

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

HEF4006B

MSI

18-stage static shift register

Product specification
File under Integrated Circuits, IC04

January 1995

18-stage static shift register

HEF4006B

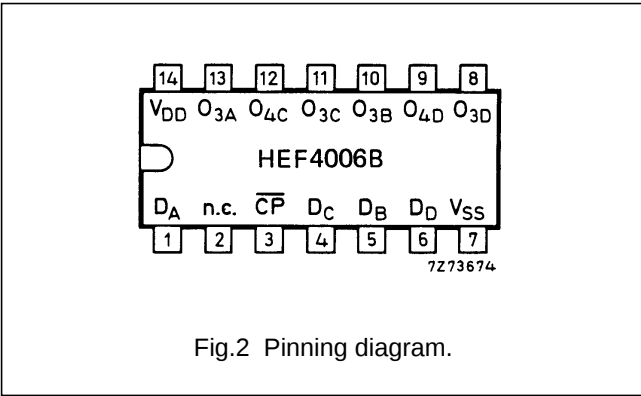
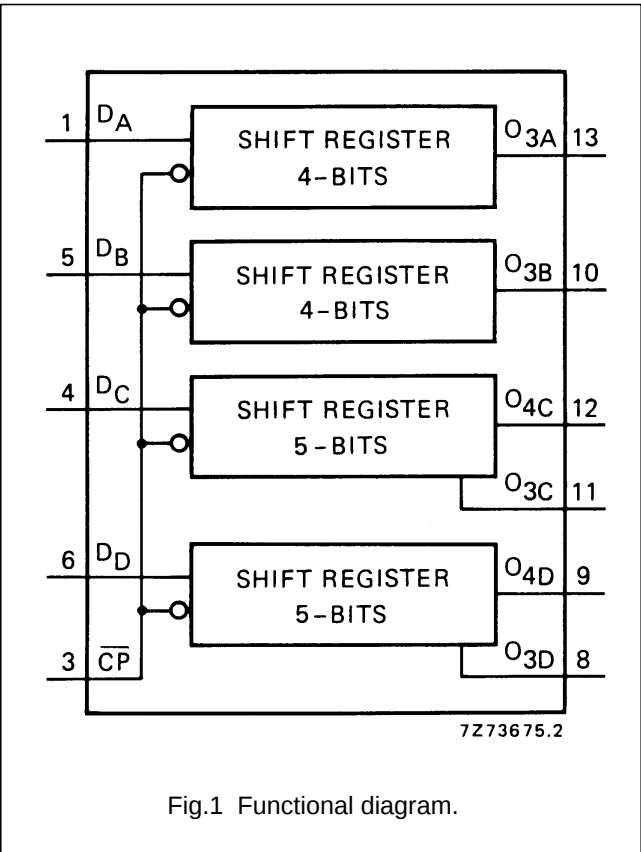
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DESCRIPTION

The HEF4006B is an 18-stage shift register arranged as two 4-stage and two 5-stage shift registers with a common clock input ($\overline{CP}$). The two 4-stage shift registers each have a data input (D_A , D_B) and a data output (O_{3A} , O_{3B}); the two

5-stage shift registers each have a data input (D_C , D_D) and data outputs from the fourth and fifth stages (O_{3C} , O_{4C} , O_{3D} , O_{4D}).

The registers can be operated in parallel or interconnected to form a single shift register of up to 18 bits. Data are shifted into the first register position of each register from the data inputs (D_A to D_D) and all the data in each register are shifted one position to the right on the HIGH to LOW transition of $\overline{CP}$.



- HEF4006BP(N): 14-lead DIL; plastic (SOT27-1)
- HEF4006BD(F): 14-lead DIL; ceramic (cerdip) (SOT73)
- HEF4006BT(D): 14-lead SO; plastic (SOT108-1)
- (): Package Designator North America

FUNCTION TABLE

D_n	$\overline{CP}$	$O_n^{(5)}$
D_1		D_1
X		no change

Notes

1. X = state is immaterial
2. = positive-going transition
3. = negative-going transition
4. D_1 = either HIGH or LOW
5. The moment D_1 appears at O depends on the register length.

PINNING

- D_A to D_D data inputs
- $\overline{CP}$ clock input (HIGH to LOW; edge-triggered)
- O_{3A} to O_{3D} ; O_{4C} ; O_{4D} data outputs

FAMILY DATA, I_{DD} LIMITS category MSI

See Family Specifications

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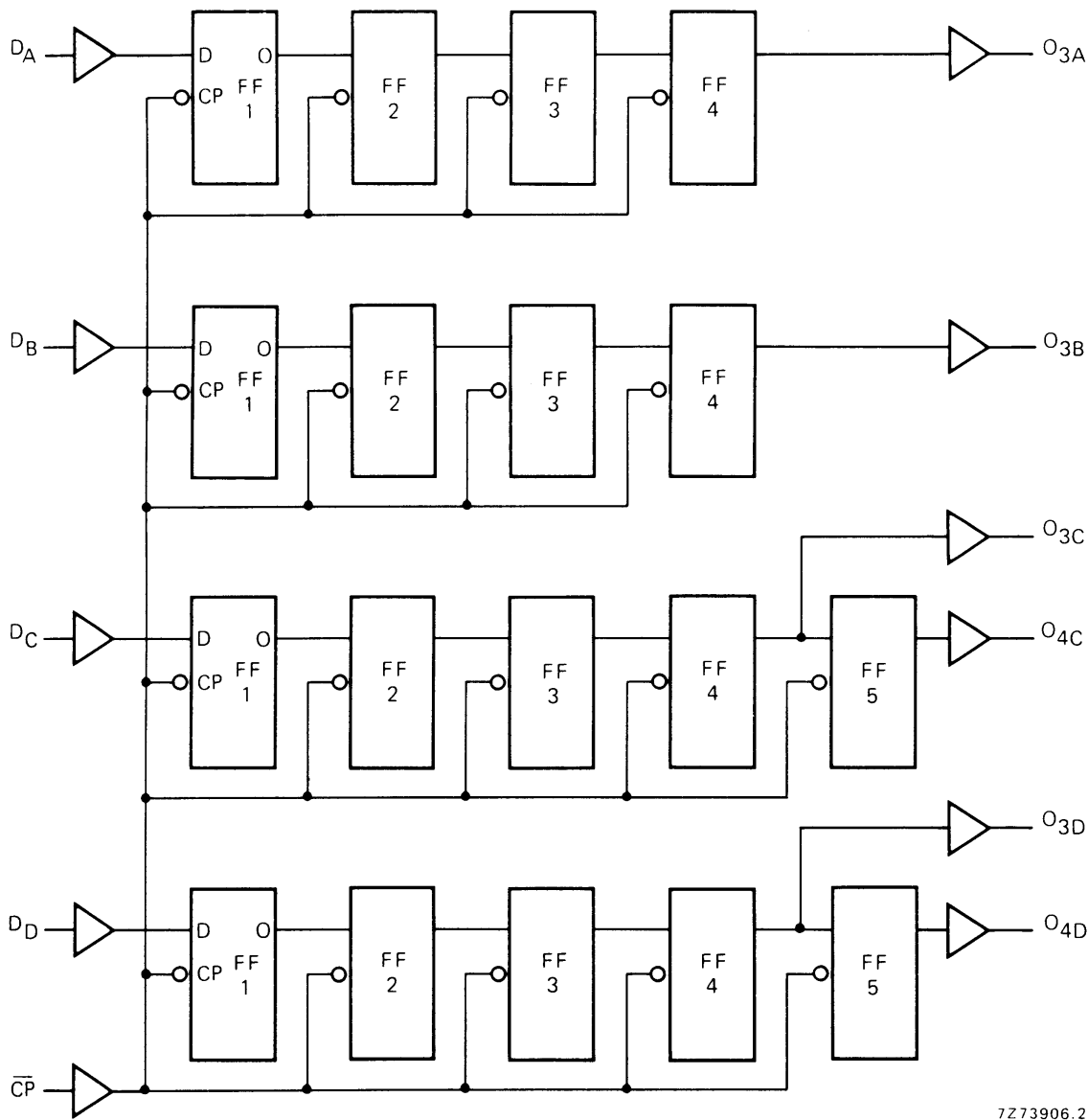


Fig.3 Logic diagram.

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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 $\leq 20\text{ ns}$

	V_{DD} V	SYMBOL	MIN	TYP	MAX	TYPICAL EXTRAPOLATION FORMULA
Propagation delays $\overline{CP} \rightarrow O_n$ HIGH to LOW	5 10 15	t_{PHL}		90 40 30	180 80 60 ns	$63\text{ ns} + (0,55\text{ ns/pF}) C_L$ $29\text{ ns} + (0,23\text{ ns/pF}) C_L$ $22\text{ ns} + (0,16\text{ ns/pF}) C_L$
LOW to HIGH	5 10 15	t_{PLH}		90 40 35	180 85 70 ns	$63\text{ ns} + (0,55\text{ ns/pF}) C_L$ $29\text{ ns} + (0,23\text{ ns/pF}) C_L$ $27\text{ ns} + (0,16\text{ ns/pF}) C_L$
Output transition times HIGH to LOW	5 10 15	t_{THL}		60 30 20	120 60 40 ns	$10\text{ ns} + (1,0\text{ ns/pF}) C_L$ $9\text{ ns} + (0,42\text{ ns/pF}) C_L$ $6\text{ ns} + (0,28\text{ ns/pF}) C_L$
LOW to HIGH	5 10 15	t_{TLH}		60 30 20	120 60 40 ns	$10\text{ ns} + (1,0\text{ ns/pF}) C_L$ $9\text{ ns} + (0,42\text{ ns/pF}) C_L$ $6\text{ ns} + (0,28\text{ ns/pF}) C_L$
Minimum clock pulse width; HIGH	5 10 15	t_{WCPH}	60 40 30	30 20 15	ns ns ns	see also waveforms Fig.4
Set-up time $D_n \rightarrow \overline{CP}$	5 10 15	t_{su}	20 10 5	10 5 0	ns ns ns	
Hold time $D_n \rightarrow \overline{CP}$	5 10 15	t_{hold}	5 5 5	-5 0 0	ns ns ns	
Maximum clock pulse frequency	5 10 15	f_{max}	9 15 18	18 30 36	MHz MHz MHz	

	V_{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5 10 15	$600 f_i + \sum (f_o C_L) \times V_{DD}^2$ $3200 f_i + \sum (f_o C_L) \times V_{DD}^2$ $11\,600 f_i + \sum (f_o C_L) \times V_{DD}^2$	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)

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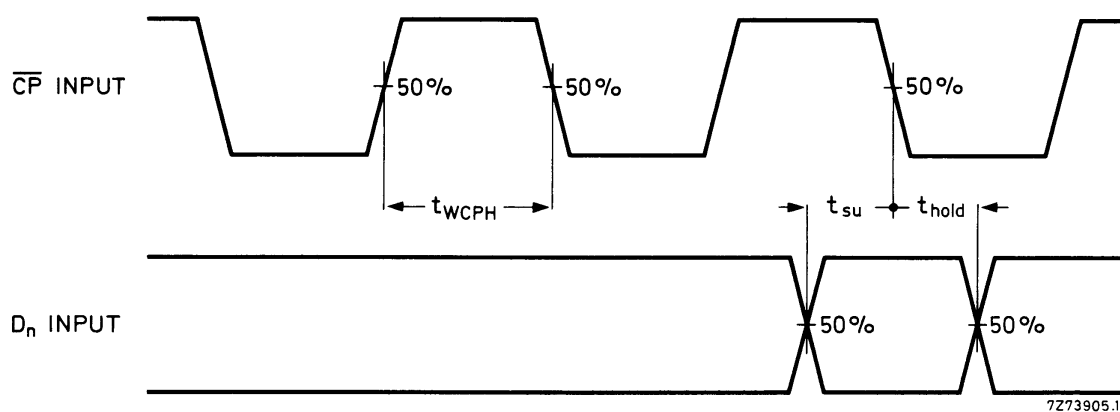
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Fig.4 Waveforms showing minimum clock pulse width, and set-up and hold-times for D_n to $\overline{CP}$. Set-up and hold times are shown as positive values but may be specified as negative values.