

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

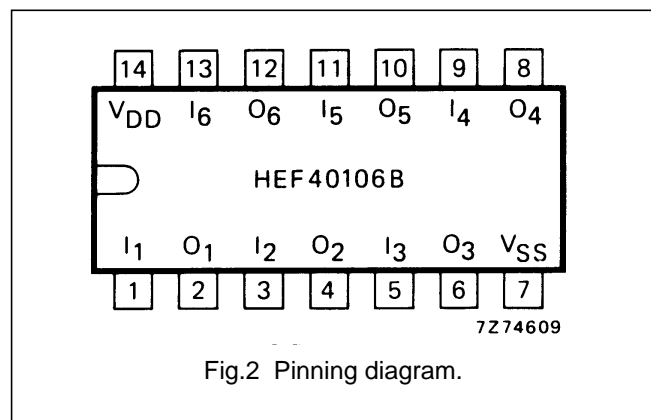
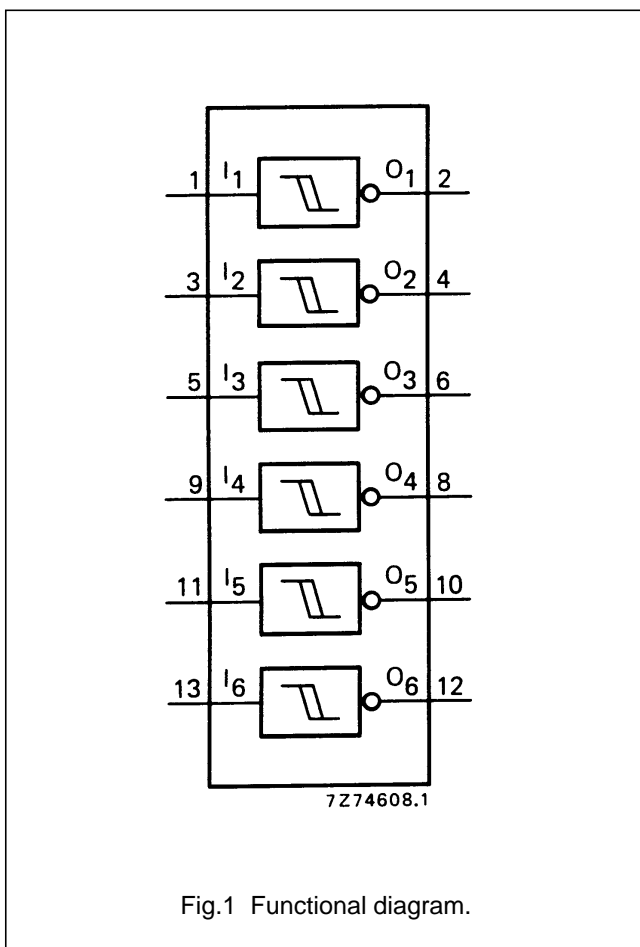
Hex inverting Schmitt trigger

HEF40106B gates

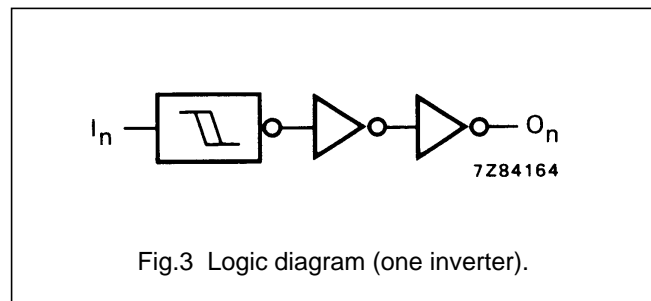
DESCRIPTION

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.



- 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



FAMILY DATA, I_{DD} LIMITS category GATES

See Family Specifications

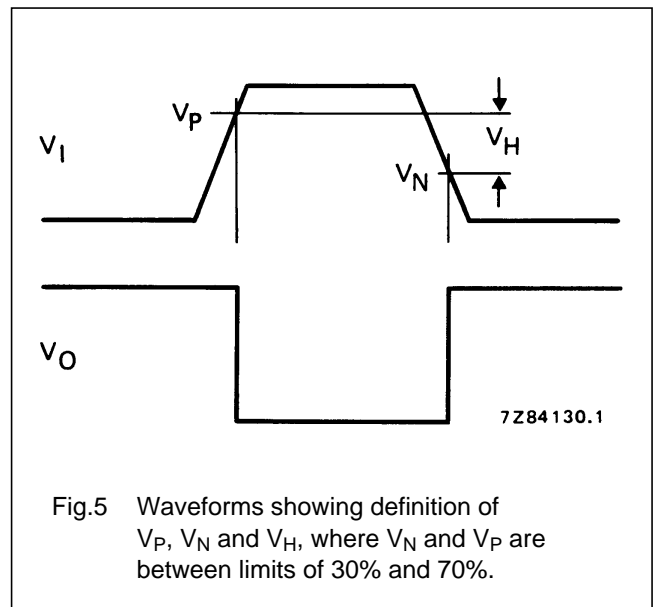
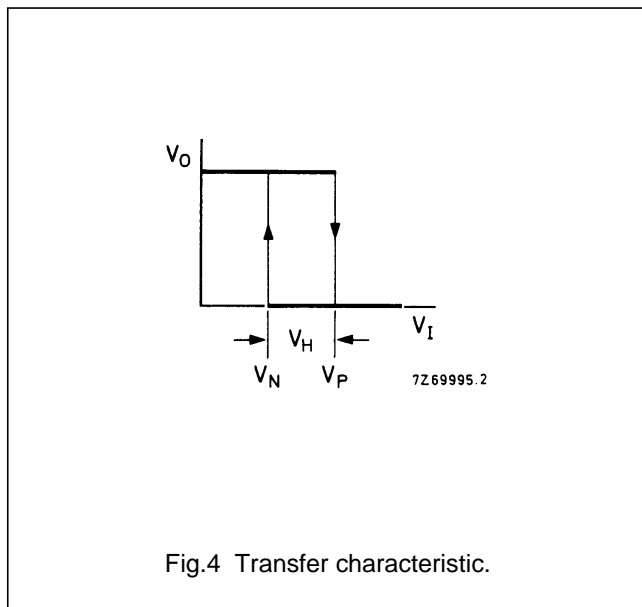
Hex inverting Schmitt trigger

HEF40106B
gates

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	V
	10		3,7	5,8	7	V
	15		4,9	8,3	11	V
negative-going input voltage	5	V_N	1,5	2,2	3	V
	10		3	4,5	6,3	V
	15		4	6,5	10,1	V



Hex inverting Schmitt trigger

HEF40106B
gates

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	TYP.	MAX.		TYPICAL EXTRAPOLATION FORMULA
Propagation delays $I_n \rightarrow O_n$ HIGH to LOW	5	t_{PHL}	90	180	ns	$63\text{ ns} + (0,55\text{ ns/pF}) C_L$
	10		35	70	ns	$24\text{ ns} + (0,23\text{ ns/pF}) C_L$
	15		30	60	ns	$22\text{ ns} + (0,16\text{ ns/pF}) C_L$
LOW to HIGH	5	t_{PLH}	75	150	ns	$48\text{ ns} + (0,55\text{ ns/pF}) C_L$
	10		35	70	ns	$24\text{ ns} + (0,23\text{ ns/pF}) C_L$
	15		30	60	ns	$22\text{ ns} + (0,16\text{ ns/pF}) C_L$
Output transition times HIGH to LOW	5	t_{THL}	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	$6\text{ ns} + (0,28\text{ ns/pF}) C_L$
LOW to HIGH	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	$6\text{ ns} + (0,28\text{ ns/pF}) C_L$

	V_{DD} V	TYPICAL FORMULA FOR P (μW)	
Dynamic power dissipation per package (P)	5	$2\ 300 f_i + \sum (f_o C_L) \times V_{DD}^2$	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)
	10	$9\ 000 f_i + \sum (f_o C_L) \times V_{DD}^2$	
	15	$20\ 000 f_i + \sum (f_o C_L) \times V_{DD}^2$	

Hex inverting Schmitt trigger

HEF40106B
gates

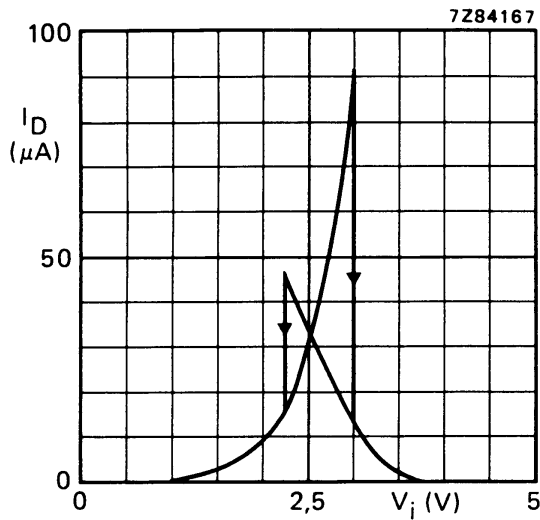


Fig.6 Typical drain current as a function of input voltage; $V_{DD} = 5 V$; $T_{amb} = 25^\circ C$.

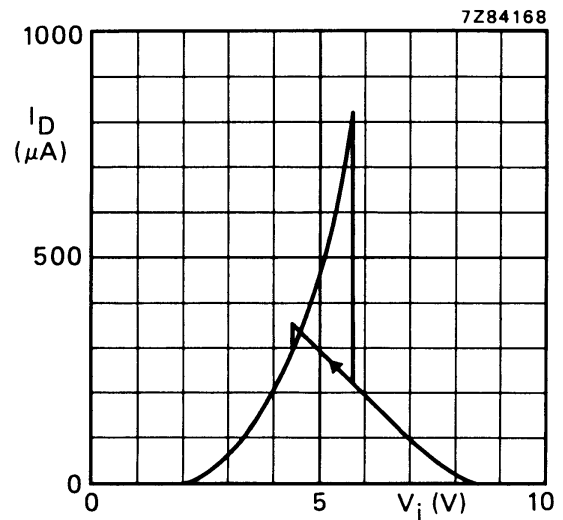


Fig.7 Typical drain current as a function of input voltage; $V_{DD} = 10 V$; $T_{amb} = 25^\circ C$.

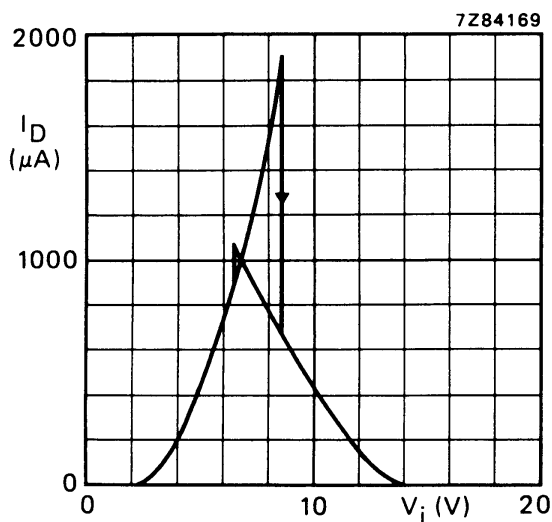


Fig.8 Typical drain current as a function of input voltage; $V_{DD} = 15 V$; $T_{amb} = 25^\circ C$.

Hex inverting Schmitt trigger

HEF40106B
gates

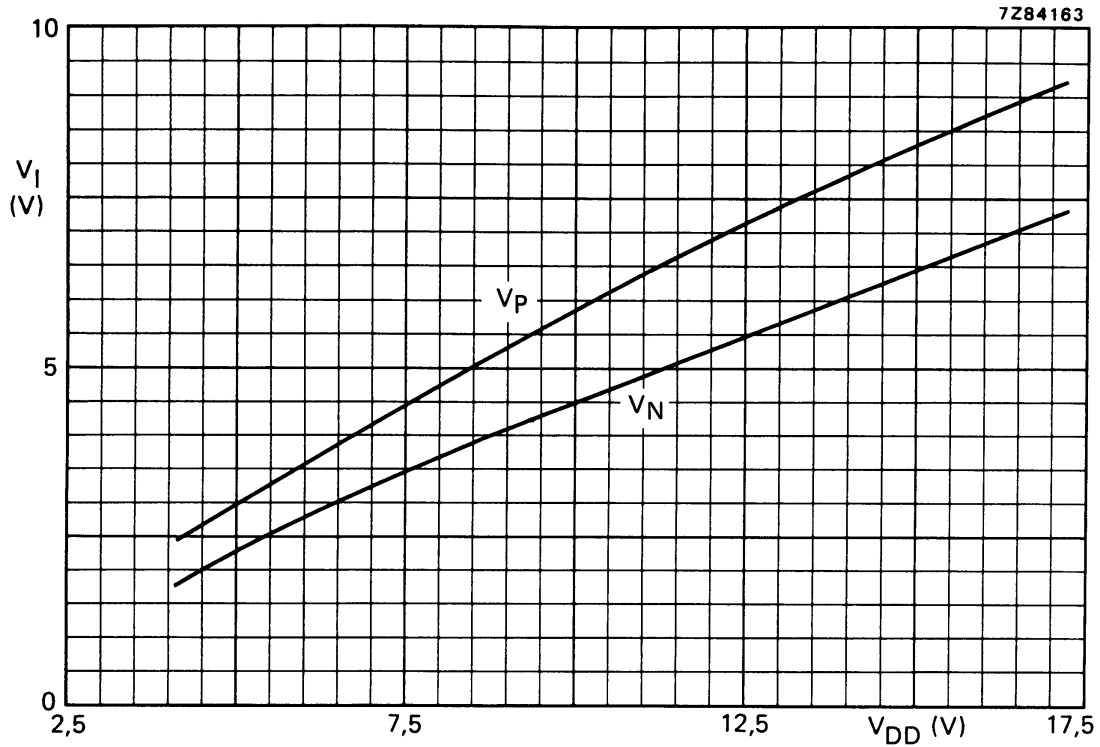


Fig.9 Typical switching levels as a function of supply voltage \$V_{DD}\$; \$T_{amb} = 25\text{ }^\circ\text{C}\$.

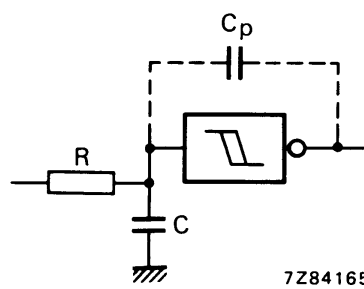


Fig.10 Schmitt trigger driven via a high impedance (\$R > 1\text{ k}\Omega\$).

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.

Hex inverting Schmitt trigger

HEF40106B gates

APPLICATION INFORMATION

Some examples of applications for the HEF40106B are:

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

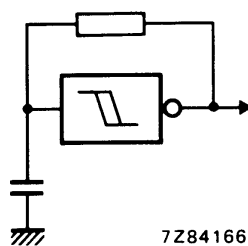


Fig.11 The HEF40106B used as an astable multivibrator.