

# 74ABT126

Quad buffer; 3-state

Rev. 04 — 17 February 2005

Product data sheet

## 1. General 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 enable inputs (nOE each controlling one of the 3-state outputs (nY)).

## 2. Features

- Quad bus interface
- 3-state buffers
- Live insertion and extraction permitted
- Output capability: +64 mA and –32 mA
- Inputs are disabled during 3-state mode
- Power-up 3-state
- Latch-up protection:
  - ◆ JESD78: exceeds 500 mA
- ESD protection:
  - ◆ MIL STD 883 method 3015: exceeds 2000 V
  - ◆ Machine model: exceeds 200 V

## 3. Quick reference data

**Table 1: Quick reference data**

$T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $GND = 0\text{ V}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PLH}$	propagation delay nA to nY	$C_L = 50\text{ pF}$ ; $V_{CC} = 5\text{ V}$	-	2.9	-	ns
$t_{PHL}$	propagation delay nA to nY	$C_L = 50\text{ pF}$ ; $V_{CC} = 5\text{ V}$	-	3.0	-	ns
$C_I$	input capacitance	$V_I = 0\text{ V}$ or $V_{CC}$	-	4	-	pF
$C_O$	output capacitance	outputs disabled; $V_O = 0\text{ V}$ or $V_{CC}$	-	7	-	pF
$I_{CC}$	quiescent supply current	outputs 3-state; $V_{CC} = 5.5\text{ V}$	-	65	-	$\mu\text{A}$

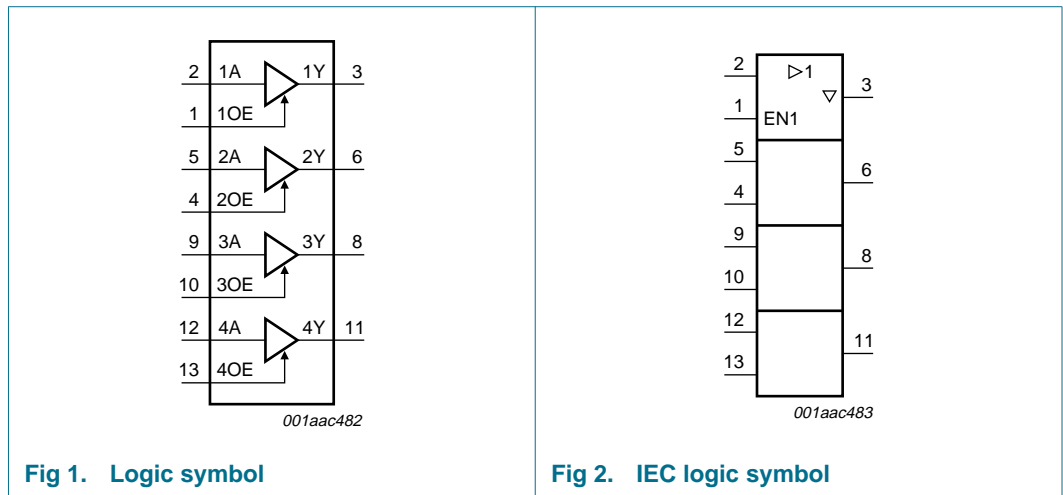
**PHILIPS**

## 4. Ordering information

**Table 2: Ordering information**

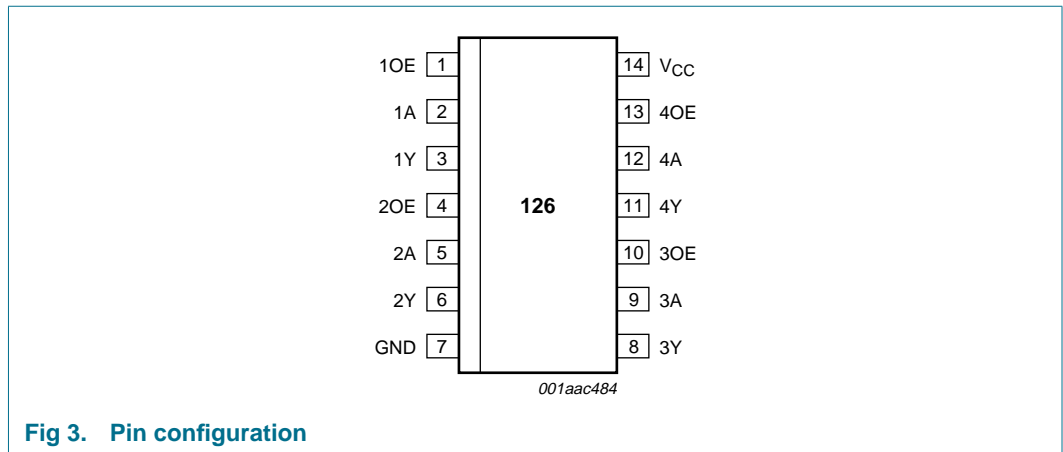
Type number	Package			Version
	Temperature range	Name	Description	
74ABT126D	-40 °C to +85 °C	SO14	plastic small outline package; 14 leads; body width 3.9 mm	SOT108-1
74ABT126DB	-40 °C to +85 °C	SSOP14	plastic shrink small outline package; 14 leads; body width 5.3 mm	SOT337-1
74ABT126PW	-40 °C to +85 °C	TSSOP14	plastic thin small outline package; 14 leads; body width 4.4 mm	SOT402-1

## 5. Functional diagram



## 6. Pinning information

### 6.1 Pinning



## 6.2 Pin description

Table 3: Pin description

Symbol	Pin	Description
1OE	1	1 output enable input
1A	2	1 data input
1Y	3	1 data output
2OE	4	2 output enable input
2A	5	2 data input
2Y	6	2 data output
GND	7	ground (0 V)
3Y	8	3 data output
3A	9	3 data input
3OE	10	3 output enable input
4Y	11	4 data output
4A	12	4 data input
4OE	13	4 output enable input
V <sub>CC</sub>	14	supply voltage

## 7. Functional description

### 7.1 Function table

Table 4: Function table [\[1\]](#)

Input		Output
nOE	nA	nY
H	L	L
H	H	H
L	X	Z

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

## 8. Limiting values

**Table 5: Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+7.0	V
$V_I$	input voltage		[1] -1.2	+7.0	V
$V_O$	output voltage	output in OFF-state or HIGH-state	[1] -0.5	+5.5	V
$I_{IK}$	input diode current	$V_I < 0$ V	-	-18	mA
$I_{OK}$	output diode current	$V_O < 0$ V	-	-50	mA
$I_O$	output current	output in LOW-state	-	128	mA
$T_j$	junction temperature		[2] -	150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[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.

## 9. Recommended operating conditions

**Table 6: Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC}$	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
$\Delta t/\Delta V$	input transition rise or fall rate		0	-	10	ns/V
$T_{amb}$	ambient temperature	in free air	-40	-	+85	°C

## 10. Static characteristics

**Table 7: Static characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
<b>T<sub>amb</sub> = 25 °C</b>								
V <sub>IK</sub>	input clamp voltage	V <sub>CC</sub> = 4.5 V; I <sub>IK</sub> = -18 mA	-	-0.9	-1.2	V		
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>						
		I <sub>OH</sub> = -3 mA	2.5	2.9	-	V		
		I <sub>OH</sub> = -32 mA	2.0	2.4	-	V		
		V <sub>CC</sub> = 5.0 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>						
		I <sub>OH</sub> = -3 mA	3.0	3.4	-	V		
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>						
		I <sub>OL</sub> = 64mA	-	0.35	0.55	V		
I <sub>LI</sub>	input leakage current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or 5.5 V	-	±0.01	±1.0	µA		
I <sub>OFF</sub>	power-off leakage current	V <sub>CC</sub> = 0 V; V <sub>O</sub> or V <sub>I</sub> ≤ 4.5 V	-	±5.0	±100	µA		
I <sub>PU</sub> , I <sub>PD</sub>	power-up or power-down down 3-state output current	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	[1]	-	±5.0	±50	µA	
I <sub>OZ</sub>	3-state output current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>						
		output HIGH-state at V <sub>O</sub> = 2.7 V	-	1.0	50	µA		
		output LOW-state at V <sub>O</sub> = 0.5 V	-	-1.0	-50	µA		
I <sub>CEx</sub>	output HIGH-state 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	µA		
I <sub>O</sub>	output current	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 2.5 V	[2]	-50	-100	-180	mA	
I <sub>CC</sub>	quiescent supply current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>						
		outputs HIGH-state	-	65	250	µA		
		outputs LOW-state	-	12	15	mA		
		outputs 3-state	-	65	250	µA		
ΔI <sub>CC</sub>	additional supply current	per data input pin	one data input at 3.4 V and other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	[3]				
					-	0.5	1.5	mA
					-	50	250	µA
		per enable input pin	one enable input at 3.4 V and other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	[3]				
					-	0.5	1.5	mA
		outputs 3-state	-	0.5	1.5	mA		
C <sub>I</sub>	input capacitance	V <sub>I</sub> = 0 V or V <sub>CC</sub>	-	4	-	pF		
C <sub>O</sub>	output capacitance	outputs disabled; V <sub>O</sub> = 0 V or V <sub>CC</sub>	-	7	-	pF		
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>								
V <sub>IK</sub>	input clamp voltage	V <sub>CC</sub> = 4.5 V; I <sub>IK</sub> = -18 mA	-	-	-1.2	V		

**Table 7: Static characteristics ...continued**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>				
		I <sub>OH</sub> = -3 mA	2.5	-	-	V
		I <sub>OH</sub> = -32 mA	2.0	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 5.0 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>				
		I <sub>OH</sub> = -3 mA	3.0	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>				
		I <sub>OL</sub> = 64 mA	-	-	0.55	V
I <sub>LI</sub>	input leakage current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or 5.5 V	-	-	±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	-	-	±100	µA
I <sub>PU</sub> , I <sub>PD</sub>	power-up or power-down down 3-state output current	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>nOE</sub> = don't care	[1]	-	-	±50 µA
I <sub>OZ</sub>	3-state output current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>				
		output HIGH-state at V <sub>O</sub> = 2.7 V	-	-	50	µA
		output LOW-state at V <sub>O</sub> = 0.5 V	-	-	-50	µA
I <sub>CEX</sub>	output HIGH-state 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>	-	-	50	µA
I <sub>O</sub>	output current	V <sub>CC</sub> = 5.5 V; V <sub>O</sub> = 2.5 V	[2]	-50	-	-180 mA
I <sub>CC</sub>	quiescent supply current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>				
		outputs HIGH-state	-	-	250	µA
		outputs LOW-state	-	-	15	mA
ΔI <sub>CC</sub>	additional supply current	outputs 3-state	-	-	250	µA
		per data input pin	[3]			
		one data input at 3.4 V and other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V				
per enable input pin	one enable input at 3.4 V and other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	outputs enabled	-	-	1.5	mA
		outputs 3-state	-	-	250	µA
		outputs 3-state	-	-	1.5	mA

[1] 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 ms. From V<sub>CC</sub> = 2.1 V to V<sub>CC</sub> = 5 V ± 10 % a transition time of up to 100 µs is permitted.

[2] Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

[3] This is the increase in supply current for each input at 3.4 V.

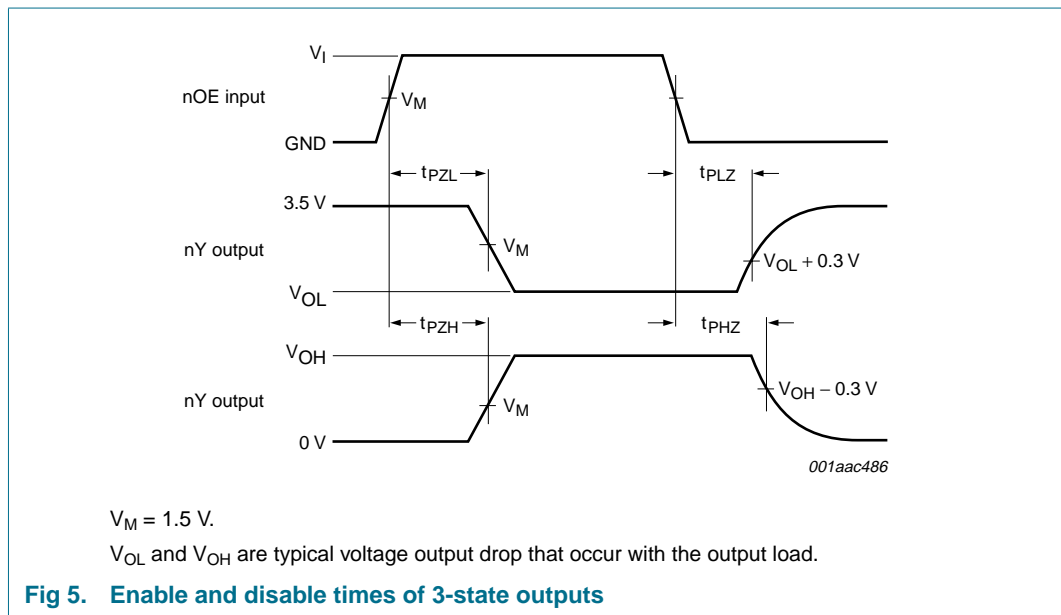
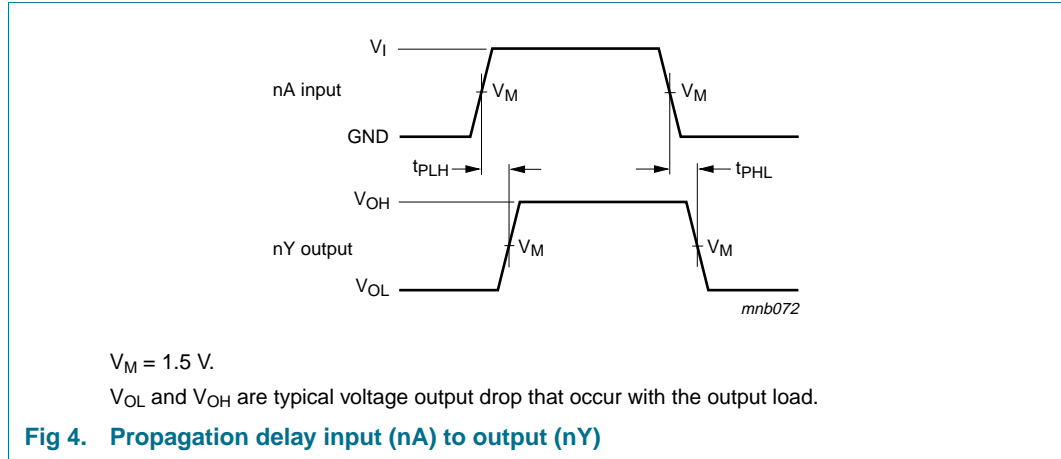
## 11. Dynamic characteristics

**Table 8: Dynamic characteristics**

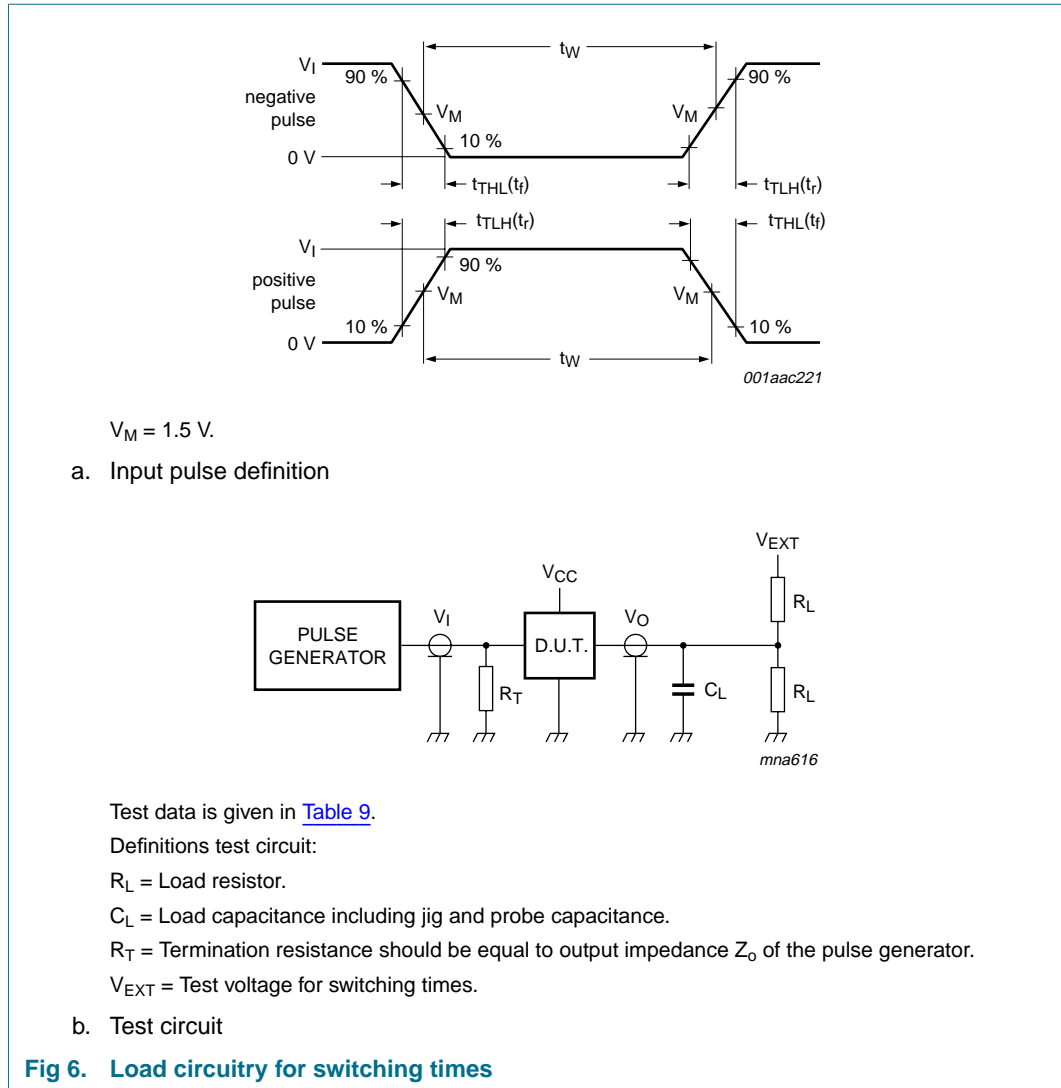
Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25\text{ °C}; V_{CC} = 5.0\text{ V}</math></b>						
$t_{PLH}$	propagation delay nA to nY	see <a href="#">Figure 4</a>	1.0	2.9	4.2	ns
$t_{PHL}$	propagation delay nA to nY	see <a href="#">Figure 4</a>	1.0	3.0	4.3	ns
$t_{PZH}$	output enable time to HIGH-level	see <a href="#">Figure 5</a>	1.5	3.2	5.8	ns
$t_{PZL}$	output enable time to LOW-level	see <a href="#">Figure 5</a>	1.9	4.4	5.9	ns
$t_{PHZ}$	output disable time from HIGH-level	see <a href="#">Figure 5</a>	1.0	4.2	5.2	ns
$t_{PLZ}$	output disable time from LOW-level	see <a href="#">Figure 5</a>	1.0	2.9	4.9	ns
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}; V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}</math></b>						
$t_{PLH}$	propagation delay nA to nY	see <a href="#">Figure 4</a>	1.0	-	4.4	ns
$t_{PHL}$	propagation delay nA to nY	see <a href="#">Figure 4</a>	1.0	-	4.6	ns
$t_{PZH}$	output enable time to HIGH-level	see <a href="#">Figure 5</a>	1.5	-	6.5	ns
$t_{PZL}$	output enable time to LOW-level	see <a href="#">Figure 5</a>	1.9	-	6.5	ns
$t_{PHZ}$	output disable time from HIGH-level	see <a href="#">Figure 5</a>	1.0	-	5.8	ns
$t_{PLZ}$	output disable time from LOW-level	see <a href="#">Figure 5</a>	1.0	-	5.5	ns

12. Waveforms







**Table 9: Test data**

Input				Load		$V_{EXT}$			
$V_I$	$f_i$	$t_W$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHZ}, t_{PZH}$	$t_{PLZ}, t_{PZL}$	$t_{PLH}, t_{PHL}$	
3.0 V	$\leq 1 \text{ MHz}$	500 ns	$\leq 2.5 \text{ ns}$	50 pF	500 $\Omega$	open	7.0 V	open	

13. Package outline

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

SOT108-1

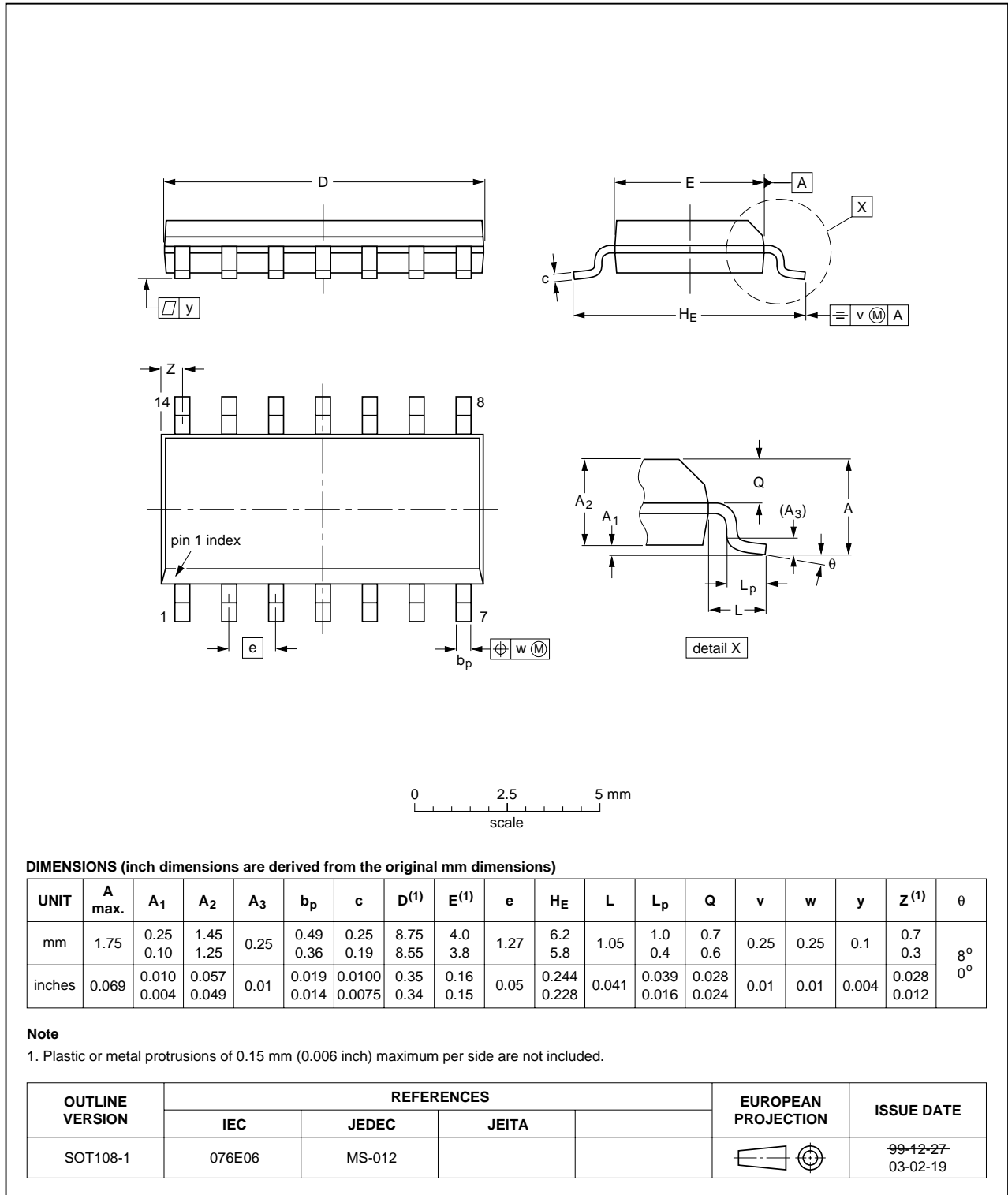


Fig 7. Package outline SOT108-1 (SO14)

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

SOT337-1

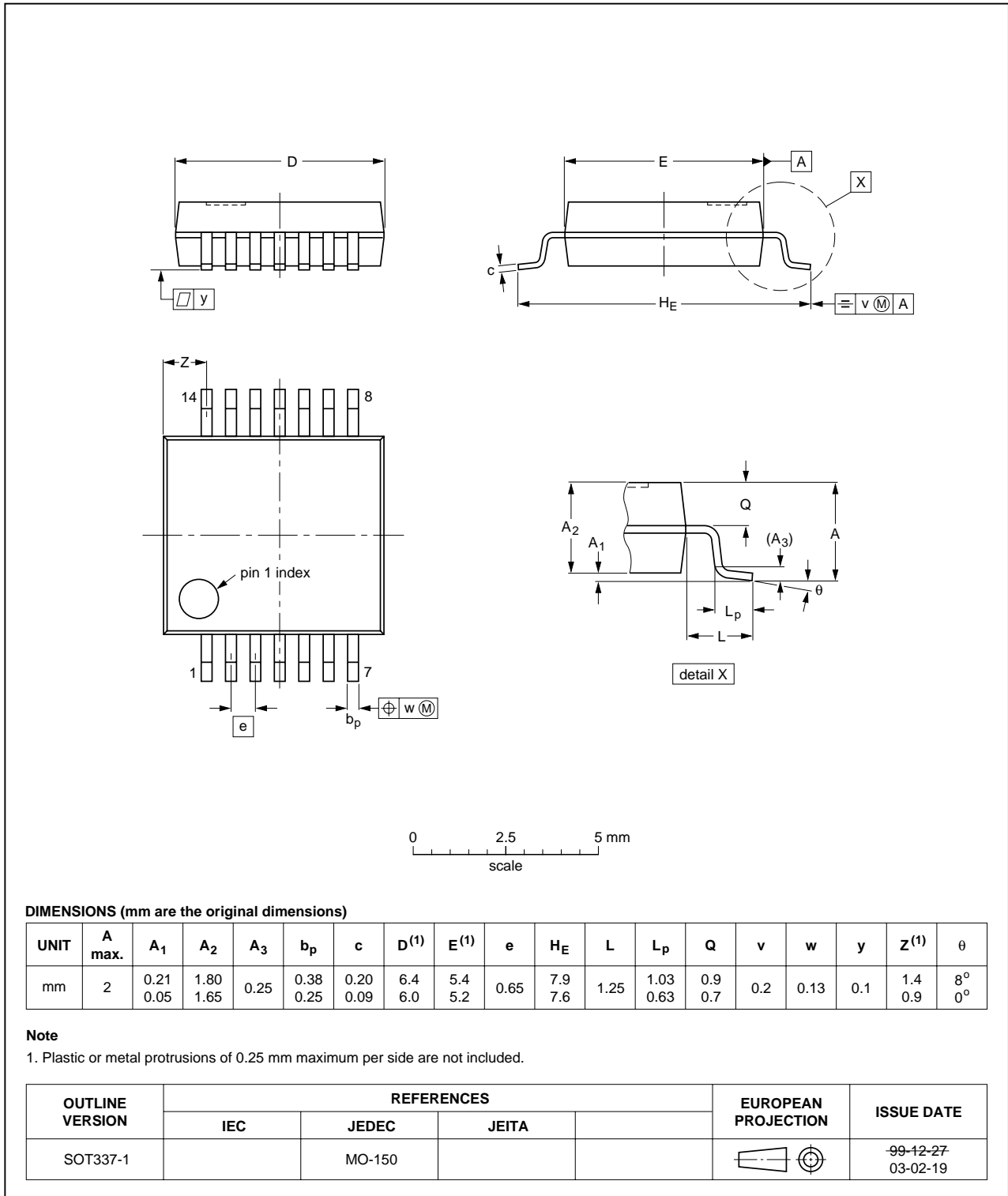


Fig 8. Package outline SOT337-1 (SSOP14)

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

SOT402-1

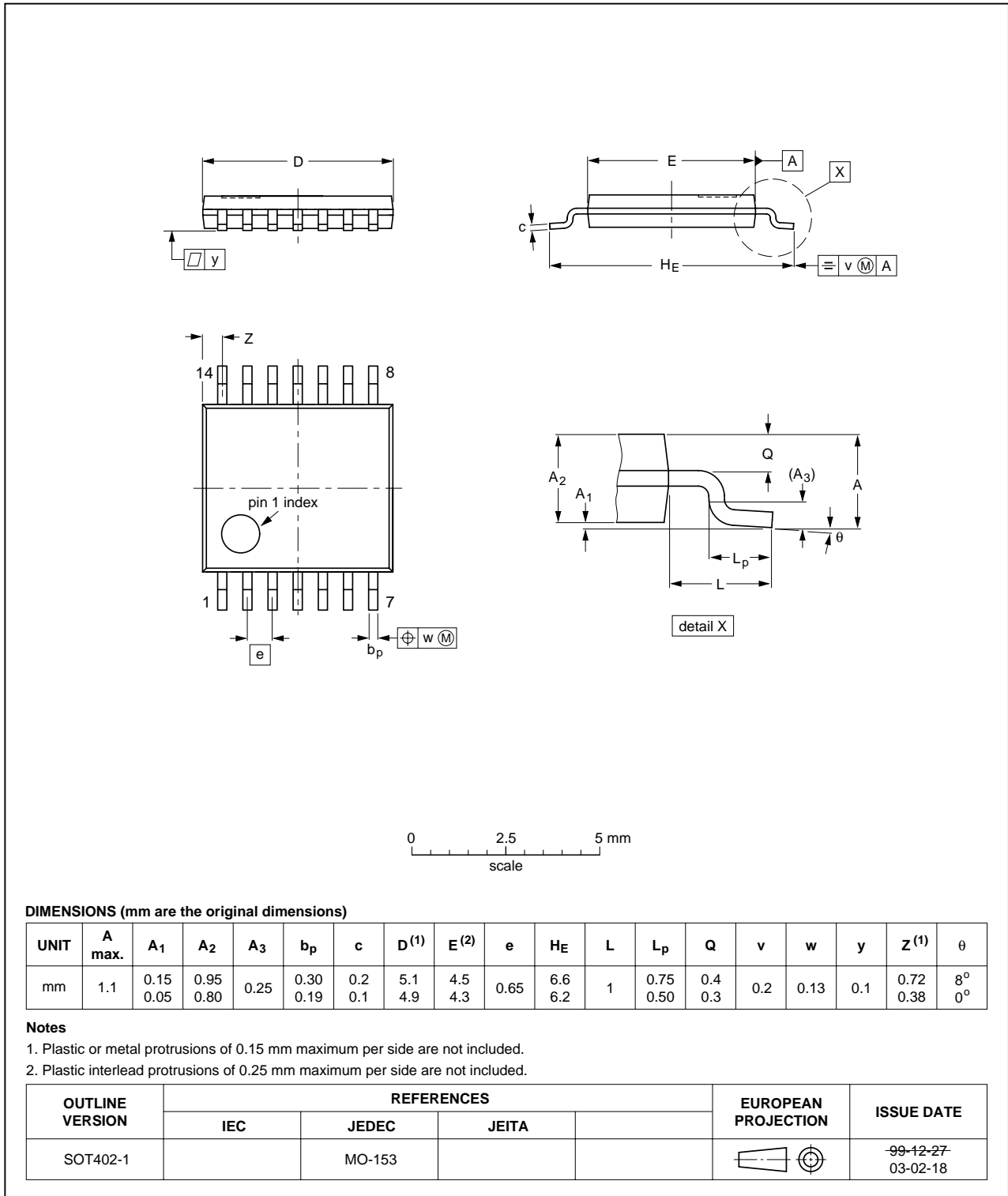


Fig 9. Package outline SOT402-1 (TSSOP14)

## 14. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74ABT126_4	20050217	Product data sheet	-	9397 750 14597	74ABT126_3
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.</li> <li><a href="#">Section 2 "Features"</a>: modified 'JEDEC Std 17' into 'JESD78'.</li> <li><a href="#">Table 8 "Dynamic characteristics"</a>: changed min value of <math>t_{PZH}</math> from 1.9 ns into 1.5 ns for both conditions <math>V_{CC} = 5.0 \text{ V}</math> at <math>T_{amb} = 25 \text{ }^\circ\text{C}</math> and <math>V_{CC} = 5.0 \text{ V} \pm 0.5 \text{ V}</math> at <math>T_{amb} = -40 \text{ }^\circ\text{C}</math> to <math>+85 \text{ }^\circ\text{C}</math>.</li> </ul>				
74ABT126_3	20021213	Product specification	-	9397 750 10856	74ABT126_2
74ABT126_2	19980116	Product specification	-	9397 750 03462	74ABT126_1
74ABT126_1	-	-	-	-	-

## 15. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	Definition
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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

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

## 16. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**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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