/Bn} \rightarrow O_{An/Bn}$ LOW to HIGH	5	$t_{PLH}$		85	170	ns	82 ns + (0,06 ns/pF) $C_L$ 38 ns + (0,03 ns/pF) $C_L$ 29 ns + (0,02 ns/pF) $C_L$
		10			40	80	ns	
		15			30	60	ns	
Output transition times HIGH to LOW	5	$t_{THL}$		40	80	ns	see Fig.6	
	10			20	40	ns		
	15			15	30	ns		
	LOW to HIGH	5	$t_{TLH}$		30	60		ns
		10			20	40		ns
		15			15	30		ns
3-state propagation delays Output disable times $\overline{EO} \rightarrow O_{An/Bn}$ HIGH	5	$t_{PHZ}$		70	140	ns		
	10			35	70	ns		
	15			30	60	ns		
	LOW	5	$t_{PLZ}$		75	150		ns
		10			40	80		ns
		15			30	60		ns
Output enable times $\overline{EO} \rightarrow O_{An/Bn}$ HIGH	5	$t_{PZH}$		80	160	ns		
	10			35	70	ns		
	15			30	60	ns		
	LOW	5	$t_{PZL}$		90	180		ns
		10			40	80		ns
		15			30	60		ns



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