

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

HEF40106B

gates

Hex inverting Schmitt trigger

Product specification
File under Integrated Circuits, IC04

January 1995

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DESCRIPTION

Each circuit of the HEF40106B functions as an inverter with Schmitt-trigger action. The Schmitt-trigger switches at different points for the positive and negative-going input signals. The difference between the positive-going voltage (V_P) and the negative-going voltage (V_N) is defined as hysteresis voltage (V_H).

This device may be used for enhanced noise immunity or to "square up" slowly changing waveforms.

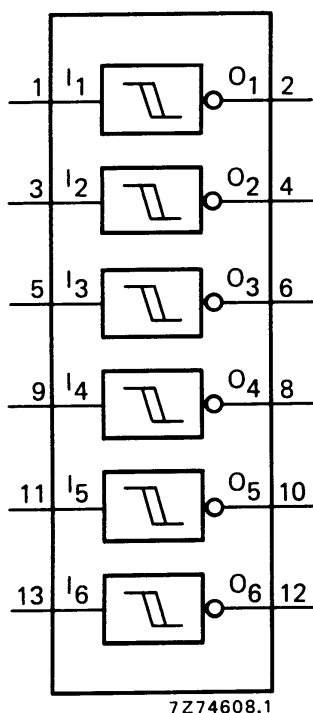


Fig.1 Functional diagram.

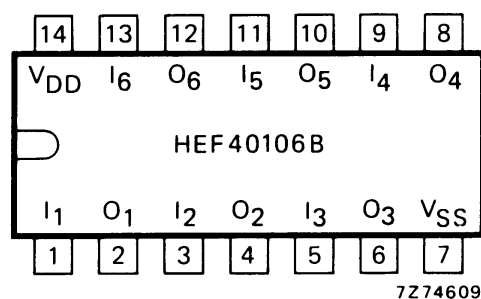


Fig.2 Pinning diagram.

- HEF40106BP(N): 14-lead DIL; plastic (SOT27-1)
 HEF40106BD(F): 14-lead DIL; ceramic (cerdip) (SOT73)
 HEF40106BT(D): 14-lead SO; plastic (SOT108-1)
 (): Package Designator North America

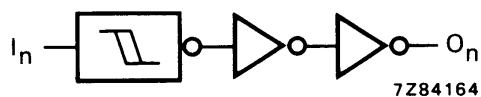


Fig.3 Logic diagram (one inverter).

FAMILY DATA, I_{DD} LIMITS category GATES

See Family Specifications

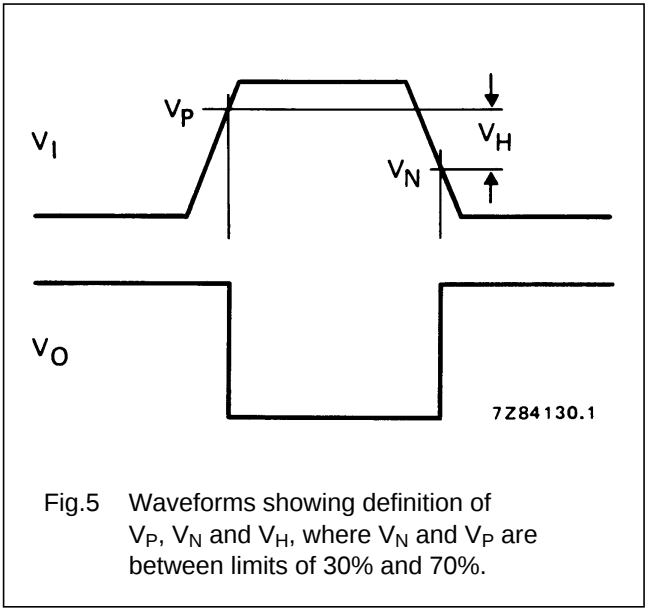
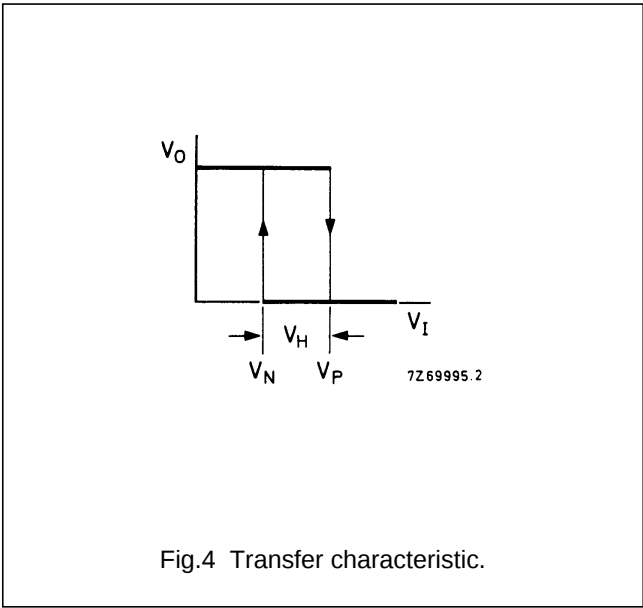
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DC CHARACTERISTICS

$V_{SS} = 0\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$

	V_{DD} V	SYMBOL	MIN.	TYP.	MAX.
Hysteresis voltage	5	V_H	0,5	0,8	V
	10		0,7	1,3	V
	15		0,9	1,8	V
Switching levels positive-going input voltage	5	V_P	2	3,0	3,5
	10		3,7	5,8	7
	15		4,9	8,3	11
negative-going input voltage	5	V_N	1,5	2,2	3
	10		3	4,5	6,3
	15		4	6,5	10,1



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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 10 15	t_{PHL}	90 35 30	180 70 60	ns	63 ns + (0,55 ns/pF) C_L 24 ns + (0,23 ns/pF) 22 ns + (0,16 ns/pF) C_L
LOW to HIGH	5 10 15	t_{PLH}	75 35 30	150 70 60	ns	48 ns + (0,55 ns/pF) C_L 24 ns + (0,23 ns/pF) C_L 22 ns + (0,16 ns/pF) C_L
Output transition times HIGH to LOW	5 10 15	t_{THL}	60 30 20	120 60 40	ns	10 ns + (1,0 ns/pF) C_L 9 ns + (0,42 ns/pF) C_L 6 ns + (0,28 ns/pF) C_L
LOW to HIGH	5 10 15	t_{TLH}	60 30 20	120 60 40	ns	10 ns + (1,0 ns/pF) C_L 9 ns + (0,42 ns/pF) C_L 6 ns + (0,28 ns/pF) C_L

	V_{DD} V	TYPICAL FORMULA FOR P (μ W)	
Dynamic power dissipation per package (P)	5 10 15	$2\,300 f_i + \sum (f_o C_L) \times V_{DD}^2$ $9\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$ $20\,000 f_i + \sum (f_o C_L) \times V_{DD}^2$	where f_i = input freq. (MHz) f_o = output freq. (MHz) C_L = load capacitance (pF) $\sum (f_o C_L)$ = sum of outputs V_{DD} = supply voltage (V)

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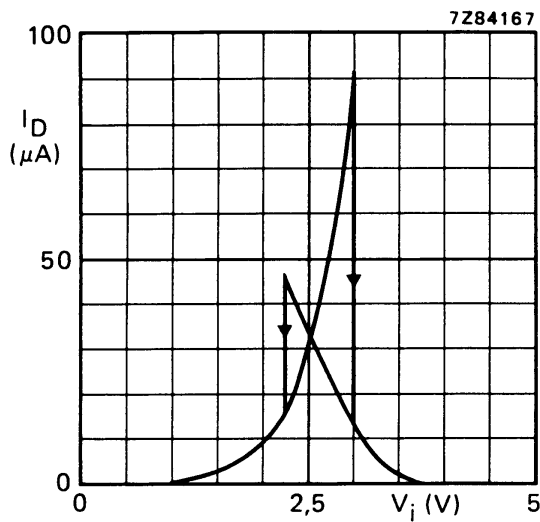


Fig.6 Typical drain current as a function of input voltage; $V_{DD} = 5 V$; $T_{amb} = 25\text{ }^{\circ}C$.

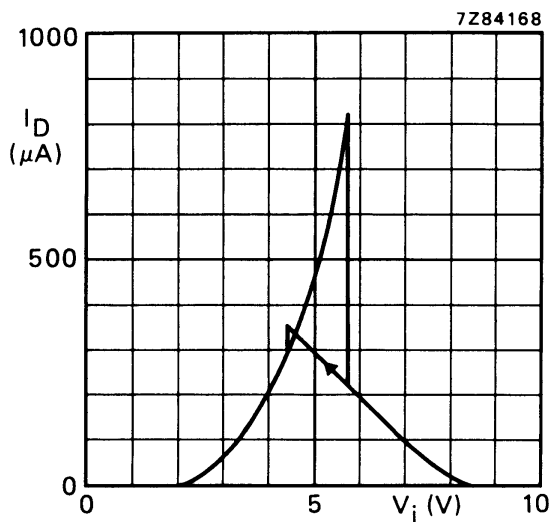


Fig.7 Typical drain current as a function of input voltage; $V_{DD} = 10 V$; $T_{amb} = 25\text{ }^{\circ}C$.

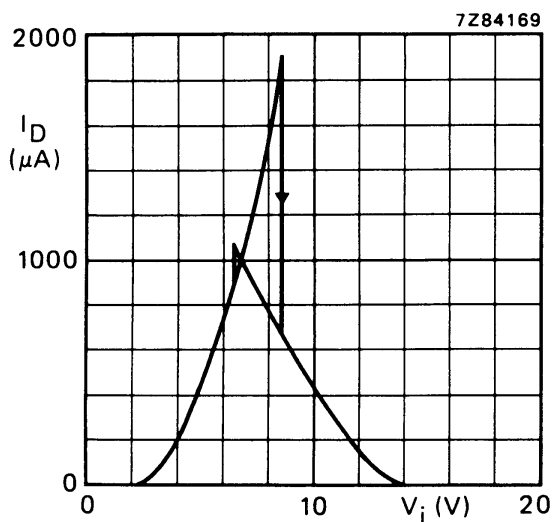
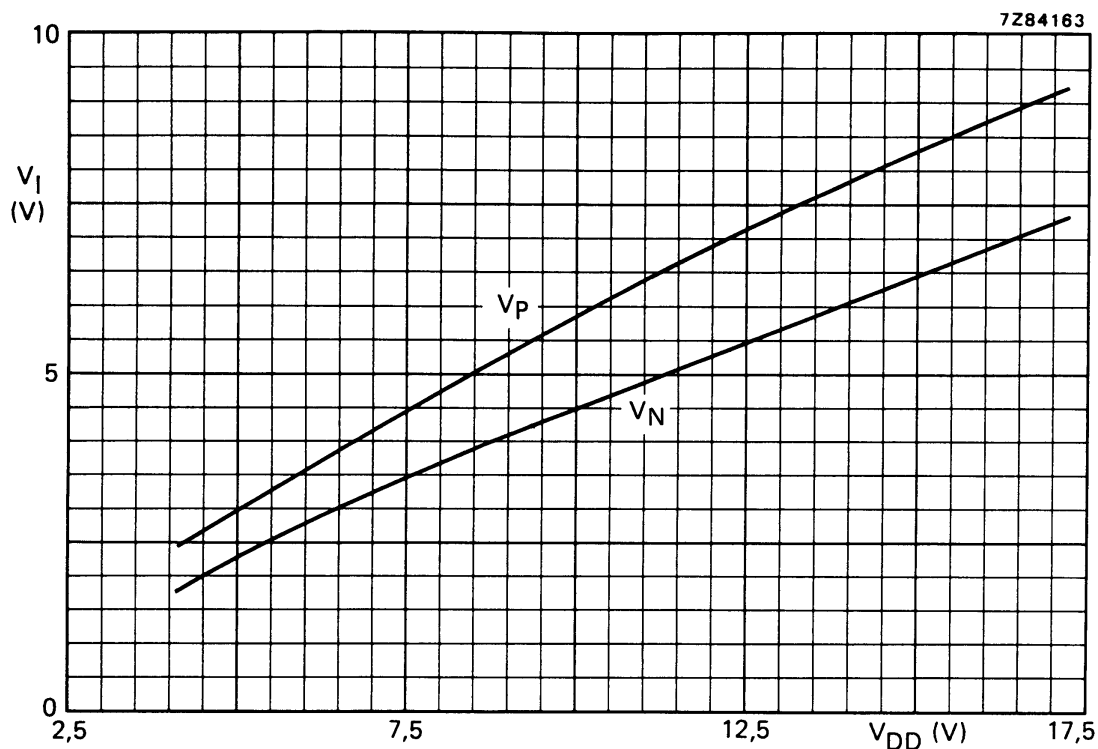
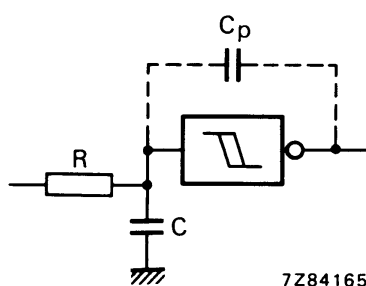


Fig.8 Typical drain current as a function of input voltage; $V_{DD} = 15 V$; $T_{amb} = 25\text{ }^{\circ}C$.

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If a Schmitt trigger is driven via a high impedance ($R > 1\text{ k}\Omega$) then it is necessary to incorporate a capacitor C of such value that: $\frac{C}{C_p} > \frac{V_{DD} - V_{SS}}{V_H}$, otherwise oscillation can occur on the edges of a pulse.

C_p is the external parasitic capacitance between input and output; the value depends on the circuit board layout.

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APPLICATION INFORMATION

Some examples of applications for the HEF40106B are:

- Wave and pulse shapers
- Astable multivibrators
- Monostable multivibrators.

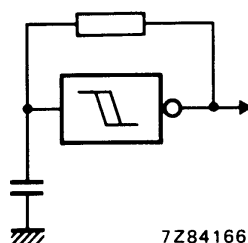


Fig.11 The HEF40106B used as an astable multivibrator.