

DATA SHEET

74ABT827

10-bit buffer/line driver, non-inverting
(3-State)

Product specification
Supersedes data of 1995 Sep 06
IC23 Data Handbook

1998 Jan 16

10-bit buffer/line driver, non-inverting (3-State)

74ABT827

FEATURES

- Ideal where high speed, light loading, or increased fan-in are required
- Flow through pinout architecture for microprocessor oriented applications
- Output capability: +64mA/-32mA
- Slim 300 mil-wide plastic 24-pin package
- Latch-up protection exceeds 500mA 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 74ABT827 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT827 10-bit buffers provide high performance bus interface buffering for wide data/address paths or buses carrying parity. They have NOR Output Enables ($\overline{OE}0$, $\overline{OE}1$) for maximum control flexibility.

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 An to Yn | $C_L = 50\text{pF}; V_{CC} = 5\text{V}$ | 3.0 | 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; $V_{CC} = 5.5\text{V}$ | 500 | nA |

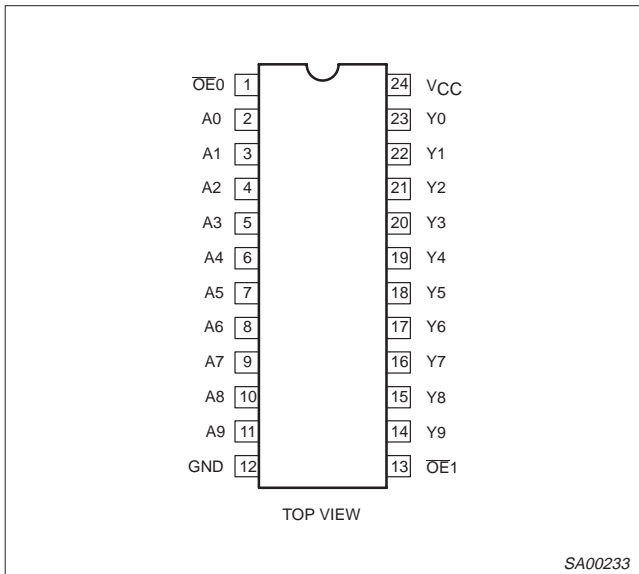
ORDERING INFORMATION

| PACKAGES | TEMPERATURE RANGE | OUTSIDE NORTH AMERICA | NORTH AMERICA | DWG NUMBER |
|-----------------------------|-------------------|-----------------------|---------------|------------|
| 24-Pin Plastic DIP | -40°C to +85°C | 74ABT827 N | 74ABT827 N | SOT222-1 |
| 24-Pin plastic SO | -40°C to +85°C | 74ABT827 D | 74ABT827 D | SOT137-1 |
| 24-Pin Plastic SSOP Type II | -40°C to +85°C | 74ABT827 DB | 74ABT827 DB | SOT340-1 |
| 24-Pin Plastic TSSOP Type I | -40°C to +85°C | 74ABT827 PW | 74ABT827PW DH | SOT355-1 |

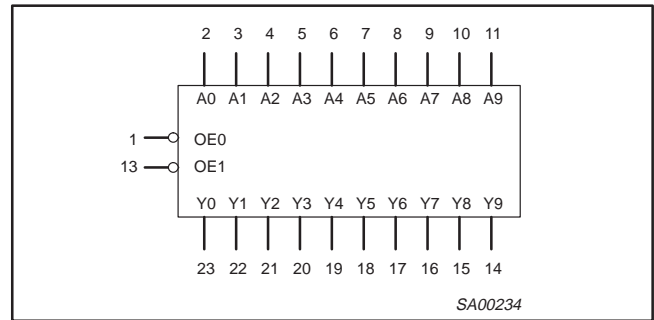
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PIN CONFIGURATION



LOGIC SYMBOL



FUNCTION TABLE

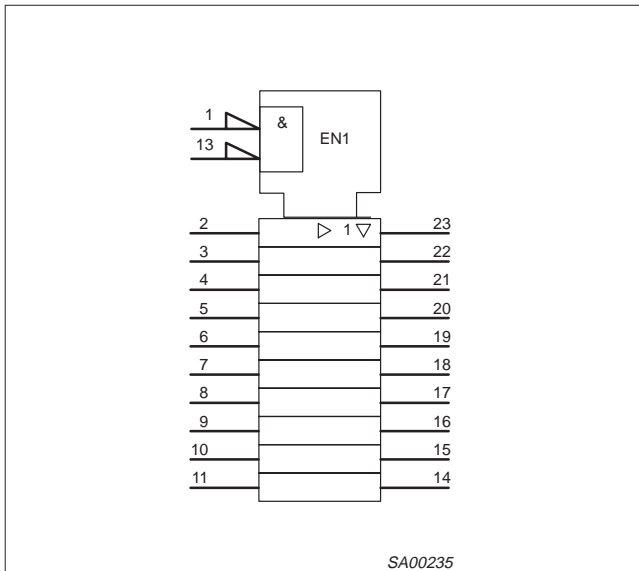
| INPUTS | | OUTPUTS | OPERATING MODE |
|-----------------|----------------|----------------|----------------|
| OE _n | A _n | Y _n | |
| L | L | L | Transparent |
| L | H | H | Transparent |
| H | X | Z | High impedance |

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

PIN DESCRIPTION

| PIN NUMBER | SYMBOL | FUNCTION |
|--|-----------------------------------|----------------------------------|
| 1, 13 | OE ₀ , OE ₁ | Output enable input (active-Low) |
| 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 | A ₀ -A ₉ | Data inputs |
| 23, 22, 21, 20, 19, 18, 17, 16, 15, 14 | Y ₀ -Y ₉ | Data outputs |
| 10 | GND | Ground (0V) |
| 20 | V _{CC} | Positive supply voltage |

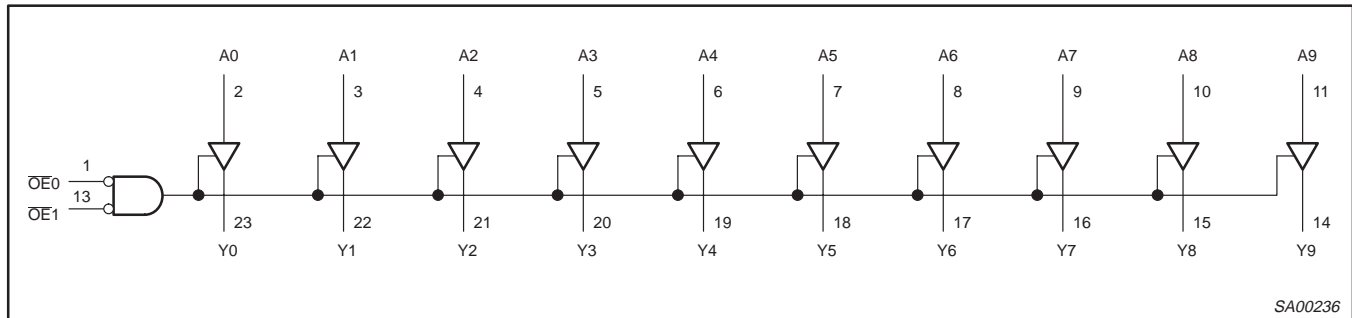
LOGIC SYMBOL (IEEE/IEC)



10-bit buffer/line driver, non-inverting (3-State)

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LOGIC DIAGRAM



SA00236

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 | | 64 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | 0 | 5 | ns/V |
| T_{amb} | Operating free-air temperature range | -40 | +85 | °C |

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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 | V _{CC} = 4.5V; I _{OH} = -3mA; V _I = V _{IL} or V _{IH} | 2.5 | 2.9 | | 2.5 | | V |
| | | V _{CC} = 5.0V; 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} = 64mA; V _I = V _{IL} or V _{IH} | | 0.42 | 0.55 | | 0.55 | 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} /I _{PD} | Power-up/down 3-State output current ³ | V _{CC} = 2.0V; V _O = 0.5V; V _I = GND or V _{CC} ; V _{OE} = V _{CC} | | ±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} | | 5.0 | 50 | | 50 | μA |
| I _{OZL} | 3-State output Low current | V _{CC} = 5.5V; V _O = 0.5V; V _I = V _{IL} or V _{IH} | | -5.0 | -50 | | -50 | 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 | -80 | -180 | -50 | -180 | mA |
| I _{CCH} | Quiescent supply current | V _{CC} = 5.5V; Outputs High, V _I = GND or V _{CC} | | 0.5 | 250 | | 250 | μA |
| I _{CCL} | | V _{CC} = 5.5V; Outputs Low, V _I = GND or V _{CC} | | 25 | 38 | | 38 | mA |
| I _{CCZ} | | V _{CC} = 5.5V; Outputs 3-State; V _I = GND or V _{CC} | | 0.5 | 250 | | 250 | μA |
| ΔI _{CC} | Additional supply current per input pin ² | Outputs enabled, one input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 5.5V | | 0.5 | 1.5 | | 1.5 | mA |
| | | Outputs 3-State, one data input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 5.5V | | 0.01 | 50 | | 50 | mA |
| | | Outputs 3-State, one enable input at 3.4V, other inputs at V _{CC} or GND; V _{CC} = 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_{CC} between 0V and 2.1V with a transition time of up to 10msec. For V_{CC} = 2.1V to V_{CC} = 5V ± 10%, a transition time of up to 100μsec is permitted.

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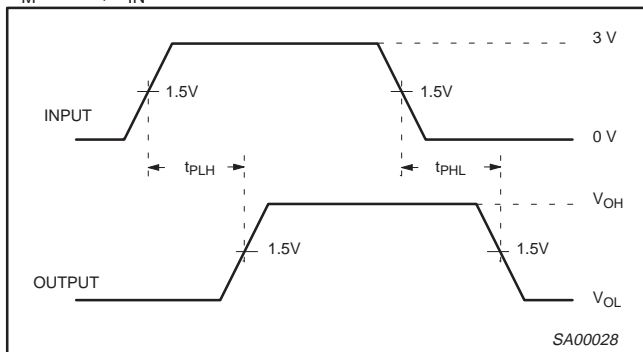
AC CHARACTERISTICS

GND = 0V, $t_R = t_F = 2.5\text{ns}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$

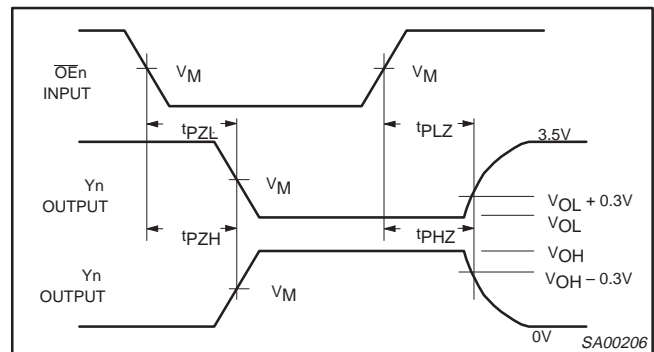
| SYMBOL | PARAMETER | WAVEFORM | LIMITS | | | | | UNIT |
|--------------------------------------|--|----------|--|------------|------------|--|------------|------|
| | | | $T_{\text{amb}} = +25^\circ\text{C}$ $V_{\text{CC}} = +5.0\text{V}$ | | | $T_{\text{amb}} = -40 \text{ to } +85^\circ\text{C}$ $V_{\text{CC}} = +5.0\text{V} \pm 0.5\text{V}$ | | |
| | | | Min | Typ | Max | Min | Max | |
| t_{PLH} t_{PHL} | Propagation delay An to Yn | 1 | 1.1 1.1 | 3.0 2.9 | 4.4 4.1 | 1.1 1.1 | 4.8 4.7 | ns |
| t_{PZH} t_{PZL} | Output enable time to High and Low level | 2 | 1.6 2.6 | 3.7 4.6 | 5.1 5.9 | 1.6 2.6 | 5.9 6.9 | ns |
| t_{PHZ} t_{PLZ} | Output disable time from High and Low level | 2 | 2.0 2.5 | 4.8 5.1 | 6.3 6.6 | 2.0 2.5 | 6.8 6.9 | ns |

AC WAVEFORMS

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



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 WAVEFORM

Load Circuit

| TEST | S1 |
|---------------------------------|------|
| t_{pd} | open |
| $t_{\text{PLZ}}/t_{\text{PZL}}$ | 7 V |
| $t_{\text{PHZ}}/t_{\text{PZH}}$ | open |

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

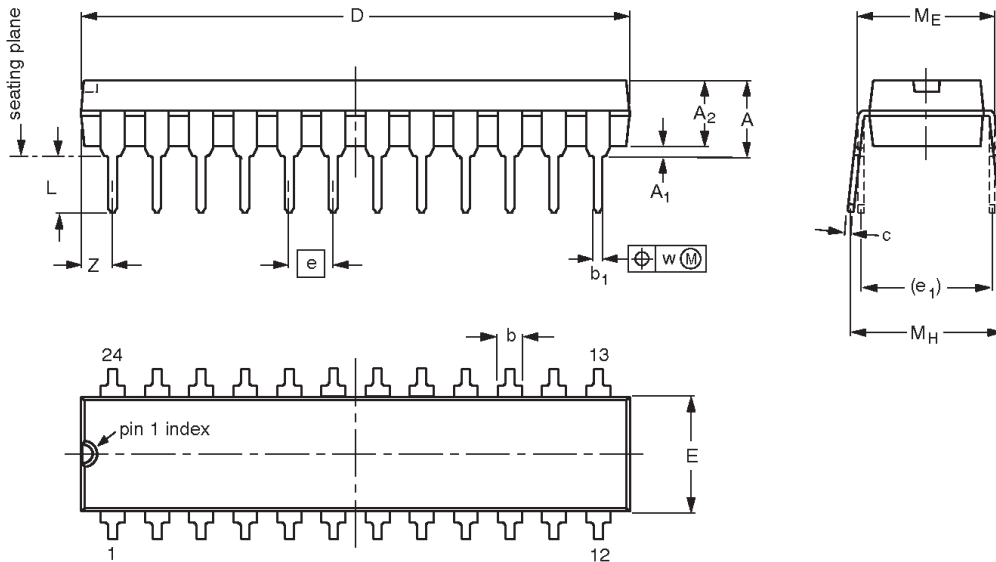
SA00012

10-bit buffer/line driver, non-inverting (3-State)

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DIP24: plastic dual in-line package; 24 leads (300 mil)

SOT222-1



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

| UNIT | A max. | A ₁ min. | A ₂ max. | b | b ₁ | c | D ⁽¹⁾ | E ⁽¹⁾ | e | e ₁ | L | M _E | M _H | w | Z ⁽¹⁾ max. |
|--------|--------|---------------------|---------------------|----------------|----------------|----------------|------------------|------------------|-------|----------------|----------------|----------------|----------------|------|-----------------------|
| mm | 4.70 | 0.38 | 3.94 | 1.63 1.14 | 0.56 0.43 | 0.36 0.25 | 31.9 31.5 | 6.73 6.48 | 2.54 | 7.62 | 3.51 3.05 | 8.13 7.62 | 10.03 7.62 | 0.25 | 2.05 |
| inches | 0.185 | 0.015 | 0.155 | 0.064 0.045 | 0.022 0.017 | 0.014 0.010 | 1.256 1.240 | 0.265 0.255 | 0.100 | 0.300 | 0.138 0.120 | 0.32 0.30 | 0.395 0.300 | 0.01 | 0.081 |

Note

1. Plastic or metal protrusions of 0.01 inches maximum per side are not included.

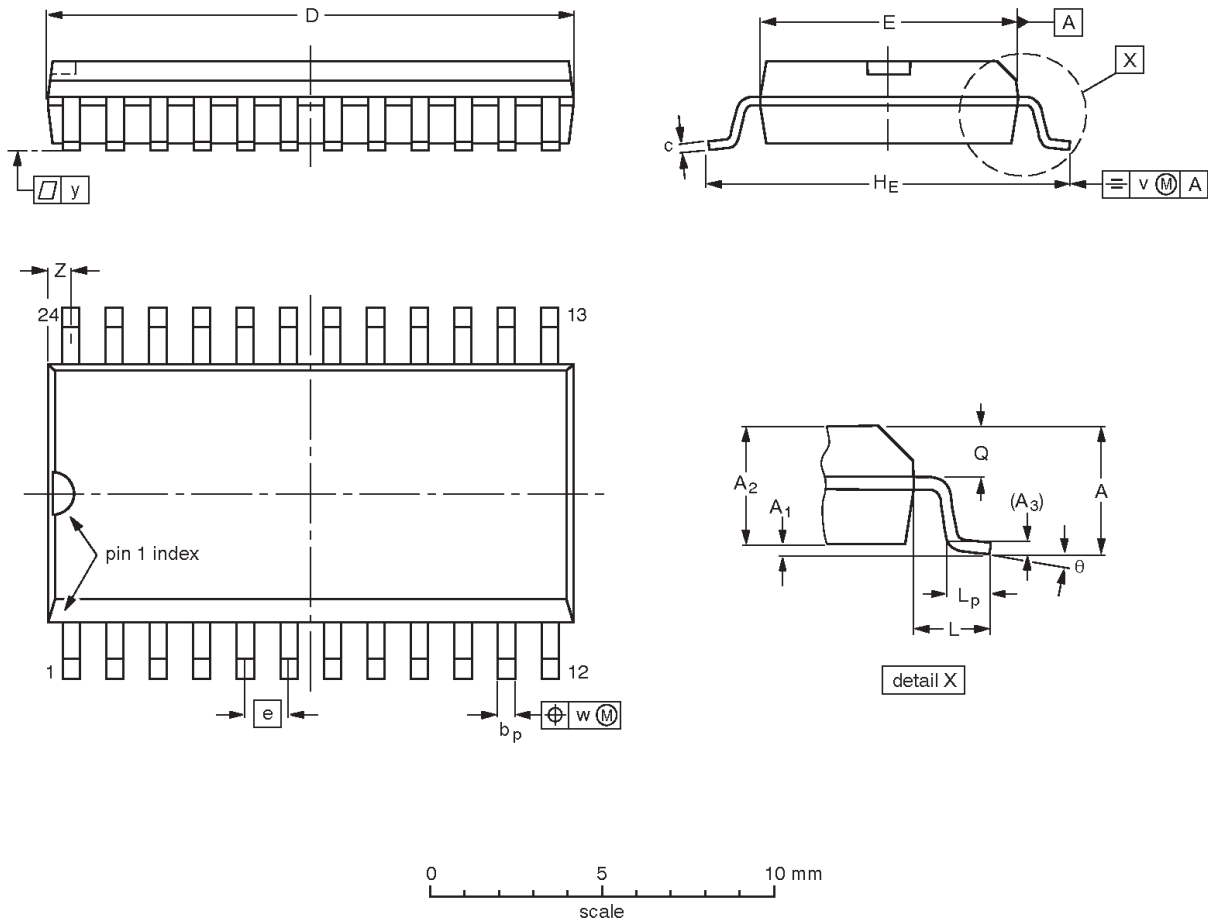
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT222-1 | | MS-001AF | | | | 95-03-11 |

10-bit buffer/line driver, non-inverting (3-State)

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SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



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

| UNIT | A max. | A ₁ | A ₂ | A ₃ | b _p | c | D ⁽¹⁾ | E ⁽¹⁾ | e | H _E | L | L _p | Q | v | w | y | z ⁽¹⁾ | θ |
|--------|--------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|-------|----------------|-------|----------------|----------------|------|------|-------|------------------|----------|
| mm | 2.65 | 0.30 0.10 | 2.45 2.25 | 0.25 | 0.49 0.36 | 0.32 0.23 | 15.6 15.2 | 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° 0° |
| inches | 0.10 | 0.012 0.004 | 0.096 0.089 | 0.01 | 0.019 0.014 | 0.013 0.009 | 0.61 0.60 | 0.30 0.29 | 0.050 | 0.419 0.394 | 0.055 | 0.043 0.016 | 0.043 0.039 | 0.01 | 0.01 | 0.004 | 0.035 0.016 | |

Note

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

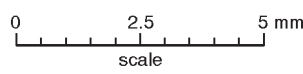
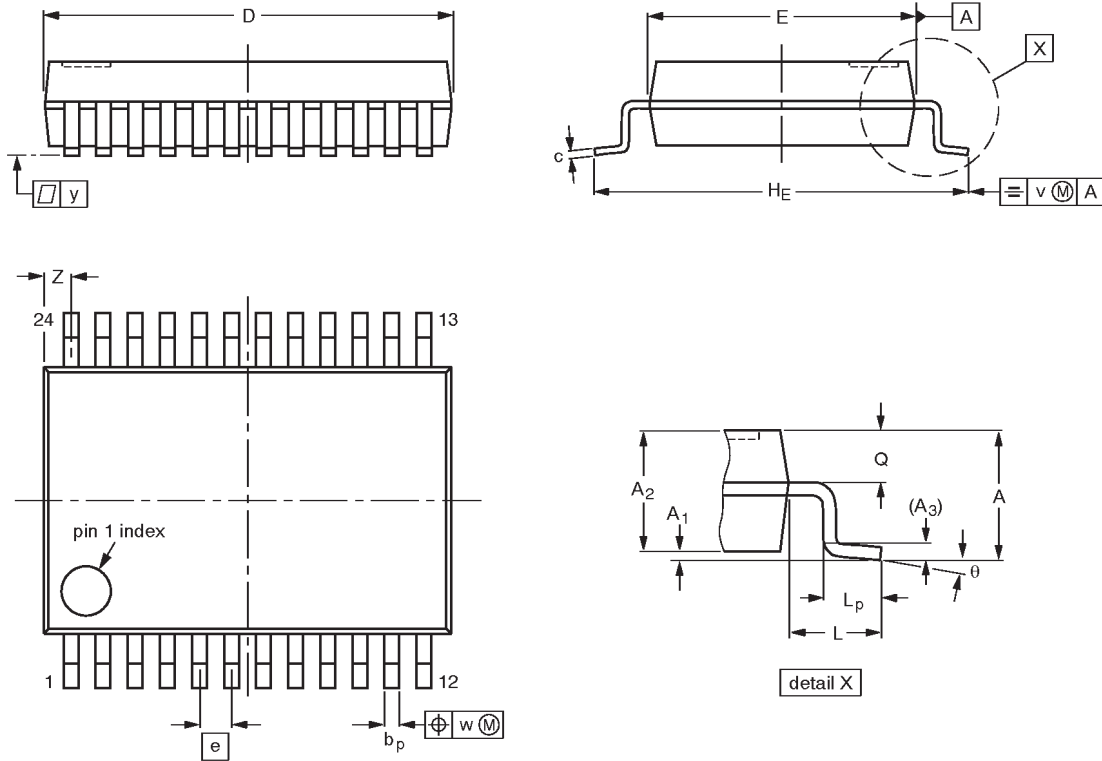
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|------|--|---------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT137-1 | 075E05 | MS-013AD | | | | 95-01-24 97-05-22 |

10-bit buffer/line driver, non-inverting (3-State)

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SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm

SOT340-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A ₁ | A ₂ | A ₃ | b _p | c | D ⁽¹⁾ | E ⁽¹⁾ | e | H _E | L | L _p | Q | v | w | y | Z ⁽¹⁾ | θ |
|------|--------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|------|----------------|------------|-----|------|-----|------------------|----------|
| mm | 2.0 | 0.21 0.05 | 1.80 1.65 | 0.25 | 0.38 0.25 | 0.20 0.09 | 8.4 8.0 | 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 | 0.8 0.4 | 8° 0° |

Note

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

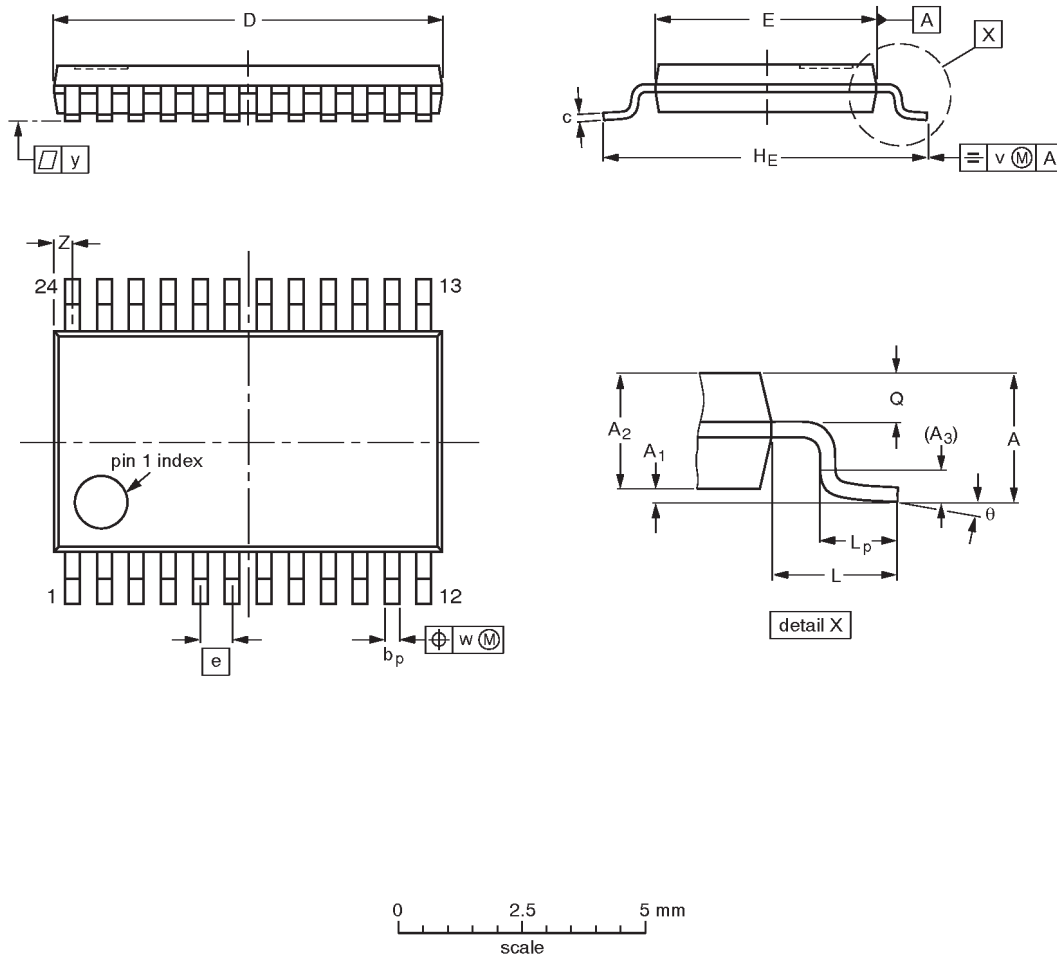
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|------|--|---------------------|-----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT340-1 | | MO-150AG | | | | 93-09-08- 95-02-04 |

10-bit buffer/line driver, non-inverting (3-State)

74ABT827

TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm

SOT355-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A ₁ | A ₂ | A ₃ | b _p | c | D ⁽¹⁾ | E ⁽²⁾ | e | H _E | L | L _p | Q | v | w | y | z ⁽¹⁾ | θ |
|------|--------|----------------|----------------|----------------|----------------|------------|------------------|------------------|------|----------------|-----|----------------|------------|-----|------|-----|------------------|----------|
| mm | 1.10 | 0.15 0.05 | 0.95 0.80 | 0.25 | 0.30 0.19 | 0.2 0.1 | 7.9 7.7 | 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 VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|----------|------|--|---------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT355-1 | | MO-153AD | | | | 93-06-16 95-02-04 |

10-bit buffer/line driver, non-inverting (3-State)

74ABT827

DEFINITIONS

| Data Sheet Identification | Product Status | Definition |
|----------------------------------|-------------------------------|--|
| <i>Objective Specification</i> | Formative or in Design | 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> | Preproduction Product | 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. |
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