

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

HEF4008B

MSI

4-bit binary full adder

Product specification
File under Integrated Circuits, IC04

January 1995

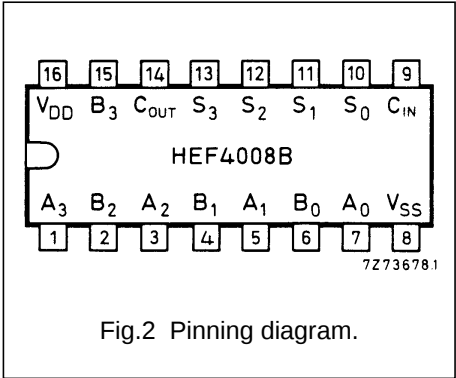
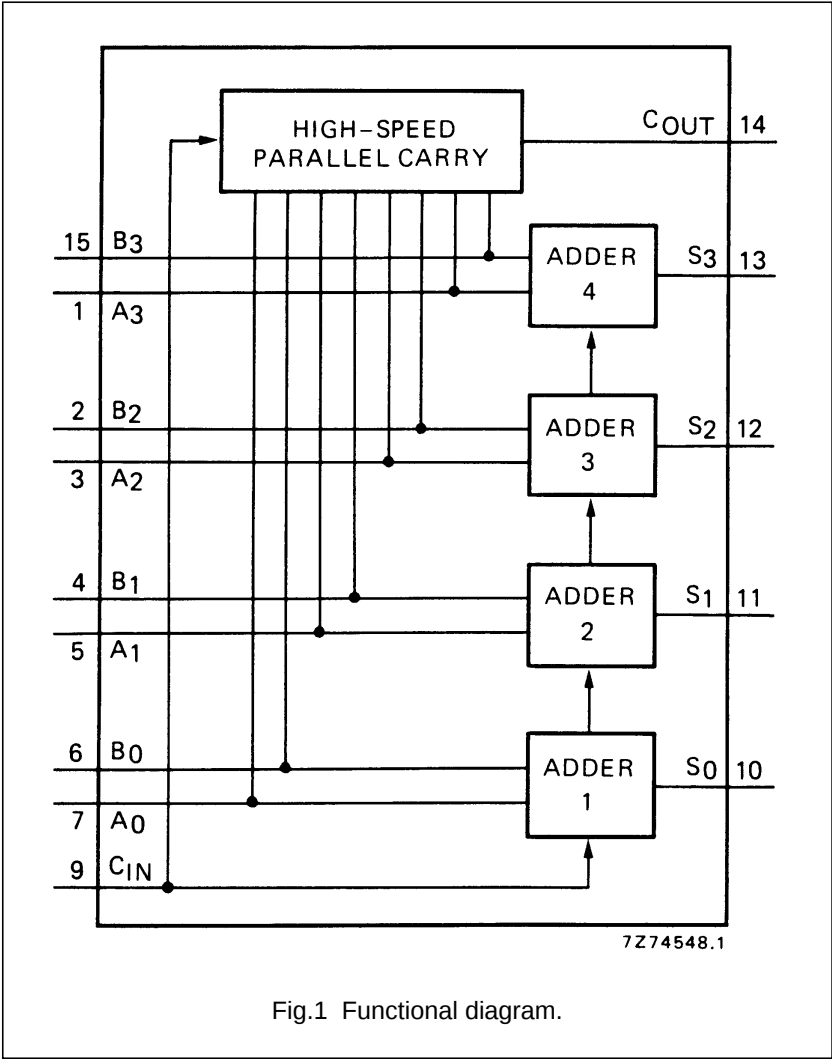
4-bit binary full adder

HEF4008B
MSI

DESCRIPTION

The HEF4008B is a 4-bit binary full adder with two 4-bit data inputs (A_0 to A_3 , B_0 to B_3), a carry input (C_{IN}), four sum outputs (S_0 to S_3), and a carry

output (C_{OUT}). The IC uses full look-ahead across 4-bits to generate C_{OUT} . This minimizes the necessity for extensive look-ahead and carry-cascading circuits.



PINNING

- A_0 to A_3

B_0 to B_3

S_0 to S_3

C_{IN}

C_{OUT}
- data inputs

data inputs

sum outputs

carry input

carry output

TRUTH TABLE (one adder)

C_{IN}	A	B	C_{OUT}	S
L	L	L	L	L
L	L	H	L	H
L	H	L	L	H
L	H	H	H	L
H	L	L	L	H
H	L	H	H	L
H	H	L	H	L
H	H	H	H	H

- HEF4008BP(N):

HEF4008BD(F):

HEF4008BT(D):

() : Package Designator North America
- 16-lead DIL; plastic
(SOT38-1)

16-lead DIL; ceramic (cerdip)
(SOT74)

16-lead SO; plastic
(SOT109-1)

FAMILY DATA, I_{DD} LIMITS category MSI

See Family Specifications

4-bit binary full adder

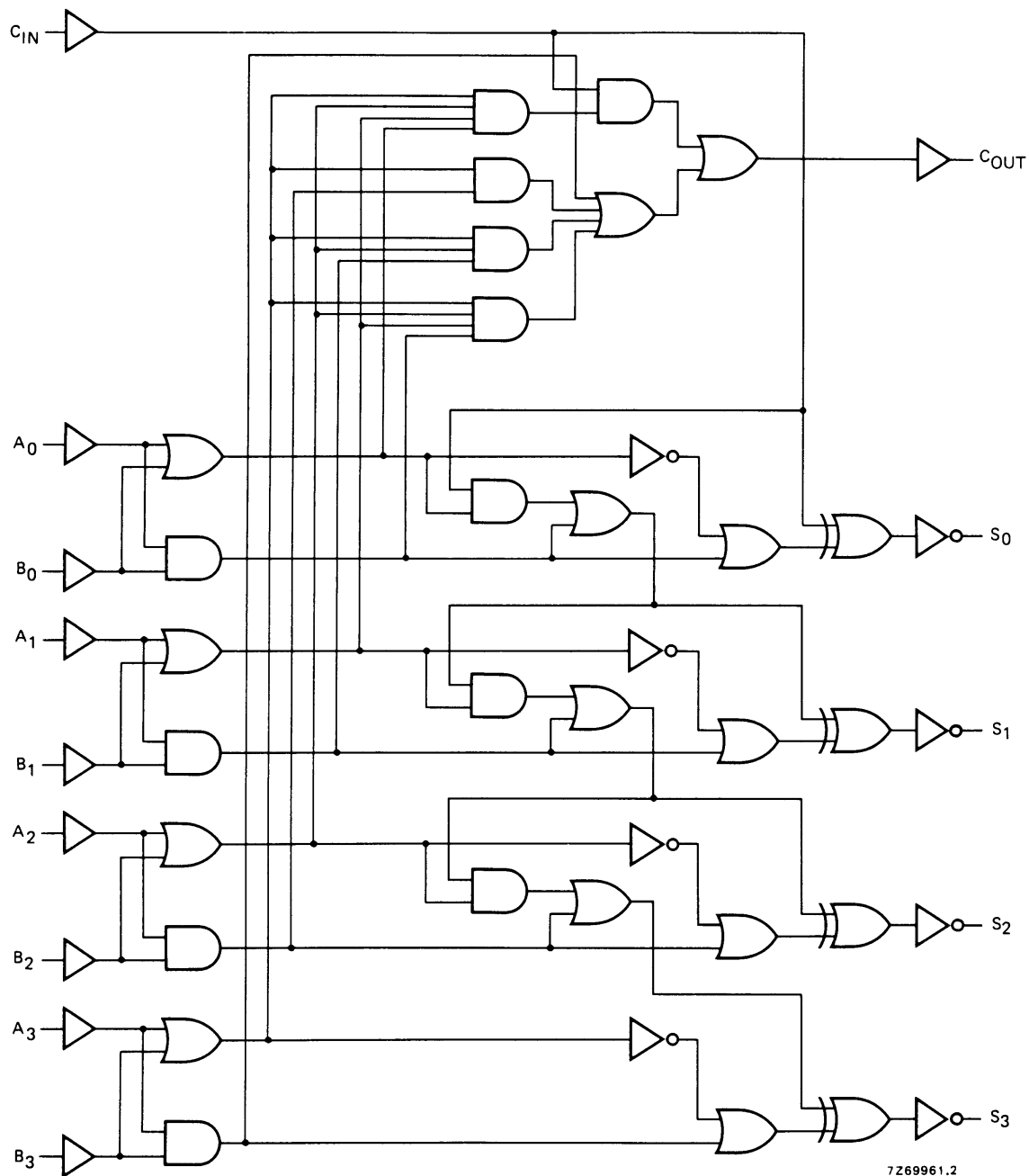
HEF4008B
MSI

Fig.3 Logic diagram.

4-bit binary full adder

HEF4008B
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						
sum in $\rightarrow$ sum out	5	t_{PHL}		150	300 ns	123 ns + (0,55 ns/pF) C_L
HIGH to LOW	10			55	110 ns	44 ns + (0,23 ns/pF) C_L
	15			40	80 ns	32 ns + (0,16 ns/pF) C_L
LOW to HIGH	5	t_{PLH}		135	270 ns	108 ns + (0,55 ns/pF) C_L
	10			55	110 ns	44 ns + (0,23 ns/pF) C_L
	15			40	80 ns	32 ns + (0,16 ns/pF) C_L
sum in $\rightarrow C_{OUT}$	5	t_{PHL}		125	250 ns	98 ns + (0,55 ns/pF) C_L
HIGH to LOW	10			50	100 ns	39 ns + (0,23 ns/pF) C_L
	15			35	70 ns	27 ns + (0,16 ns/pF) C_L
LOW to HIGH	5	t_{PLH}		100	200 ns	73 ns + (0,55 ns/pF) C_L
	10			45	90 ns	34 ns + (0,23 ns/pF) C_L
	15			30	60 ns	22 ns + (0,16 ns/pF) C_L
$C_{IN} \rightarrow$ sum out	5	t_{PHL}		130	260 ns	103 ns + (0,55 ns/pF) C_L
HIGH to LOW	10			50	100 ns	39 ns + (0,23 ns/pF) C_L
	15			35	70 ns	27 ns + (0,16 ns/pF) C_L
LOW to HIGH	5	t_{PLH}		115	230 ns	88 ns + (0,55 ns/pF) C_L
	10			50	100 ns	39 ns + (0,23 ns/pF) C_L
	15			35	70 ns	27 ns + (0,16 ns/pF) C_L
$C_{IN} \rightarrow C_{OUT}$	5	t_{PHL}		90	180 ns	63 ns + (0,55 ns/pF) C_L
HIGH to LOW	10			35	70 ns	24 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}		75	150 ns	48 ns + (0,55 ns/pF) C_L
	10			35	70 ns	24 ns + (0,23 ns/pF) C_L
	15			25	50 ns	17 ns + (0,16 ns/pF) C_L
Output transition times						
HIGH to LOW	5	t_{THL}		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
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

4-bit binary full adder

HEF4008B
MSI

	V _{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5	$1\,500\,f_i + \sum (f_o C_L) \times V_{DD}^2$	where f _i = input freq. (MHz) f _o = output freq. (MHz) C _L = load capacitance (pF) Σ (f _o C _L) = sum of outputs V _{DD} = supply voltage (V)
	10	$6\,000\,f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$13\,500\,f_i + \sum (f_o C_L) \times V_{DD}^2$	

APPLICATION INFORMATION

