

DATA SHEET

74ABT16244-1

16-bit buffer/line driver with 30Ω series termination resistors (3-State)

Product specification

1995 Apr 11

IC23 Data Handbook

Philips Semiconductors



■ 7110826 0089195 905 ■

PHILIPS

16-bit buffer/line driver with 30Ω series termination resistors (3-State)

74ABT16244-1

FEATURES

- 16-bit bus interface
- Multiple V_{CC} and GND pins minimize switching noise
- Power-up 3-State
- 3-State buffers
- Output capability: +12 mA/−32mA
- Live insertion/extraction permitted
- Latch-up protection exceeds 500mA per Jedec JC40.2 Std 17
- ESD protection exceeds 2000 V per MIL STD 883 Method 3015 and 200 V per Machine Model

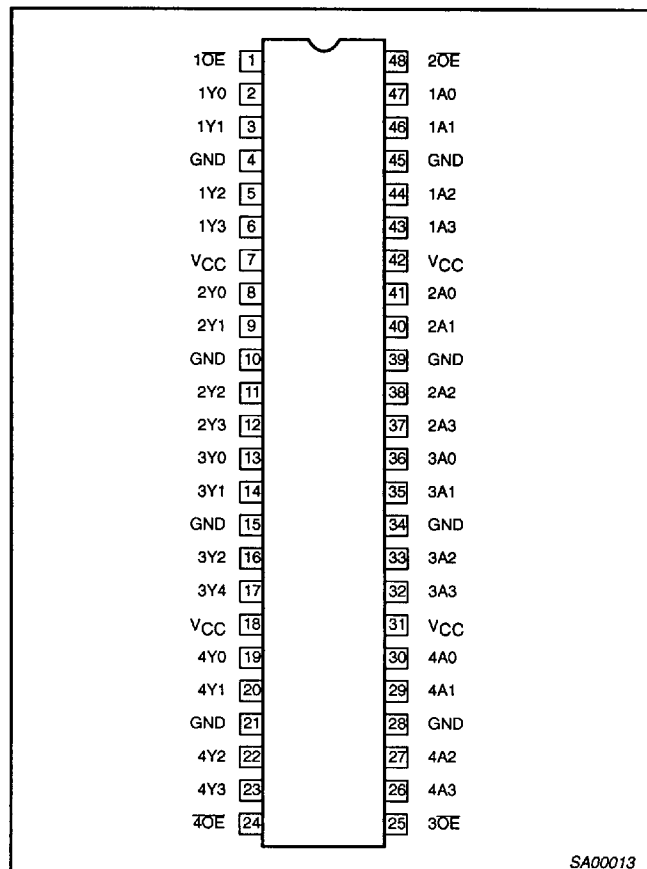
DESCRIPTION

The 74ABT16244-1 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed.

The 74ABT16244-1 device is a 16-bit buffer that is ideal for driving bus lines. The device features four Output Enables (1OE, 2OE, 3OE, 4OE), each controlling four of the 3-State outputs.

The 74ABT16244-1 is designed with 30Ω series resistance in both the upper and lower output structures. This design reduces line noise in applications such as memory address drivers, clock drivers and bus receivers/transmitters.

PIN CONFIGURATION



SA00013

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25^{\circ}\text{C}; \text{GND} = 0\text{V}$	TYPICAL	UNIT
t_{PLH} t_{PHL}	Propagation delay nAx to nYx	$C_L = 50\text{pF}; V_{CC} = 5\text{V}$	3.2	ns
C_{IN}	Input capacitance	$V_I = 0\text{V}$ or V_{CC}	3	pF
C_{OUT}	Output capacitance	$V_O = 0\text{V}$ or V_{CC} ; 3-State	7	pF
I_{CCZ}	Total supply current	Outputs disabled; $V_{CC} = 5.5\text{V}$	500	μA

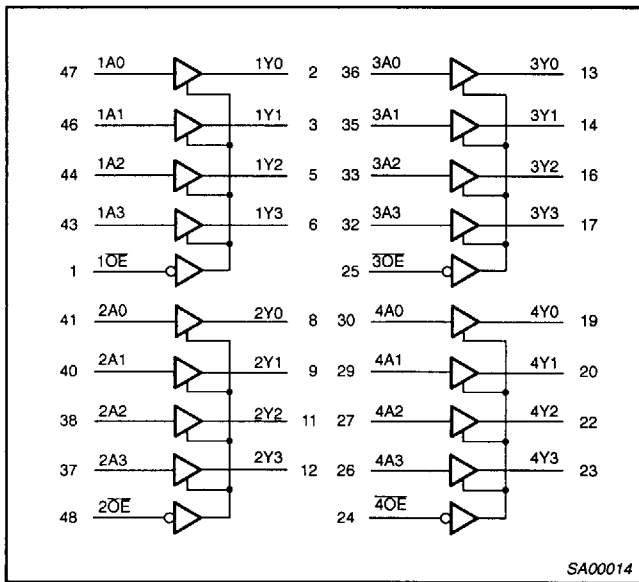
ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DRAWING NUMBER
48-pin SSOP Type III	−40°C to +85°C	BT16244−1 DL	SOT370-1
48-pin TSSOP Type II	−40°C to +85°C	BT16244-1 DGG	SOT362-1

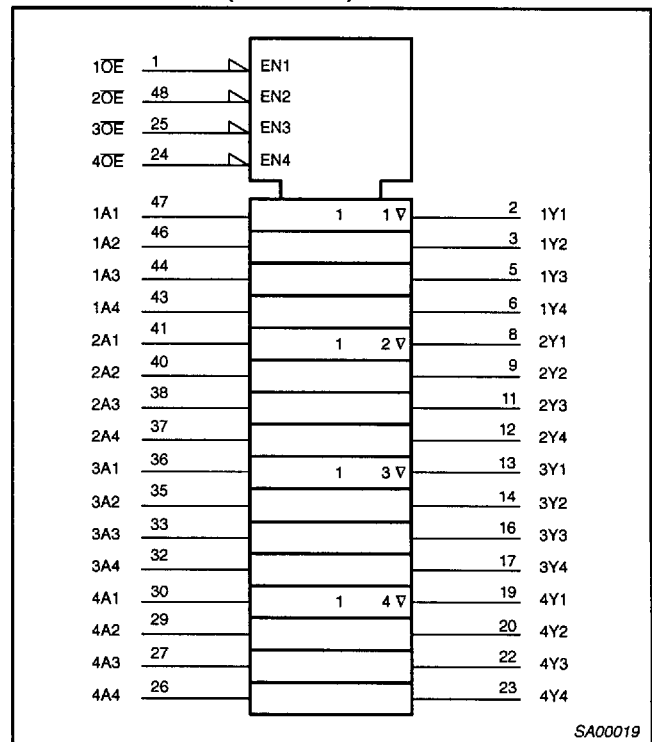
16-bit buffer/line driver with 30Ω series termination resistors (3-State)

74ABT16244-1

LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)

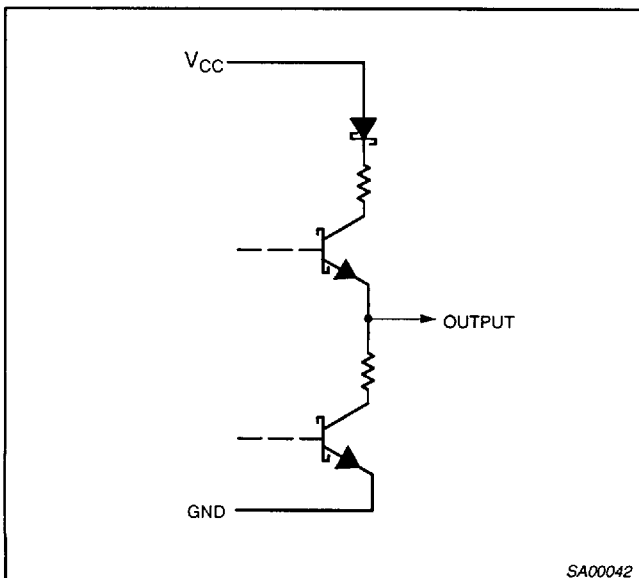


FUNCTION TABLE

INPUTS		OUTPUTS
nOE	nAx	nYx
L	L	L
L	H	H
H	X	Z

H = High voltage level
 L = Low voltage level
 X = Don't care
 Z = High impedance "off" state

SCHEMATIC OF Y OUTPUTS



PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
47, 46, 44, 43 41, 40, 38, 37 36, 35, 33, 32 30, 29, 27, 26	1A0 – 1A3, 2A0 – 2A3, 3A0 – 3A3, 4A0 – 4A3	Data inputs
2, 3, 5, 6 8, 9, 11, 12 13, 14, 16, 17 19, 20, 22, 23	1Y0 – 1Y3, 2Y0 – 2Y3, 3Y0 – 3Y3, 4Y0 – 4Y3	Data outputs
1, 48 25, 24	1OE, 2OE, 3OE, 4OE	Output enables
4, 10, 15, 21 28, 34, 39, 45	GND	Ground (0V)
7, 18, 31, 42	V _{CC}	Positive supply voltage

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74ABT16244-1

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
V _I	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.
2. 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.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		Min	Max	
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		12	mA
Δt/Δv	Input transition rise or fall rate	0	10	ns/V
T _{amb}	Operating free-air temperature range	-40	+85	°C

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74ABT16244-1

DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T _{amb} = +25°C			T _{amb} = -40°C to +85°C		
			Min	Typ	Max	Min	Max	
V _{IK}	Input clamp voltage	V _{CC} = 4.5V; I _{IK} = -18mA		-0.9	-1.2		-1.2	V
V _{OH}	High-level output voltage ³	V _{CC} = 4.5V; I _{OH} = -3mA; V _I = V _{IL} or V _{IH}	2.5	2.9		2.5		V
		V _{CC} = 5V; I _{OH} = -3mA; V _I = V _{IL} or V _{IH}	3.0	3.4		3.0		V
		V _{CC} = 4.5V; I _{OH} = -32mA; V _I = V _{IL} or V _{IH}	2.0	2.4		2.0		V
V _{OL}	Low-level output voltage	V _{CC} = 4.5V; I _{OL} = 8mA; V _I = V _{IL} or V _{IH}			0.65		0.65	V
		V _{CC} = 4.5V; I _{OL} = 12mA; V _I = V _{IL} or V _{IH}			0.80		0.80	V
I _I	Input leakage current	V _{CC} = 5.5V; V _I = GND or 5.5V		±0.01	±1.0		±1.0	μA
I _{OFF}	Power-off leakage current	V _{CC} = 0.0V; V _O or V _I ≤ 4.5V		±5.0	±100		±100	μA
I _{PU/PD}	Power-up/down 3-State output current	V _{CC} = 2.0V; V _O = 0.5V; V _I = GND or V _{CC} ; V _{OE} = Don't care		±5.0	±50		±50	μA
I _{OZH}	3-State output High current	V _{CC} = 5.5V; V _O = 2.7V; V _I = V _{IL} or V _{IH}		0.1	10		10	μA
I _{OZL}	3-State output Low current	V _{CC} = 5.5V; V _O = 0.5V; V _I = V _{IL} or V _{IH}		-0.1	-10		-10	μA
I _{CEX}	Output High leakage current	V _{CC} = 5.5V; V _O = 5.5V; V _I = GND or V _{CC}		5.0	50		50	μA
I _O	Output current ¹	V _{CC} = 5.5V; V _O = 2.5V	-50	-100	-180	-50	-180	mA
I _{CCH}	Quiescent supply current ³	V _{CC} = 5.5V; Outputs High, V _I = GND or V _{CC}		0.300	0.700		0.700	mA
I _{CCL}		V _{CC} = 5.5V; Outputs Low, V _I = GND or V _{CC}		10	19		19	mA
I _{CCZ}		V _{CC} = 5.5V; Outputs 3-State; V _I = GND or V _{CC}		0.300	0.700		0.700	mA
ΔI _{CC}	Additional supply current per input pin ^{2, 3}	Outputs enabled, one data input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 5.5V		0.400	0.700		0.700	mA
		Outputs disabled, one data input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 5.5V		0.01	0.05		0.05	mA
		Control pins, outputs disabled, one enable input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 5.5V		0.400	0.700		0.700	mA

NOTES:

- 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 3.4V.
- This data sheet limit may vary among suppliers.

AC CHARACTERISTICS

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

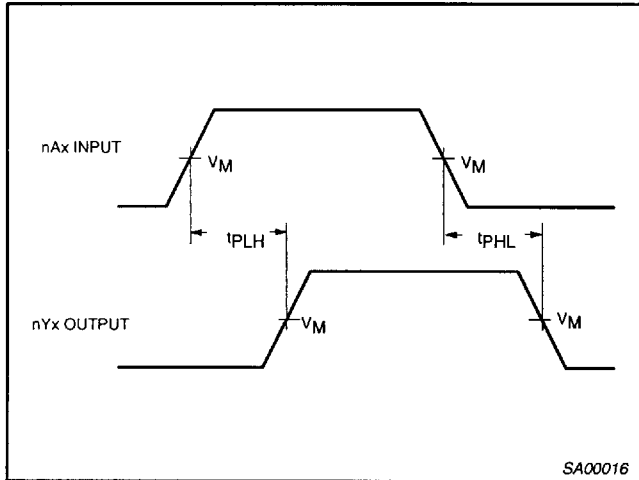
SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			T _{amb} = +25°C V _{CC} = +5.0V			T _{amb} = -40°C to +85°C V _{CC} = +5.0V ±0.5V		
			Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation delay nAx to nYx	1	1.0 1.6	1.8 3.2	2.4 4.0	1.0 1.6	2.7 4.4	ns
t _{PZH} t _{PZL}	Output enable time to High and Low level	2	1.2 2.6	2.7 5.0	3.5 6.2	1.2 2.6	4.3 7.3	ns
t _{PHZ} t _{PLZ}	Output disable time from High and Low level	2	1.5 1.3	3.0 2.6	3.8 3.3	1.5 1.3	4.5 4.6	ns

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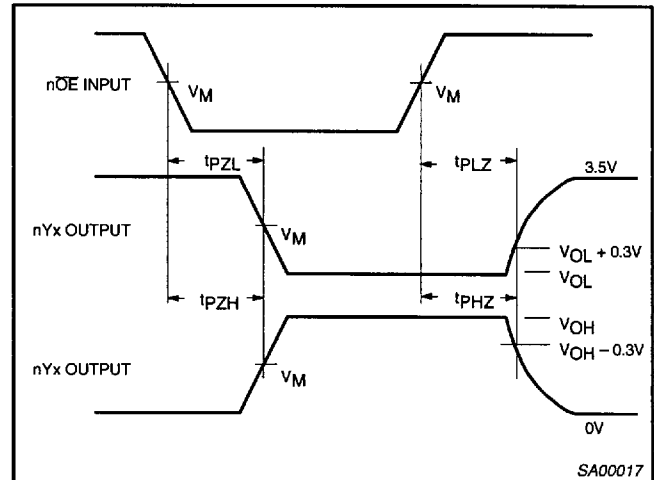
74ABT16244-1

AC WAVEFORMS

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



Waveform 1. Waveforms Showing the Input (An) to Output (Yn) Propagation Delays



Waveform 2. Waveforms Showing the 3-State Output Enable and Disable Times

TEST CIRCUIT AND WAVEFORMS

Test Circuit for 3-State Outputs

Input Pulse Definition

$V_M = 1.5V$

SWITCH POSITION

TEST	SWITCH
t_{PLZ}	closed
t_{PZL}	closed
All other	open

DEFINITIONS

R_L = Load resistor; see AC CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

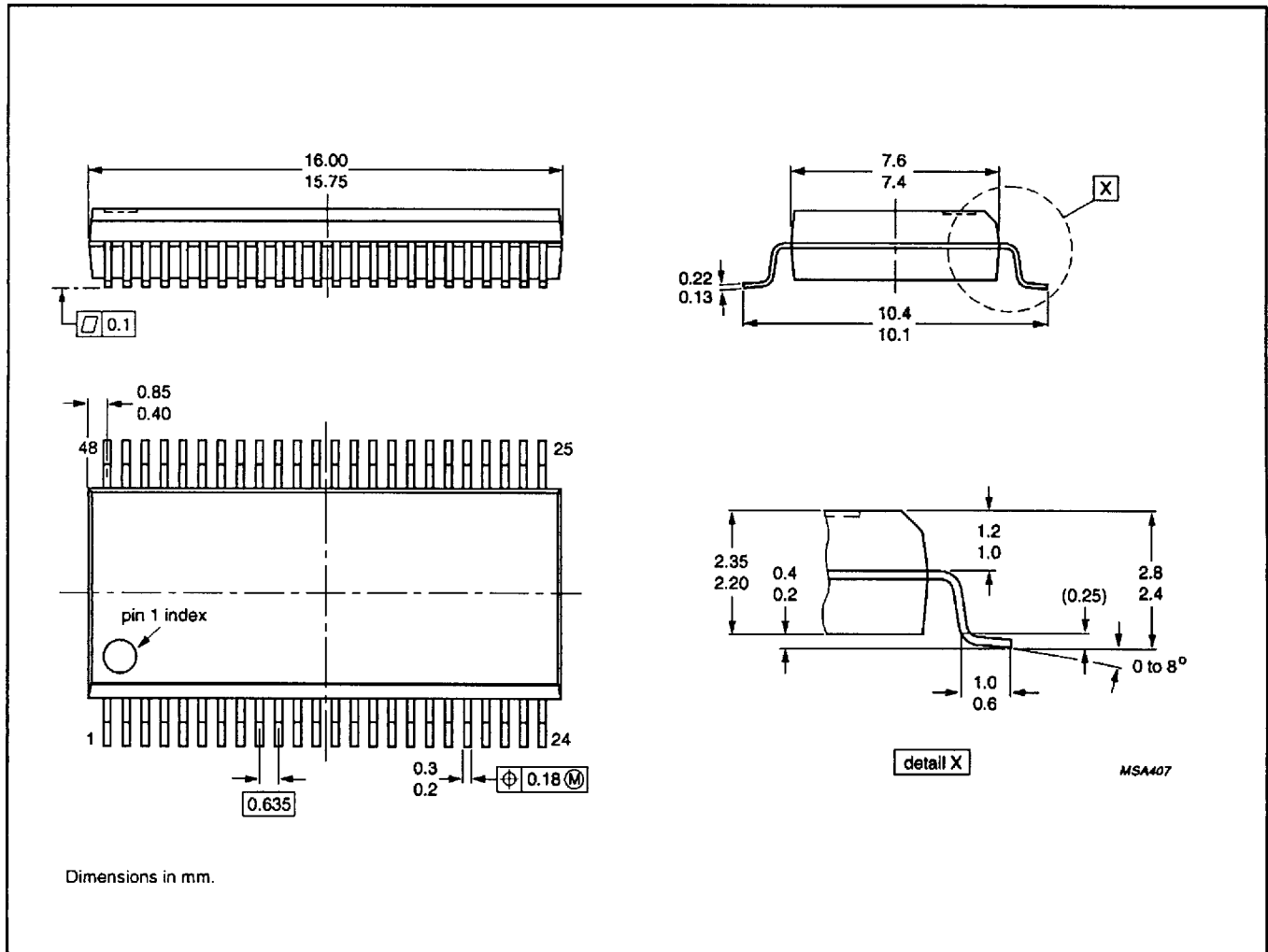
FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_w	t_r	t_f
74ABT16	3.0V	1MHz	500ns	2.5ns	2.5ns

SA00018

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74ABT16244-1

SOT370-1 PLASTIC SHRINK SMALL OUTLINE PACKAGE; 48 LEADS; BODY WIDTH 7.5mm



16-bit buffer/line driver with 30Ω series termination resistors (3-State)

74ABT16244-1

SOT362-1 PLASTIC THIN SHRINK SMALL OUTLINE PACKAGE; 48 LEADS; BODY WIDTH 6.1mm

