

INTEGRATED CIRCUITS

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

HEF4049B buffers HEX inverting buffers

Product specification
File under Integrated Circuits, IC04

January 1995

HEX inverting buffers

HEF4049B buffers

DESCRIPTION

The HEF4049B provides six inverting buffers with high current output capability suitable for driving TTL or high capacitive loads. Since input voltages in excess of the buffers' supply voltage are permitted, the buffers may also be used to convert logic levels of up to 15 V to standard TTL levels. Their guaranteed fan-out into common bipolar logic elements is shown in the table below.

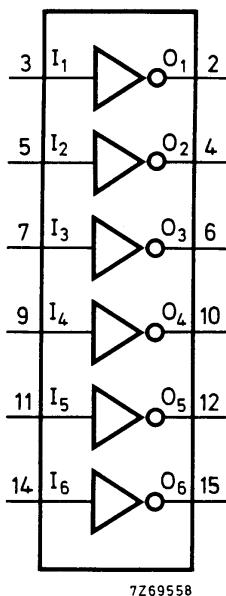


Fig.1 Functional diagram.

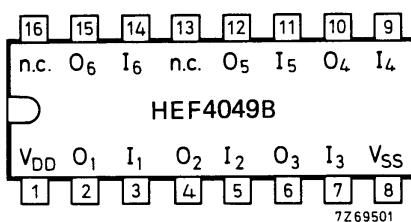


Fig.2 Pinning diagram.

HEF4049BP(N): 16-lead DIL; plastic (SOT38-1)

HEF4049BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)

HEF4049BT(D): 16-lead SO; plastic (SOT109-1)

(): Package Designator North America

Guaranteed fan-out in common logic families

DRIVEN ELEMENT	GUARANTEED FAN-OUT
standard TTL	2
74 LS	9
74 L	16

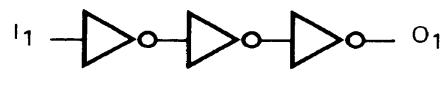


Fig.3 Logic diagram (one gate).

APPLICATION INFORMATION

Some examples of applications for the HEF4049B are:

- LOC莫斯 to DTL/TTL converter
- HIGH sink current for driving 2 TTL loads
- HIGH-to-LOW level logic conversion

Input protection

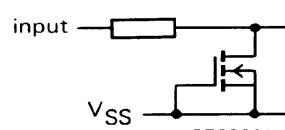


Fig.4 Input protection circuit that allows input voltages in excess of V_{DD}.

FAMILY DATA, I_{DD} LIMITS category BUFFERS

See Family Specifications

HEX inverting buffers

HEF4049B
buffers

DC CHARACTERISTICS

 $V_{SS} = 0 \text{ V}$; $V_I = V_{SS}$ or V_{DD}

HEF	V_{DD} V	V_o V	SYMBOL	T_{amb} ($^{\circ}\text{C}$)					
				-40		+25		+85	
				MIN.	MAX.	MIN.	MAX.	MN.	MAX.
Output (sink) 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
Output (source) current HIGH	5	4,6	$-I_{OH}$	0,52	-	0,44	-	0,36	- mA
	10	9,5		1,3	-	1,1	-	0,9	- mA
	15	13,5		3,6	-	3,0	-	2,4	- mA
Output (source) current HIGH	5	2,5	$-I_{OH}$	1,7	-	1,4	-	1,1	- mA

HEC	V_{DD} V	V_o V	SYMBOL	T_{amb} ($^{\circ}\text{C}$)					
				-55		+25		+125	
				MIN.	MAX.	MIN.	MAX.	MN.	MAX.
Output (sink) 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
Output (source) current HIGH	5	4,6	$-I_{OH}$	0,52	-	0,44	-	0,36	- mA
	10	9,5		1,3	-	1,1	-	0,9	- mA
	15	13,5		3,6	-	3,0	-	2,4	- mA

	V_{DD} V	SYMBOL	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA	
Propagation delays $I_n \rightarrow O_n$ HIGH to LOW	5	t_{PHL}	35	70	ns	$26 \text{ ns} + (0,18 \text{ ns/pF}) C_L$
	10		15	30	ns	$11 \text{ ns} + (0,08 \text{ ns/pF}) C_L$
	15		12	25	ns	$9 \text{ ns} + (0,05 \text{ ns/pF}) C_L$
	5	t_{PLH}	50	100	ns	$23 \text{ ns} + (0,55 \text{ ns/pF}) C_L$
	10		25	50	ns	$14 \text{ ns} + (0,23 \text{ ns/pF}) C_L$
	15		20	40	ns	$12 \text{ ns} + (0,16 \text{ ns/pF}) C_L$
Output transition times HIGH to LOW	5	t_{THL}	20	40	ns	$3 \text{ ns} + (0,35 \text{ ns/pF}) C_L$
	10		10	20	ns	$3 \text{ ns} + (0,14 \text{ ns/pF}) C_L$
	15		7	14	ns	$2 \text{ ns} + (0,09 \text{ ns/pF}) C_L$
	5	t_{TLH}	60	120	ns	$10 \text{ ns} + (1,0 \text{ ns/pF}) C_L$
	10		30	60	ns	$9 \text{ ns} + (0,42 \text{ ns/pF}) C_L$
	15		20	40	ns	$6 \text{ ns} + (0,28 \text{ ns/pF}) C_L$

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	V_{DD} V	TYPICAL FORMULA FOR P (μ W)	
Dynamic power dissipation per package (P)	5	$2\ 500 f_i + \sum (f_o C_L) \times V_{DD}^2$	where
	10	$11\ 000 f_i + \sum (f_o C_L) \times V_{DD}^2$	f_i = input freq. (MHz)
	15	$35\ 000 f_i + \sum (f_o C_L) \times V_{DD}^2$	f_o = output freq. (MHz) C_L = load capacitance (pF) $\sum (f_o C_L)$ = sum of outputs V_{DD} = supply voltage (V)