

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

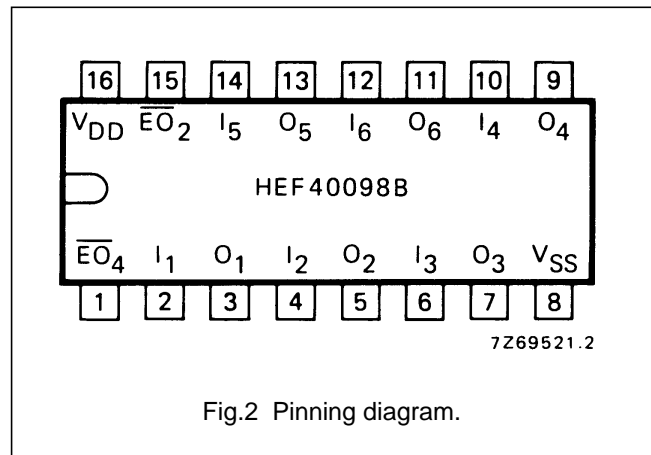
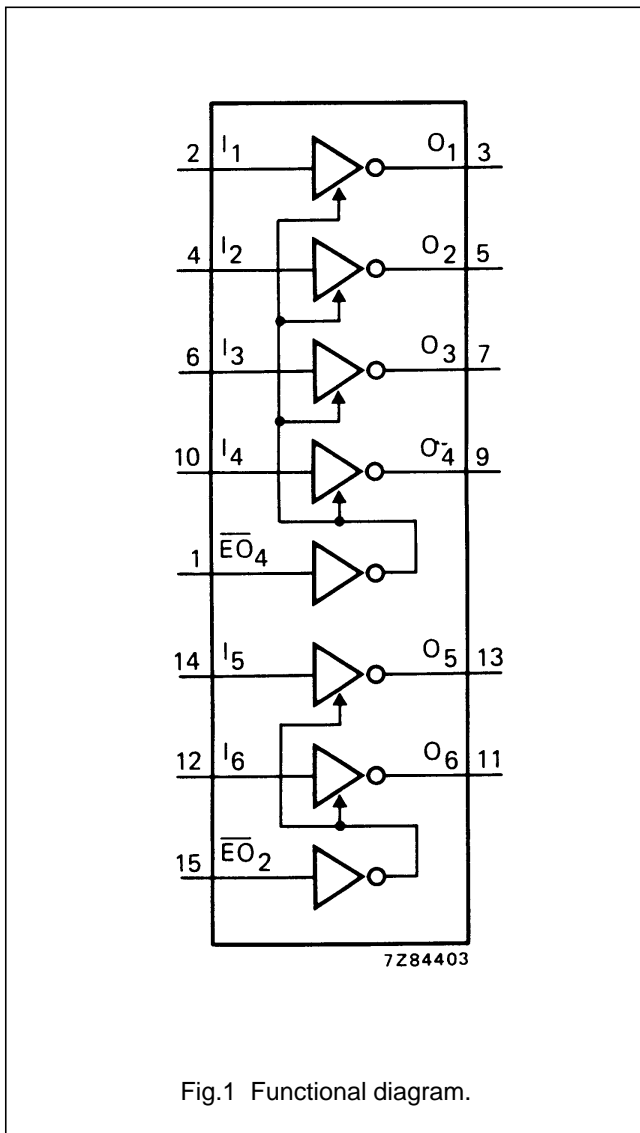
January 1995

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

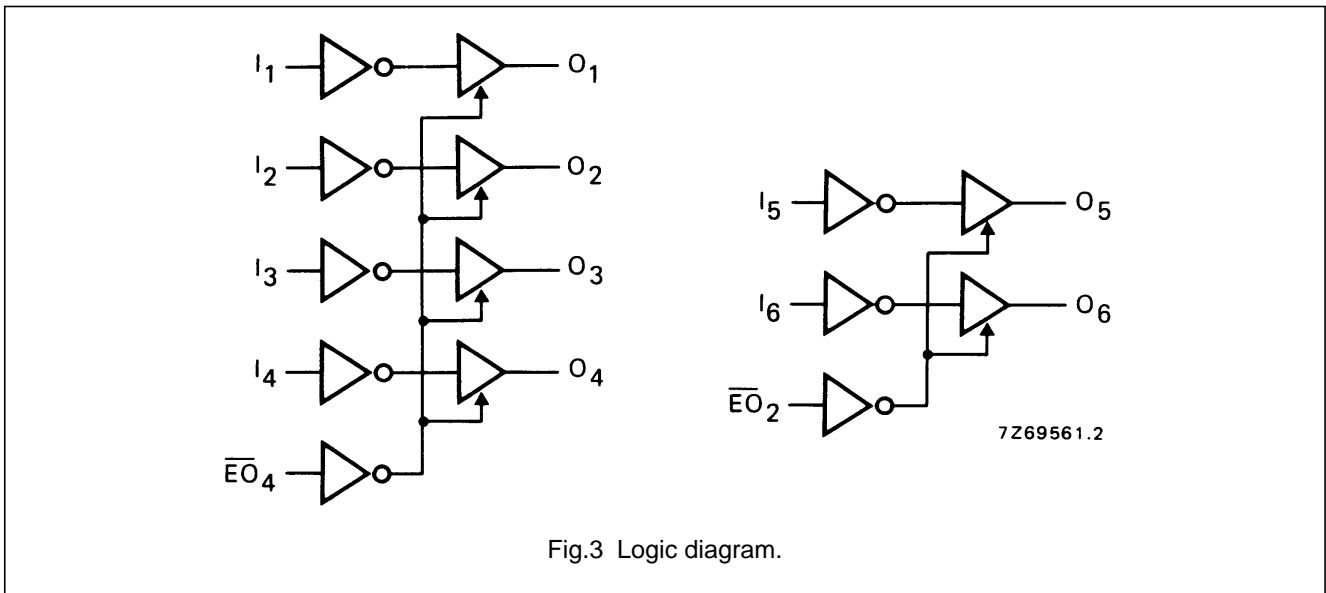
- I_1 to I_6 buffer inputs
- $\overline{EO}_4, \overline{EO}_2$ enable inputs (active LOW)
- O_1 to O_6 buffer outputs (active LOW)

FAMILY DATA, I_{DD} LIMITS category BUFFERS

See Family Specifications

3-state hex inverting buffer

HEF40098B
buffers



DC CHARACTERISTICS

V_{SS} = 0 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

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HEF40098B
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AC CHARACTERISTICS

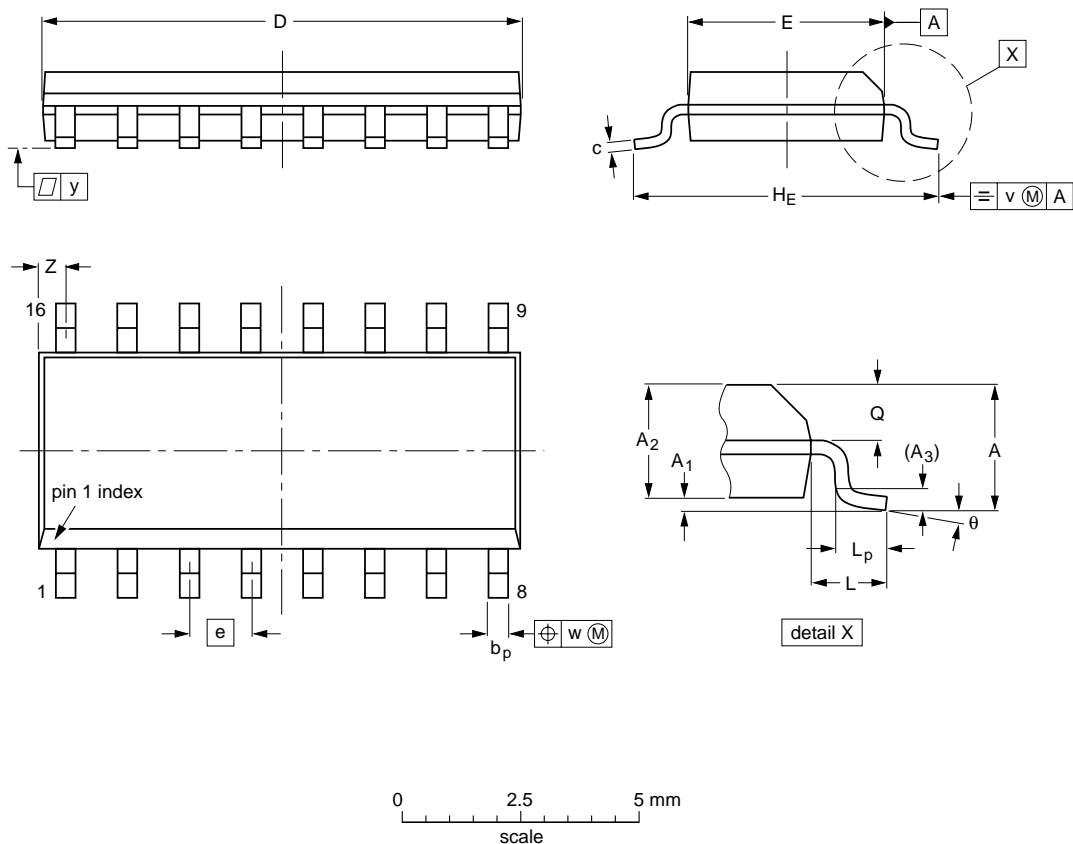
 $V_{SS} = 0$ V; $T_{amb} = 25$ °C; $C_L = 50$ pF; input transition times ≤ 20 ns

	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 ns + (0,20 ns/pF) C_L
	10		35	70	ns	31 ns + (0,08 ns/pF) C_L
	15		25	50	ns	22 ns + (0,06 ns/pF) C_L
LOW to HIGH	5	t_{PLH}	65	130	ns	50 ns + (0,30 ns/pF) C_L
	10		30	60	ns	24 ns + (0,13 ns/pF) C_L
	15		25	50	ns	23 ns + (0,05 ns/pF) C_L
Output transition times HIGH to LOW	5	t_{THL}	30	60	ns	15 ns + (0,30 ns/pF) C_L
	10		15	30	ns	10 ns + (0,11 ns/pF) C_L
	15		10	20	ns	7 ns + (0,07 ns/pF) C_L
LOW to HIGH	5	t_{TLH}	35	70	ns	10 ns + (0,50 ns/pF) C_L
	10		20	40	ns	8 ns + (0,24 ns/pF) C_L
	15		15	30	ns	6 ns + (0,18 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 (μ W)	
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	$81\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.39 0.38	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	

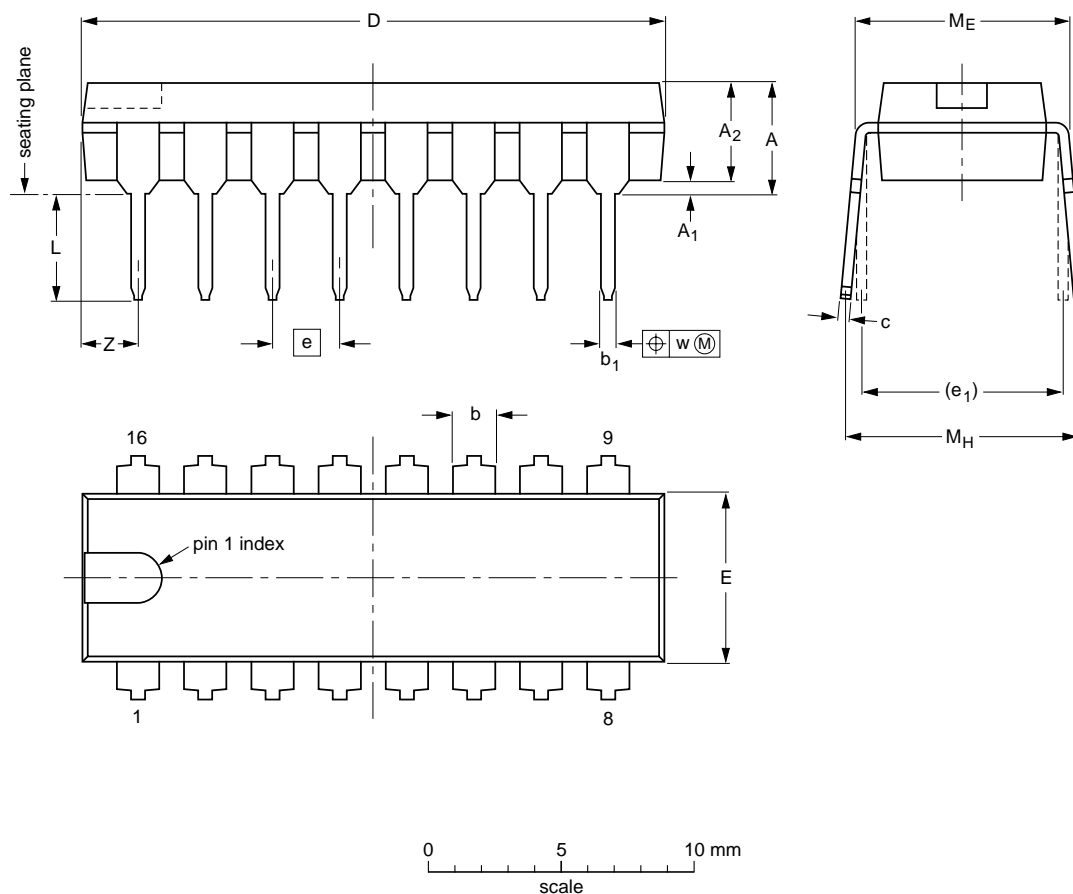
Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT109-1	076E07S	MS-012AC				95-01-23 97-05-22

DIP16: plastic dual in-line package; 16 leads (300 mil); long body

SOT38-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	c	D ⁽¹⁾	E ⁽¹⁾	e	e ₁	L	M _E	M _H	w	Z ⁽¹⁾ max.
mm	4.7	0.51	3.7	1.40 1.14	0.53 0.38	0.32 0.23	21.8 21.4	6.48 6.20	2.54	7.62	3.9 3.4	8.25 7.80	9.5 8.3	0.254	2.2
inches	0.19	0.020	0.15	0.055 0.045	0.021 0.015	0.013 0.009	0.86 0.84	0.26 0.24	0.10	0.30	0.15 0.13	0.32 0.31	0.37 0.33	0.01	0.087

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT38-1	050G09	MO-001AE				92-10-02 95-01-19