

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

HEF40098B **buffers** 3-state hex inverting buffer

Product specification
File under Integrated Circuits, IC04

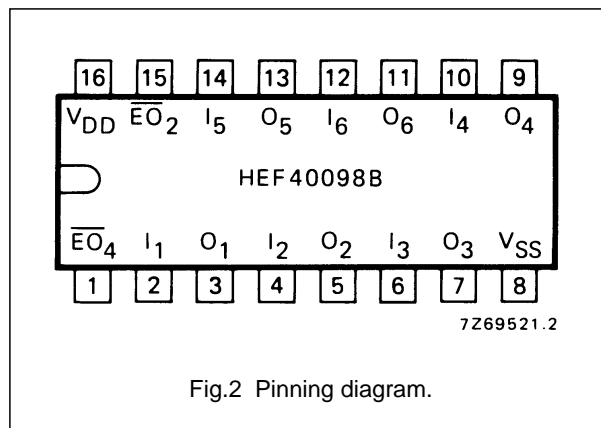
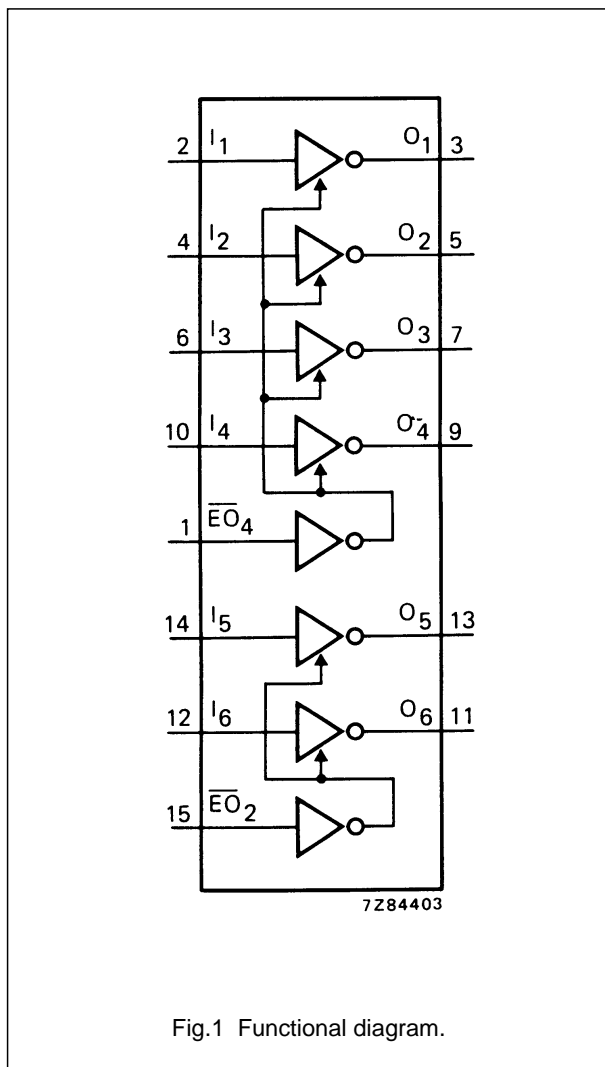
January 1995

3-state hex inverting buffer

HEF40098B buffers

DESCRIPTION

The HEF40098B is a hex inverting buffer with 3-state outputs. The 3-state outputs are controlled by two enable inputs (\overline{EO}_4 and \overline{EO}_2). A HIGH on \overline{EO}_4 causes four of the six buffer elements to assume a high impedance or OFF-state regardless of the other input conditions and a HIGH on \overline{EO}_2 causes the outputs of the remaining two buffer elements to assume a high impedance or OFF-state regardless of the other input conditions.



- HEF40098BP(N): 16-lead DIL; plastic (SOT38-1)
 - HEF40098BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
 - HEF40098BT(D): 16-lead SO; plastic (SOT109-1)
- (): Package Designator North America

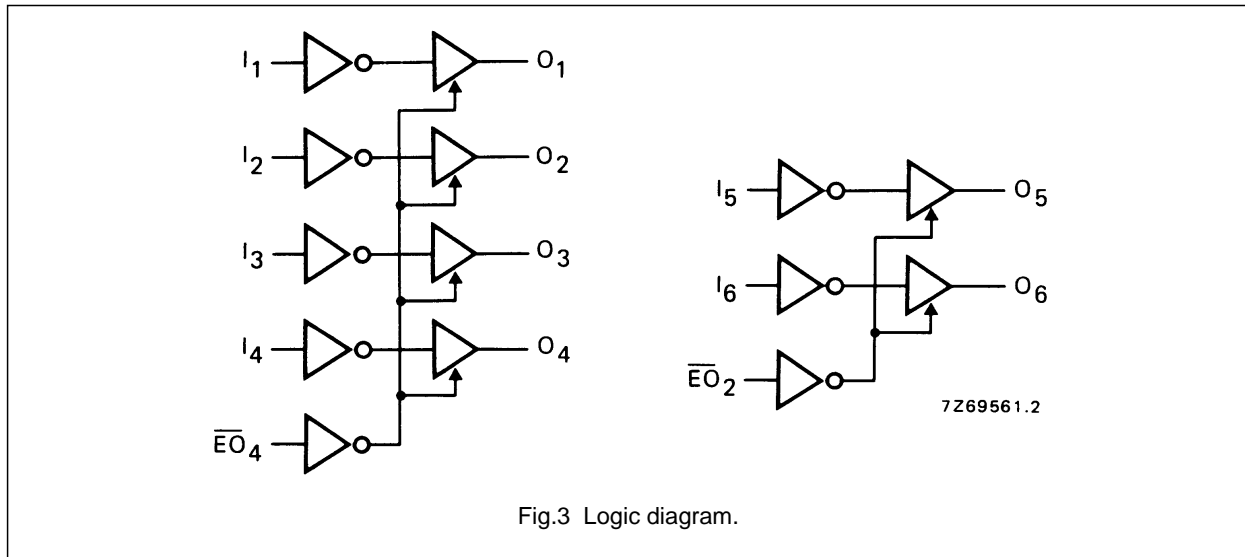
PINNING

- I_1 to I_6 buffer inputs
- $\overline{EO}_4, \overline{EO}_2$ enable inputs (active LOW)
- O_1 to O_6 buffer outputs (active LOW)

FAMILY DATA, I_{DD} LIMITS category BUFFERS

See Family Specifications

3-state hex inverting buffer

HEF40098B
buffers

DC CHARACTERISTICS

 $V_{SS} = 0\text{ V}$

HEF	V_{DD} V	V_{OH} V	V_{OL} V	SYMBOL	T_{amb} (°C)						
					-40		+25		+85		
					MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Output current HIGH	5	4,6		$-I_{OH}$	1,2		1,0		0,8		mA
	10	9,5			3,8		3,2		2,5		mA
	15	13,5			12,0		10,0		8,0		mA
HIGH	5	2,5		$-I_{OH}$	3,8		3,2		2,5		mA
Output current LOW	4,75		0,4	I_{OL}	3,5		2,9		2,3		mA
	10		0,5		12,0		10,0		8,0		mA
	15		1,5		24,0		20,0		16,0		mA

HEC	V_{DD} V	V_{OH} V	V_{OL} V	SYMBOL	T_{amb} (°C)						
					-55		+25		+125		
					MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Output current HIGH	5	4,6		$-I_{OH}$	1,25		1,0		0,6		mA
	10	9,5			4,0		3,2		2,1		mA
	15	12,5			12,5		10,0		6,7		mA
HIGH	5	2,5		$-I_{OH}$	4,0		3,2		2,1		mA
Output current LOW	4,75		0,4	I_{OL}	3,6		2,9		1,9		mA
	10		0,5		12,5		10,0		6,7		mA
	15		1,5		25,0		20,0		13,0		mA

3-state hex inverting buffer

HEF40098B
buffers**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 $I_n \rightarrow O_n$ HIGH to LOW	5	t_{PHL}	80	160	ns	$70\text{ ns} + (0,20\text{ ns/pF}) C_L$
	10		35	70	ns	$31\text{ ns} + (0,08\text{ ns/pF}) C_L$
	15		25	50	ns	$22\text{ ns} + (0,06\text{ ns/pF}) C_L$
LOW to HIGH	5	t_{PLH}	65	130	ns	$50\text{ ns} + (0,30\text{ ns/pF}) C_L$
	10		30	60	ns	$24\text{ ns} + (0,13\text{ ns/pF}) C_L$
	15		25	50	ns	$23\text{ ns} + (0,05\text{ ns/pF}) C_L$
Output transition times HIGH to LOW	5	t_{THL}	30	60	ns	$15\text{ ns} + (0,30\text{ ns/pF}) C_L$
	10		15	30	ns	$10\text{ ns} + (0,11\text{ ns/pF}) C_L$
	15		10	20	ns	$7\text{ ns} + (0,07\text{ ns/pF}) C_L$
LOW to HIGH	5	t_{TLH}	35	70	ns	$10\text{ ns} + (0,50\text{ ns/pF}) C_L$
	10		20	40	ns	$8\text{ ns} + (0,24\text{ ns/pF}) C_L$
	15		15	30	ns	$6\text{ ns} + (0,18\text{ ns/pF}) C_L$
3-state propagation delays Output disable times $\overline{EO}_2, \overline{EO}_4 \rightarrow O_n$ HIGH	5	t_{PHZ}	45	85	ns	
	10		35	65	ns	
	15		30	60	ns	
LOW	5	t_{PLZ}	65	135	ns	
	10		40	80	ns	
	15		35	70	ns	
Output enable times $\overline{EO}_2, \overline{EO}_4 \rightarrow O_n$ HIGH	5	t_{PZH}	70	140	ns	
	10		35	75	ns	
	15		30	65	ns	
LOW	5	t_{PZL}	90	185	ns	
	10		40	85	ns	
	15		35	70	ns	

	V_{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5	$5\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	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	$22\,800 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$81\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	