

# 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

## **HEF4539B**

## **MSI**

## Dual 4-input multiplexer

Product specification  
File under Integrated Circuits, IC04

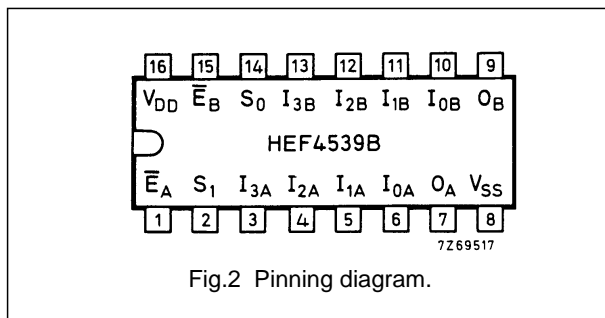
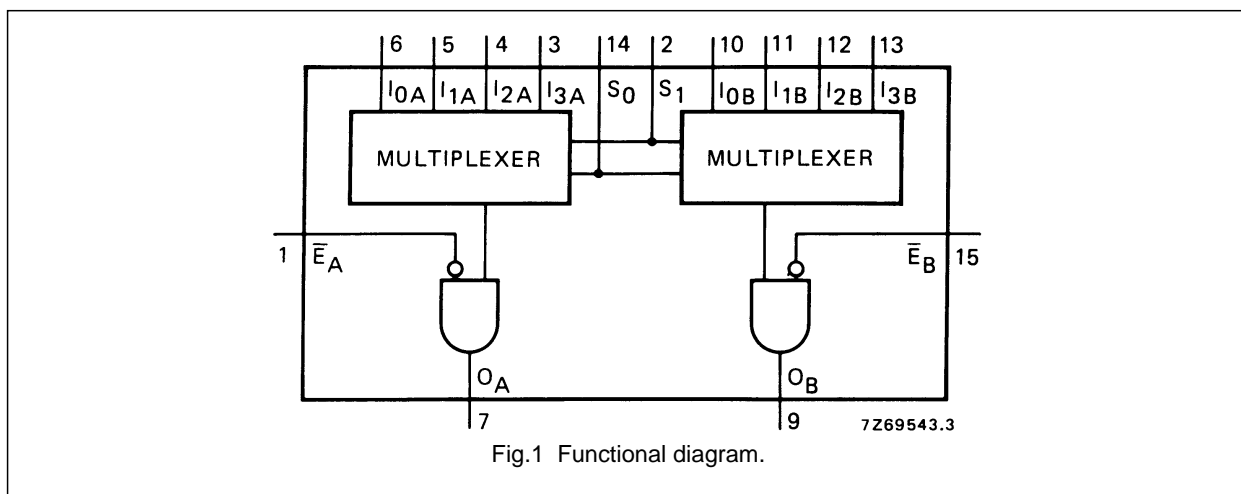
January 1995

# Dual 4-input multiplexer

# HEF4539B MSI

## DESCRIPTION

The HEF4539B is a dual 4-input multiplexer with common select logic. Each multiplexer has four multiplexer inputs ( $I_0$  and  $I_3$ ), an active LOW enable input ( $\bar{E}$ ) and a multiplexer output (O). When HIGH,  $\bar{E}$  forces O of the respective multiplexer LOW, independent of the select inputs ( $S_0$  to  $S_1$ ) and  $I_0$  to  $I_3$ . When  $\bar{E}$  is LOW,  $S_0$  and  $S_1$  determine which multiplexer input ( $I_0$  to  $I_3$ ) on each of the multiplexers is routed to the respective multiplexer output (O).



## PINNING

- $I_{0A}, I_{1A}, I_{2A}, I_{3A}$  multiplexer inputs
- $I_{0B}, I_{1B}, I_{2B}, I_{3B}$  multiplexer inputs
- $S_0, S_1$  select inputs
- $\bar{E}_A, \bar{E}_B$  enable inputs (active LOW)
- $O_A, O_B$  multiplexer outputs

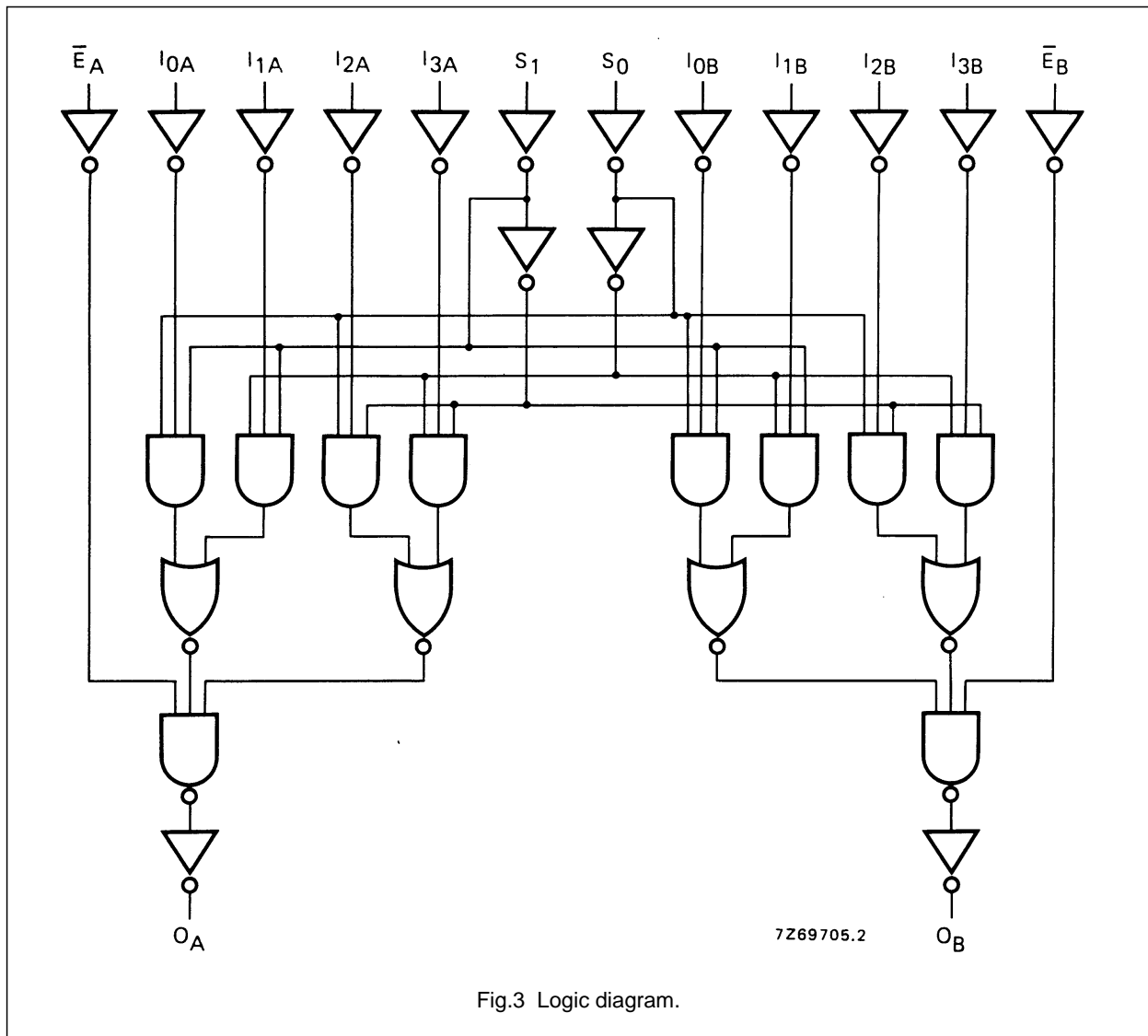
## FAMILY DATA, $I_{DD}$ LIMITS category MSI

See Family Specifications

- HEF4539BP(N): 16-lead DIL; plastic (SOT38-1)
- HEF4539BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
- HEF4539BT(D): 16-lead SO; plastic (SOT109-1)
- ( ): Package Designator North America

Dual 4-input multiplexer

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**FUNCTION TABLE**

INPUTS			OUTPUT
S <sub>0</sub>	S <sub>1</sub>	$\bar{E}_n$	O <sub>n</sub>
X	X	H	L
L	L	L	I <sub>0</sub>
H	L	L	I <sub>1</sub>
L	H	L	I <sub>2</sub>
H	H	L	I <sub>3</sub>

**Notes**

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

## Dual 4-input multiplexer

HEF4539B  
MSI**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	$I_n \rightarrow O_n$ HIGH to LOW	$t_{PHL}$	5	120	240	ns	$93\text{ ns} + (0,55\text{ ns/pF}) C_L$
			10	45	90	ns	$34\text{ ns} + (0,23\text{ ns/pF}) C_L$
			15	30	60	ns	$22\text{ ns} + (0,16\text{ ns/pF}) C_L$
	LOW to HIGH	$t_{PLH}$	5	120	245	ns	$93\text{ ns} + (0,55\text{ ns/pF}) C_L$
			10	50	100	ns	$39\text{ ns} + (0,23\text{ ns/pF}) C_L$
			15	35	65	ns	$27\text{ ns} + (0,16\text{ ns/pF}) C_L$
	$S_n \rightarrow O_n$ HIGH to LOW	$t_{PHL}$	5	165	330	ns	$138\text{ ns} + (0,55\text{ ns/pF}) C_L$
			10	65	125	ns	$54\text{ ns} + (0,23\text{ ns/pF}) C_L$
			15	40	80	ns	$32\text{ ns} + (0,16\text{ ns/pF}) C_L$
	LOW to HIGH	$t_{PLH}$	5	155	310	ns	$128\text{ ns} + (0,55\text{ ns/pF}) C_L$
			10	60	120	ns	$49\text{ ns} + (0,23\text{ ns/pF}) C_L$
			15	40	80	ns	$32\text{ ns} + (0,16\text{ ns/pF}) C_L$
$\bar{E}_n \rightarrow O_n$ HIGH to LOW	$t_{PHL}$	5	100	200	ns	$73\text{ ns} + (0,55\text{ ns/pF}) C_L$	
		10	40	80	ns	$29\text{ ns} + (0,23\text{ ns/pF}) C_L$	
		15	30	55	ns	$22\text{ ns} + (0,16\text{ ns/pF}) C_L$	
LOW to HIGH	$t_{PLH}$	5	100	200	ns	$73\text{ ns} + (0,55\text{ ns/pF}) C_L$	
		10	40	80	ns	$29\text{ ns} + (0,23\text{ ns/pF}) C_L$	
		15	30	55	ns	$22\text{ ns} + (0,16\text{ ns/pF}) C_L$	
Output transition times	HIGH to LOW	$t_{THL}$	5	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	$t_{TLH}$	5	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	$6\text{ ns} + (0,28\text{ ns/pF}) C_L$

	$V_{DD}$ V	TYPICAL FORMULA FOR P ( $\mu\text{W}$ )	
Dynamic power dissipation per package (P)	5	$700 f_i + \sum (f_o C_L) \times V_{DD}^2$	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	$2900 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$8100 f_i + \sum (f_o C_L) \times V_{DD}^2$	

**APPLICATION INFORMATION**

Some examples of applications for the HEF4539B are: \* Data selectors \* Data multiplexers