

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

HEF4086B

gates

4-wide 2-input AND-OR-invert gate

Product specification
File under Integrated Circuits, IC04

January 1995

4-wide 2-input AND-OR-invert gate

HEF4086B gates

DESCRIPTION

The HEF4086B is a 4-wide 2-input AND-OR-invert (AOI) gate with two additional inputs (I_8 or \bar{I}_9) which can be used as either expander or inhibit inputs by connecting them to any standard LOCMOS output. A HIGH on I_8 or a LOW on \bar{I}_9 forces the output (O) LOW independent of the other eight inputs (I_0 to I_7). The output (O) is fully buffered for highest noise immunity and pattern insensitivity of output impedance.

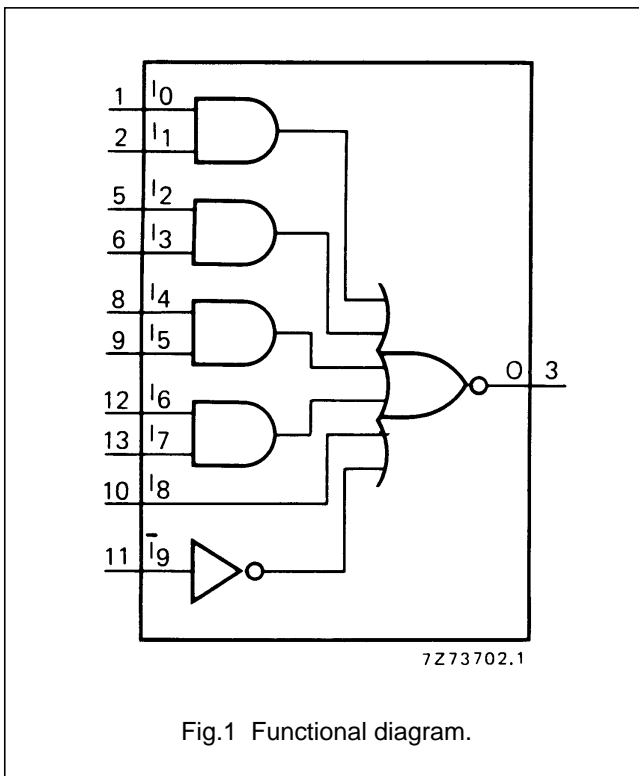


Fig.1 Functional diagram.

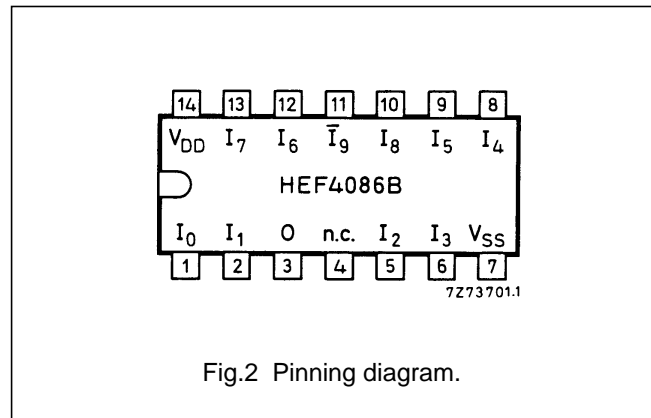


Fig.2 Pinning diagram.

- HEF4086BP(N): 14-lead DIL; plastic (SOT27-1)
- HEF4086BD(F): 14-lead DIL; ceramic (cerdip) (SOT73)
- HEF4086BT(D): 14-lead SO; plastic (SOT108-1)
- (): Package Designator North America

PINNING

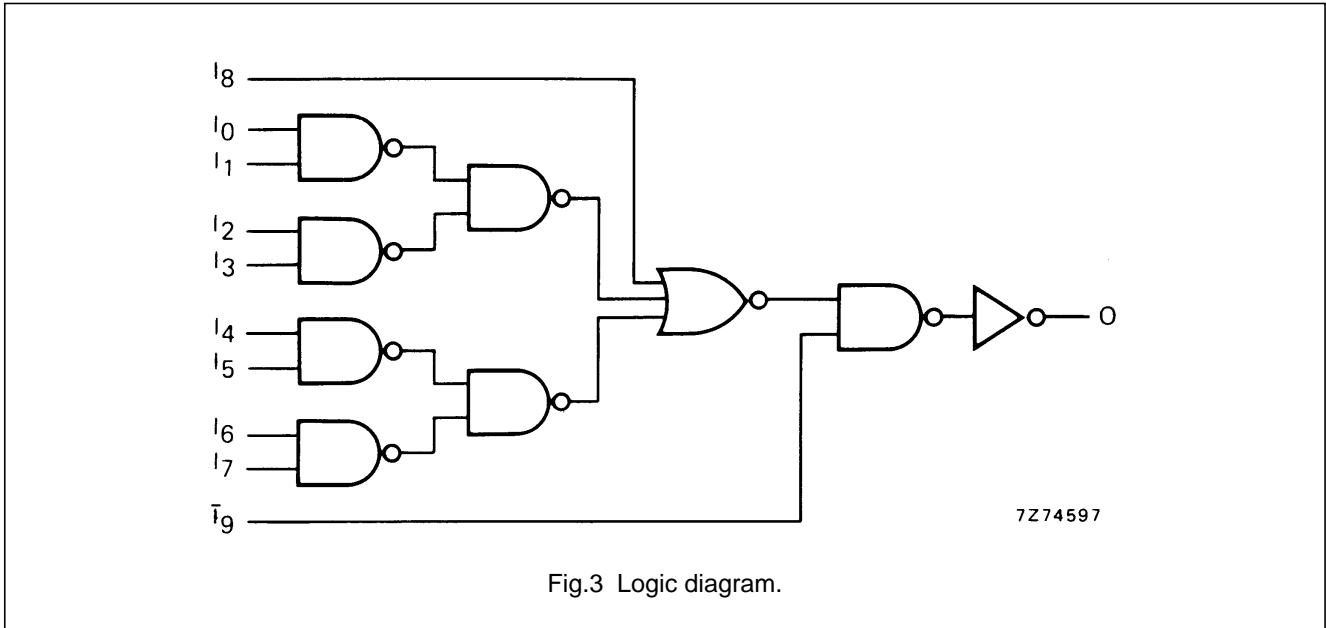
- I_0 to I_8 gate inputs
- \bar{I}_9 gate input (active LOW)
- O output (active LOW)

FAMILY DATA, I_{DD} LIMITS category GATES

See Family Specifications

4-wide 2-input AND-OR-invert gate

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LOGIC EQUATION

$$O = \overline{I_0 \cdot I_1 + I_2 \cdot I_3 + I_4 \cdot I_5 + I_6 \cdot I_7 + I_8 + I_9}$$

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AC CHARACTERISTICS

 $V_{SS} = 0\text{ V}$; $T_{amb} = 25\text{ °C}$; $C_L = 50\text{ pF}$; input transition times $\leq 20\text{ ns}$

	V_{DD} V	SYMBOL	TYP.	MAX.		TYPICAL EXTRAPOLATION FORMULA	
Propagation delays	I_0 to $I_7 \rightarrow O$ HIGH to LOW	t_{PHL}	90	180	ns	$63\text{ ns} + (0,55\text{ ns/pF}) C_L$	
			30	65	ns	$19\text{ ns} + (0,23\text{ ns/pF}) C_L$	
			20	40	ns	$12\text{ ns} + (0,16\text{ ns/pF}) C_L$	
	LOW to HIGH	t_{PLH}	80	155	ns	$53\text{ ns} + (0,55\text{ ns/pF}) C_L$	
			30	60	ns	$19\text{ ns} + (0,23\text{ ns/pF}) C_L$	
			20	40	ns	$12\text{ ns} + (0,16\text{ ns/pF}) C_L$	
	$I_8 \rightarrow O$ HIGH to LOW	t_{PHL}	70	140	ns	$43\text{ ns} + (0,55\text{ ns/pF}) C_L$	
			25	55	ns	$14\text{ ns} + (0,23\text{ ns/pF}) C_L$	
			20	40	ns	$12\text{ ns} + (0,16\text{ ns/pF}) C_L$	
		LOW to HIGH	t_{PLH}	55	115	ns	$28\text{ ns} + (0,55\text{ ns/pF}) C_L$
				20	40	ns	$9\text{ ns} + (0,23\text{ ns/pF}) C_L$
				15	25	ns	$7\text{ ns} + (0,16\text{ ns/pF}) C_L$
$\bar{I}_9 \rightarrow O$ HIGH to LOW	t_{PHL}	55	105	ns	$28\text{ ns} + (0,55\text{ ns/pF}) C_L$		
		20	45	ns	$9\text{ ns} + (0,23\text{ ns/pF}) C_L$		
		15	30	ns	$7\text{ ns} + (0,16\text{ ns/pF}) C_L$		
	LOW to HIGH	t_{PLH}	45	90	ns	$18\text{ ns} + (0,55\text{ ns/pF}) C_L$	
			15	35	ns	$4\text{ ns} + (0,23\text{ ns/pF}) C_L$	
			10	25	ns	$2\text{ ns} + (0,16\text{ ns/pF}) C_L$	
Output transition times	HIGH to LOW	t_{THL}	60	120	ns	$10\text{ ns} + (1,0\text{ ns/pF}) C_L$	
			30	60	ns	$9\text{ ns} + (0,42\text{ ns/pF}) C_L$	
			20	40	ns	$6\text{ ns} + (0,28\text{ ns/pF}) C_L$	
	LOW to HIGH	t_{TLH}	60	120	ns	$10\text{ ns} + (1,0\text{ ns/pF}) C_L$	
			30	60	ns	$9\text{ ns} + (0,42\text{ ns/pF}) C_L$	
			20	40	ns	$6\text{ ns} + (0,28\text{ ns/pF}) C_L$	

	V_{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5	$525 f_i + \sum (f_o C_L) \times V_{DD}^2$	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	$2600 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$7300 f_i + \sum (f_o C_L) \times V_{DD}^2$	

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APPLICATION INFORMATION

Figure 4 shows two HEF4086B ICs connected to obtain an 8-wide 2-input AOI function. The output (O_A) of the first IC is fed directly into the \bar{I}_{9B} gate input of the second IC. Similarly, any NAND gate output can be fed directly into the \bar{I}_9 gate input to obtain a 5-wide AOI function. In addition, any AND gate output can be fed directly into the I₈ gate input with the same result.

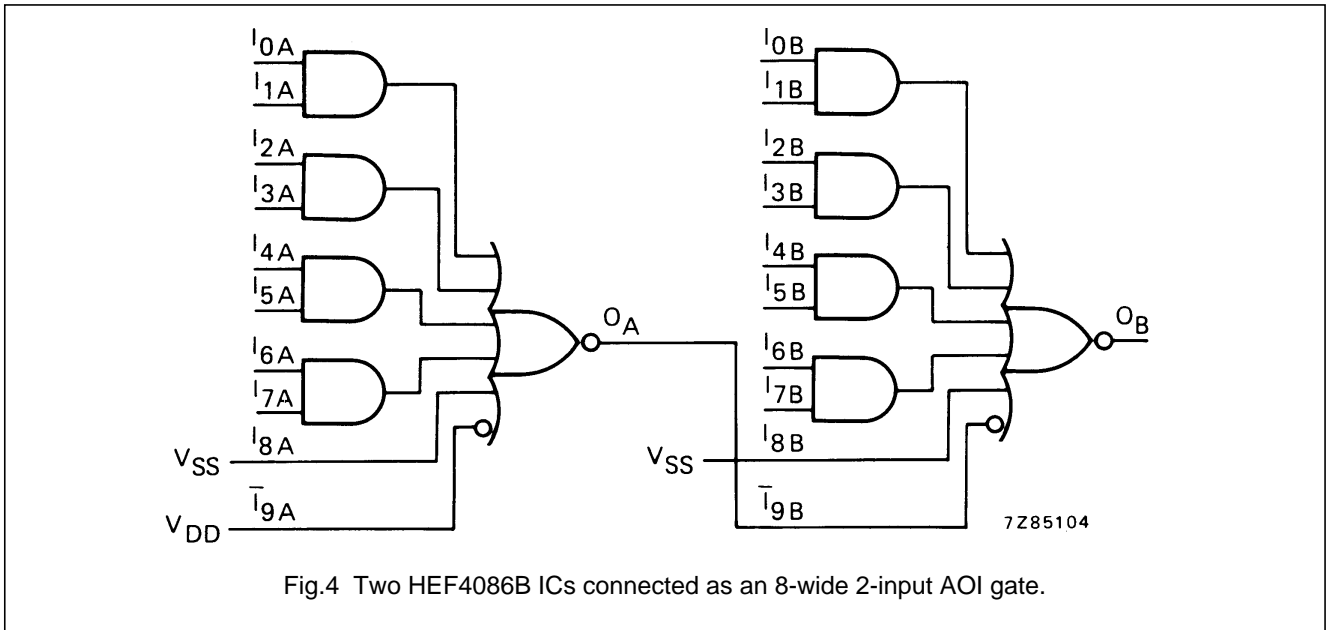


Fig.4 Two HEF4086B ICs connected as an 8-wide 2-input AOI gate.

Logic equation for Fig.4:

$$O_B = \overline{I_{0A} \cdot I_{1A} + I_{2A} \cdot I_{3A} + I_{4A} \cdot I_{5A} + I_{6A} \cdot I_{7A} + I_{0B} \cdot I_{1B} + I_{2B} \cdot I_{3B} + I_{4B} \cdot I_{5B} + I_{6B} \cdot I_{7B}}$$



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