

# DATA SHEET

**74ABT126**

Quad buffer (3-State)

Product data  
Supersedes data of 1998 Jan 16

2002 Dec 13

# Quad buffer (3-State)

# 74ABT126

## FEATURES

- Quad bus interface
- 3-State buffers
- Live insertion/extraction permitted
- Output capability: +64 mA / -32 mA
- Latch-up protection exceeds 500 mA per JEDEC Std 17
- ESD protection exceeds 2000 V per MIL STD 883 Method 3015 and 200 V per Machine Model
- Power-up 3-State
- Inputs are disabled during 3-State mode

## DESCRIPTION

The 74ABT126 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT126 device is a quad buffer that is ideal for driving bus lines. The device features four Output Enables (OE0, OE1, OE2, OE3), each controlling one of the 3-State outputs.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25\text{ }^{\circ}\text{C}; \text{GND} = 0\text{ V}$	TYPICAL	UNIT
$t_{PLH}$ $t_{PHL}$	Propagation delay An to Yn	$C_L = 50\text{ pF}; V_{CC} = 5\text{ V}$	2.9	ns
$C_{IN}$	Input capacitance	$V_I = 0\text{ V or } V_{CC}$	4	pF
$C_{OUT}$	Output capacitance	Outputs disabled; $V_O = 0\text{ V or } V_{CC}$	7	pF
$I_{CCZ}$	Total supply current	Outputs disabled; $V_{CC} = 5.5\text{ V}$	65	$\mu\text{A}$

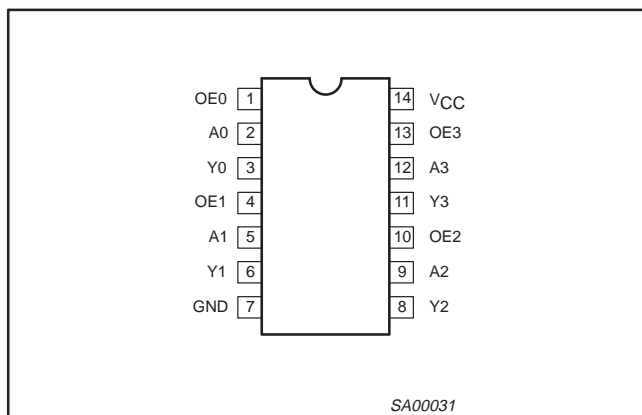
## ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	PART NUMBER	DWG NUMBER
14-Pin plastic SO	-40 °C to +85 °C	74ABT126D	SOT108-1
14-Pin Plastic SSOP Type II	-40 °C to +85 °C	74ABT126DB	SOT337-1
14-Pin Plastic TSSOP Type I	-40 °C to +85 °C	74ABT126PW	SOT402-1

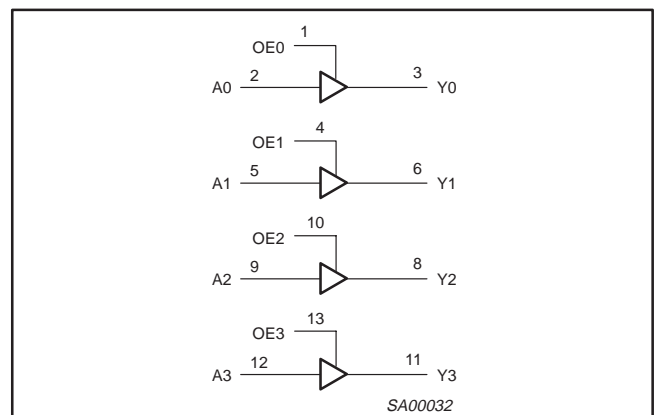
## PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
2, 5, 9, 12	A0 – A3	Data inputs
3, 6, 8, 11	Y0 – Y3	Data outputs
1, 4, 10, 13	OE0 – OE3	Output enable inputs
7	GND	Ground (0 V)
14	$V_{CC}$	Positive supply voltage

## PIN CONFIGURATION



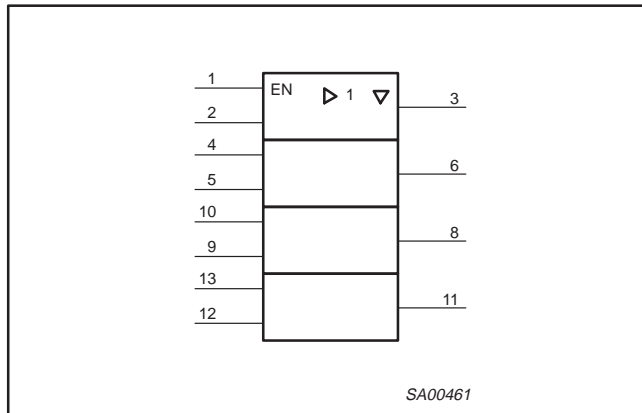
## LOGIC SYMBOL



# Quad buffer (3-State)

74ABT126

## LOGIC SYMBOL (IEEE/IEC)



## FUNCTION TABLE

INPUTS		OUTPUTS
OEn	An	Yn
H	L	L
H	H	H
L	X	Z

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

## ABSOLUTE MAXIMUM RATINGS<sup>1, 2</sup>

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V <sub>CC</sub>	DC supply voltage		-0.5 to +7.0	V
I <sub>IK</sub>	DC input diode current	V <sub>I</sub> < 0 V	-18	mA
V <sub>I</sub>	DC input voltage <sup>3</sup>		-1.2 to +7.0	V
I <sub>OK</sub>	DC output diode current	V <sub>O</sub> < 0 V	-50	mA
V <sub>OUT</sub>	DC output voltage <sup>3</sup>	output in Off or HIGH state	-0.5 to +5.5	V
I <sub>OUT</sub>	DC output current	output in LOW state	128	mA
T <sub>stg</sub>	Storage temperature range		-65 to 150	°C

### NOTES:

- 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.
- 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 <sub>CC</sub>	DC supply voltage	4.5	5.5	V
V <sub>I</sub>	Input voltage	0	V <sub>CC</sub>	V
V <sub>IH</sub>	HIGH-level input voltage	2.0		V
V <sub>IL</sub>	LOW-level Input voltage		0.8	V
I <sub>OH</sub>	HIGH-level output current		-32	mA
I <sub>OL</sub>	LOW-level output current		64	mA
Δt/Δv	Input transition rise or fall rate	0	10	ns/V
T <sub>amb</sub>	Operating free-air temperature range	-40	+85	°C

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## DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T <sub>amb</sub> = +25 °C			T <sub>amb</sub> = -40 °C to +85 °C		
			Min	Typ	Max	Min	Max	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = 4.5 V; I <sub>IK</sub> = -18 mA		-0.9	-1.2		-1.2	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = 4.5 V; I <sub>OH</sub> = -3 mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.5	2.9		2.5		V
		V <sub>CC</sub> = 5.0 V; I <sub>OH</sub> = -3 mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	3.0	3.4		3.0		V
		V <sub>CC</sub> = 4.5 V; I <sub>OH</sub> = -32 mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.0	2.4		2.0		V
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 4.5 V; I <sub>OL</sub> = 64 mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		0.35	0.55		0.55	V
I <sub>I</sub>	Input leakage current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or 5.5 V		±0.01	±1.0		±1.0	µA
I <sub>OFF</sub>	Power-off leakage current	V <sub>CC</sub> = 0.0 V; V <sub>O</sub> or V <sub>I</sub> ≤ 4.5 V		±5.0	±100		±100	µA
I <sub>PU</sub> /I <sub>PD</sub>	Power-up/down 3-State output current <sup>3</sup>	V <sub>CC</sub> = 2.1 V; V <sub>O</sub> = 0.5 V; V <sub>I</sub> GND or V <sub>CC</sub> ; V <sub>OE</sub> = Don't care		±5.0	±50		±50	µA
I <sub>OZH</sub>	3-State output HIGH current	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 2.7 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		1.0	50		50	µA
I <sub>OZL</sub>	3-State output LOW current	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 0.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		-1.0	-50		-50	µA
I <sub>CEX</sub>	Output HIGH leakage current	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>		5.0	50		50	µA
I <sub>O</sub>	Output current <sup>1</sup>	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 2.5 V	-50	-100	-180	-50	-180	mA
I <sub>CCH</sub>	Quiescent supply current	V <sub>CC</sub> = 5.5 V; Outputs High, V <sub>I</sub> = GND or V <sub>CC</sub>		65	250		250	µA
I <sub>CCL</sub>		V <sub>CC</sub> = 5.5 V; Outputs Low, V <sub>I</sub> = GND or V <sub>CC</sub>		12	15		15	mA
I <sub>CCZ</sub>		V <sub>CC</sub> = 5.5 V; Outputs 3-State; V <sub>I</sub> = GND or V <sub>CC</sub>		65	250		250	µA
ΔI <sub>CC</sub>	Additional supply current per input pin <sup>2</sup>	Outputs enabled, one data input at 3.4 V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V		0.5	1.5		1.5	mA
		Outputs 3-State, one data input at 3.4 V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V		50	250		250	µA
		Outputs 3-State, one enable input at 3.4 V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V		0.5	1.5		1.5	mA

**NOTES:**

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

## AC CHARACTERISTICS

GND = 0 V; t<sub>R</sub> = t<sub>F</sub> = 2.5 ns; C<sub>L</sub> = 50 pF, R<sub>L</sub> = 500 Ω

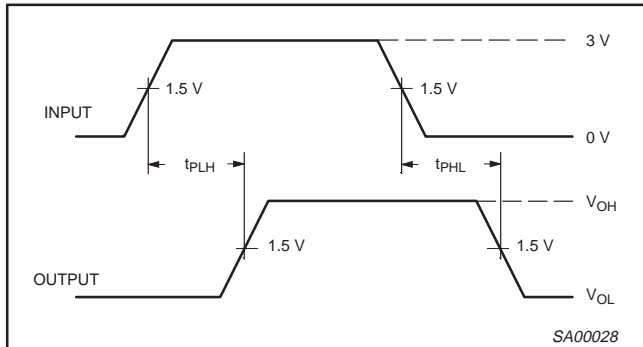
SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			T <sub>amb</sub> = +25 °C V <sub>CC</sub> = +5.0 V			T <sub>amb</sub> = -40 °C to +85 °C V <sub>CC</sub> = +5.0 V ±0.5 V		
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay An to Yn	1	1.0 1.0	2.9 3.0	4.2 4.3	1.0 1.0	4.4 4.6	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output enable time to HIGH and LOW level	2	1.9 1.9	3.2 4.4	5.8 5.9	1.9 1.9	6.5 6.5	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output disable time from HIGH and LOW level	2	1.0 1.0	4.2 2.9	5.2 4.9	1.0 1.0	5.8 5.5	ns

# Quad buffer (3-State)

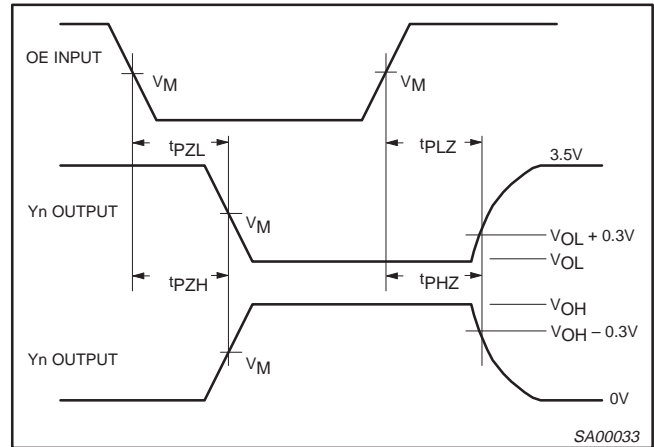
# 74ABT126

## AC WAVEFORMS

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



**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**

**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.

$V_M = 1.5\text{ V}$

**Input Pulse Definition**

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	$t_W$	$t_R$	$t_F$
74ABT	3.0V	1MHz	500ns	2.5ns	2.5ns

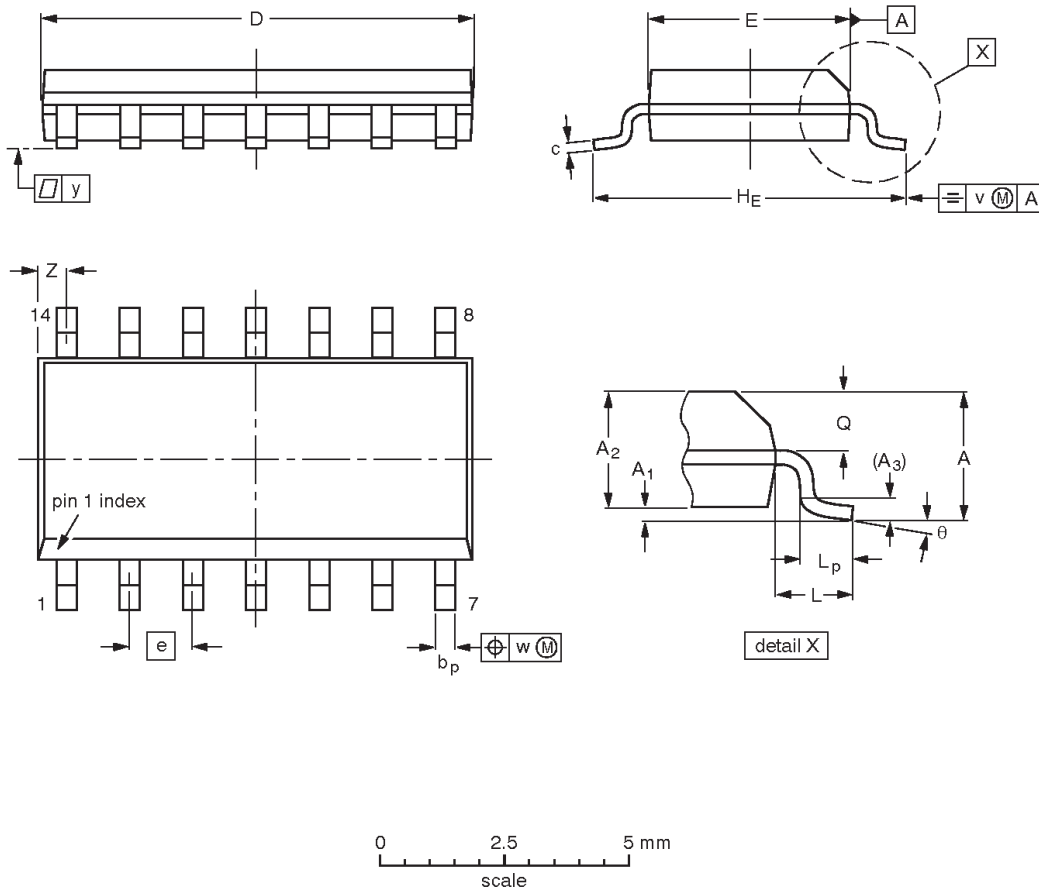
SA00012

# Quad buffer (3-State)

# 74ABT126

**SO14: plastic small outline package; 14 leads; body width 3.9 mm**

**SOT108-1**



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

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

**Note**

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

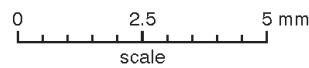
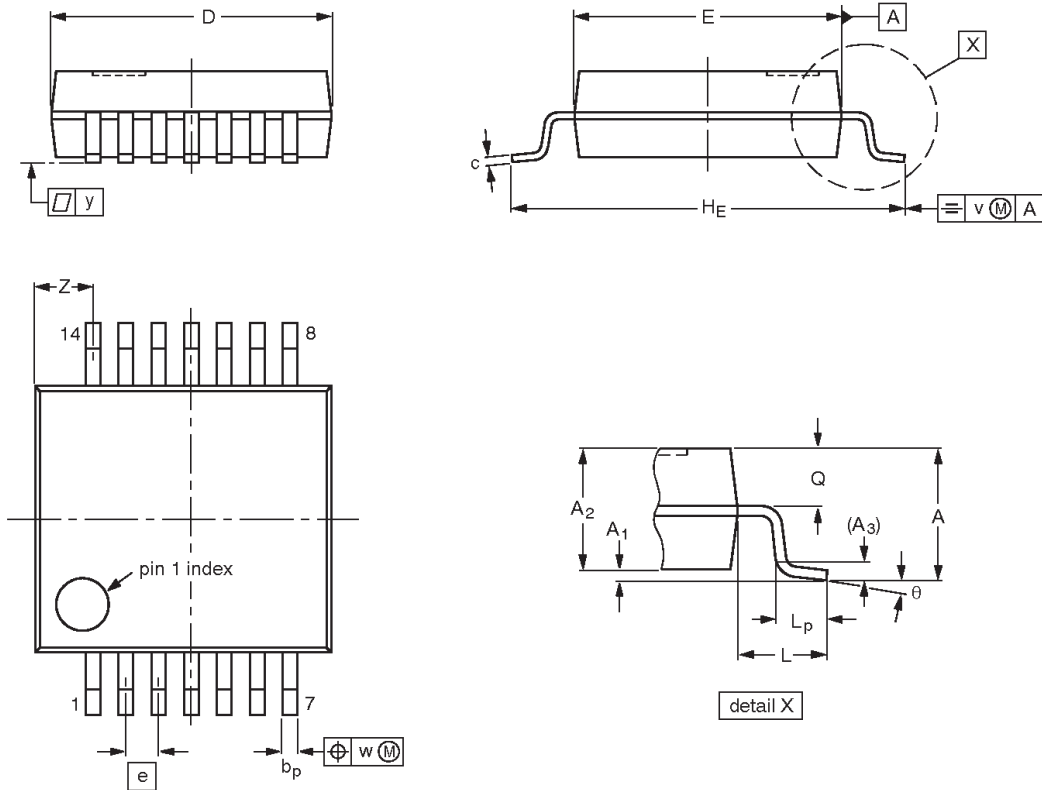
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06	MS-012				97-05-22 99-12-27

# Quad buffer (3-State)

# 74ABT126

**SSOP14:** plastic shrink small outline package; 14 leads; body width 5.3 mm

**SOT337-1**



**DIMENSIONS (mm are the original dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	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	1.4 0.9	8° 0°

**Note**

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

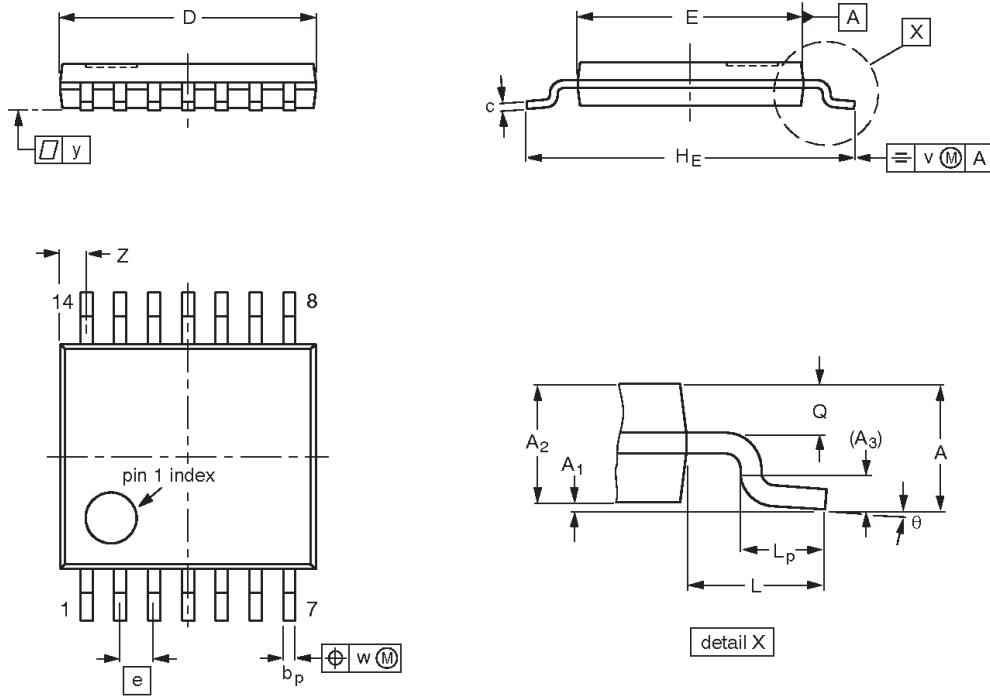
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT337-1		MO-150				96-01-18 99-12-27

# Quad buffer (3-State)

# 74ABT126

**TSSOP14:** plastic thin shrink small outline package; 14 leads; body width 4.4 mm

**SOT402-1**



**DIMENSIONS (mm are the original dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(2)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	1.10	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	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	0.72 0.38	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 VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT402-1		MO-153				-95-04-04 99-12-27



## Quad buffer (3-State)

74ABT126

**REVISION HISTORY**

Rev	Date	Description
_3	20021213	<b>Product data (9397 750 10856); ECN 853-1607 29291 of 12 December 2002.</b> <b>Supersedes data of 16 January 1998 (9397 750 03462).</b> Modifications: <ul style="list-style-type: none"><li>● Ordering information table: remove "North America" column; remove 74ABT126N package offering.</li></ul>
_2	19980116	<b>Product specification (9397 750 03462). ECN 853-1607 18867 of 16 January 1998.</b> <b>Supersedes data of 26 February 1996.</b>

## Quad buffer (3-State)

74ABT126

## Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	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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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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Document order number:

9397 750 10856

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