

# 74F827

10-bit buffer/line driver; non-inverting; 3-state

Rev. 04 — 29 January 2010

Product data sheet

## 1. General description

The 74F827 10-bit buffer, provides high performance bus interface buffering for wide data/address paths or buses carrying parity. The device has NOR output enables ( $\overline{OE}0$ ,  $\overline{OE}1$ ) for maximum control flexibility.

## 2. Features

- High impedance NPN base inputs for reduced loading (20  $\mu$ A input current in HIGH and LOW states)
- $I_{IL} = 20 \mu\text{A}$  compared to 600  $\mu\text{A}$  in FAST family specification
- Ideal for high speed, light bus loading with increased fan-in
- Controlled rise and fall times to minimize ground bounce
- Glitch-free power-up in 3-state
- Flow-through pinout architecture for microprocessor oriented applications
- Output sink capability,  $I_{OL} = 64 \text{ mA}$

## 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
N74F827D	0 °C to 70 °C	SO24	plastic small outline package; 24 leads; body width 7.5 mm	SOT137-1
N74F827DB	0 °C to 70 °C	SSOP24	plastic shrink small outline package; 24 leads; body width 5.3 mm	SOT340-1

### 4. Functional diagram

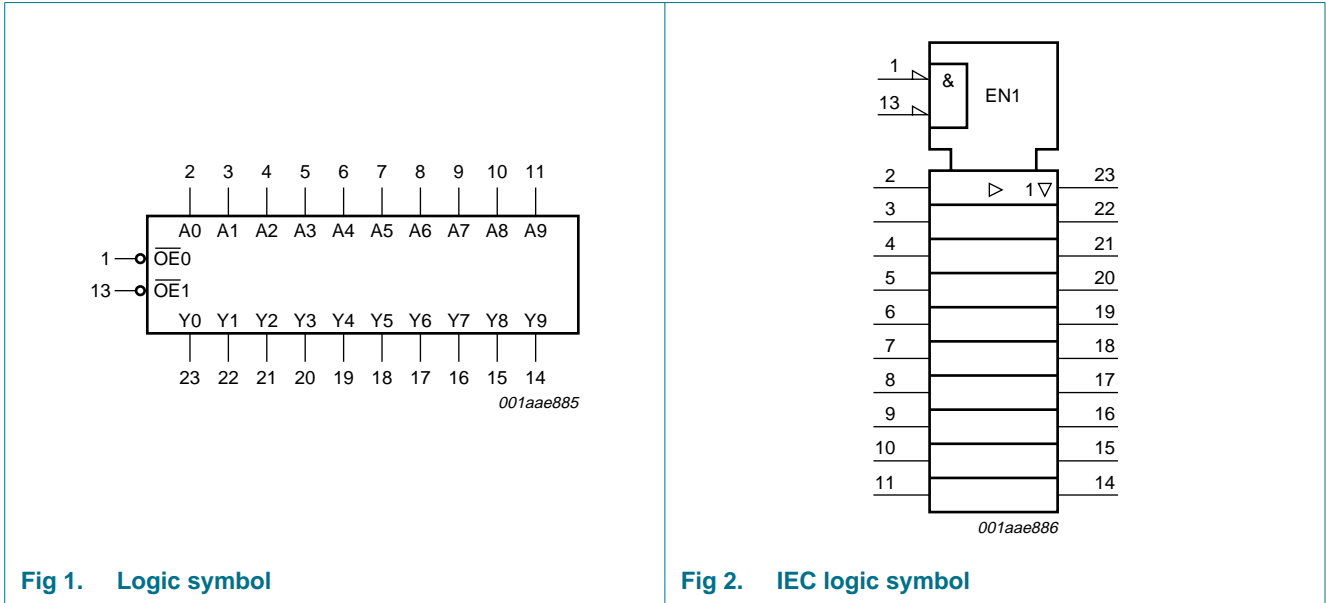


Fig 1. Logic symbol

Fig 2. IEC logic symbol

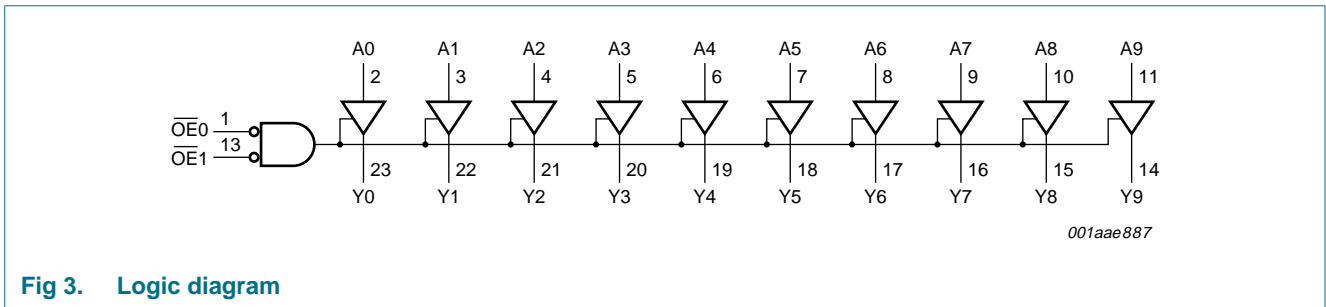
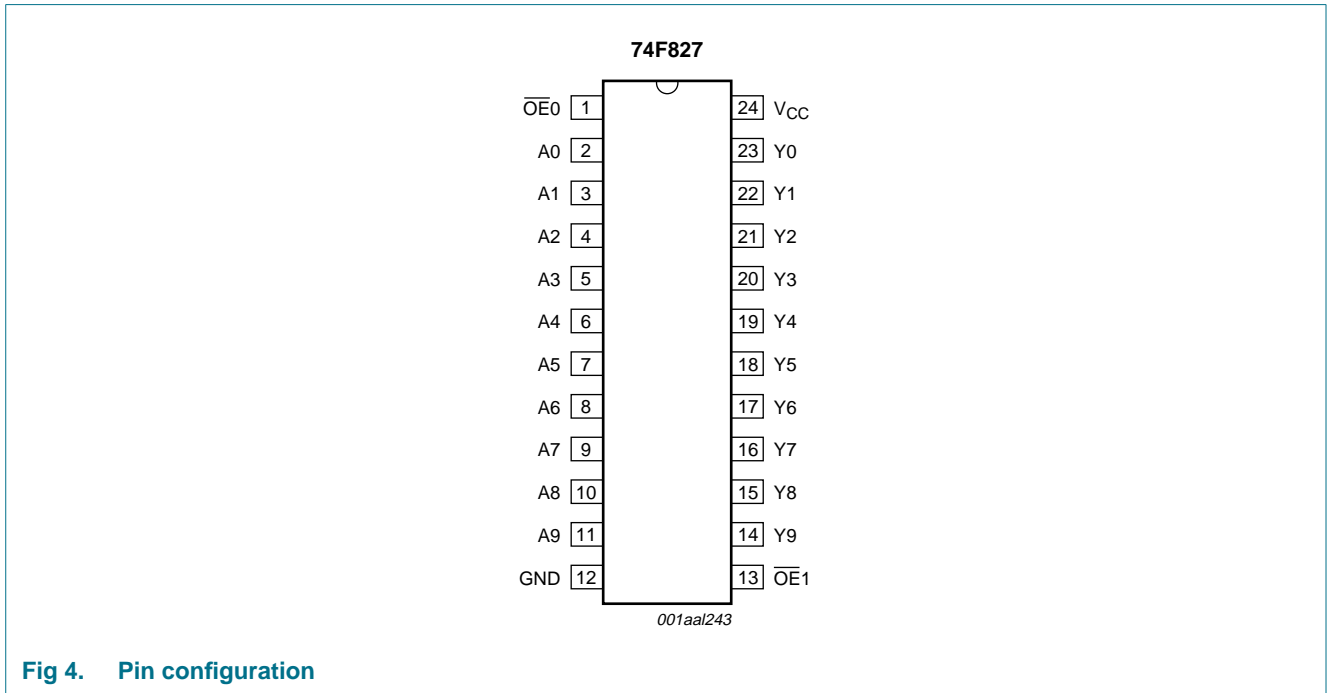


Fig 3. Logic diagram

## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

**Table 2. Pin description**

Symbol	Pin	Description	Unit load HIGH/LOW	Load value <sup>[1]</sup> HIGH/LOW
$\overline{OE}0$	1	output enable input (active LOW)	1.0/0.033	20 $\mu$ A/20 $\mu$ A
A0 to A9	2, 3, 4, 5, 6, 7, 8, 9, 10, 11	data input	1.0/0.033	20 $\mu$ A/20 $\mu$ A
GND	12	ground (0 V)	-	-
$\overline{OE}1$	13	output enable input (active LOW)	1.0/0.033	20 $\mu$ A/20 $\mu$ A
Y0 to Y9	23, 22, 21, 20, 19, 18, 17, 16, 15, 14	data output	1200/106.7	24 mA/64 mA
$V_{CC}$	24	supply voltage	-	-

[1] One FAST Unit Load (UL) is defined as 20  $\mu$ A in HIGH state, 0.6  $\mu$ A in LOW state.

## 6. Functional description

### 6.1 Function table

Table 3. Function selection<sup>[1]</sup>

Input		Output		Status
OEn	An	Yn		
L	L	L		transparent
L	H	H		
H	X	Z		disabled

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

## 7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		-0.5	+7.0	V
V <sub>I</sub>	input voltage		<sup>[1]</sup> -0.5	+7.0	V
V <sub>O</sub>	output voltage	output in HIGH-state	<sup>[1]</sup> -0.5	+7.0	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-30	+5	mA
I <sub>O</sub>	output current	output in LOW-state	-	128	mA
T <sub>amb</sub>	ambient temperature	in free-air	<sup>[2]</sup> 0	70	°C
T <sub>stg</sub>	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. The maximum junction temperature of this integrated circuit should not exceed 150 °C.

## 8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	supply voltage		4.5	5.0	5.5	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>IK</sub>	input clamping current		-18	-	-	mA
I <sub>OH</sub>	HIGH-level output current		-24	-	-	mA
I <sub>OL</sub>	LOW-level output current		-	-	64	mA

## 9. Static characteristics

**Table 6. Static characteristics**

Symbol	Parameter	Conditions	25 °C			0 °C to 70 °C		Unit	
			Min	Typ <sup>[1]</sup>	Max	Min	Max		
V <sub>IK</sub>	input clamping voltage	V <sub>CC</sub> = 4.5 V; I <sub>IK</sub> = -18 mA	-1.2	-0.73	-	-1.2	-	V	
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>IL</sub> = 0.8 V; V <sub>IH</sub> = 2.0 V I <sub>OH</sub> = -15 mA	-	-	-	2.4	-	V	
		V <sub>CC</sub> = ±10 %	-	3.3	-	2.4	-	V	
		V <sub>CC</sub> = ±5 %	-	-	-	-	-	-	-
		I <sub>OH</sub> = -24 mA	-	-	-	2.0	-	V	
		V <sub>CC</sub> = ±5 %	-	-	-	2.0	-	V	
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 4.5 V; V <sub>IL</sub> = 0.8 V; V <sub>IH</sub> = 2.0 V I <sub>OL</sub> = 64 mA	-	-	-	-	0.55	V	
		V <sub>CC</sub> = ±10 %	-	0.42	-	-	0.55	V	
		V <sub>CC</sub> = ±5 %	-	-	-	-	-	-	
I <sub>I</sub>	input leakage current	V <sub>CC</sub> = 0 V; V <sub>I</sub> = 7.0 V	-	-	-	-	100	μA	
I <sub>IH</sub>	HIGH-level input current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = 2.7 V	-	-	-	-	20	μA	
I <sub>IL</sub>	LOW-level input current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = 0.5 V	-	-	-	-	-20	μA	
I <sub>OZ</sub>	OFF-state output current	V <sub>CC</sub> = 5.5 V	-	-	-	-	-	-	
		V <sub>O</sub> = 2.7 V	-	-	-	-	50	μA	
		V <sub>O</sub> = 0.5 V	-	-	-	-	-50	μA	
I <sub>O</sub>	output current	V <sub>CC</sub> = 5.5 V <sup>[2]</sup>	-	-	-	-100	-225	mA	
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 5.5 V; V <sub>I</sub> = GND or V <sub>CC</sub>	-	-	-	-	-	-	
		outputs HIGH-state	-	50	-	-	70	mA	
		outputs LOW-state	-	70	-	-	100	mA	
		outputs OFF-state	-	60	-	-	90	mA	

[1] All typical values are measured at V<sub>CC</sub> = 5 V.

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

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

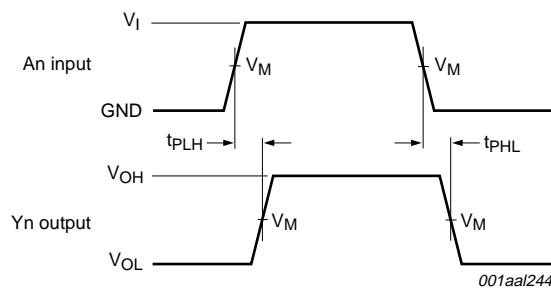
GND = 0 V; for test circuit, see [Figure 7](#).

Symbol	Parameter	Conditions	25 °C; V <sub>CC</sub> = 5.0 V			0 °C to 70 °C; V <sub>CC</sub> = 5.0 V ± 0.5 V		Unit
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	LOW to HIGH propagation delay	An to Yn; see <a href="#">Figure 5</a>	-	-	-	-	-	-
		C <sub>L</sub> = 50 pF	2.0	5.5	8.5	2.0	9.0	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	9.5	13.0	-	14.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	12.0	16.0	-	17.0	ns

**Table 7. Dynamic characteristics ...continued**  
*GND = 0 V; for test circuit, see Figure 7.*

Symbol	Parameter	Conditions	25 °C; V <sub>CC</sub> = 5.0 V			0 °C to 70 °C; V <sub>CC</sub> = 5.0 V ± 0.5 V		Unit
			Min	Typ	Max	Min	Max	
t <sub>PHL</sub>	HIGH to LOW propagation delay	An to Yn; see Figure 5						
		C <sub>L</sub> = 50 pF	2.0	4.5	8.5	2.0	9.0	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	7.5	10.0	-	11.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	14.0	17.0	-	18.0	ns
t <sub>PZH</sub>	OFF-state to HIGH propagation delay	$\overline{OEn}$ to Yn; see Figure 6						
		C <sub>L</sub> = 50 pF	5.0	8.0	12.0	4.5	14.0	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	15.0	20.0	-	21.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	15.0	20.0	-	21.0	ns
t <sub>PZL</sub>	OFF-state to LOW propagation delay	$\overline{OEn}$ to Yn; see Figure 6						
		C <sub>L</sub> = 50 pF	4.0	6.0	10.5	4.0	11.5	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	9.5	13.0	-	14.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	17.0	21.0	-	21.5	ns
t <sub>PHZ</sub>	HIGH to OFF-state propagation delay	$\overline{OEn}$ to Yn; see Figure 6						
		C <sub>L</sub> = 50 pF	2.5	5.0	8.0	2.0	8.5	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	15.0	19.0	-	20.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	15.0	19.0	-	20.0	ns
t <sub>PLZ</sub>	LOW to OFF-state propagation delay	$\overline{OEn}$ to Yn; see Figure 6						
		C <sub>L</sub> = 50 pF	2.5	5.0	8.0	2.0	8.5	ns
		C <sub>L</sub> = 300 pF, 1 output switching	-	9.5	13.5	-	14.0	ns
		C <sub>L</sub> = 300 pF, 10 outputs switching	-	12.5	15.5	-	16.0	ns

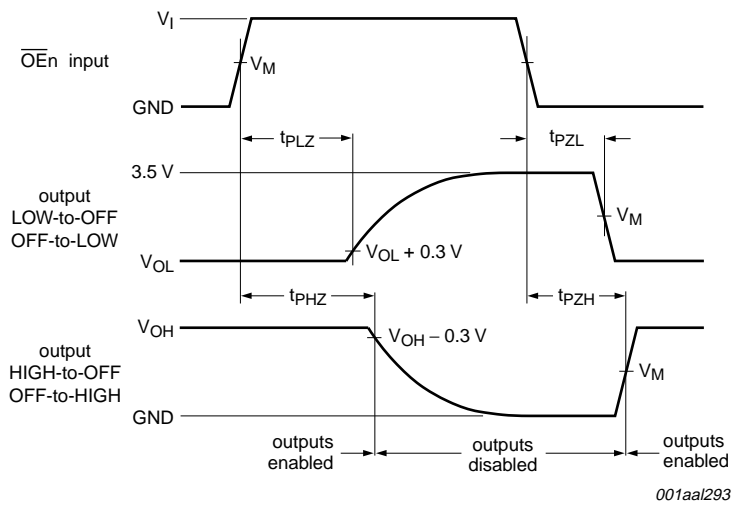
## 11. Waveforms



V<sub>M</sub> = 1.5 V

V<sub>OL</sub> and V<sub>OH</sub> are typical voltage output levels that occur with the output load.

**Fig 5. Propagation delay input (An) to output (Yn)**



$V_M = 1.5 V$

$V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 6. Propagation delay 3-state output enable time to LOW-level and output disable time from LOW-level**

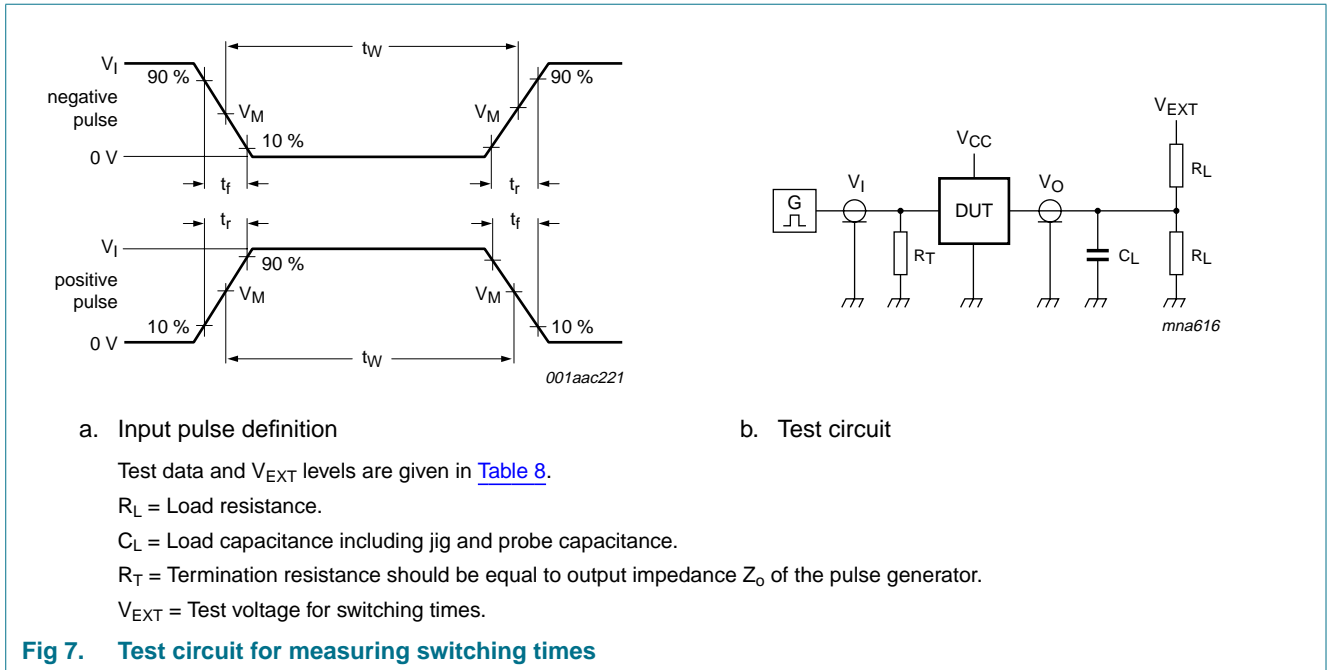


Table 8. Test data

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



12. Package outline

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

SOT137-1

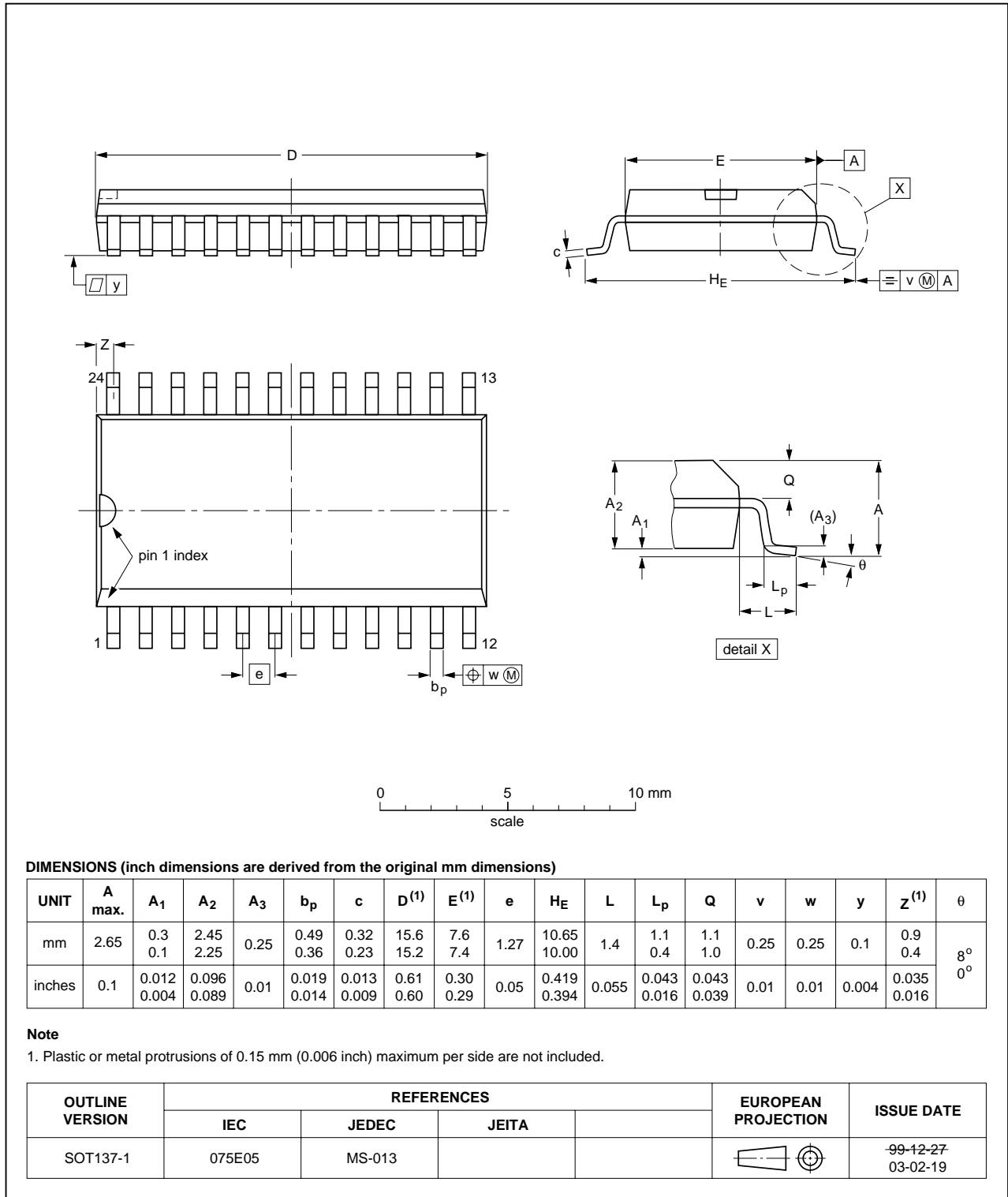


Fig 8. Package outline SOT137-1 (SO24)

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

SOT340-1

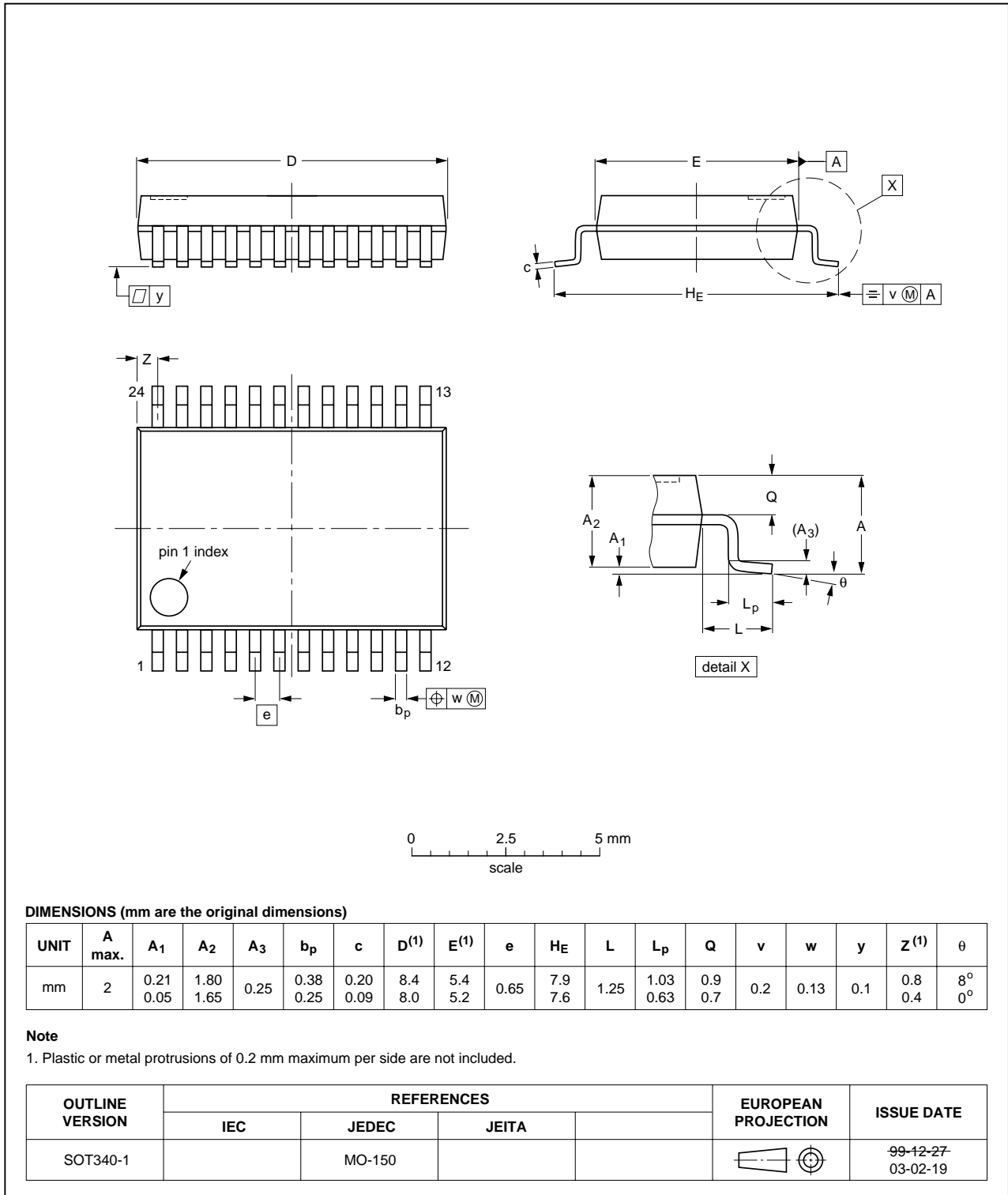


Fig 9. Package outline SOT340-1 (SSOP24)

## 13. Abbreviations

Table 9. Abbreviations

Acronym	Description
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model

## 14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74F827_4	20100129	Product data sheet	-	74F827_3
Modifications:		<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• DIP 24 (SOT222-1) package removed from <a href="#">Section 3 “Ordering information”</a> and <a href="#">Section 12 “Package outline”</a></li></ul>		
74F827_3	20040121	Product specification	-	74F827_74F828_2
74F827_74F828_2	19941205	Product specification	-	-

## 15. Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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