

# 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/HCT7245** Octal bus Schmitt-trigger transceiver; 3-state

Product specification  
File under Integrated Circuits, IC06

December 1990

# Octal bus Schmitt-trigger transceiver; 3-state

## 74HC/HCT7245

### FEATURES

- Octal bidirectional bus interface
- Non-inverting 3-state outputs
- Output capability: bus driver
- I<sub>CC</sub> category: MSI
- Schmitt-trigger action on all data inputs

### GENERAL DESCRIPTION

The 74HC/HCT7245 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/HCT7245 are octal transceivers featuring non-inverting 3-state bus compatible outputs in both send and receive directions. The "7245" features an output enable ( $\overline{OE}$ ) input for easy cascading and a send/receive input (DIR) for direction control.  $\overline{OE}$  controls the outputs so that the buses are effectively isolated. The 74HC/HCT7245 have Schmitt-trigger inputs. These inputs are capable of transforming slowly changing input signals into sharply defined jitter-free output signals.

The "7245" is identical to the "245" but has hysteresis on the data inputs.

### FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
$\overline{OE}$	DIR	A <sub>n</sub>	B <sub>n</sub>
L	L	A = B	inputs
L	H	inputs	B = A
H	X	Z	Z

### Notes

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

### QUICK REFERENCE DATA

GND = 0 V; T<sub>amb</sub> = 25 °C; t<sub>r</sub> = t<sub>f</sub> = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to B <sub>n</sub>	C <sub>L</sub> = 15 pF; V <sub>CC</sub> = 5 V	8	12	ns
C <sub>I</sub>	input capacitance		3.5	3.5	pF
C <sub>I/O</sub>	input/output capacitance		10	10	pF
C <sub>PD</sub>	power dissipation capacitance per transceiver	notes 1 and 2	40	40	pF

### Notes

1. C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz

f<sub>o</sub> = output frequency in MHz

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

C<sub>L</sub> = output load capacitance in pF

V<sub>CC</sub> = supply voltage in V

2. For HC the condition is V<sub>I</sub> = GND to V<sub>CC</sub>  
For HCT the condition is V<sub>I</sub> = GND to V<sub>CC</sub> - 1.5 V

### ORDERING INFORMATION

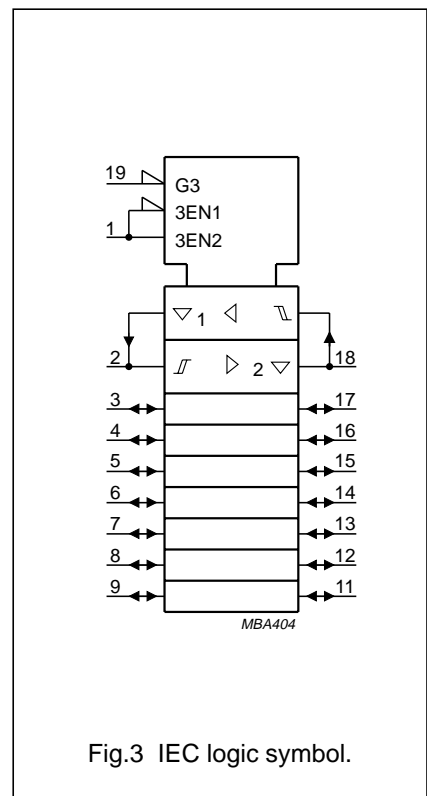
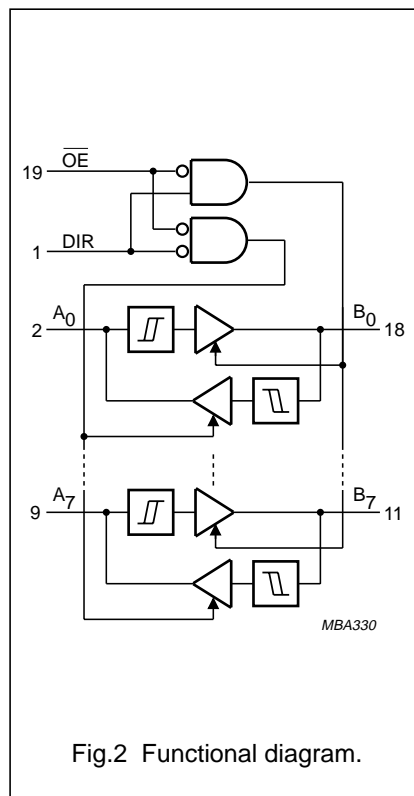
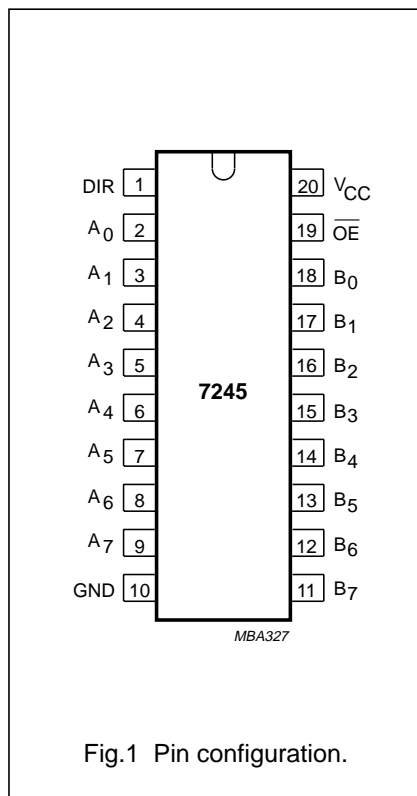
See "74HC/HCT/HCU/HCMOS Logic Package Information".

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## PIN DESCRIPTION

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



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## DC CHARACTERISTICS FOR 74HC

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

Output capability: bus driver

I<sub>CC</sub> category: MSI

## TRANSFER CHARACTERISTICS FOR 74HC

Voltages are referred to GND (ground = 0 V)

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)						UNIT	TEST CONDITIONS		
		74HC							V <sub>CC</sub> (V)	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
V <sub>T+</sub>	positive-going threshold			1.50 3.15 4.20		1.50 3.15 4.20		1.50 3.15 4.20	V	2.0 4.5 6.0	Figs. 4 and 5
V <sub>T-</sub>	negative-going threshold	0.30 1.35 1.80			0.30 1.35 1.80		0.30 1.35 1.80		V	2.0 4.5 6.0	Figs. 4 and 5
V <sub>H</sub>	hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )	0.1 0.25 0.3	0.2 0.4 0.5		0.1 0.25 0.3		0.1 0.25 0.3		V	2.0 4.5 6.0	Figs. 4 and 5

## AC CHARACTERISTICS FOR 74HC

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)						UNIT	TEST CONDITIONS		
		74HC							V <sub>CC</sub> (V)	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to B <sub>n</sub> ; B <sub>n</sub> to A <sub>n</sub>		33 12 10	100 20 17		125 25 21		150 30 26	ns	2.0 4.5 6.0	Fig.7
t <sub>PZH</sub> / t <sub>PZL</sub>	3-state output enable time $\overline{OE}$ to A <sub>n</sub> ; $\overline{OE}$ to B <sub>n</sub>		47 17 14	160 32 27		200 40 34		240 48 41	ns	2.0 4.5 6.0	Fig.7
t <sub>PHZ</sub> / t <sub>PLZ</sub>	3-state output disable time $\overline{OE}$ to A <sub>n</sub> ; $\overline{OE}$ to B <sub>n</sub>		52 19 16	160 32 27		200 40 34		240 48 41	ns	2.0 4.5 6.0	Fig.7
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		14 5 4	60 12 10		75 15 13		90 18 15	ns	2.0 4.5 6.0	Fig.7

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## DC CHARACTERISTICS FOR 74HCT

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

Output capability: bus driver

I<sub>CC</sub> category: MSI

### Note to HCT types

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

INPUT	UNIT LOAD COEFFICIENT
A <sub>n</sub>	0.33
B <sub>n</sub>	0.33
$\overline{OE}$	1.50
DIR	1.00

## TRANSFER CHARACTERISTICS FOR 74HCT

Voltages are referred to GND (ground = 0 V)

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)								UNIT	TEST CONDITIONS	
		74HCT									V <sub>CC</sub> (V)	WAVEFORMS
		+25			-40 to +85		-40 to +125					
		min.	typ.	max.	min.	max.	min.	max.				
V <sub>T+</sub>	positive-going threshold			2.0 2.1		2.0 2.1		2.0 2.1	V	4.5 5.5	Figs. 4 and 5	
V <sub>T-</sub>	negative-going threshold	0.7 0.8			0.64 0.74		0.6 0.7		V	4.5 5.5	Figs. 4 and 5	
V <sub>H</sub>	hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )	0.17 0.17	0.23 0.23						V	4.5 5.5	Figs. 4 and 5	

# Octal bus Schmitt-trigger transceiver; 3-state

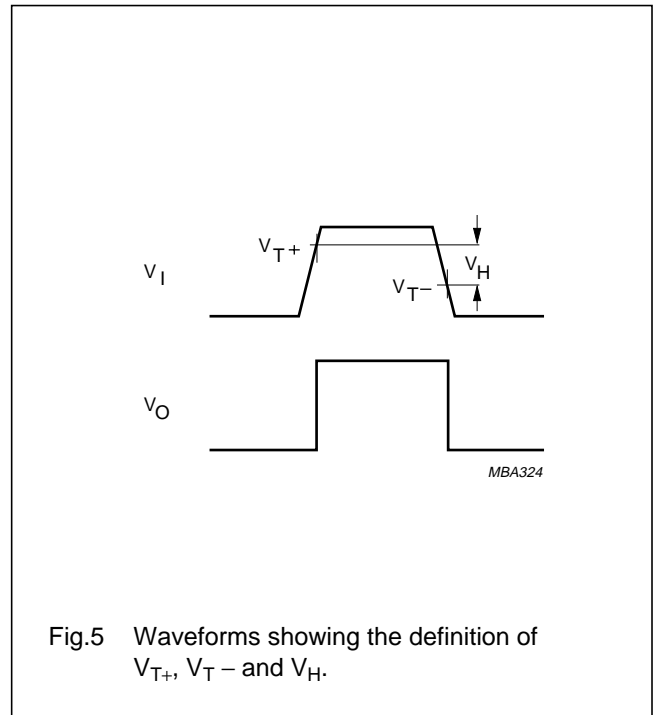
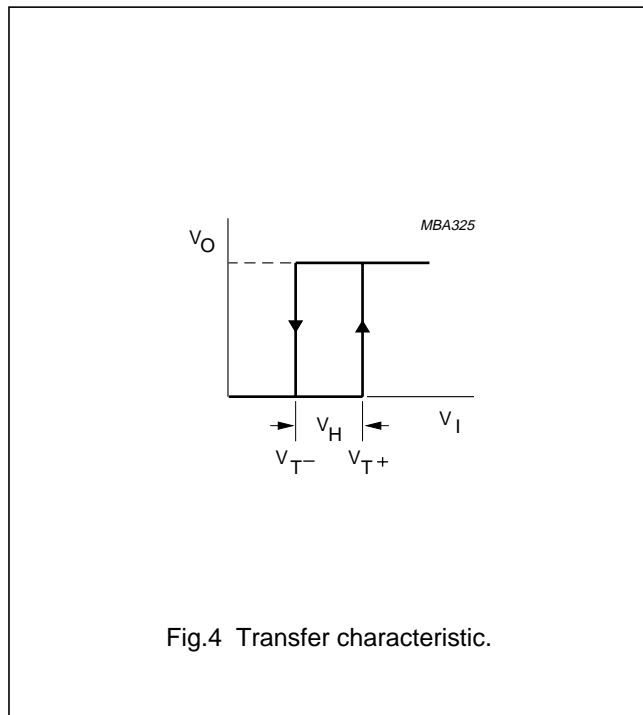
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## AC CHARACTERISTICS FOR 74HCT

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

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)						UNIT	TEST CONDITIONS		
		74HCT							V <sub>CC</sub> (V)	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to B <sub>n</sub> ; B <sub>n</sub> to A <sub>n</sub>		17	30		37		45	ns	4.5	Fig.7
t <sub>PZH</sub> / t <sub>PZL</sub>	3-state output enable time $\overline{OE}$ to A <sub>n</sub> ; $\overline{OE}$ to B <sub>n</sub>		19	32		40		48	ns	4.5	Fig.7
t <sub>PHZ</sub> / t <sub>PLZ</sub>	3-state output disable time $\overline{OE}$ to A <sub>n</sub> ; $\overline{OE}$ to B <sub>n</sub>		19	32		40		48	ns	4.5	Fig.7
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		5	12		15		18	ns	4.5	Fig.7

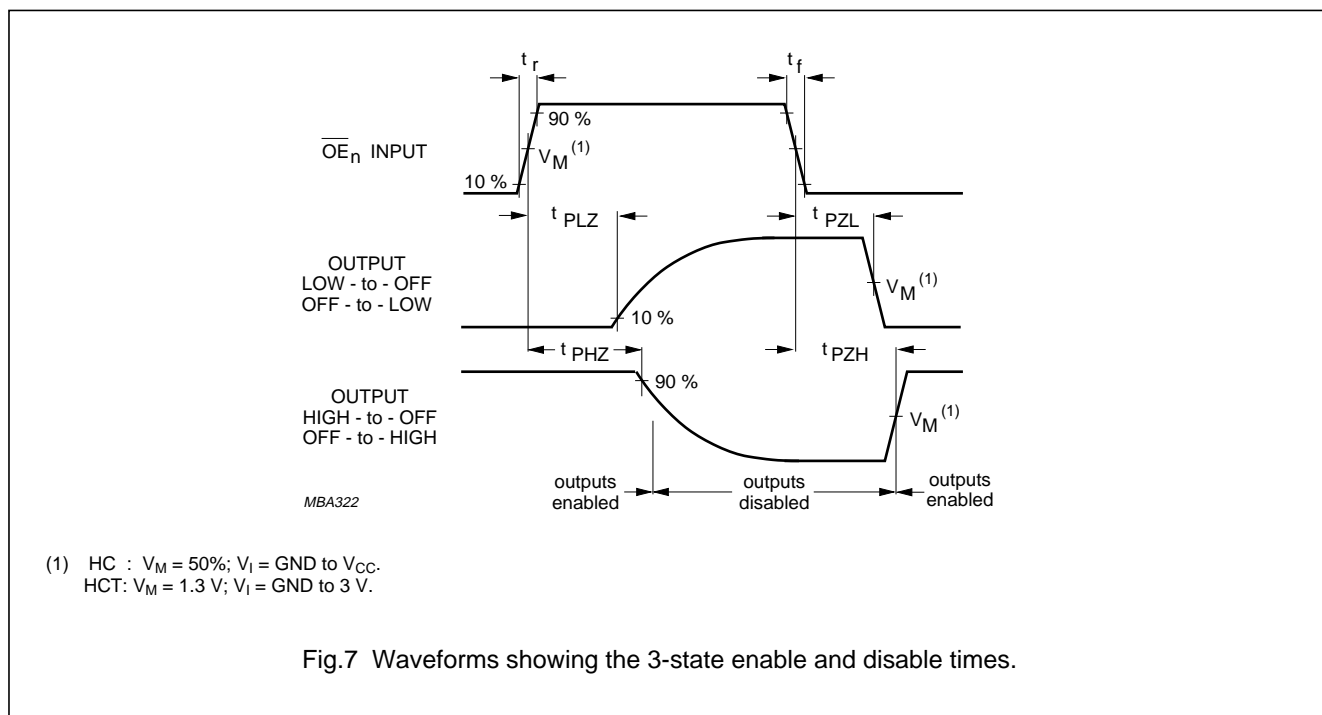
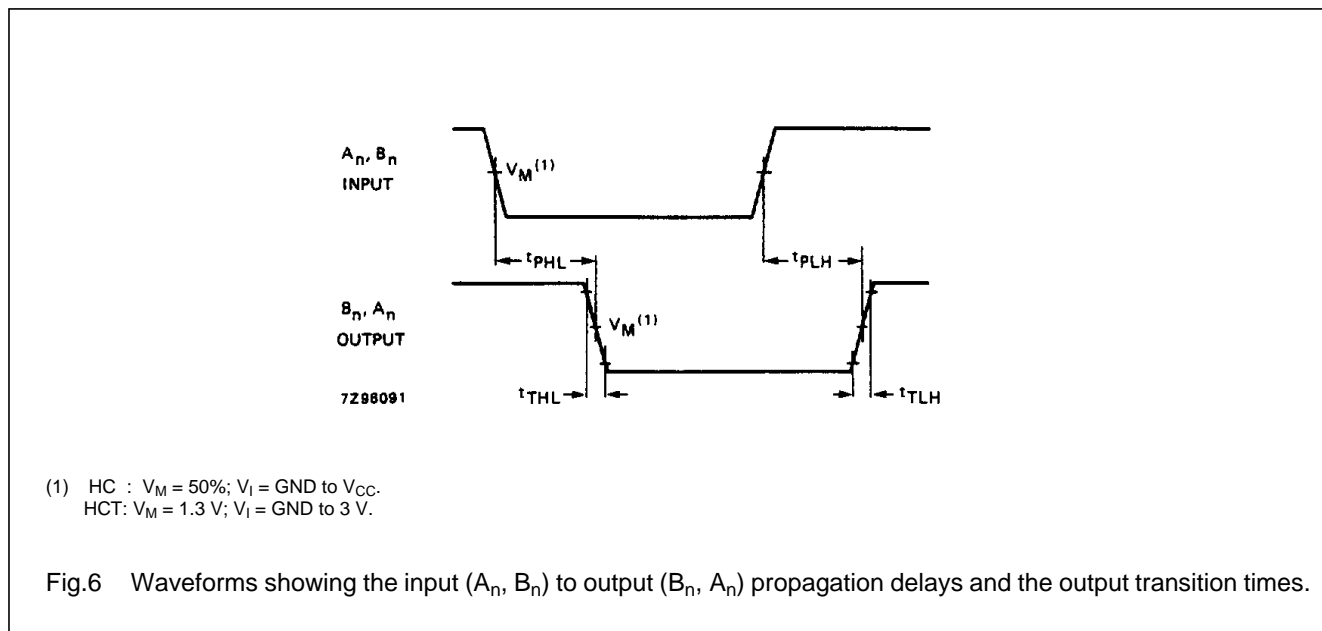
## TRANSFER CHARACTERISTIC WAVEFORMS



# Octal bus Schmitt-trigger transceiver; 3-state

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## AC WAVEFORMS



## PACKAGE OUTLINES

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

# Discontinued and withdrawn products, packages, availability and ordering

Type number	North American	Order code (12nc)	marking/packing <a href="#">PDF IC packing info</a>	package	device	buy
	Type number				status	online
74HC7245D		9350 209 30112	Standard Marking * Tube	<a href="#">SOT163</a> (SO20)	<a href="#">Withdrawn</a>	-
		9350 209 30118	Standard Marking * Reel Pack, SMD, 13"	<a href="#">SOT163</a> (SO20)	<a href="#">Withdrawn</a>	-
74HC7245N		9350 209 10112	Standard Marking * Tube	<a href="#">SOT146-1</a> (DIP20)	<a href="#">Withdrawn</a>	-
74HCT7245D		9350 209 40112	Standard Marking * Tube	<a href="#">SOT163</a> (SO20)	<a href="#">Withdrawn</a>	-
		9350 209 40118	Standard Marking * Reel Pack, SMD, 13"	<a href="#">SOT163</a> (SO20)	<a href="#">Withdrawn</a>	-
74HCT7245N		9350 209 20112	Standard Marking * Tube	<a href="#">SOT146-1</a> (DIP20)	<a href="#">Withdrawn</a>	-

## [Detailed discontinuation information](#)

Please note, devices listed in the "Products, packages, availability and ordering" table marked with "Withdrawn" are not in production anymore. Devices marked with "Discontinued" will not be in production in the near future.

Contact your nearest [sales or distributor office](#) for the latest information on product status and availability.

Click to return to the available devices: [→ INFO 74hc\\_hct7245\\_cnv\\_2](#)