INTEGRATED CIRCUITS

DATA SHEET

74ABT245

Octal transceiver with direction pin (3-State)

Product data Supersedes data of 1998 Jan 16

2003 Feb 06





Philips Semiconductors Product data

Octal transceiver with direction pin (3-State)

74ABT245

FEATURES

- Octal bidirectional bus interface
- 3-State buffers
- Output capability: +64 mA/-32 mA
- Latch-up protection exceeds 500 mA per Jedec Std 17
- ESD protection exceeds 2000 V per MIL STD 833 Method 3015 and 200 V per Machine Model
- Power-up 3-State
- Live insertion/extraction permitted
- Inputs are disabled during 3-State mode

DESCRIPTION

The 74ABT245 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT245 device is an octal transceiver featuring non-inverting 3-State bus compatible outputs in both send and receive directions. The control function implementation minimizes external timing requirements. The device features an Output Enable (\overline{OE}) input for easy cascading and a Direction (DIR) input for direction control.

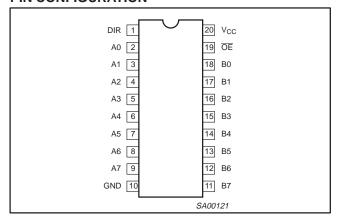
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25 ^{\circ}C; GND = 0 V$	TYPICAL	UNIT
t _{PLH} t _{PHL}	Propagation delay An to Bn or Bn to An	$C_L = 50 \text{ pF}; V_{CC} = 5 \text{ V}$	2.2 2.9	ns
C _{IN}	Input capacitance DIR, OE	$V_I = 0 \text{ V or } V_{CC}$	4	pF
C _{I/O}	I/O pin capacitance	Outputs disabled; $V_O = 0 \text{ V or } V_{CC}$	7	pF
I _{CCZ}	Total supply current	Outputs disabled; V _{CC} =5.5 V	50	μА

ORDERING INFORMATION

OKE EKING IN OKUMATION			
PACKAGES	TEMPERATURE RANGE	PART NUMBER	DWG NUMBER
20-Pin plastic SO	−40 °C to +85 °C	74ABT245D	SOT163-1
20-Pin Plastic SSOP Type II	−40 °C to +85 °C	74ABT245DB	SOT339-1
20-Pin Plastic TSSOP Type I	-40 °C to +85 °C	74ABT245PW	SOT360-1

PIN CONFIGURATION



PIN DESCRIPTION

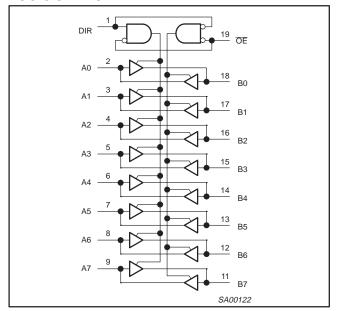
PIN NUMBER	SYMBOL	NAME AND FUNCTION				
1	DIR	Direction control input				
2, 3, 4, 5, 6, 7, 8, 9	A0 – A7	Data inputs/outputs (A side)				
18, 17, 16, 15, 14, 13, 12, 11	B0 – B7	Data inputs/outputs (B side)				
19	ŌĒ	Output enable input (active-LOW)				
10	GND	Ground (0 V)				
20	V _{CC}	Positive supply voltage				

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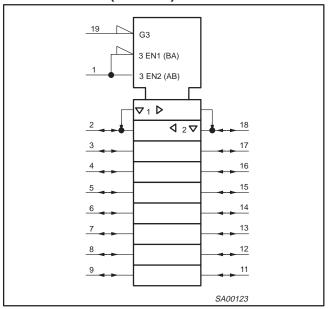
Octal transceiver with direction pin (3-State)

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LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



FUNCTION TABLE

INP	UTS	INPUTS/OUTPUTS				
ŌĒ	DIR	An	Bn			
L	L	An = Bn	Inputs			
L	Н	Inputs	Bn = An			
Н	Х	Z	Z			

H = High voltage level

= Low voltage level

X = Don't care Z = High impedance "off" state

ABSOLUTE MAXIMUM RATINGS^{1, 2}

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V _{CC}	DC supply voltage		−0.5 to +7.0	V
I _{IK}	DC input diode current	V _I < 0	-18	mA
VI	DC input voltage ³		-1.2 to +7.0	V
I _{OK}	DC output diode current	V _O < 0	-50	mA
V _{OUT}	DC output voltage ³	output in Off or High state	-0.5 to +5.5	V
I _{OUT}	DC output current	output in Low state	128	mA
T _{stg}	Storage temperature range		-65 to 150	°C

NOTES:

- 1. Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150 °C.

3. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIM	UNIT	
STWIBUL	PARAMETER	Min	Max	UNIT
V _{CC}	DC supply voltage	4.5	5.5	V
V _I	Input voltage	0	V _{CC}	V
V _{IH}	HIGH-level input voltage	2.0		V
V _{IL}	LOW-level Input voltage		0.8	V
I _{OH}	HIGH-level output current		-32	mA
I _{OL}	LOW-level output current		64	mA
Δt/Δν	Input transition rise or fall rate	0	5	ns/V
T _{amb}	Operating free-air temperature range	-40	+85	°C

DC ELECTRICAL CHARACTERISTICS

						LIMITS			
SYMBOL	PARAM	ETER	TEST CONDITIONS	Tar	_{nb} = +25	°C	T _{amb} =	–40 °C 35 °C	UNIT
				Min	Тур	Max	Min	Max	1 1
V _{IK}	Input clamp volt	age	$V_{CC} = 4.5 \text{ V}; I_{IK} = -18 \text{ mA}$		-0.9	-1.2		-1.2	V
			$V_{CC} = 4.5 \text{ V}; I_{OH} = -3 \text{ mA}; V_I = V_{IL} \text{ or } V_{IH}$	2.5	2.9		2.5		V
V _{OH}	High-level output voltage		$V_{CC} = 5.0 \text{ V}; I_{OH} = -3 \text{ mA}; V_I = V_{IL} \text{ or } V_{IH}$	3.0	3.4		3.0		V
			$V_{CC} = 4.5 \text{ V}$; $I_{OH} = -32 \text{ mA}$; $V_I = V_{IL} \text{ or } V_{IH}$	2.0	2.4		2.0		V
V _{OL}	Low-level output voltage		$V_{CC} = 4.5 \text{ V}$; $I_{OL} = 64 \text{ mA}$; $V_I = V_{IL} \text{ or } V_{IH}$		0.42	0.55		0.55	V
1.	Input leakage	Control pins	V _{CC} = 5.5 V; V _I = GND or 5.5 V		±0.01	±1.0		±1.0	μΑ
l tı	current	Data pins	$V_{CC} = 5.5 \text{ V}; V_{I} = \text{GND or } 5.5 \text{ V}$		±5	±100		±100	μΑ
I _{OFF}	Power-off leaka	ge current	$V_{CC} = 0.0 \text{ V}; V_{I} \text{ or } V_{O} \le 4.5 \text{ V}$		±5.0	±100		±100	μΑ
I _{PU} /I _{PD}	Power-up/down 3-State output current ³		$V_{\underline{CC}}$ = 2.0 V; V_{O} = 0.5 V; V_{I} = GND or V_{CC} ; V_{OE} = Don't care		±5.0	±50		±50	μА
I _{IH} + I _{OZH}	3-State output F	ligh current	$V_{CC} = 5.5 \text{ V}; V_O = 2.7 \text{ V}; V_I = V_{IL} \text{ or } V_{IH}$		5.0	50		50	μΑ
I _{IL} + I _{OZL}	3-State output L	ow current	$V_{CC} = 5.5 \text{ V}; V_O = 0.5 \text{ V}; V_I = V_{IL} \text{ or } V_{IH}$		-5.0	-50		-50	μΑ
I _{CEX}	Output high leal	kage current	$V_{CC} = 5.5 \text{ V}; V_{O} = 5.5 \text{ V}; V_{I} = \text{GND or } V_{CC}$		5.0	50		50	μΑ
Io	Output current ¹		V _{CC} = 5.5 V; V _O = 2.5 V	-40	-100	-180	-40	-180	mA
Іссн			V_{CC} = 5.5 V; Outputs HIGH; V _I = GND or V _{CC}		50	250		250	μА
I _{CCL}	Quiescent supp	ly current	V_{CC} = 5.5 V; Outputs LOW; V _I = GND or V _{CC}		24	30		30	mA
I _{CCZ}			V_{CC} = 5.5 V; Outputs 3-State; V _I = GND or V _{CC}		50	250		250	μА
			Outputs enabled, one input at 3.4 V, other inputs at V_{CC} or GND; V_{CC} = 5.5 V		0.5	1.5		1.5	mA
Δl _{CC}	Additional supplinput pin ²	y current per	Outputs 3-State, one data input at 3.4 V, other inputs at V_{CC} or GND; $V_{CC} = 5.5 \text{ V}$		50	250		250	μА
			Outputs 3-State, one enable input at 3.4 V, other inputs at V_{CC} or GND; $V_{CC} = 5.5 \text{ V}$		0.5	1.5		1.5	mA

- 1. Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- This is the increase in supply current for each input at 3.4 V.
 This parameter is valid for any V_{CC} between 0 V and 2.1 V with a transition time of up to 10 msec. For V_{CC} = 2.1 V to V_{CC} = 5 V ± 10%, a transition time of up to 100 μsec is permitted.

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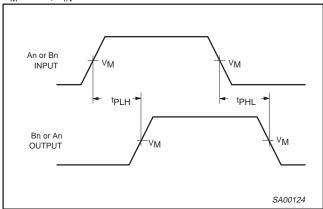
AC CHARACTERISTICS

GND = 0 V; t_R = t_F = 2.5 ns; C_L = 50 pF, R_L = 500 Ω

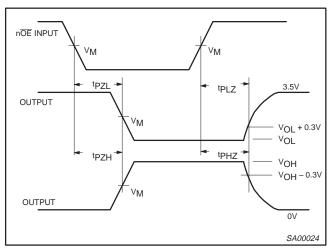
SYMBOL	PARAMETER	WAVEFORM	T _a	_{mb} = +25 ° _{CC} = +5.0	°C V	$T_{amb} = -40^{\circ}$ $V_{CC} = +5.0$	UNIT	
			Min	Тур	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation delay An to Bn or Bn to An	1	1.0 1.0	2.2 2.9	4.1 4.2	1.0 1.0	4.6 4.6	ns
t _{PZH} t _{PZL}	Output enable time to HIGH and LOW level	2	1.3 2.3	3.0 4.0	4.8 5.8	1.3 2.3	5.3 6.3	ns
t _{PHZ} t _{PLZ}	Output disable time from HIGH and LOW Level	2	1.0 1.0	4.7 4.1	6.2 5.8	1.0 1.0	7.2 6.3	ns

AC WAVEFORMS

 $V_M = 1.5V$, $V_{IN} = GND$ to 3.0V

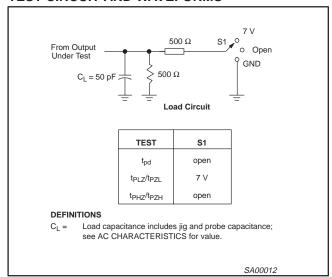


Waveform 1. Waveforms showing the input to output propagation delays



Waveform 2. Waveforms showing the 3-State Output Enable and Disable times

TEST CIRCUIT AND WAVEFORMS

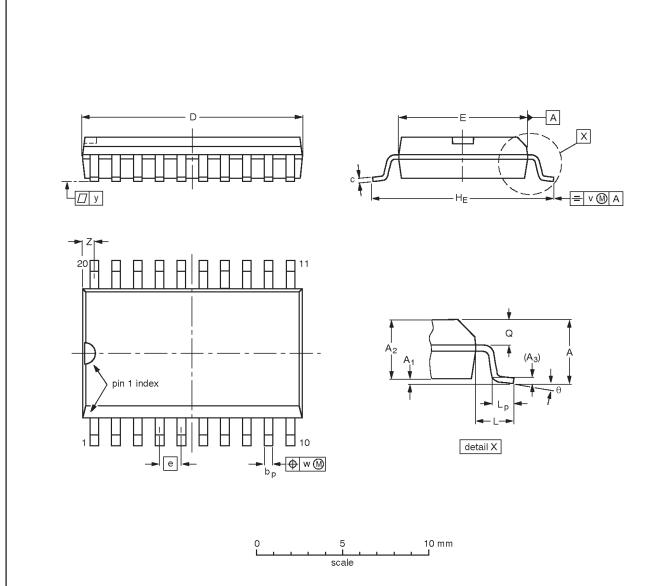


Octal transceiver with direction pin (3-State)

74ABT245

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	٧	w	у	z ⁽¹⁾	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016		0.01	0.01	0.004	0.035 0.016	0°

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

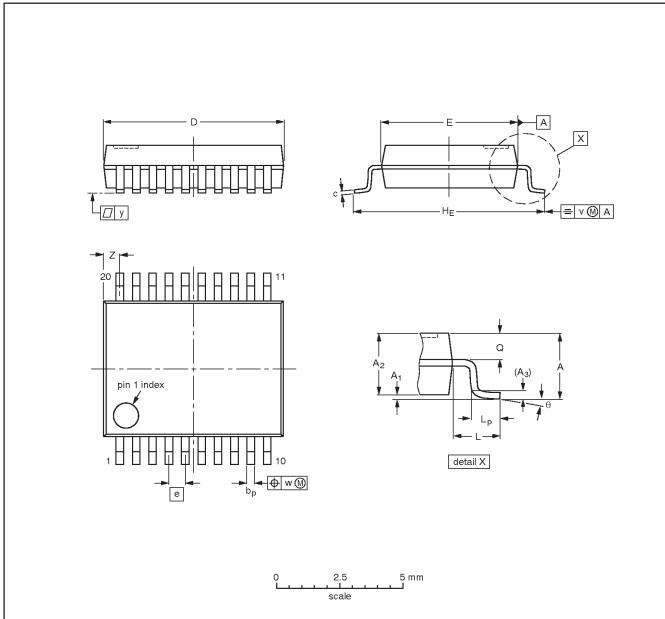
OUTLINE		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ		PROJECTION	1330E DATE
SOT163-1	075E04	MS-013				-97-05-22 99-12-27

Octal transceiver with direction pin (3-State)

74ABT245

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	А3	bp	c	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	٧	w	у	Z ⁽¹⁾	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

Note

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

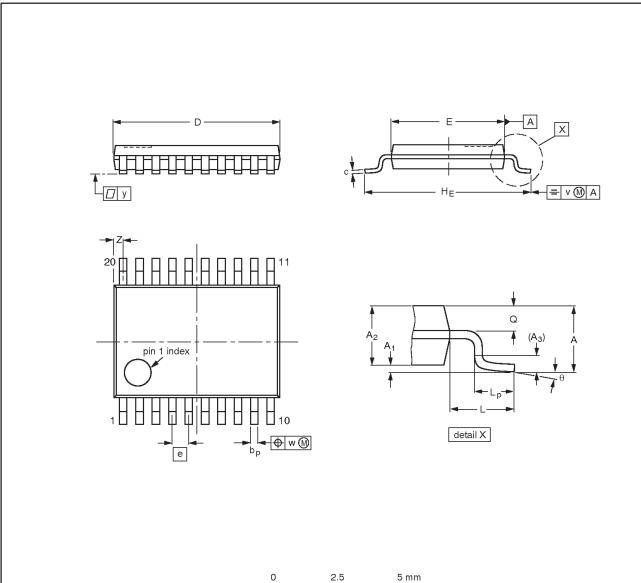
OUTLINE		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE
SOT339-1		MO-150				-95-02-04- 99-12-27

Octal transceiver with direction pin (3-State)

74ABT245

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



0 2.5 5 mn

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	А3	bp	С	D ⁽¹⁾	E ⁽²⁾	е	HE	L	Lp	Q	v	w	у	Z ⁽¹⁾	θ
mm	1.10	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1.0	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°

Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT360-1		MO-153				-95-02-04- 99-12-27	

Philips Semiconductors Product data

Octal transceiver with direction pin (3-State)

74ABT245

REVISION HISTORY

Rev	Date	Description
_3	20030206	Product data (9397 750 11087); ECN 853-1447 29305 of 17 December 2002; Supersedes Product specification (9397 750 03467) of 1998 Jan 16.
		Modifications:
		● Delete all references to N package. DIP20 package option discontinued.
_2	19980116	Product specification (9397 750 03467) 1998 Jan 16; ECN 853-1447 18867 of 16 January 1998. Supersedes data of 1996 Sep 10.

Data sheet status

Level	Data sheet status [1]	Product status ^{[2] [3]}	Definitions
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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^[1] Please consult the most recently issued data sheet before initiating or completing a design.

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Contact information

For additional information please visit

http://www.semiconductors.philips.com. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

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^[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.