

# DATA SHEET

## **74F827**

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

## **74F828**

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

Product specification

1994 Dec 5

IC15 Data Handbook

Philips Semiconductors

PHILIPS



## Buffers

## 74F827, 74F828

*74F827 10-bit buffer/line driver, non-inverting (3-State)*

*74F828 10-bit buffer/line driver, inverting (3-State)*

### FEATURES

- High impedance NPN base inputs for reduced loading (20µA in High and Low states)
- $I_{IL}$  is 20µA vs FAST family spec of 600µA and 1000µA for AMD 29827/29828 series
- Ideal where high speed, light bus loading and increased fan-in are required
- Controlled rise and fall times to minimize ground bounce
- Glitch free power-up in 3-State
- Flow through pinout architecture for microprocessor oriented applications
- Outputs sink 64mA
- 74F827 available in SSOP type II package

### DESCRIPTION

The 74F827 and 74F828 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.

The 74F827 and 74F828 are functionally and pin compatible to AMD AM29827 and AM29828. The 74F828 is an inverting version of 74F827.

| TYPE   | TYPICAL PROPAGATION DELAY | TYPICAL SUPPLY CURRENT (TOTAL) |
|--------|---------------------------|--------------------------------|
| 74F827 | 6.0ns                     | 60mA                           |
| 74F828 | 6.0ns                     | 55mA                           |

### ORDERING INFORMATION

| PACKAGES                     | COMMERCIAL RANGE<br>$V_{CC} = 5V \pm 10\%$ ; $T_A = 0^\circ C$ to $+70^\circ C$ | DRAWING NUMBER |
|------------------------------|---------------------------------------------------------------------------------|----------------|
| 24-Pin Plastic DIP (300 mil) | N74F827N, N74F828N                                                              | SOT222-1       |
| 24-Pin Plastic SOL           | N74F827D, N74F828D                                                              | SOT137-1       |
| 24-Pin Plastic SSOP Type II  | N74F827DB                                                                       | SOT340-1       |

### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

| PINS                                | DESCRIPTION                       | 74F(U.L.)<br>HIGH/LOW | LOAD VALUE<br>HIGH/LOW |
|-------------------------------------|-----------------------------------|-----------------------|------------------------|
| D0-D9                               | Data inputs                       | 1.0/0.033             | 20µA/20µA              |
| $\overline{OE}0$ - $\overline{OE}1$ | Output enable inputs (active Low) | 1.0/0.033             | 20µA/20µA              |
| Q0-Q9                               | Data outputs (74F827)             | 1200/106.7            | 24mA/64mA              |
| $\overline{Q}0$ - $\overline{Q}9$   | Data outputs ( 74F828)            | 1200/106.7            | 24mA/64mA              |

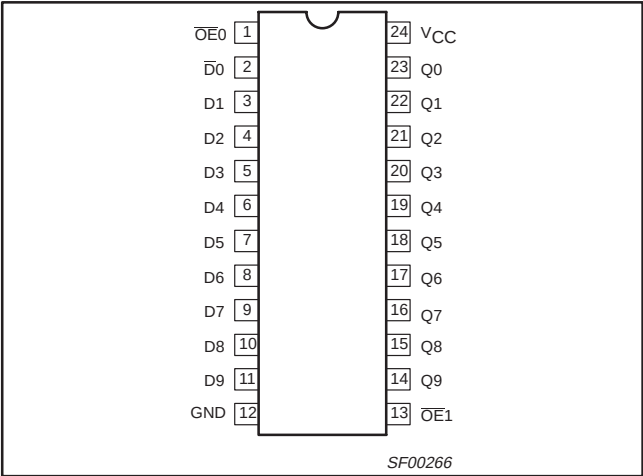
#### NOTES:

One (1.0) FAST Unit Load is defined as: 20µA in the High state and 0.6 mA in the Low state.

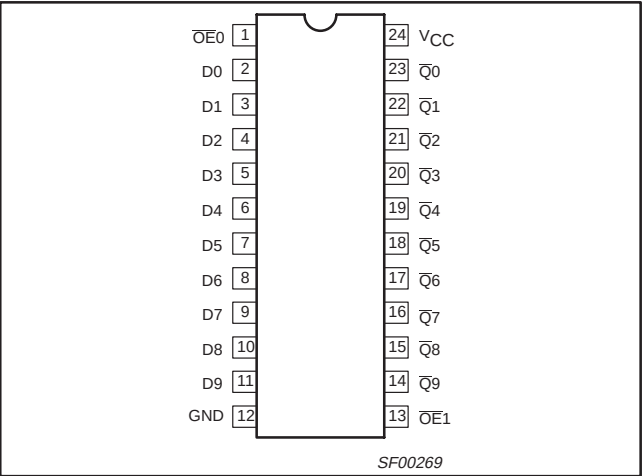
Buffers

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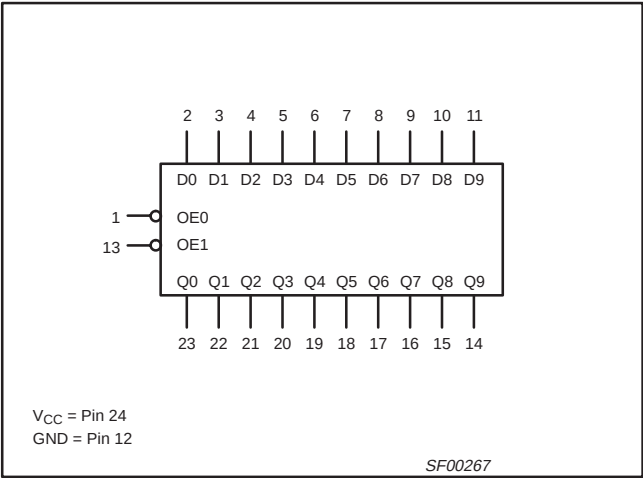
PIN CONFIGURATION - 74F827



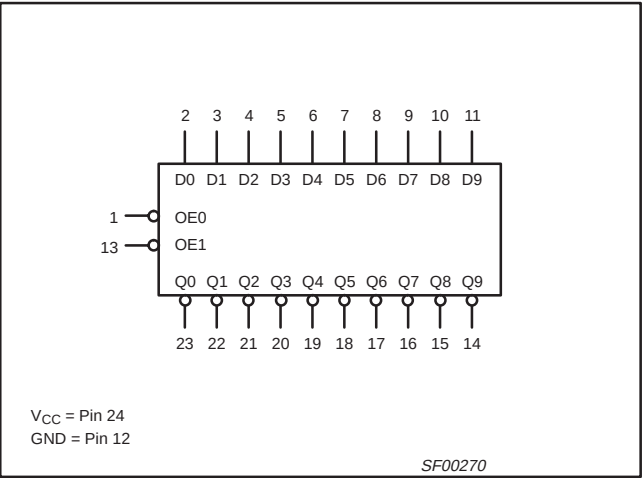
PIN CONFIGURATION - 74F828



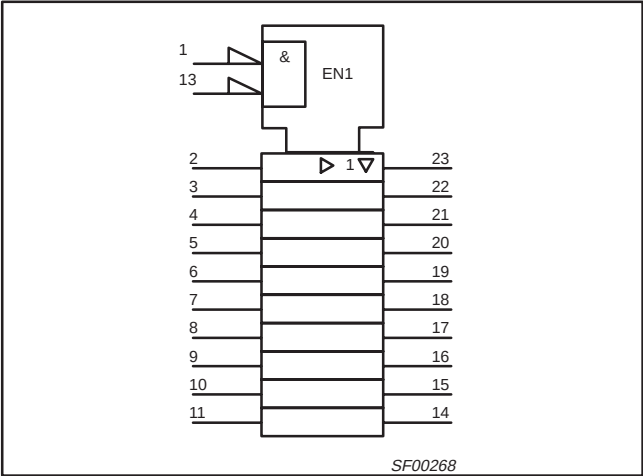
LOGIC SYMBOL - 74F827



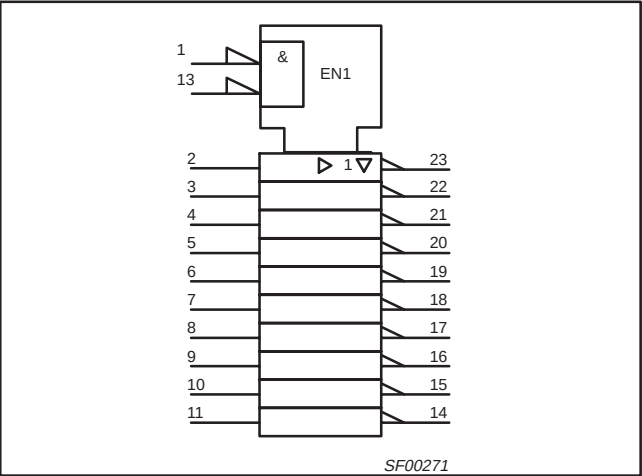
LOGIC SYMBOL - 74F828



LOGIC SYMBOL (IEEE/IEC) - 74F827



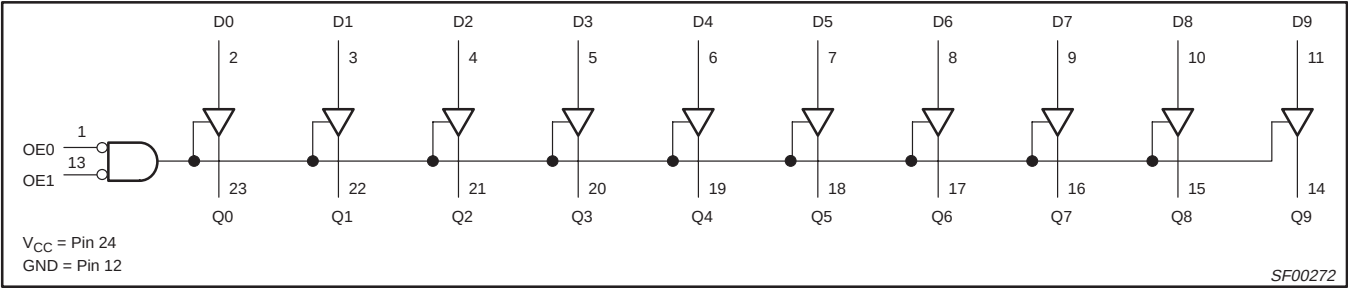
LOGIC SYMBOL (IEEE/IEC) - 74F828



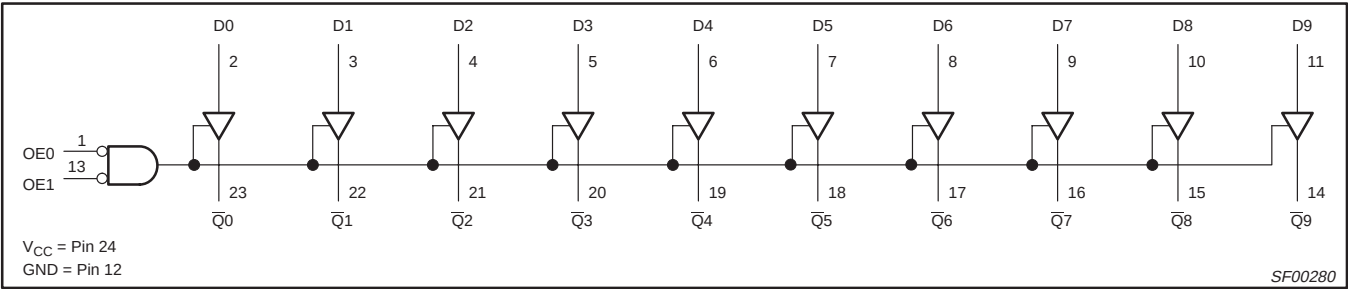
Buffers

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LOGIC DIAGRAM 74F827



LOGIC DIAGRAM 74F828



FUNCTION TABLE

| INPUTS          |                | OUTPUTS        |                 | OPERATING MODE |
|-----------------|----------------|----------------|-----------------|----------------|
|                 |                | 74F827         | 74F828          |                |
| OE <sub>n</sub> | D <sub>n</sub> | Q <sub>n</sub> | Q̄ <sub>n</sub> |                |
| L               | L              | L              | H               | Transparent    |
| L               | H              | H              | L               | Transparent    |
| H               | X              | Z              | Z               | High impedance |

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

ABSOLUTE MAXIMUM RATINGS

Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.

| SYMBOL           | PARAMETER                                      | RATING                   | UNIT |
|------------------|------------------------------------------------|--------------------------|------|
| V <sub>CC</sub>  | Supply voltage                                 | −0.5 to +7.0             | V    |
| V <sub>IN</sub>  | Input voltage                                  | −0.5 to +7.0             | V    |
| I <sub>IN</sub>  | Input current                                  | −30 to +5                | mA   |
| V <sub>OUT</sub> | Voltage applied to output in High output state | −0.5 to +V <sub>CC</sub> | V    |
| I <sub>OUT</sub> | Current applied to output in Low output state  | 128                      | mA   |
| T <sub>A</sub>   | Operating free-air temperature range           | 0 to + 70                | °C   |
| T <sub>stg</sub> | Storage temperature range                      | −65 to + 150             | °C   |

## Buffers

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## RECOMMENDED OPERATING CONDITIONS

| SYMBOL    | PARAMETER                            | LIMITS |     |     | UNIT |
|-----------|--------------------------------------|--------|-----|-----|------|
|           |                                      | Min    | Nom | Max |      |
| $V_{CC}$  | Supply voltage                       | 4.5    | 5.0 | 5.5 | V    |
| $V_{IH}$  | High-level input voltage             | 2.0    |     |     | V    |
| $V_{IL}$  | Low-level input voltage              |        |     | 0.8 | V    |
| $I_{IK}$  | Input clamp current                  |        |     | -18 | mA   |
| $I_{OH}$  | High-level output current            |        |     | -24 | mA   |
| $I_{OL}$  | Low-level output current             |        |     | 64  | mA   |
| $T_{amb}$ | Operating free-air temperature range | 0      |     | +70 | °C   |

## DC ELECTRICAL CHARACTERISTICS

Over recommended operating free-air temperature range unless otherwise noted.

| SYMBOL           | PARAMETER                                         |        |                  | TEST CONDITIONS <sup>1</sup>                                              |                         |                      | LIMITS |                  |      | UNIT |
|------------------|---------------------------------------------------|--------|------------------|---------------------------------------------------------------------------|-------------------------|----------------------|--------|------------------|------|------|
|                  |                                                   |        |                  |                                                                           |                         |                      | MIN    | TYP <sup>2</sup> | MAX  |      |
| V <sub>OH</sub>  | High-level output voltage                         |        |                  | V <sub>CC</sub> = MIN,<br>V <sub>IL</sub> = MAX,<br>V <sub>IH</sub> = MIN | I <sub>OH</sub> = −15mA | ± 10%V <sub>CC</sub> | 2.4    |                  |      | V    |
|                  |                                                   |        |                  |                                                                           |                         | ± 5%V <sub>CC</sub>  | 2.4    | 3.3              |      | V    |
|                  |                                                   |        |                  | V <sub>CC</sub> = MIN,<br>V <sub>IL</sub> = MAX,<br>V <sub>IH</sub> = MIN | I <sub>OH</sub> = −24mA | ± 10%V <sub>CC</sub> | 2.0    |                  |      | V    |
|                  |                                                   |        |                  |                                                                           |                         | ± 5%V <sub>CC</sub>  | 2.0    |                  |      | V    |
| V <sub>OL</sub>  | Low-level output voltage                          |        |                  | V <sub>CC</sub> = MIN,<br>V <sub>IL</sub> = MAX,<br>V <sub>IH</sub> = MIN | I <sub>OL</sub> = MAX   | ± 10%V <sub>CC</sub> |        |                  | 0.55 | V    |
|                  |                                                   |        |                  |                                                                           |                         | ± 5%V <sub>CC</sub>  |        | 0.42             | 0.55 | V    |
| V <sub>IK</sub>  | Input clamp voltage                               |        |                  | V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>                   |                         |                      |        | −0.73            | −1.2 | V    |
| I <sub>I</sub>   | Input current at maximum input voltage            |        |                  | V <sub>CC</sub> = 0.0V, V <sub>I</sub> = 7.0V                             |                         |                      |        |                  | 100  | μA   |
| I <sub>IH</sub>  | High-level input current                          |        |                  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V                              |                         |                      |        |                  | 20   | μA   |
| I <sub>IL</sub>  | Low-level input current                           |        |                  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V                              |                         |                      |        |                  | −20  | μA   |
| I <sub>OZH</sub> | Off-state output current,<br>High voltage applied |        |                  | V <sub>CC</sub> = MAX, V <sub>O</sub> = 2.7V                              |                         |                      |        |                  | 50   | μA   |
| I <sub>OZL</sub> | Off-state output current,<br>Low voltage applied  |        |                  | V <sub>CC</sub> = MAX, V <sub>O</sub> = 0.5V                              |                         |                      |        |                  | −50  | μA   |
| I <sub>OS</sub>  | Short circuit output current <sup>3</sup>         |        |                  | V <sub>CC</sub> = MAX                                                     |                         |                      | −100   |                  | −225 | mA   |
| I <sub>CC</sub>  | Supply current<br>(total)                         | 74F827 | I <sub>CCH</sub> | V <sub>CC</sub> = MAX                                                     |                         |                      |        | 50               | 70   | mA   |
|                  |                                                   |        | I <sub>CCL</sub> |                                                                           |                         |                      |        | 70               | 100  | mA   |
|                  |                                                   |        | I <sub>CCZ</sub> |                                                                           |                         |                      |        | 60               | 90   | mA   |
|                  |                                                   | 74F828 | I <sub>CCH</sub> | V <sub>CC</sub> = MAX                                                     |                         |                      |        | 30               | 45   | mA   |
|                  |                                                   |        | I <sub>CCL</sub> |                                                                           |                         |                      |        | 65               | 85   | mA   |
|                  |                                                   |        | I <sub>CCZ</sub> |                                                                           |                         |                      |        | 55               | 70   | mA   |

## NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under operating conditions for the applicable type.
- All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^\circ\text{C}$ .
- Not more than one output should be shorted at one time. For testing  $I_{OS}$ , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests,  $I_{OS}$  tests should be performed last.

## Buffers

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## AC CHARACTERISTICS

| SYMBOL                               | PARAMETER                                                |        |                          | LIMITS                                                                                             |            |              |                                                                                                                 |              | UNIT |
|--------------------------------------|----------------------------------------------------------|--------|--------------------------|----------------------------------------------------------------------------------------------------|------------|--------------|-----------------------------------------------------------------------------------------------------------------|--------------|------|
|                                      |                                                          |        |                          | T <sub>amb</sub> = +25°C<br>V <sub>CC</sub> = 5V<br>C <sub>L</sub> = 50pF<br>R <sub>L</sub> = 500Ω |            |              | T <sub>amb</sub> = 0 °C to +70°C<br>V <sub>CC</sub> = 5V ±10%<br>C <sub>L</sub> = 50pF<br>R <sub>L</sub> = 500Ω |              |      |
|                                      |                                                          |        |                          | Min                                                                                                | Typ        | Max          | Min                                                                                                             | Max          |      |
|                                      |                                                          |        |                          |                                                                                                    |            |              |                                                                                                                 |              |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>    | 74F827 | Waveform 1               | 2.0<br>2.0                                                                                         | 5.5<br>4.5 | 8.5<br>8.5   | 2.0<br>2.0                                                                                                      | 9.0<br>9.0   | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>OE <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 | 5.0<br>4.0                                                                                         | 8.0<br>6.0 | 12.0<br>10.5 | 4.5<br>4.0                                                                                                      | 14.0<br>11.5 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>OE <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 | 2.5<br>2.5                                                                                         | 5.0<br>5.0 | 8.0<br>8.0   | 2.0<br>2.0                                                                                                      | 8.5<br>8.5   | ns   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>    | 74F828 | Waveform 2               | 2.0<br>1.0                                                                                         | 6.0<br>3.0 | 8.5<br>7.0   | 2.0<br>1.0                                                                                                      | 9.5<br>8.0   | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>OE <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 | 6.0<br>5.0                                                                                         | 8.0<br>7.0 | 11.5<br>10.5 | 5.5<br>4.5                                                                                                      | 14.0<br>12.0 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>OE <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 | 2.5<br>1.5                                                                                         | 5.0<br>4.0 | 8.5<br>7.0   | 2.0<br>1.5                                                                                                      | 9.0<br>8.0   | ns   |

## AC CHARACTERISTICS

for 1 Output switching with  $C_L = 300\text{pF}$  and  $R_L = 500\Omega$  load

| SYMBOL                               | PARAMETER                                                            |        |                          | LIMITS                                                                                              |              |              |                                                                                                                   |              | UNIT |
|--------------------------------------|----------------------------------------------------------------------|--------|--------------------------|-----------------------------------------------------------------------------------------------------|--------------|--------------|-------------------------------------------------------------------------------------------------------------------|--------------|------|
|                                      |                                                                      |        |                          | T <sub>amb</sub> = +25°C<br>V <sub>CC</sub> = 5V<br>C <sub>L</sub> = 300pF<br>R <sub>L</sub> = 500Ω |              |              | T <sub>amb</sub> = 0 °C to +70°C<br>V <sub>CC</sub> = 5V ± 10%<br>C <sub>L</sub> = 300pF<br>R <sub>L</sub> = 500Ω |              |      |
|                                      |                                                                      |        |                          | MIN                                                                                                 | Typ          | Max          | MIN                                                                                                               | Max          |      |
|                                      |                                                                      |        |                          |                                                                                                     |              |              |                                                                                                                   |              |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>                | 74F827 | Waveform 1               |                                                                                                     | 9.5<br>7.5   | 13.0<br>10.0 |                                                                                                                   | 14.0<br>11.0 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>O <sub>E</sub> <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 |                                                                                                     | 15.0<br>9.5  | 20.0<br>13.0 |                                                                                                                   | 21.0<br>14.0 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>O <sub>E</sub> <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 |                                                                                                     | 15.0<br>9.5  | 19.0<br>13.5 |                                                                                                                   | 20.0<br>14.0 | ns   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>                | 74F828 | Waveform 2               |                                                                                                     | 10.0<br>6.0  | 13.0<br>9.0  |                                                                                                                   | 14.0<br>10.0 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>O <sub>E</sub> <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 |                                                                                                     | 15.5<br>10.5 | 19.0<br>13.0 |                                                                                                                   | 21.0<br>14.0 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>O <sub>E</sub> <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 |                                                                                                     | 15.0<br>10.0 | 18.0<br>13.0 |                                                                                                                   | 20.0<br>14.5 | ns   |

Buffers

74F827, 74F828

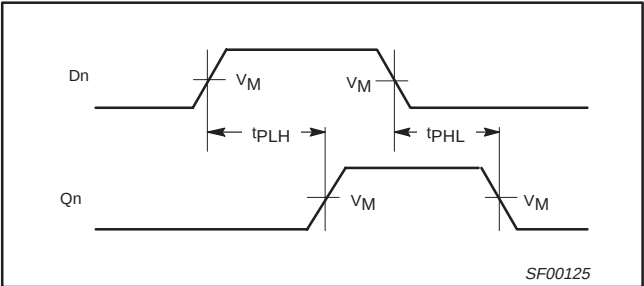
AC CHARACTERISTICS

for 10 Outputs switching with  $C_L = 300\text{pF}$  and  $R_L = 500\Omega$  load

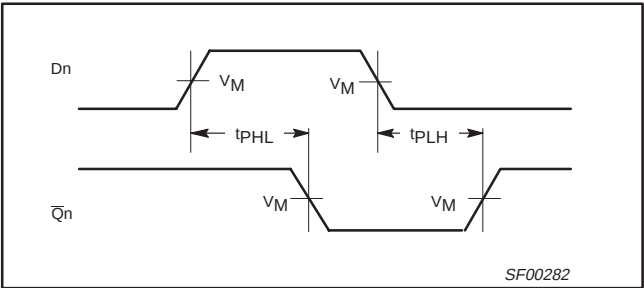
| SYMBOL                               | PARAMETER                                                |        |                          | LIMITS                                                                                             |              |              |                                                                                                                 |              | UNIT |
|--------------------------------------|----------------------------------------------------------|--------|--------------------------|----------------------------------------------------------------------------------------------------|--------------|--------------|-----------------------------------------------------------------------------------------------------------------|--------------|------|
|                                      |                                                          |        |                          | T <sub>amb</sub> = +25°C<br>V <sub>CC</sub> = 5V<br>C <sub>L</sub> = 50pF<br>R <sub>L</sub> = 500Ω |              |              | T <sub>amb</sub> = 0 °C to +70°C<br>V <sub>CC</sub> = 5V ±10%<br>C <sub>L</sub> = 50pF<br>R <sub>L</sub> = 500Ω |              |      |
|                                      |                                                          |        |                          | MIN                                                                                                | Typ          | Max          | MIN                                                                                                             | Max          |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>    | 74F827 | Waveform 1               |                                                                                                    | 12.0<br>14.0 | 16.0<br>17.0 |                                                                                                                 | 17.0<br>18.0 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>OE <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 |                                                                                                    | 15.0<br>17.0 | 20.0<br>21.0 |                                                                                                                 | 21.0<br>21.5 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>OE <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 |                                                                                                    | 15.0<br>12.5 | 19.0<br>15.5 |                                                                                                                 | 20.0<br>16.0 | ns   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>D <sub>n</sub> to Q <sub>n</sub>    | 74F828 | Waveform 2               |                                                                                                    | 10.0<br>10.0 | 17.0<br>13.5 |                                                                                                                 | 18.0<br>14.0 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>OE <sub>n</sub> to Q <sub>n</sub>  |        | Waveform 3<br>Waveform 4 |                                                                                                    | 18.0<br>15.0 | 21.0<br>18.0 |                                                                                                                 | 23.0<br>19.0 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>OE <sub>n</sub> to Q <sub>n</sub> |        | Waveform 3<br>Waveform 4 |                                                                                                    | 16.5<br>11.5 | 19.5<br>14.5 |                                                                                                                 | 22.5<br>15.0 | ns   |

AC WAVEFORMS

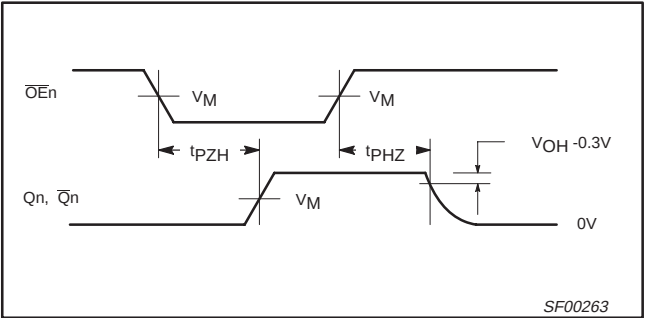
For all waveforms,  $V_M = 1.5\text{V}$



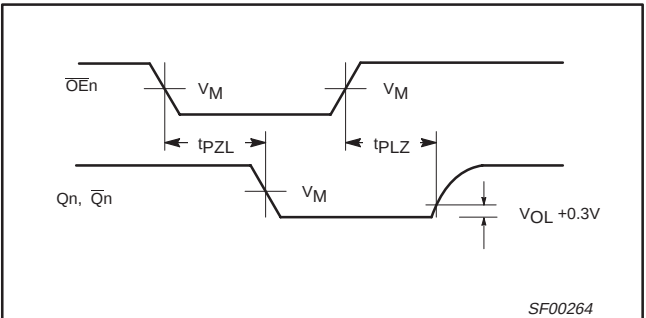
Waveform 1. Propagation Delay for Non-Inverting Output



Waveform 2. Propagation Delay for Inverting Output



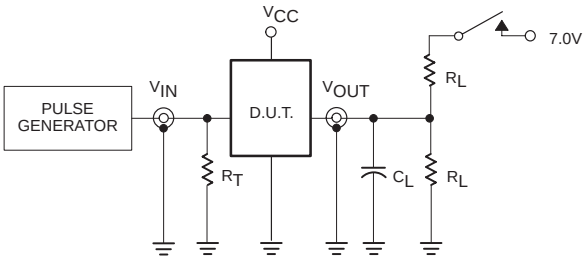
Waveform 3. 3-State Output Enable Time to High Level and Output Disable Time from High Level



Waveform 4. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level

Buffers

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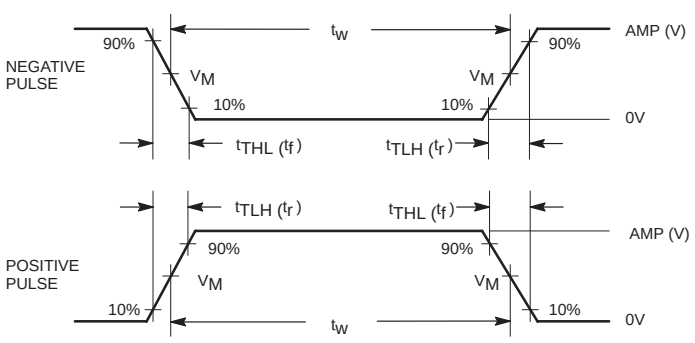


The test circuit diagram shows a Pulse Generator connected to the input  $V_{IN}$  of a D.U.T. (Device Under Test) through a termination resistor  $R_T$ . The output  $V_{OUT}$  is connected to a load resistor  $R_L$  and a load capacitor  $C_L$  in parallel. A switch is connected to the output  $V_{OUT}$  and a 7.0V source. The circuit is powered by  $V_{CC}$ .

**Test Circuit for Open Collector Outputs**

**SWITCH POSITION**

| TEST      | SWITCH |
|-----------|--------|
| $t_{PLZ}$ | closed |
| $t_{PZL}$ | closed |
| All other | open   |



The input pulse definition shows two waveforms: a Negative Pulse and a Positive Pulse. The Negative Pulse starts at 90% of  $V_M$ , falls to 10% of  $V_M$ , and then rises back to 90% of  $V_M$ . The Positive Pulse starts at 10% of  $V_M$ , rises to 90% of  $V_M$ , and then falls back to 10% of  $V_M$ . The pulse width is  $t_W$ , the rise time is  $t_{TLH}(t_r)$ , and the fall time is  $t_{THL}(t_f)$ . The amplitude is  $V_M$  and the output is measured in AMP (V).

**Input Pulse Definition**

| family | INPUT PULSE REQUIREMENTS |       |           |       |           |           |
|--------|--------------------------|-------|-----------|-------|-----------|-----------|
|        | amplitude                | $V_M$ | rep. rate | $t_W$ | $t_{TLH}$ | $t_{THL}$ |
| 74F    | 3.0V                     | 1.5V  | 1MHz      | 500ns | 2.5ns     | 2.5ns     |

**DEFINITIONS:**

$R_L$  = Load resistor;  
see AC electrical characteristics for value.

$C_L$  = Load capacitance includes jig and probe capacitance;  
see AC electrical characteristics for value.

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

SF00128

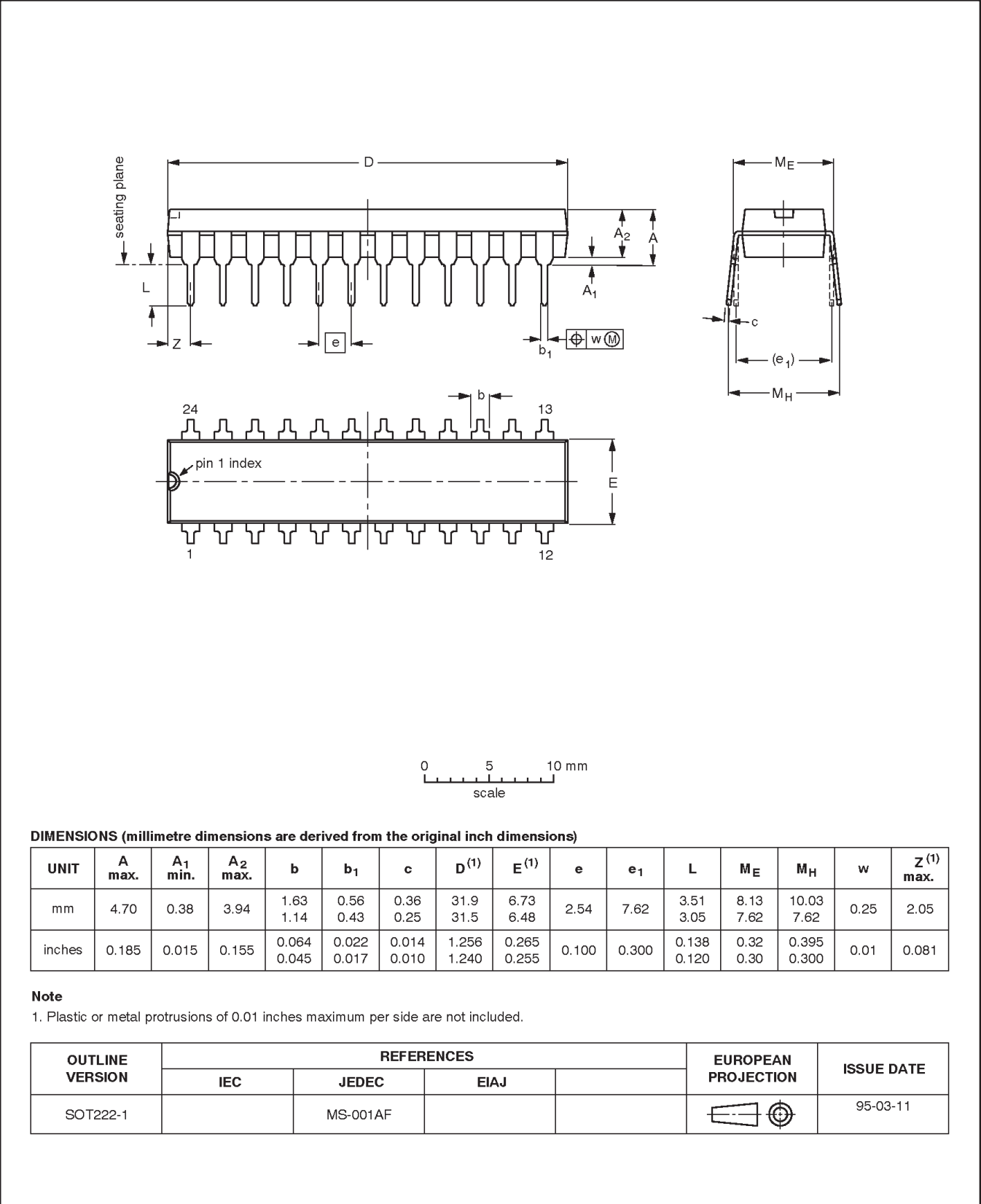


Buffers

74F827, 74F828

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

SOT222-1

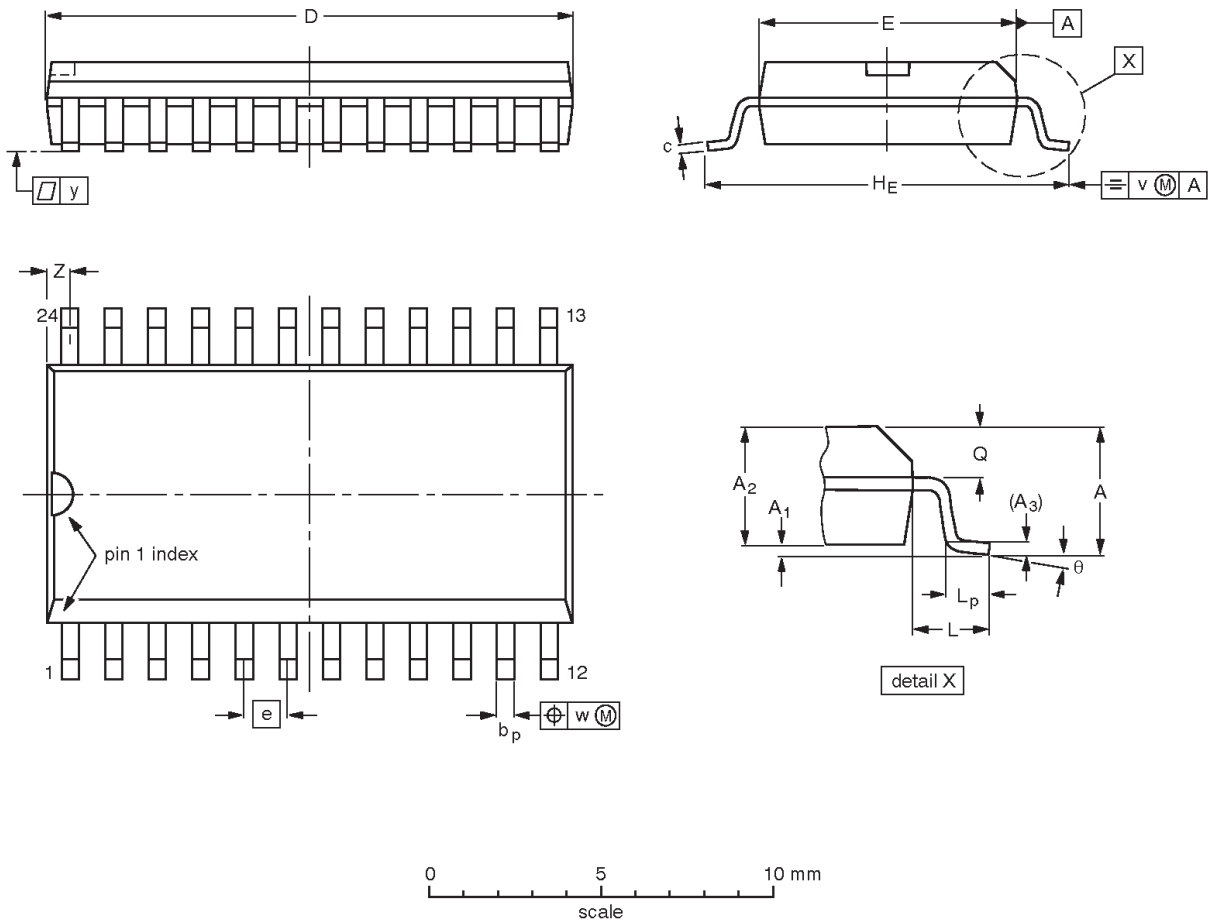


Buffers

74F827, 74F828

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<br>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     | 2.65      | 0.30<br>0.10   | 2.45<br>2.25   | 0.25           | 0.49<br>0.36   | 0.32<br>0.23   | 15.6<br>15.2     | 7.6<br>7.4       | 1.27  | 10.65<br>10.00 | 1.4   | 1.1<br>0.4     | 1.1<br>1.0     | 0.25 | 0.25 | 0.1   | 0.9<br>0.4       | 8°<br>0° |
| inches | 0.10      | 0.012<br>0.004 | 0.096<br>0.089 | 0.01           | 0.019<br>0.014 | 0.013<br>0.009 | 0.61<br>0.60     | 0.30<br>0.29     | 0.050 | 0.419<br>0.394 | 0.055 | 0.043<br>0.016 | 0.043<br>0.039 | 0.01 | 0.01 | 0.004 | 0.035<br>0.016   |          |

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

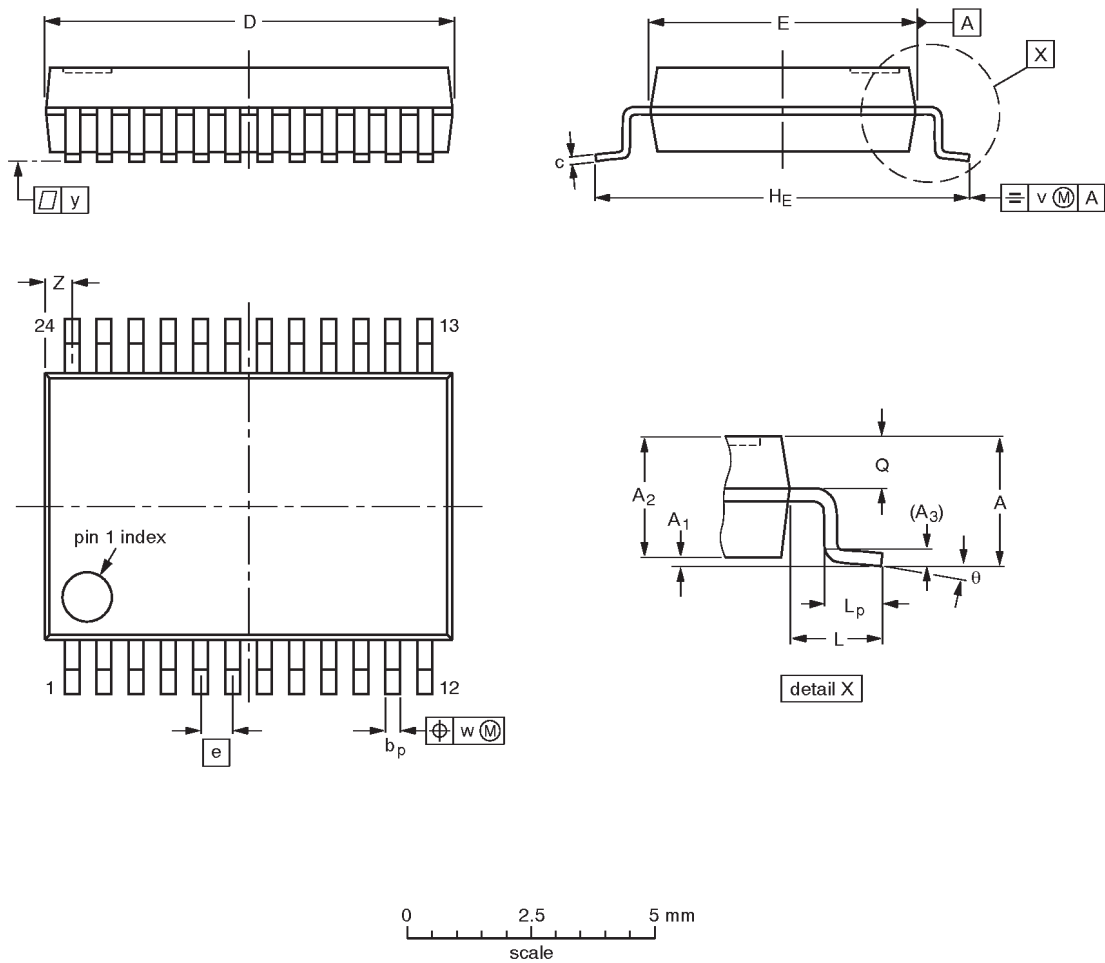
| OUTLINE<br>VERSION | REFERENCES |          |      |  | EUROPEAN<br>PROJECTION | ISSUE DATE            |
|--------------------|------------|----------|------|--|------------------------|-----------------------|
|                    | IEC        | JEDEC    | EIAJ |  |                        |       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

Buffers

74F827, 74F828

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

SOT340-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>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<br>0.05   | 1.80<br>1.65   | 0.25           | 0.38<br>0.25   | 0.20<br>0.09 | 8.4<br>8.0       | 5.4<br>5.2       | 0.65 | 7.9<br>7.6     | 1.25 | 1.03<br>0.63   | 0.9<br>0.7 | 0.2 | 0.13 | 0.1 | 0.8<br>0.4       | 8°<br>0° |

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

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

Buffers

74F827, 74F828

| DEFINITIONS               |                        |                                                                                                                                                                                                                                                            |
|---------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Sheet Identification | Product Status         | Definition                                                                                                                                                                                                                                                 |
| Objective Specification   | 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.                                                                                                         |
| Preliminary Specification | 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. |
| Product Specification     | Full Production        | 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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