

# 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

## **HEF4028B** **MSI** 1-of-10 decoder

Product specification  
File under Integrated Circuits, IC04

January 1995

1-of-10 decoder

HEF4028B  
MSI

DESCRIPTION

The HEF4028B is a 4-bit BCD to 1-of-10 active HIGH decoder. A 1-2-4-8 BCD code applied to inputs A<sub>0</sub> to A<sub>3</sub> causes the selected output to be HIGH, the other nine will be LOW. If desired, the device may be used as a 1-of-8 decoder with enable; 3-bit octal inputs are applied to inputs A<sub>0</sub>, A<sub>1</sub> and A<sub>2</sub> selecting an output O<sub>0</sub> to O<sub>7</sub>. Input A<sub>3</sub> then becomes an active LOW enable, forcing the selected output LOW when A<sub>3</sub> is HIGH. The HEF4028B may also be used as an 8-output (O<sub>0</sub> to O<sub>7</sub>) demultiplexer with A<sub>0</sub> to A<sub>2</sub> as address inputs and A<sub>3</sub> as an active LOW data input. The outputs are fully buffered for best performance.

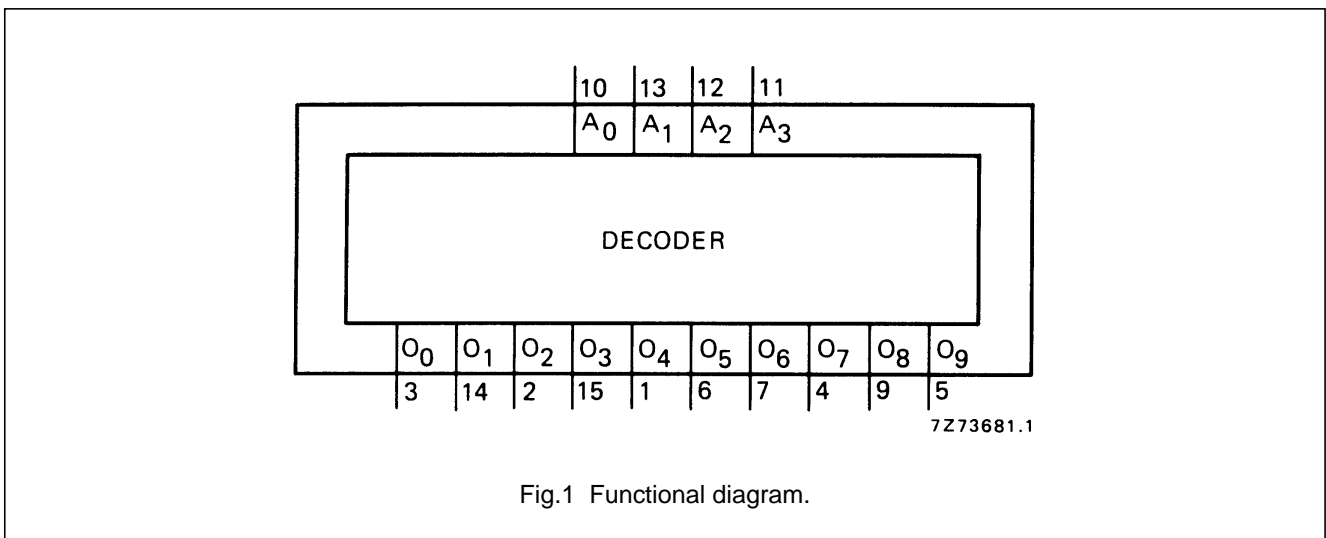


Fig.1 Functional diagram.

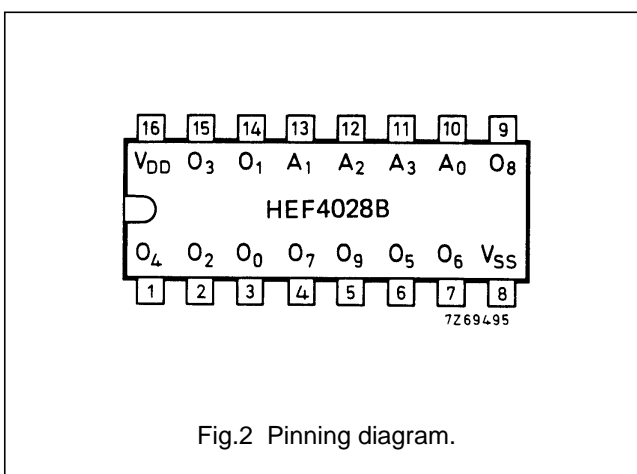


Fig.2 Pinning diagram.

- HEF4028BP(N): 16-lead DIL; plastic (SOT38-1)
  - HEF4028BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
  - HEF4028BT(D): 16-lead SO; plastic (SOT109-1)
- ( ): Package Designator North America

PINNING

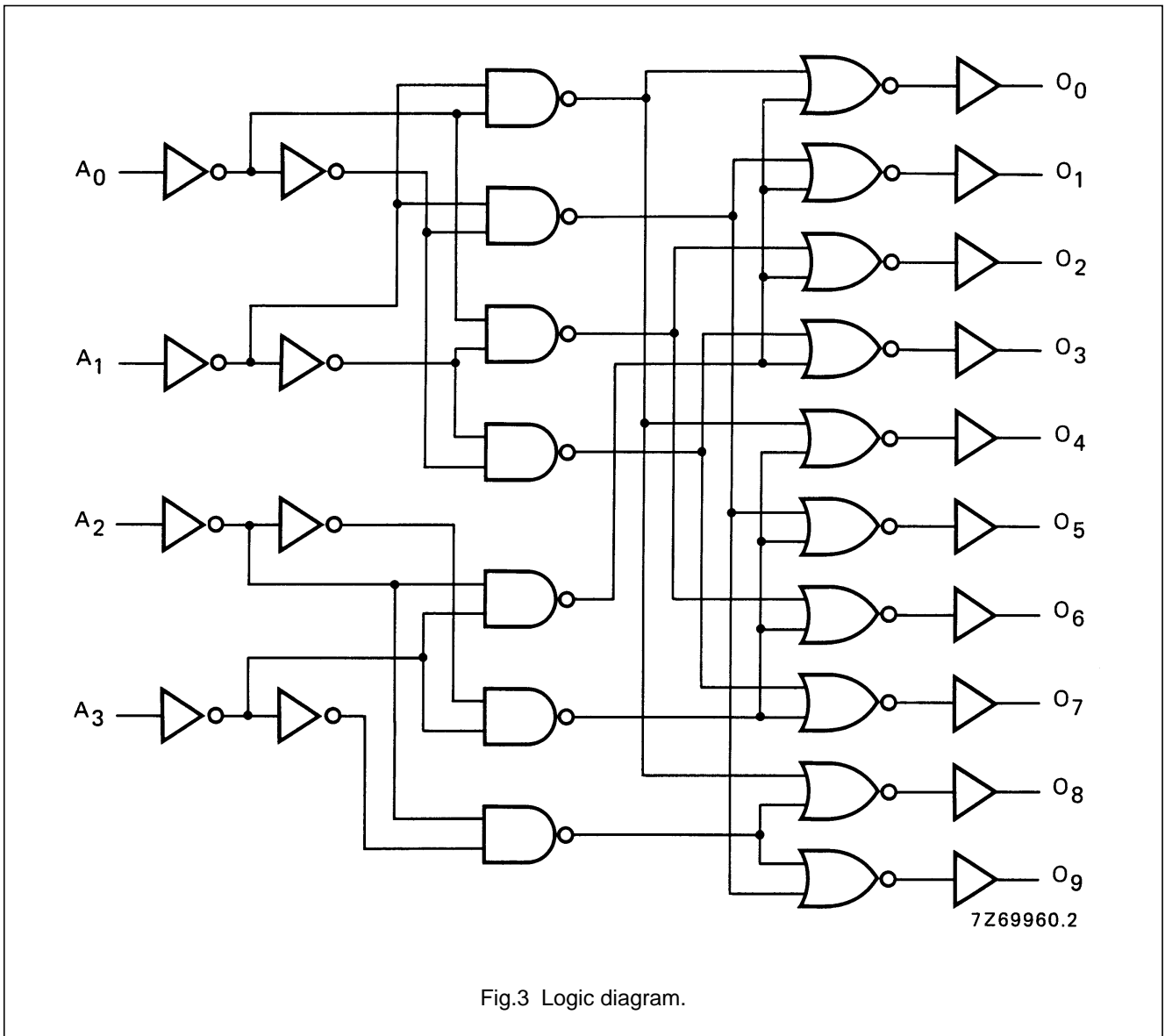
- A<sub>0</sub> to A<sub>3</sub> address inputs, 1-2-4-8 BCD
- O<sub>0</sub> to O<sub>9</sub> outputs (active HIGH)

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

See Family Specifications

1-of-10 decoder

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TRUTH TABLE

INPUTS				OUTPUTS									
A <sub>3</sub>	A <sub>2</sub>	A <sub>1</sub>	A <sub>0</sub>	O <sub>0</sub>	O <sub>1</sub>	O <sub>2</sub>	O <sub>3</sub>	O <sub>4</sub>	O <sub>5</sub>	O <sub>6</sub>	O <sub>7</sub>	O <sub>8</sub>	O <sub>9</sub>
L	L	L	L	H	L	L	L	L	L	L	L	L	L
L	L	L	H	L	H	L	L	L	L	L	L	L	L
L	L	H	L	L	L	H	L	L	L	L	L	L	L
L	L	H	H	L	L	L	H	L	L	L	L	L	L
L	H	L	L	L	L	L	L	H	L	L	L	L	L
L	H	L	H	L	L	L	L	L	H	L	L	L	L
L	H	H	L	L	L	L	L	L	L	H	L	L	L
L	H	H	H	L	L	L	L	L	L	L	H	L	L
H	L	L	L	L	L	L	L	L	L	L	L	H	L
H	L	L	H	L	L	L	L	L	L	L	L	L	H
H	L	H	L	L	L	L	L	L	L	L	L	L	L
H	L	H	H	L	L	L	L	L	L	L	L	L	L
H	H	L	L	L	L	L	L	L	L	L	L	L	L
H	H	L	H	L	L	L	L	L	L	L	L	L	L
H	H	H	L	L	L	L	L	L	L	L	L	L	L
H	H	H	H	L	L	L	L	L	L	L	L	L	L

(2)

Notes

1. H = HIGH state (the more positive voltage)  
L = LOW state (the less positive voltage)
2. Extraordinary states.

## 1-of-10 decoder

HEF4028B  
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	TYP.	MAX.		TYPICAL EXTRAPOLATION FORMULA
Propagation delays $A_n \rightarrow O_n$	5	$t_{PHL}$	100	200	ns	73 ns + (0,55 ns/pF) $C_L$
			40	80	ns	29 ns + (0,23 ns/pF) $C_L$
			30	60	ns	22 ns + (0,16 ns/pF) $C_L$
	10	$t_{PLH}$	90	180	ns	63 ns + (0,55 ns/pF) $C_L$
			40	80	ns	29 ns + (0,23 ns/pF) $C_L$
			30	60	ns	22 ns + (0,16 ns/pF) $C_L$
Output transition times	5	$t_{THL}$	60	120	ns	10 ns + (1,0 ns/pF) $C_L$
			30	60	ns	9 ns + (0,42 ns/pF) $C_L$
			20	40	ns	6 ns + (0,28 ns/pF) $C_L$
	10	$t_{TLH}$	60	120	ns	10 ns + (1,0 ns/pF) $C_L$
			30	60	ns	9 ns + (0,42 ns/pF) $C_L$
			20	40	ns	6 ns + (0,28 ns/pF) $C_L$

	$V_{DD}$ V	TYPICAL FORMULA FOR P ( $\mu\text{W}$ )	
Dynamic power dissipation per package (P)	5	$350 f_i + \sum (f_o C_L) \times V_{DD}^2$	where $f_i$ = input freq. (MHz) $f_o$ = output freq. (MHz) $C_L$ = total load cap. (pF) $\sum (f_o C_L)$ = sum of outputs $V_{DD}$ = supply voltage (V)
	10	$2\ 200 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$7\ 350 f_i + \sum (f_o C_L) \times V_{DD}^2$	