

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

HEF4024B

MSI

7-stage binary counter

Product specification
File under Integrated Circuits, IC04

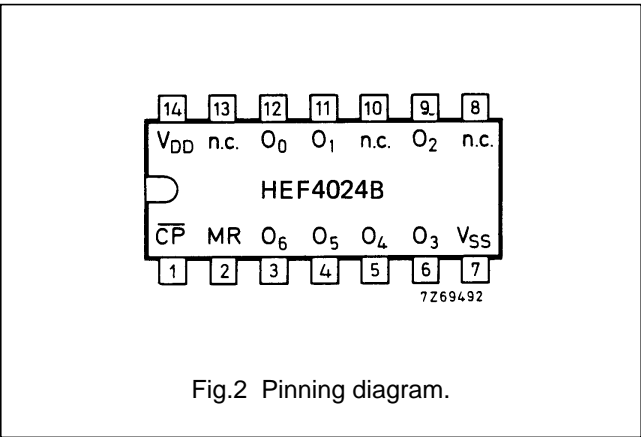
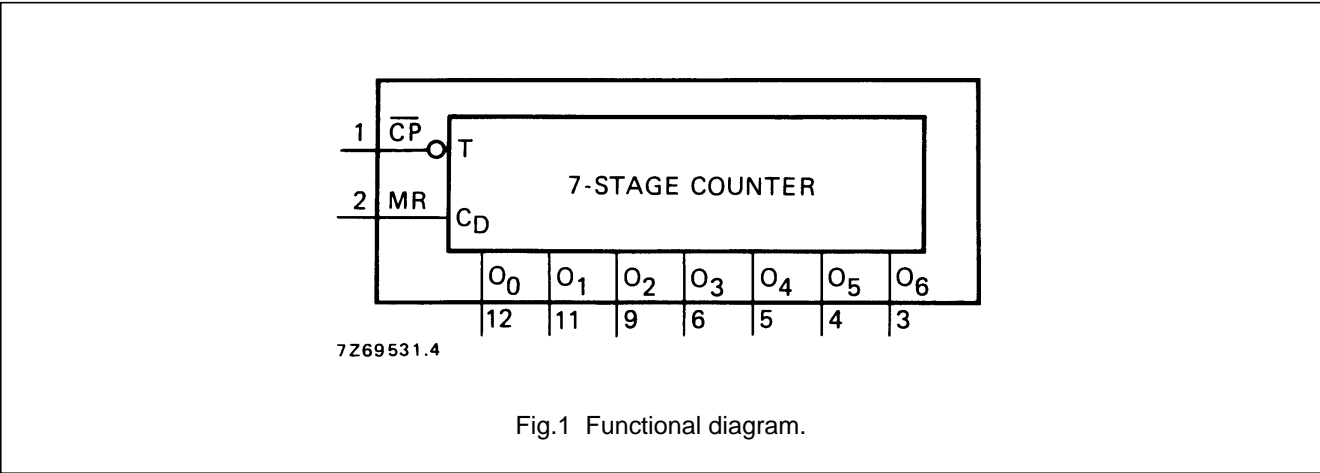
January 1995

7-stage binary counter

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DESCRIPTION

The HEF4024B is a 7-stage binary ripple counter with a clock input (\overline{CP}), and overriding asynchronous master reset input (MR) and seven fully buffered parallel outputs (O_0 to O_6). The counter advances on the HIGH to LOW transition of \overline{CP} . A HIGH on MR clears all counter stages and forces all outputs LOW, independent of \overline{CP} . Each counter stage is a static toggle flip-flop.



PINNING

\overline{CP}	clock input (HIGH to LOW triggered)
MR	master reset input
O_0 to O_6	buffered parallel outputs

APPLICATION INFORMATION

- Some examples of applications for the HEF4024B are:
- Frequency dividers
 - Time delay circuits

FAMILY DATA, I_{DD} LIMITS category MSI

See Family Specifications

- HEF4024BP(N): 14-lead DIL; plastic (SOT27-1)
- HEF4024BD(F): 14-lead DIL; ceramic (cerdip) (SOT73)
- HEF4024BT(D): 14-lead SO; plastic (SOT108-1)
- (): Package Designator North America

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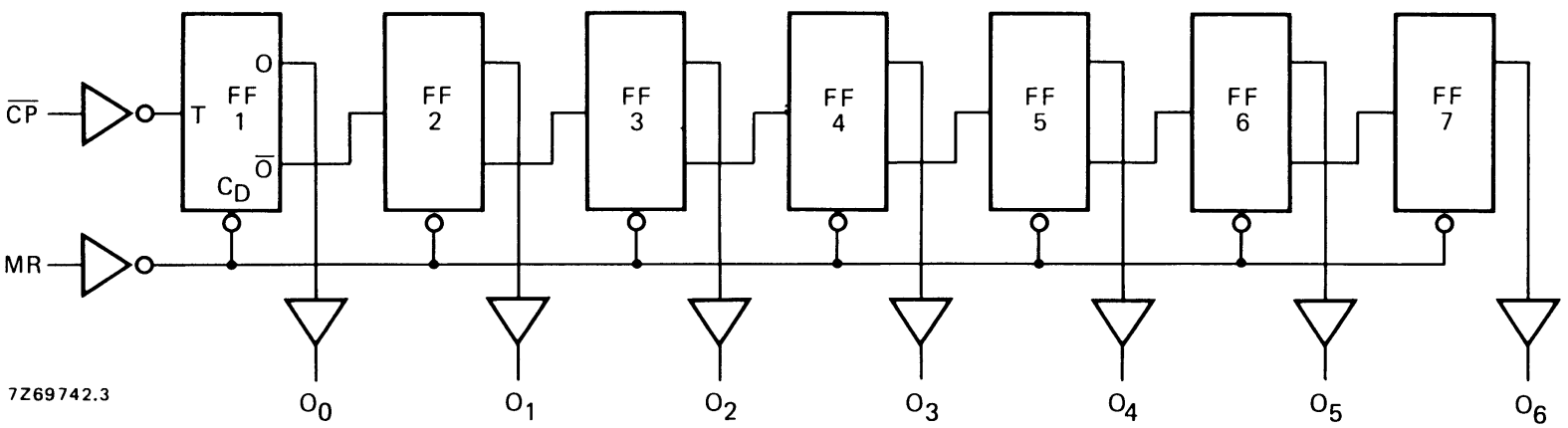
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Fig.3 Logic diagram.

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AC CHARACTERISTICS

 $V_{SS} = 0\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $C_L = 50\text{ pF}$; input transition times $\leq 20\text{ ns}$; see also waveforms Fig.4

	V _{DD} V	SYMBOL	MIN.	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA
Propagation delays						
$\overline{CP} \rightarrow O_0$	5			100	200 ns	73 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		40	75 ns	29 ns + (0,23 ns/pF) C _L
	15			25	50 ns	17 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		105	210 ns	78 ns + (0,55 ns/pF) C _L
	10			45	85 ns	34 ns + (0,23 ns/pF) C _L
	15			30	60 ns	22 ns + (0,16 ns/pF) C _L
O _n → O _n + 1	5			60	120 ns	33 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		25	50 ns	14 ns + (0,23 ns/pF) C _L
	15			20	40 ns	12 ns + (0,16 ns/pF) C _L
LOW to HIGH	5	t _{PLH}		50	100 ns	23 ns + (0,55 ns/pF) C _L
	10			20	40 ns	9 ns + (0,23 ns/pF) C _L
	15			15	30 ns	7 ns + (0,16 ns/pF) C _L
MR → O _n	5			120	240 ns	93 ns + (0,55 ns/pF) C _L
HIGH to LOW	10	t _{PHL}		45	90 ns	34 ns + (0,23 ns/pF) C _L
	15			30	60 ns	22 ns + (0,16 ns/pF) C _L
Output transition times	5			60	120 ns	10 ns + (1,0 ns/pF) C _L
HIGH to LOW	10	t _{THL}		30	60 ns	9 ns + (0,42 ns/pF) C _L
	15			20	40 ns	6 ns + (0,28 ns/pF) C _L
LOW to HIGH	5	t _{TLH}		60	120 ns	10 ns + (1,0 ns/pF) C _L
	10			30	60 ns	9 ns + (0,42 ns/pF) C _L
	15			20	40 ns	6 ns + (0,28 ns/pF) C _L
Minimum clock pulse width; HIGH	5		60	30	ns	
	10	t _{WCPH}	30	15	ns	
	15		20	10	ns	
Minimum MR pulse width; HIGH	5		80	40	ns	
	10	t _{WMRH}	35	20	ns	
	15		25	15	ns	
Recovery time for MR	5		20	10	ns	
	10	t _{RMR}	15	5	ns	
	15		15	5	ns	
Maximum clock pulse frequency	5		5	10	MHz	
	10	f _{max}	13	25	MHz	
	15		18	35	MHz	

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	V_{DD} V	TYPICAL FORMULA FOR P (μ W)	
Dynamic power dissipation per package (P)	5	$500 f_i + \sum (f_o C_L) \times V_{DD}^2$	where f_i = input freq. (MHz) f_o = output freq. (MHz) C_L = load cap. (pF) $\sum (f_o C_L)$ = sum of outputs V_{DD} = supply voltage (V)
	10	$2100 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$5200 f_i + \sum (f_o C_L) \times V_{DD}^2$	

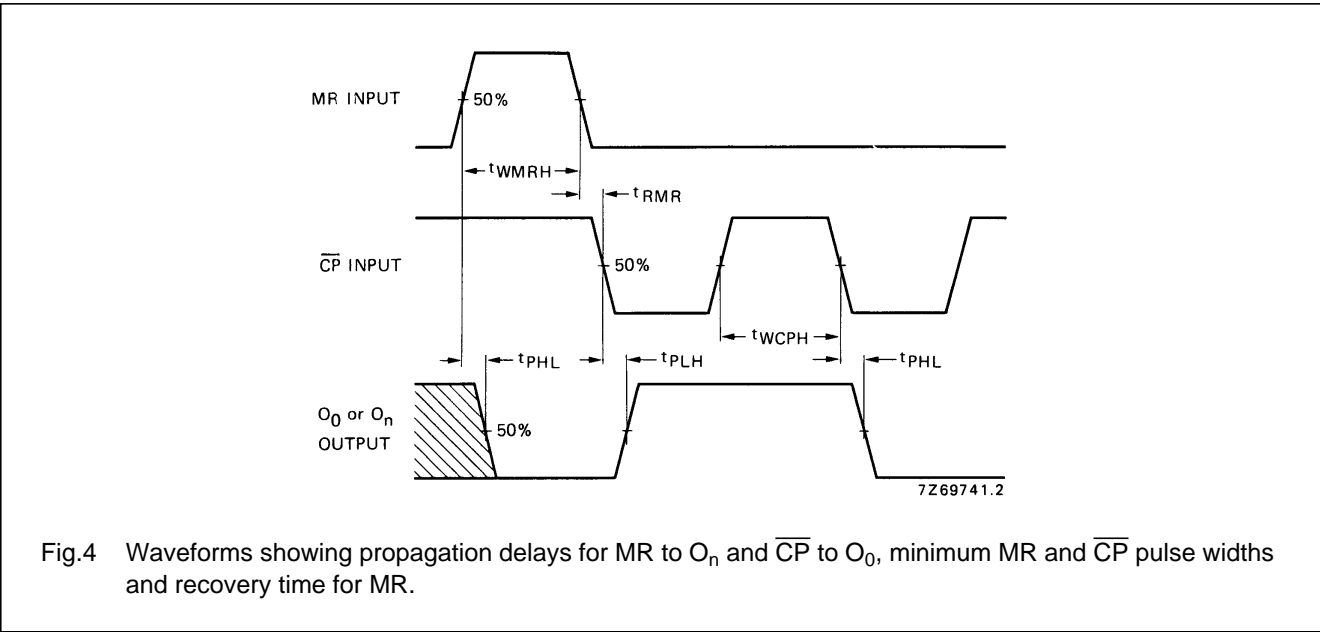


Fig.4 Waveforms showing propagation delays for MR to O_n and \overline{CP} to O_0 , minimum MR and \overline{CP} pulse widths and recovery time for MR.