

# DATA SHEET

## **74ABT126** Quad buffer (3-State)

Product specification  
Supersedes data of 1996 Feb 26  
IC23 Data Handbook

1998 Jan 16

# Quad buffer (3-State)

# 74ABT126

## FEATURES

- Quad bus interface
- 3-State buffers
- Live insertion/extraction permitted
- Output capability: +64mA/-32mA
- Latch-up protection exceeds 500mA per JEDEC Std 17
- ESD protection exceeds 2000V per MIL STD 883 Method 3015 and 200V 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<br>$T_{amb} = 25^{\circ}\text{C}; \text{GND} = 0\text{V}$ | TYPICAL | UNIT          |
|------------------------|-------------------------------|--|---------|---------------|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation delay<br>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      | $\mu\text{A}$ |

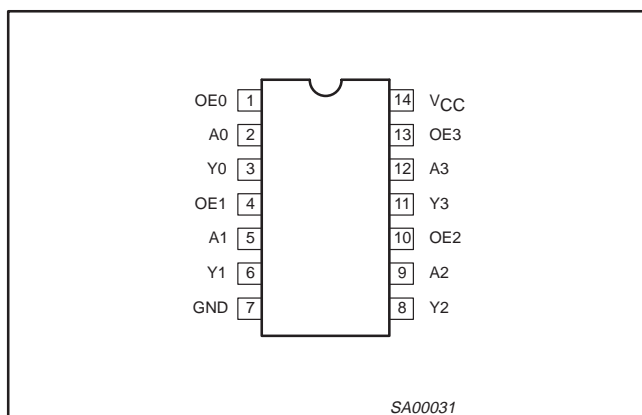
## ORDERING INFORMATION

| PACKAGES                    | TEMPERATURE RANGE | OUTSIDE NORTH AMERICA | NORTH AMERICA | DWG NUMBER |
|-----------------------------|-------------------|-----------------------|---------------|------------|
| 14-Pin Plastic DIP          | -40°C to +85°C    | 74ABT126 N            | 74ABT126 N    | SOT27-1    |
| 14-Pin plastic SO           | -40°C to +85°C    | 74ABT126 D            | 74ABT126 D    | SOT108-1   |
| 14-Pin Plastic SSOP Type II | -40°C to +85°C    | 74ABT126 DB           | 74ABT126 DB   | SOT337-1   |
| 14-Pin Plastic TSSOP Type I | -40°C to +85°C    | 74ABT126 PW           | 74ABT126PW DH | SOT402-1   |

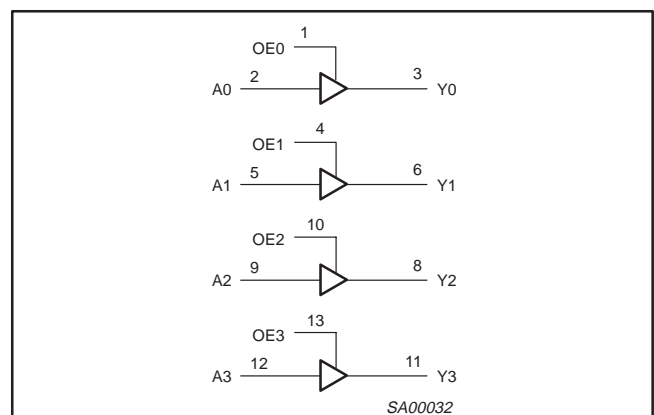
## PIN DESCRIPTION

| 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 (0V)             |
| 14           | $V_{CC}$  | Positive supply voltage |

## PIN CONFIGURATION



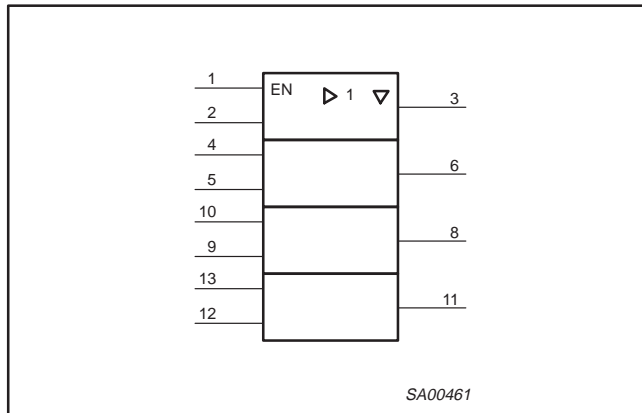
## LOGIC SYMBOL



# 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          | -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          | -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   |

## Quad buffer (3-State)

74ABT126

## 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> = 4.5V; I <sub>IK</sub> = -18mA   |                          | -0.9  | -1.2 |                                   | -1.2 | V    |
| V <sub>OH</sub>                  | High-level output voltage                            | V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                 | 2.5                      | 2.9   |      | 2.5                               |      | V    |
|                                  |  | V <sub>CC</sub> = 5.0V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                 | 3.0                      | 3.4   |      | 3.0                               |      | V    |
|                                  |  | V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -32mA; 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> = 4.5V; I <sub>OL</sub> = 64mA; 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> = 5.5V; V <sub>I</sub> = GND or 5.5V  |                          | ±0.01 | ±1.0 |                                   | ±1.0 | µA   |
| I <sub>OFF</sub>                 | Power-off leakage current                            | V <sub>CC</sub> = 0.0V; V <sub>O</sub> or V <sub>I</sub> ≤ 4.5V   |                          | ±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> = 2.1V; V <sub>O</sub> = 0.5V; 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> = 5.5V; V <sub>O</sub> = 2.7V; 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> = 5.5V; V <sub>O</sub> = 0.5V; 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> = 5.5V; V <sub>O</sub> = 5.5V; 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> = 5.5V; V <sub>O</sub> = 2.5V   | -50                      | -100  | -180 | -50                               | -180 | mA   |
| I <sub>CCH</sub>                 | Quiescent supply current                             | V <sub>CC</sub> = 5.5V; Outputs High, V <sub>I</sub> = GND or V <sub>CC</sub>                                       |                          | 65    | 250  |                                   | 250  | µA   |
| I <sub>CCL</sub>                 |  | V <sub>CC</sub> = 5.5V; Outputs Low, V <sub>I</sub> = GND or V <sub>CC</sub>  |                          | 12    | 15   |                                   | 15   | mA   |
| I <sub>CCZ</sub>                 |  | V <sub>CC</sub> = 5.5V; 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 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V             |                          | 0.5   | 1.5  |                                   | 1.5  | mA   |
|                                  |  | Outputs 3-State, one data input at 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V             |                          | 50    | 250  |                                   | 250  | µA   |
|                                  |  | Outputs 3-State, one enable input at 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V           |                          | 0.5   | 1.5  |                                   | 1.5  | 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 parameter is valid for any V<sub>CC</sub> between 0V and 2.1V, with a transition time of up to 10msec. From V<sub>CC</sub> = 2.1V to V<sub>CC</sub> = 5V ± 10%, a transition time of up to 100µsec is permitted.

## AC CHARACTERISTICS

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

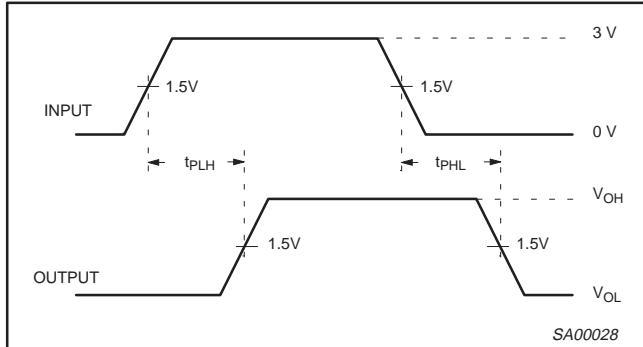
| SYMBOL                               | PARAMETER   | WAVEFORM | LIMITS  |            |            |  |            | UNIT |
|--------------------------------------|---|----------|---|------------|------------|--|------------|------|
|                                      |   |          | T <sub>amb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

# Quad buffer (3-State)

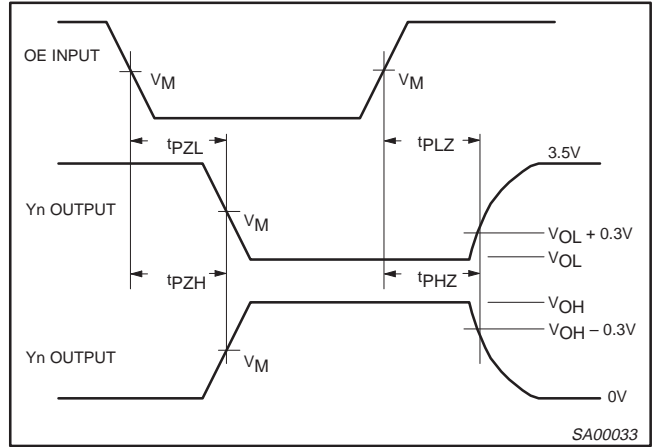
74ABT126

## AC WAVEFORMS

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

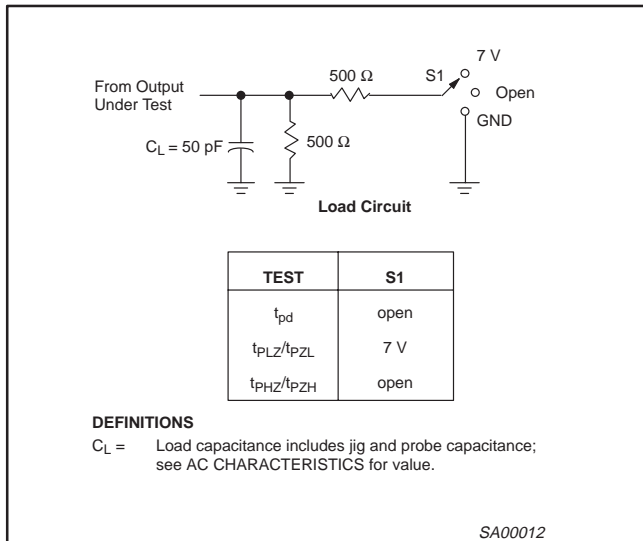


**Waveform 1. Waveforms Showing the Input (An) to Output (Yn) Propagation Delays**



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

## TEST CIRCUIT AND WAVEFORMS

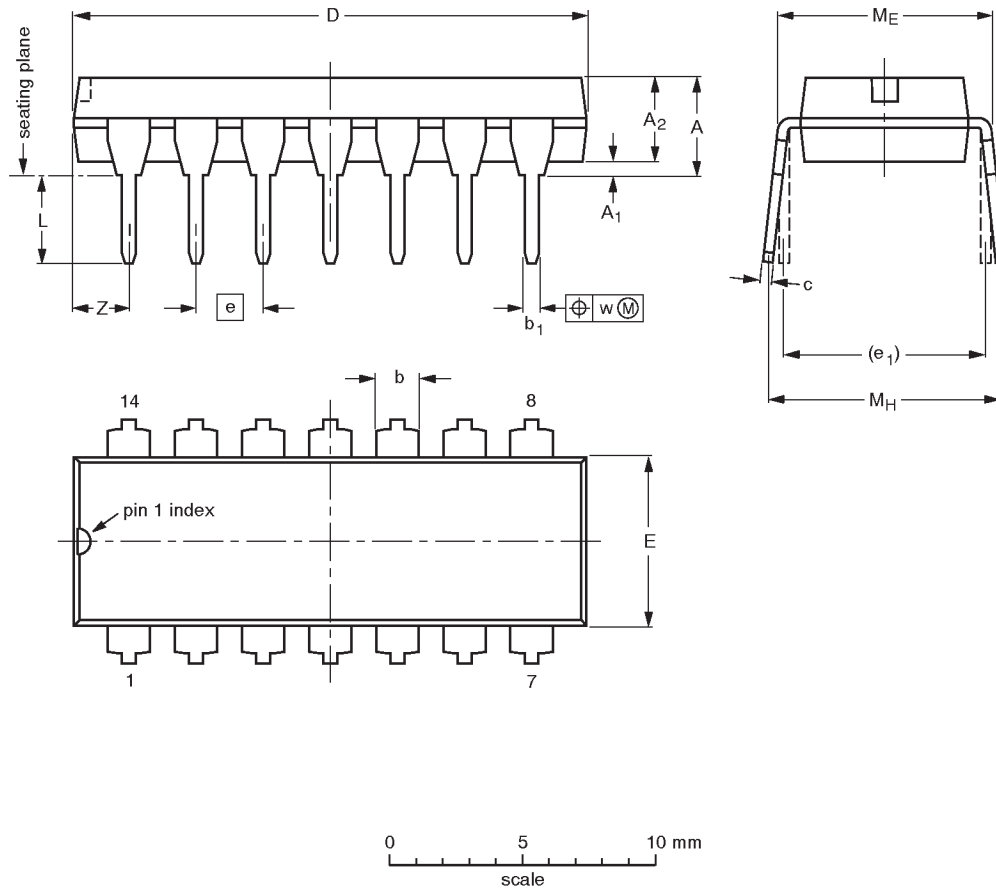


# Quad buffer (3-State)

# 74ABT126

DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1



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

| UNIT   | A max. | A <sub>1</sub> min. | A <sub>2</sub> max. | b              | b <sub>1</sub> | c              | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | e <sub>1</sub> | L            | M <sub>E</sub> | M <sub>H</sub> | w     | Z <sup>(1)</sup> max. |
|--------|--------|---------------------|---------------------|----------------|----------------|----------------|------------------|------------------|------|----------------|--------------|----------------|----------------|-------|-----------------------|
| mm     | 4.2    | 0.51                | 3.2                 | 1.73<br>1.13   | 0.53<br>0.38   | 0.36<br>0.23   | 19.50<br>18.55   | 6.48<br>6.20     | 2.54 | 7.62           | 3.60<br>3.05 | 8.25<br>7.80   | 10.0<br>8.3    | 0.254 | 2.2                   |
| inches | 0.17   | 0.020               | 0.13                | 0.068<br>0.044 | 0.021<br>0.015 | 0.014<br>0.009 | 0.77<br>0.73     | 0.26<br>0.24     | 0.10 | 0.30           | 0.14<br>0.12 | 0.32<br>0.31   | 0.39<br>0.33   | 0.01  | 0.087                 |

**Note**

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

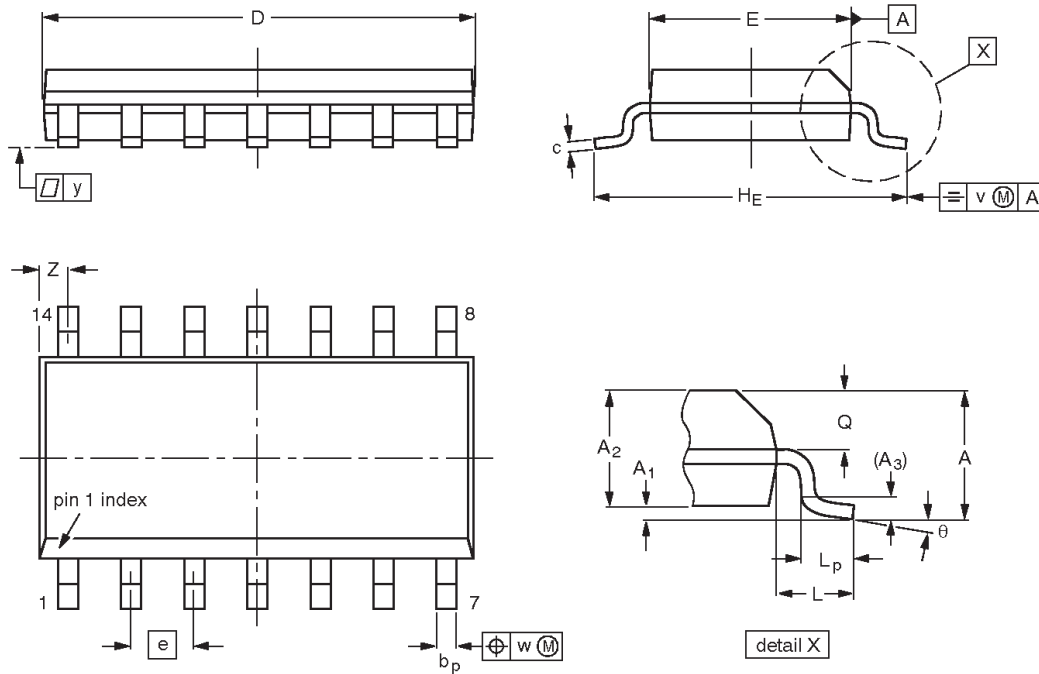
| OUTLINE VERSION | REFERENCES |          |      |  | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|----------|------|--|---------------------|----------------------|
|                 | IEC        | JEDEC    | EIAJ |  |                     |                      |
| SOT27-1         | 050G04     | MO-001AA |      |  |                     | 92-11-17<br>95-03-11 |

# 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<br>0.10   | 1.45<br>1.25   | 0.25           | 0.49<br>0.36   | 0.25<br>0.19     | 8.75<br>8.55     | 4.0<br>3.8       | 1.27  | 6.2<br>5.8     | 1.05  | 1.0<br>0.4     | 0.7<br>0.6     | 0.25 | 0.25 | 0.1   | 0.7<br>0.3       | 8°<br>0° |
| inches | 0.069  | 0.010<br>0.004 | 0.057<br>0.049 | 0.01           | 0.019<br>0.014 | 0.0100<br>0.0075 | 0.35<br>0.34     | 0.16<br>0.15     | 0.050 | 0.244<br>0.228 | 0.041 | 0.039<br>0.016 | 0.028<br>0.024 | 0.01 | 0.01 | 0.004 | 0.028<br>0.012   |          |

**Note**

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

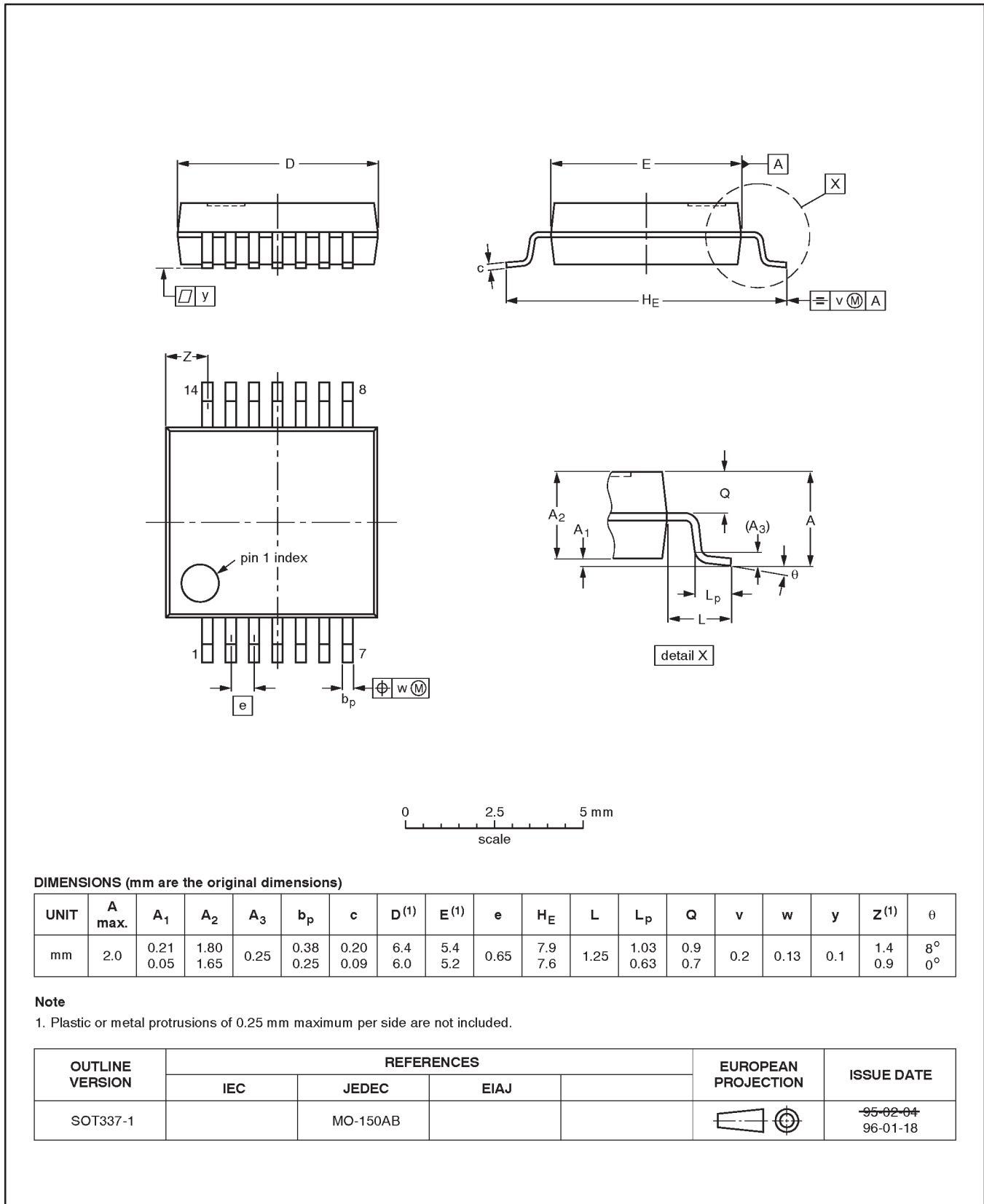
| OUTLINE VERSION | REFERENCES |          |      |  | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|----------|------|--|---------------------|----------------------|
|                 | IEC        | JEDEC    | EIAJ |  |                     |                      |
| SOT108-1        | 076E06S    | MS-012AB |      |  |                     | 95-01-23<br>97-05-22 |

# Quad buffer (3-State)

# 74ABT126

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

**SOT337-1**

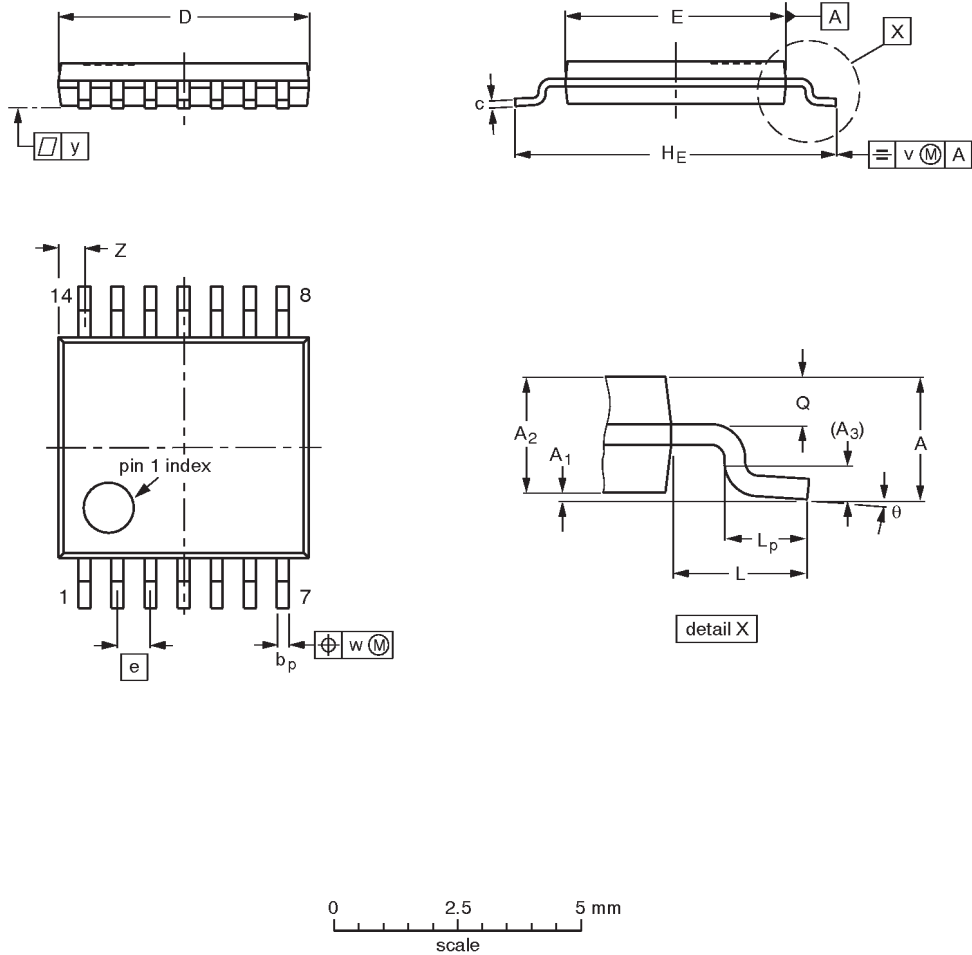


# Quad buffer (3-State)

# 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<br>0.05   | 0.95<br>0.80   | 0.25           | 0.30<br>0.19   | 0.2<br>0.1 | 5.1<br>4.9       | 4.5<br>4.3       | 0.65 | 6.6<br>6.2     | 1.0 | 0.75<br>0.50   | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.72<br>0.38     | 8°<br>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 |      |  |                     | 94-07-12<br>95-04-04 |

## Quad buffer (3-State)

74ABT126

## DEFINITIONS

| Data Sheet Identification        | Product Status                | Definition   |
|----------------------------------|-------------------------------|--|
| <i>Objective Specification</i>   | <b>Formative or in Design</b> | This data sheet contains the design target or goal specifications for product development. Specifications may change in any manner without notice.   |
| <i>Preliminary Specification</i> | <b>Preproduction Product</b>  | This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |
| <i>Product Specification</i>     | <b>Full Production</b>        | This data sheet contains Final Specifications. Philips Semiconductors reserves the right to make changes at any time without notice, in order to improve design and supply the best possible product.  |

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