DATA SHEET

For a complete data sheet, please also download:

- The IC06 74HC/HCT/HCU/HCMOS Logic Family Specifications
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Information
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Outlines

74HC/HCT368

Hex buffer/line driver; 3-state; inverting

Product specification
File under Integrated Circuits, IC06

December 1990

Philips Semiconductors

PHILIPS

Hex buffer/line driver; 3-state; inverting 74HC/HCT368

FEATURES

- Inverting outputs
- Output capability: bus driver
- I_{CC} category: MSI

GENERAL DESCRIPTION

The 74HC/HCT368 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT368 are hex inverting buffer/line drivers with 3-state outputs. The 3-state outputs ($n\overline{Y}$) are controlled by the output enable inputs ($1\overline{OE}$, $2\overline{OE}$).

A HIGH on $n\overline{OE}$ causes the outputs to assume a high impedance OFF-state.

The “368” is identical to the “367” but has inverting outputs.

QUICK REFERENCE DATA

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f$ = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t_{PHL}/ t_{PLH}	propagation delay nA to $n\overline{Y}$	C_L = 15 pF; V_{CC} = 5 V	9	11	ns
C_I	input capacitance		3.5	3.5	pF
C_{PD}	power dissipation capacitance per buffer	notes 1 and 2	30	30	pF

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in µW):
   $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$ where:
   f_i = input frequency in MHz
   f_o = output frequency in MHz
   $\sum (C_L \times V_{CC}^2 \times f_o)$ = sum of outputs
   C_L = output load capacitance in pF
   V_{CC} = supply voltage in V
2. For HC the condition is V_I = GND to V_{CC}
   For HCT the condition is V_I = GND to V_{CC} –1.5 V

ORDERING INFORMATION

See *“74HC/HCT/HCU/HCMOS Logic Package Information”*.

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1, 15	$1\overline{OE}$, $2\overline{OE}$	output enable inputs (active LOW)
2, 4, 6, 10, 12, 14	1A to 6A	data inputs
3, 5, 7, 9, 11, 13	$1\overline{Y}$ to $6\overline{Y}$	data outputs
8	GND	ground (0 V)
16	V_{CC}	positive supply voltage

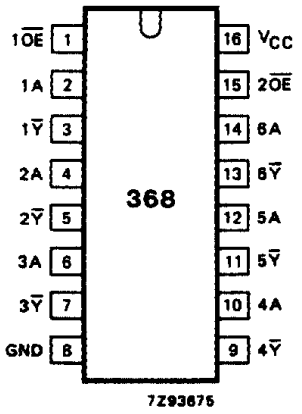


Fig.1 Pin configuration.

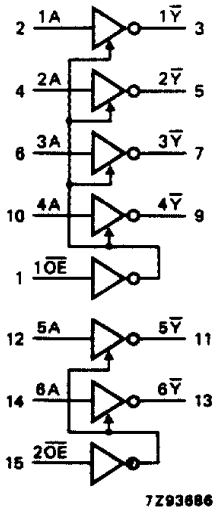


Fig.2 Logic symbol.

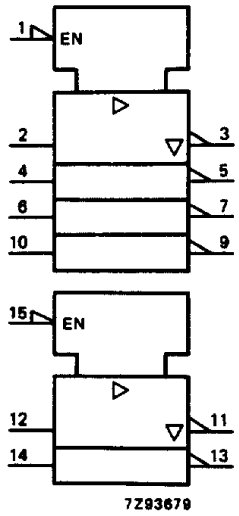


Fig.3 IEC logic symbol.

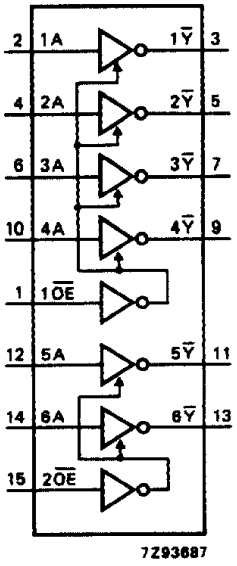


Fig.4 Functional diagram.

FUNCTION TABLE

INPUTS		OUTPUTS
$n\overline{OE}$	nA	$n\overline{Y}$
L	L	H
L	H	L
H	X	Z

Note

1. H = HIGH voltage level
   L = LOW voltage level
   X = don't care
   Z = high impedance OFF-state

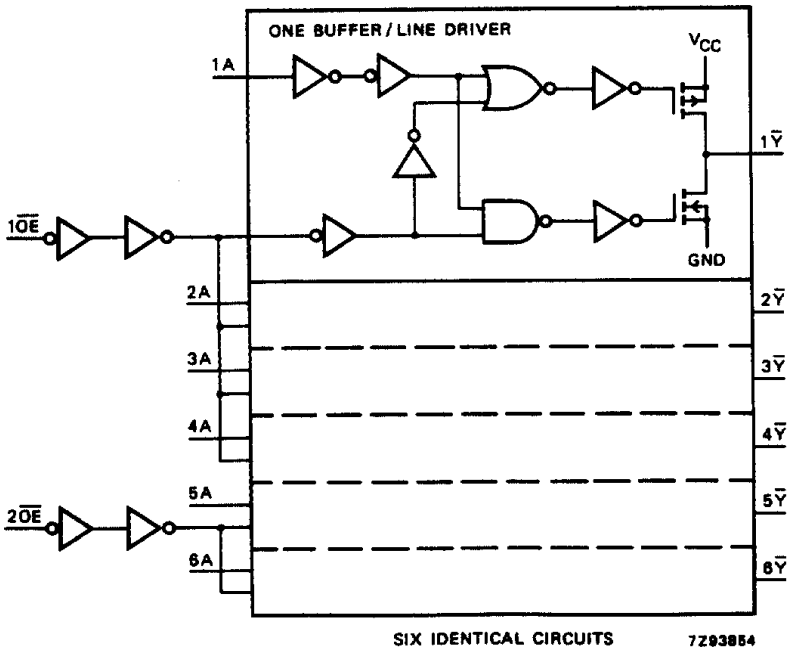


Fig.5 Logic diagram.

DC CHARACTERISTICS FOR 74HC

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver
I_{CC} category: MSI

AC CHARACTERISTICS FOR 74HC

GND = 0 V; $t_r = t_f$ = 6 ns; C_L = 50 pF

SYMBOL	PARAMETER	T_{amb} (°C)							UNIT	TEST CONDITIONS	
		74HC								V_{CC} (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t_{PHL}/ t_{PLH}	propagation delay nA to n$\overline{Y}$		30 11 9	95 19 16		120 24 20		145 29 25	ns	2.0 4.5 6.0	Fig.6
t_{PZH}/ t_{PZL}	3-state output enable time n$\overline{OE}$ to n$\overline{Y}$		41 15 12	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Fig.7
t_{PHZ}/ t_{PLZ}	3-state output disable time n$\overline{OE}$ to n$\overline{Y}$		55 20 16	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Fig.7
t_{THL}/ t_{TLH}	output transition time		14 5 4	60 12 10		75 15 13		90 18 15	ns	2.0 4.5 6.0	Fig.6

DC CHARACTERISTICS FOR 74HCT

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver
I_{CC} category: MSI

Note to HCT types

The value of additional quiescent supply current (ΔI_{CC}) for a unit load of 1 is given in the family specifications. To determine ΔI_{CC} per input, multiply this value by the unit load coefficient shown in the table below.

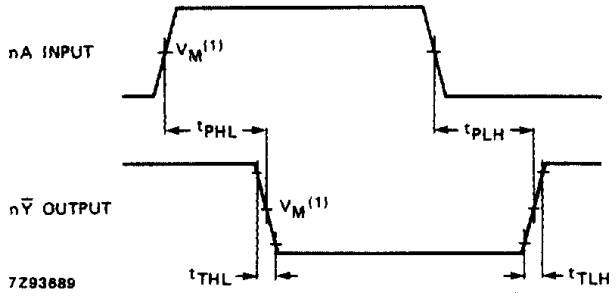
INPUT	UNIT LOAD COEFFICIENT
$1\overline{OE}$	1.00
$2\overline{OE}$	0.90
nA	1.00

AC CHARACTERISTICS FOR 74HCT

GND = 0 V; $t_r = t_f$ = 6 ns; C_L = 50 pF

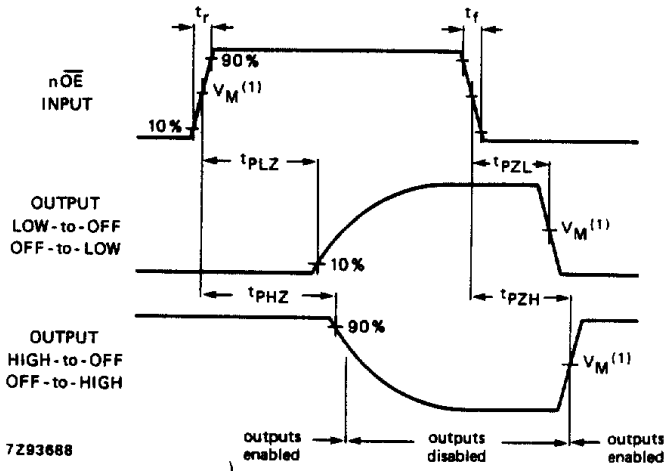
SYMBOL	PARAMETER	T_{amb} (°C)							UNIT	TEST CONDITIONS	
		74HCT								V_{CC} (V)	WAVEFORMS
		+25			−40 to +85		−40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t_{PHL}/ t_{PLH}	propagation delay nA to $n\overline{Y}$		13	24		30		36	ns	4.5	Fig.6
t_{PZH}/ t_{PZL}	3-state output enable time $n\overline{OE}$ to $n\overline{Y}$		17	35		44		53	ns	4.5	Fig.7
t_{PHZ}/ t_{PLZ}	3-state output disable time $n\overline{OE}$ to $n\overline{Y}$		20	35		44		53	ns	4.5	Fig.7
t_{THL}/ t_{TLH}	output transition time		5	12		15		18	ns	4.5	Fig.6

AC WAVEFORMS



(1) HC : V_M = 50%; V_I = GND to V_{CC}.
HCT : V_M = 1.3 V; V_I = GND to 3 V.

Fig.6 Waveforms showing the input (nA) to output (nȲ) propagation delays and the output transition times.



(1) HC : V_M = 50%; V_I = GND to V_{CC}.
HCT : V_M = 1.3 V; V_I = GND to 3 V.

Fig.7 Waveforms showing the 3-state enable and disable times.

PACKAGE OUTLINES

See *"74HC/HCT/HCU/HCMOS Logic Package Outlines"*.