

OCTAL BUS TRANSCEIVER; 3-STATE

FEATURES

- Octal bidirectional bus interface
- Non-inverting 3-state outputs
- Output capability: bus driver
- I_{CC} category: MSI

GENERAL DESCRIPTION

The 74HC/HCT245 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LS-TTL). They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT245 are octal transceivers featuring non-inverting 3-state bus compatible outputs in both send and receive directions.

The "245" features an output enable ($\overline{OE}$) input for easy cascading and a send/receive (DIR) for direction control. $\overline{OE}$ controls the outputs so that the buses are effectively isolated.

The "245" is similar to the "640" but has true (non-inverting) outputs.

FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
$\overline{OE}$	DIR	A_n	B_n
L	L	$A = B$	inputs
L	H	inputs	$B = A$
H	X	Z	Z

H = HIGH voltage level

L = LOW voltage level

X = don't care

Z = high impedance OFF-state

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t_{PHL}/t_{PLH}	propagation delay A_n to B_n ; B_n to A_n	$C_L = 15 \text{ pF}$ $V_{CC} = 5 \text{ V}$	7	10	ns
C_i	input capacitance		3.5	3.5	pF
$C_{i/O}$	input/output capacitance		10	10	pF
C_{PD}	power dissipation capacitance per transceiver	notes 1 and 2	30	30	pF

$GND = 0 \text{ V}$; $T_{amb} = 25^\circ\text{C}$; $t_r = t_f = 6 \text{ ns}$

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i = input frequency in MHz C_L = output load capacitance in pF

f_o = output frequency in MHz V_{CC} = supply voltage in V

$\sum (C_L \times V_{CC}^2 \times f_o)$ = sum of outputs

2. For HC the condition is $V_I = GND$ to V_{CC}

For HCT the condition is $V_I = GND$ to $V_{CC} - 1.5 \text{ V}$

PACKAGE OUTLINE

20-lead DIL; plastic (SOT146).

20-mini-pack; plastic (SO20; SOT163A).

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1	DIR	direction control
2, 3, 4, 5, 6, 7, 8, 9	A_0 to A_7	data inputs/outputs
10	GND	ground (0 V)
18, 17, 16, 15, 14, 13, 12, 11	B_0 to B_7	data inputs/outputs
19	$\overline{OE}$	output enable input (active LOW)
20	V_{CC}	positive supply voltage

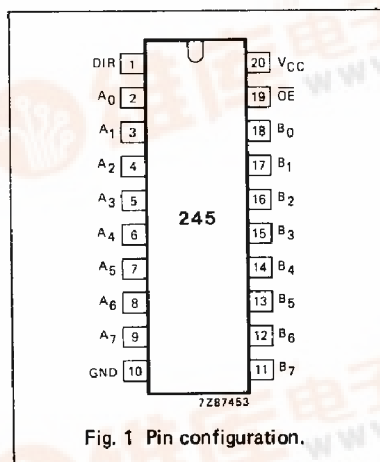


Fig. 1 Pin configuration.

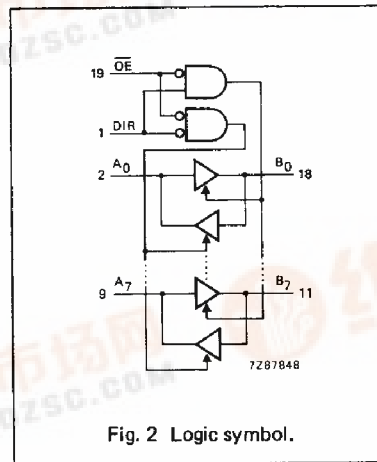


Fig. 2 Logic symbol.

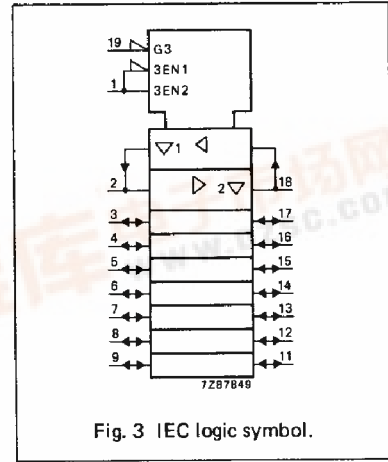
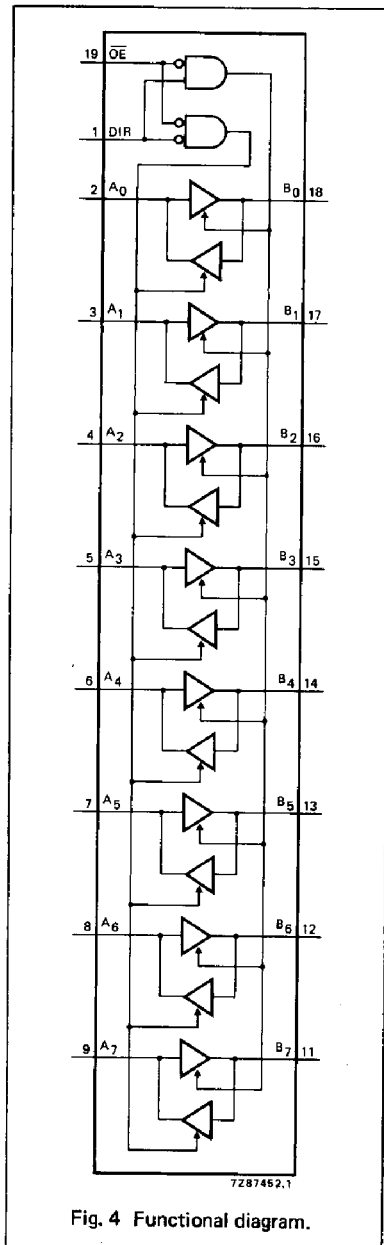


Fig. 3 IEC logic symbol.





DC CHARACTERISTICS FOR 74HC

For the DC characteristics see chapter "HCMOS family characteristics", section "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 A _n to B _n ; B _n to A _n		25 9 7	90 18 15		115 23 20		135 27 23	ns	2.0 4.5 6.0	Fig. 5
t _{PZH} / t _{PZL}	3-state output enable time OE to A _n ; OE to B _n signalname DIR		30 11 9	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Fig. 6
t _{PHZ} / t _{PLZ}	3-state output disable time OE to A _n ; OE to B _n signalname DIR		41 15 12	150 30 26		190 38 33		225 45 38	ns	2.0 4.5 6.0	Fig. 6
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. 5

74HC/HCT245
MSI

DC CHARACTERISTICS FOR 74HCT

For the DC characteristics see chapter "HCMOS family characteristics", section "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
A_n	0.40
B_n	0.40
$\overline{OE}$	1.50
DIR	0.90

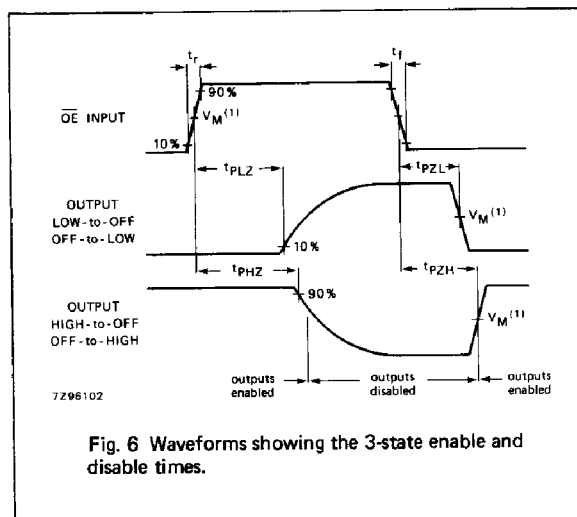
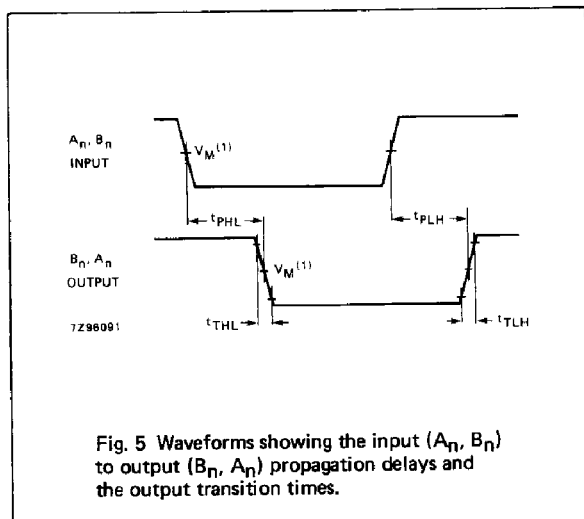
AC CHARACTERISTICS FOR 74HCT

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 A _n to B _n ; B _n to A _n		12	22		28		33	ns	4.5	Fig. 5
t _{PZH} / t _{PZL}	3-state output enable time OE to A _n ; OE to B _n signalname DIR		16	30		38		45	ns	4.5	Fig. 6
t _{PHZ} / t _{PLZ}	3-state output disable time OE to A _n ; OE to B _n signalname DIR		16	30		38		45	ns	4.5	Fig. 6
t _{THL} / t _{TLH}	output transition time		5	12		15		18	ns	4.5	Fig. 5



AC WAVEFORMS



Note to AC waveforms

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