

# 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

## **HEF40245B**

### **buffers**

Octal bus transceiver with 3-state outputs

Product specification  
File under Integrated Circuits, IC04

January 1995

# Octal bus transceiver with 3-state outputs

# HEF40245B buffers

### DESCRIPTION

The HEF40245B is an octal bus transmitter/receiver designed for 8-line asynchronous, 2-way data communication between data buses. It features output stages with high current output capability suitable for driving highly capacitive loads.

The direction input (DR) controls transmission of data from bus A to bus B, or bus B to bus A, depending on its logic level. The 3-state outputs are controlled by the enable input  $\overline{EO}$ . 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 HEF40245B is pin and functionally compatible with the TTL '245' device.

### PINNING

$A_0$ to $A_7$	data input/output
$B_0$ to $B_7$	data input/output
DR	direction input
$\overline{EO}$	output enable input (active LOW)

- HEF40245BP(N): 20-lead DIL; plastic (SOT146-1)
- HEF40245BD(F): 20-lead DIL; ceramic (cerdip) (SOT152)
- HEF40245BT(D): 20-lead SO; plastic (SOT163-1)
- ( ): Package Designator North America

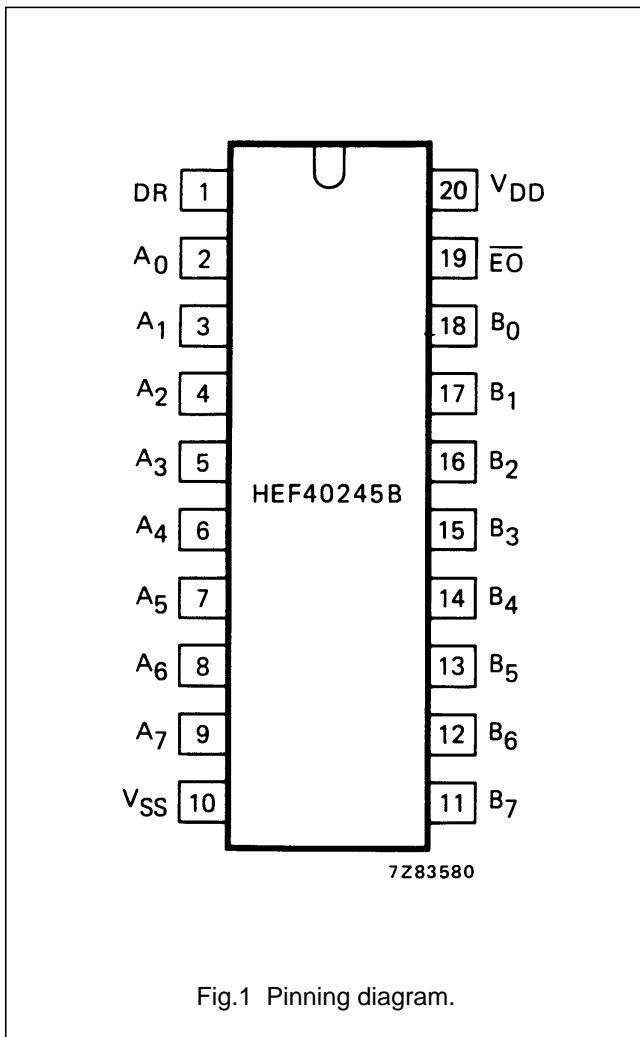


Fig.1 Pinning diagram.

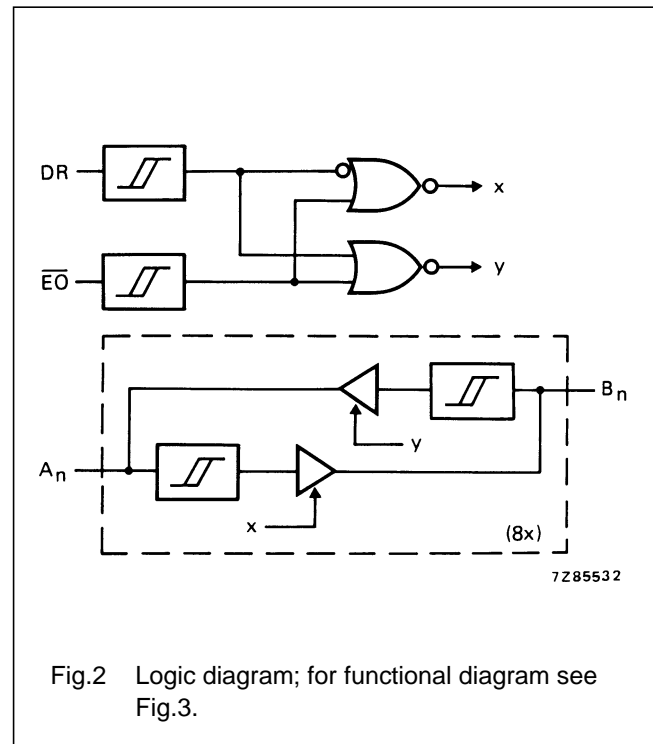


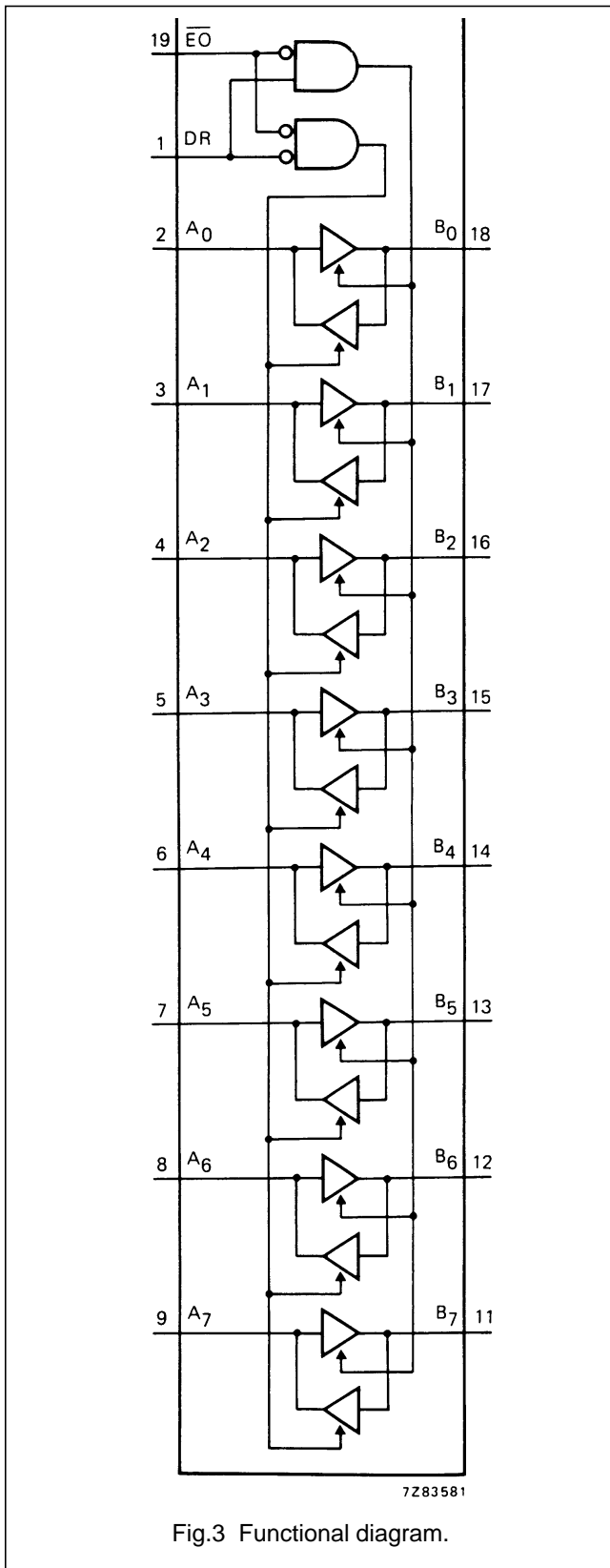
Fig.2 Logic diagram; for functional diagram see Fig.3.

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

See Family Specifications.

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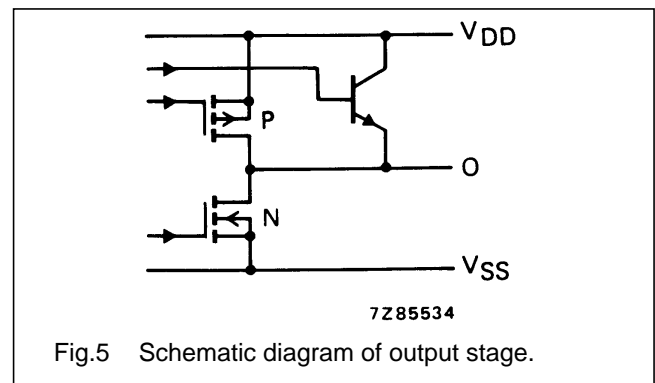
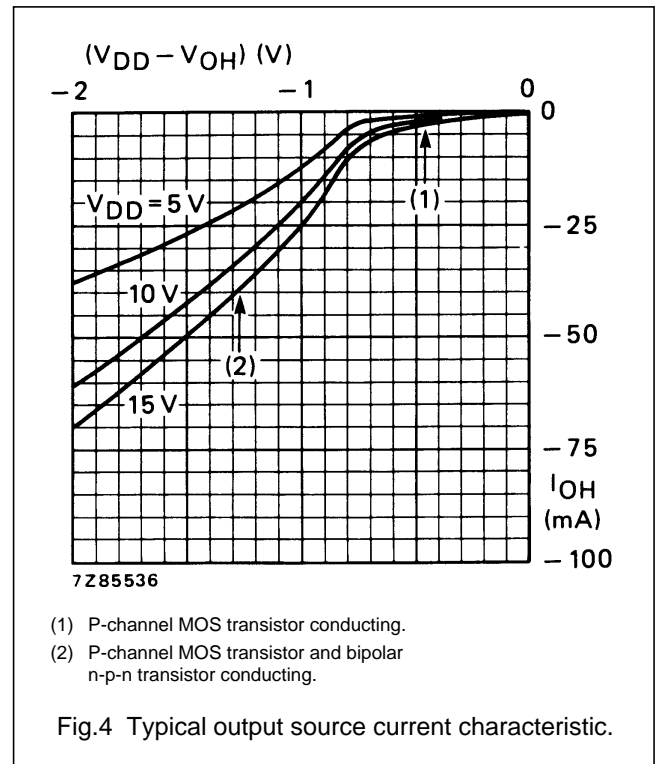


FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
$\overline{EO}$	DR	$A_n$	$B_n$
L	L	A = B	input
L	H	input	B = A
H	X	Z	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



## Octal bus transceiver with 3-state outputs

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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** $V_{SS} = 0\text{ V}$ 

	$V_{DD}$ V	$V_{OH}$ V	$V_{OL}$ V	SYMBOL	$T_{amb}$ (°C)						
					-40		+ 25			+ 85	
					MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.
Output current HIGH	5	4,6		$-I_{OH}$	0,75		0,6	1,2		0,45	mA
	10	9,5			1,85		1,5	3,0		1,1	mA
	15	13,5			14,5		15	50		15,5	mA
Output current HIGH	5	3,6		$-I_{OH}$	9,3		10	24		10,7	mA
	10	8,4			14,4		15	46		15,0	mA
	15	13,2			19,5		20	62		19,8	mA
Output current LOW	5		0,4	$I_{OL}$	2,9		2,3	5,4		1,75	mA
	10		0,5		9,5		7,6	17		5,50	mA
	15		1,5		30,0		25	45		19,0	mA
Hysteresis voltage (any input)	5			$V_H$			220				mV
	10						250				mV
	15						320				mV
3-state input/output leakage current pins $A_n$ or $B_n$	15			$I_{OZ}^{(1)}$	-	1,6	-	-	1,6	-	12 $\mu$ A

**Note**1. Relevant output in OFF-state;  $A_n$  at  $V_{SS}$  or  $V_{DD}$ ;  $B_n$  at  $V_{SS}$  or  $V_{DD}$ .

## Octal bus transceiver with 3-state outputs

HEF40245B  
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	$V_{DD}$ V	SYMBOL	MIN.	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA		
Propagation delays $A_n \rightarrow B_n$ HIGH to LOW	5	$t_{PHL}$		95	190	ns	$83 \text{ ns} + (0,24 \text{ ns/pF}) C_L$	
	10		40	80	ns	$35 \text{ ns} + (0,10 \text{ ns/pF}) C_L$		
	15		30	60	ns	$26 \text{ ns} + (0,07 \text{ ns/pF}) C_L$		
	$A_n \rightarrow B_n$ LOW to HIGH	5	$t_{PLH}$		85	170	ns	$82 \text{ ns} + (0,06 \text{ ns/pF}) C_L$
		10		40	80	ns	$38 \text{ ns} + (0,03 \text{ ns/pF}) C_L$	
		15		30	60	ns	$29 \text{ ns} + (0,02 \text{ ns/pF}) C_L$	
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 $\overline{EO} \rightarrow A_n, B_n$ HIGH	5	$t_{PHZ}$		100	200	ns		
	10		50	100	ns			
	15		40	80	ns			
	LOW	5	$t_{PLZ}$		100	200		ns
		10		60	120	ns		
		15		50	100	ns		
Output enable times $\overline{EO} \rightarrow A_n, B_n$ HIGH	5	$t_{PZH}$		100	200	ns		
	10		45	90	ns			
	15		35	70	ns			
	LOW	5	$t_{PZL}$		115	230		ns
		10		55	110	ns		
		15		45	90	ns		

ALL BUFFERS SWITCHING	$V_{DD}$ V	TYPICAL FORMULA FOR P ( $\mu$ W)	
Dynamic power dissipation per package (P)	5	$4\,250 f_i + \sum (f_o C_L) \times V_{DD}^2$	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)
	10	$17\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$46\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	

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