

# PDTA144V series

PNP resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = 10 k $\Omega$

Rev. 04 — 3 September 2009

Product data sheet

## 1. Product profile

### 1.1 General description

PNP resistor-equipped transistors.

Table 1. Product overview

Type number	Package		NPN complement
	NXP	JEITA	
PDTA144VE	SOT416	SC-75	PDTC144VE
PDTA144VK	SOT346	SC-59A	PDTC144VK
PDTA144VM	SOT883	SC-101	PDTC144VM
PDTA144VS <sup>[1]</sup>	SOT54	SC-43A	PDTC144VS
PDTA144VT	SOT23	-	PDTC144VT
PDTA144VU	SOT323	SC-70	PDTC144VU

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#))

### 1.2 Features

- Built-in bias resistors
- Reduces component count
- Simplifies circuit design
- Reduces pick and place costs

### 1.3 Applications

- General purpose switching and amplification
- Circuit drivers
- Inverter and interface circuits

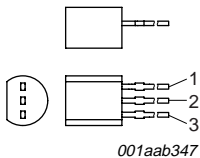
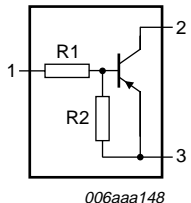
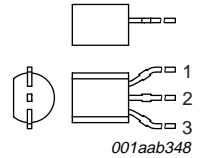
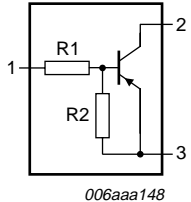
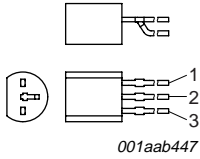
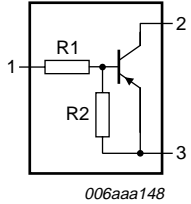
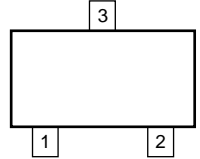
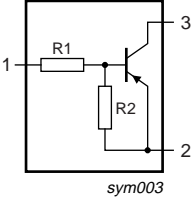
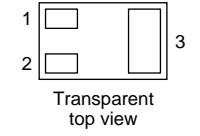
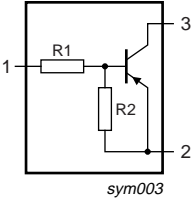
### 1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CE0}$	collector-emitter voltage	open base	-	-	-50	V
$I_O$	output current (DC)		-	-	-100	mA
R1	bias resistor 1 (input)		33	47	61	k $\Omega$
R2/R1	bias resistor ratio		0.17	0.21	0.26	

**2. Pinning information**

**Table 3. Pinning**

Pin	Description	Simplified outline	Symbol
<b>SOT54</b>			
1	input (base)	 <p>001aab347</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
<b>SOT54A</b>			
1	input (base)	 <p>001aab348</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
<b>SOT54 variant</b>			
1	input (base)	 <p>001aab447</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
<b>SOT23, SOT323, SOT346, SOT416</b>			
1	input (base)	 <p>006aaa144</p>	 <p>sym003</p>
2	GND (emitter)		
3	output (collector)		
<b>SOT883</b>			
1	input (base)	 <p>Transparent top view</p>	 <p>sym003</p>
2	GND (emitter)		
3	output (collector)		

### 3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PDTA144VE	SC-75	plastic surface mounted package; 3 leads	SOT416
PDTA144VK	SC-59A	plastic surface mounted package; 3 leads	SOT346
PDTA144VM	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTA144VS <sup>[1]</sup>	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTA144VT	-	plastic surface mounted package; 3 leads	SOT23
PDTA144VU	SC-70	plastic surface mounted package; 3 leads	SOT323

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#) and [Section 9](#)).

### 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
PDTA144VE	13
PDTA144VK	12
PDTA144VM	E9
PDTA144VS	TA144V
PDTA144VT	*AG
PDTA144VU	*12

[1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CBO</sub>	collector-base voltage	open emitter	-	-50	V
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-50	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	-15	V
V <sub>I</sub>	input voltage				
	positive		-	+15	V
	negative		-	-40	V
I <sub>O</sub>	output current (DC)		-	-100	mA
I <sub>CM</sub>	peak collector current		-	-100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C			
	SOT416		[1] -	150	mW
	SOT346		[1] -	250	mW
	SOT883		[2][3] -	250	mW
	SOT54		[1] -	500	mW
	SOT23		[1] -	250	mW
	SOT323		[1] -	200	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
T <sub>j</sub>	junction temperature		-	150	°C
T <sub>amb</sub>	ambient temperature		-65	+150	°C

[1] Refer to standard mounting conditions.

[2] Reflow soldering is the only recommended soldering method.

[3] Refer to SOT883 standard mounting conditions; FR4 printed-circuit board with 60 μm copper strip line.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air				
	SOT416		[1] -	-	833	K/W
	SOT346		[1] -	-	500	K/W
	SOT883		[2][3] -	-	500	K/W
	SOT54		[1] -	-	250	K/W
	SOT23		[1] -	-	500	K/W
	SOT323		[1] -	-	625	K/W

[1] Refer to standard mounting conditions.

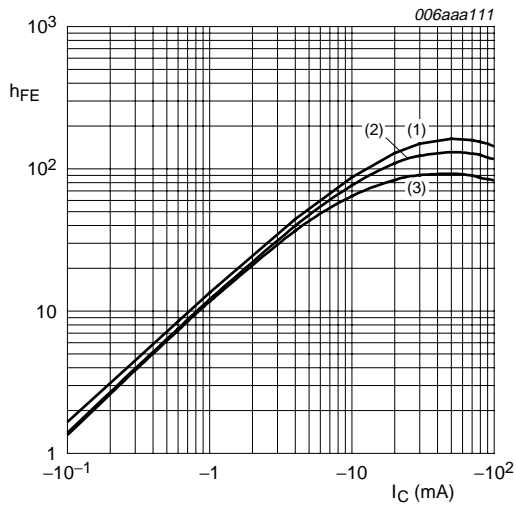
[2] Reflow soldering is the only recommended soldering method.

[3] Refer to SOT883 standard mounting conditions; FR4 printed-circuit board with 60 μm copper strip line.

## 7. Characteristics

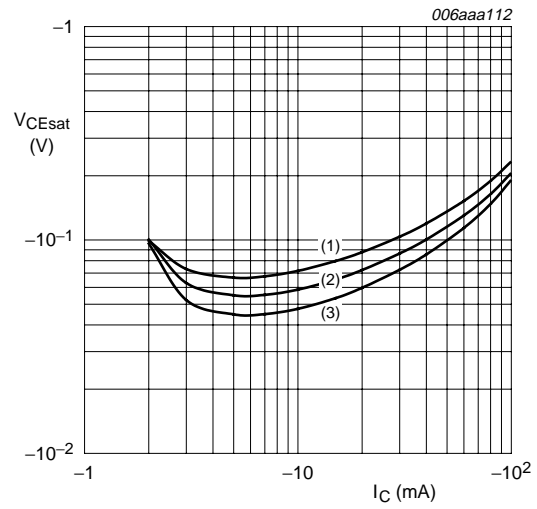
**Table 8. Characteristics**
*T<sub>amb</sub> = 25 °C unless otherwise specified*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = -50 V; I <sub>E</sub> = 0 A	-	-	-100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A	-	-	-1	$\mu$ A
		V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A; T <sub>j</sub> = 150 °C	-	-	-50	$\mu$ A
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A	-	-	-150	$\mu$ A
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -5 mA	40	-	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA	-	-	-150	mV
V <sub>I(off)</sub>	off-state input voltage	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -100 $\mu$ A	-	-3.1	-1	V
V <sub>I(on)</sub>	on-state input voltage	V <sub>CE</sub> = -300 mV; I <sub>C</sub> = -2 mA	-6	-3.8	-	V
R1	bias resistor 1 (input)		33	47	61	k $\Omega$
R2/R1	bias resistor ratio		0.17	0.21	0.26	
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = -10 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz	-	-	2	pF



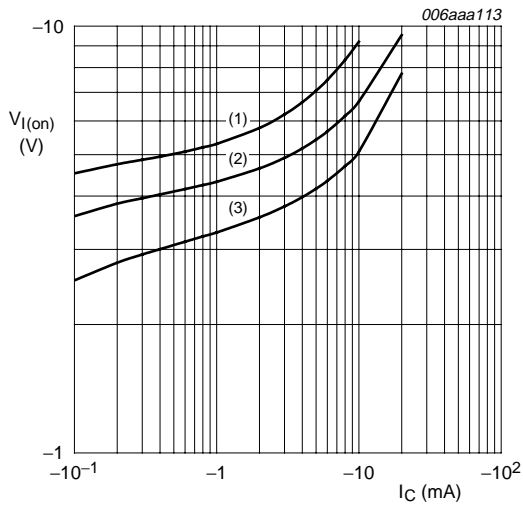
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 100\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

**Fig 1. DC current gain as a function of collector current; typical values**



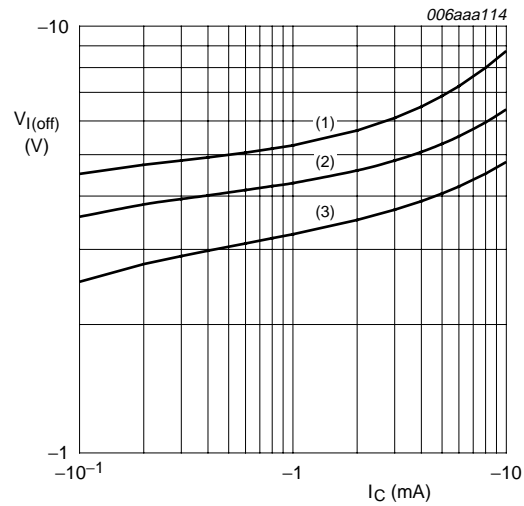
$I_C/I_B = 20$   
 (1)  $T_{amb} = 100\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

**Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values**



$V_{CE} = -0.3\text{ V}$   
 (1)  $T_{amb} = -40\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 100\text{ }^{\circ}\text{C}$

**Fig 3. On-state input voltage as a function of collector current; typical values**



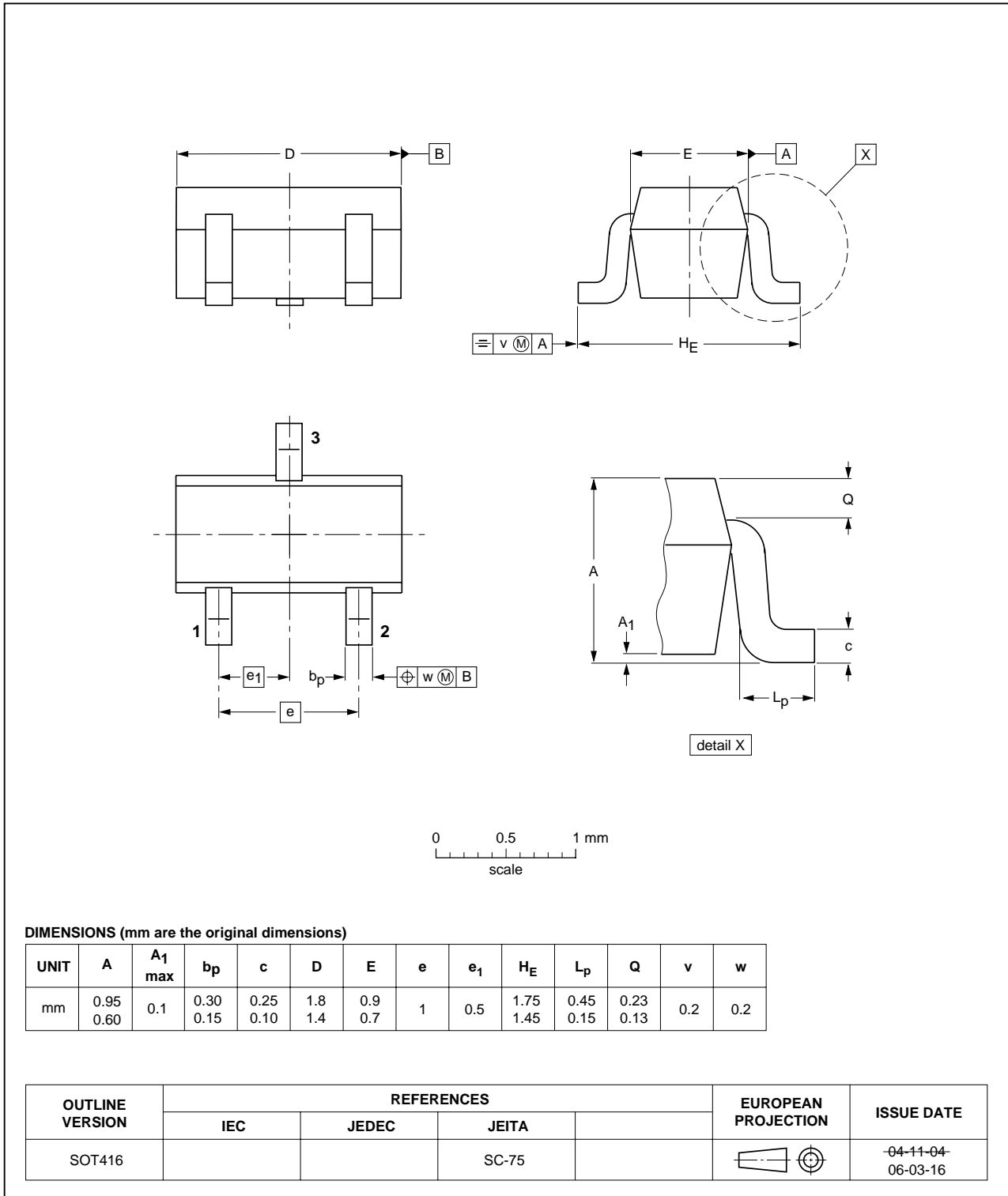
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -40\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 100\text{ }^{\circ}\text{C}$

**Fig 4. Off-state input voltage as a function of collector current; typical values**

**8. Package outline**

Plastic surface-mounted package; 3 leads

SOT416



**Fig 5. Package outline SOT416 (SC-75)**

Plastic surface-mounted package; 3 leads

SOT346

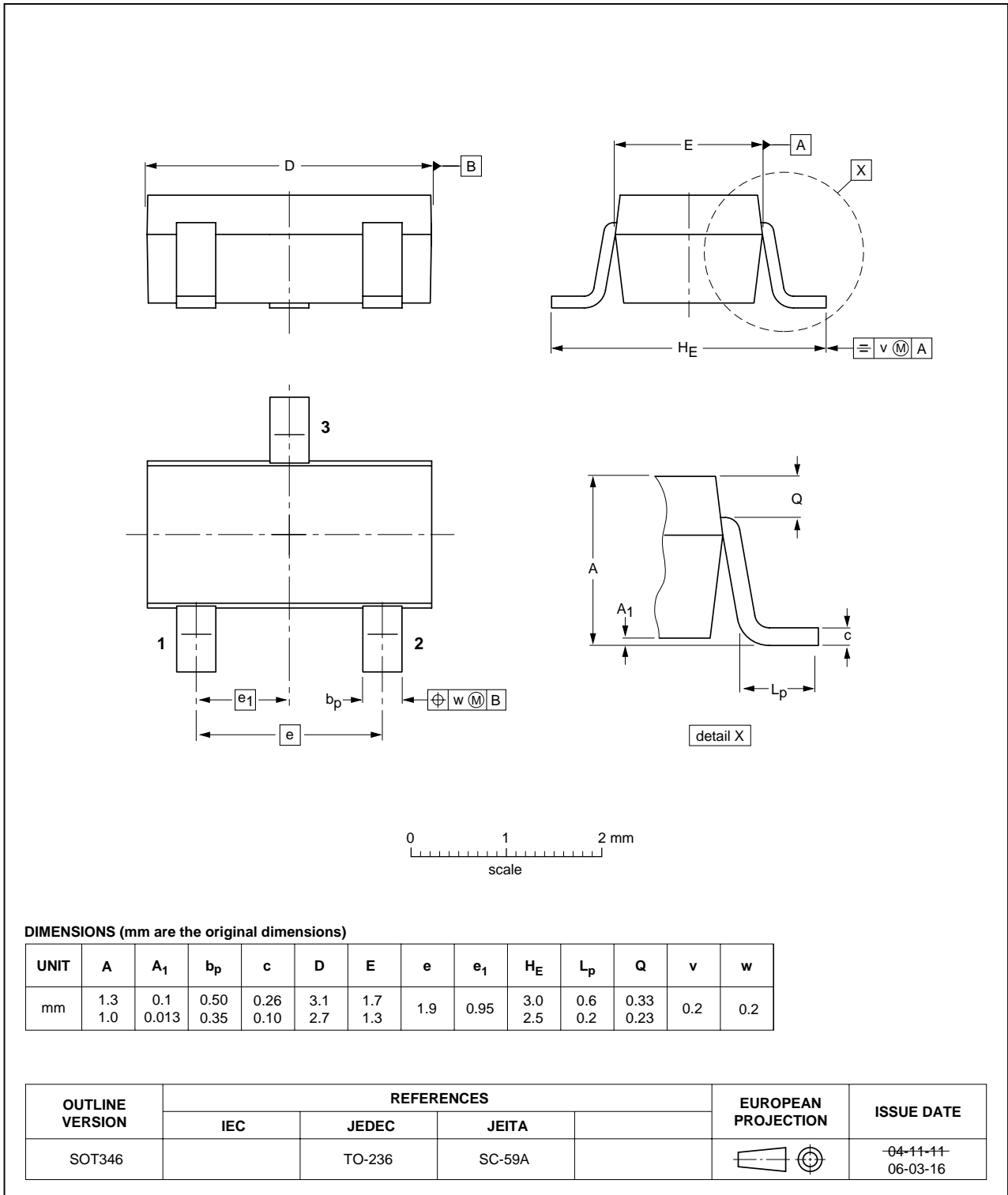


Fig 6. Package outline SOT346 (SC-59A/TO-236)



Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm

SOT883

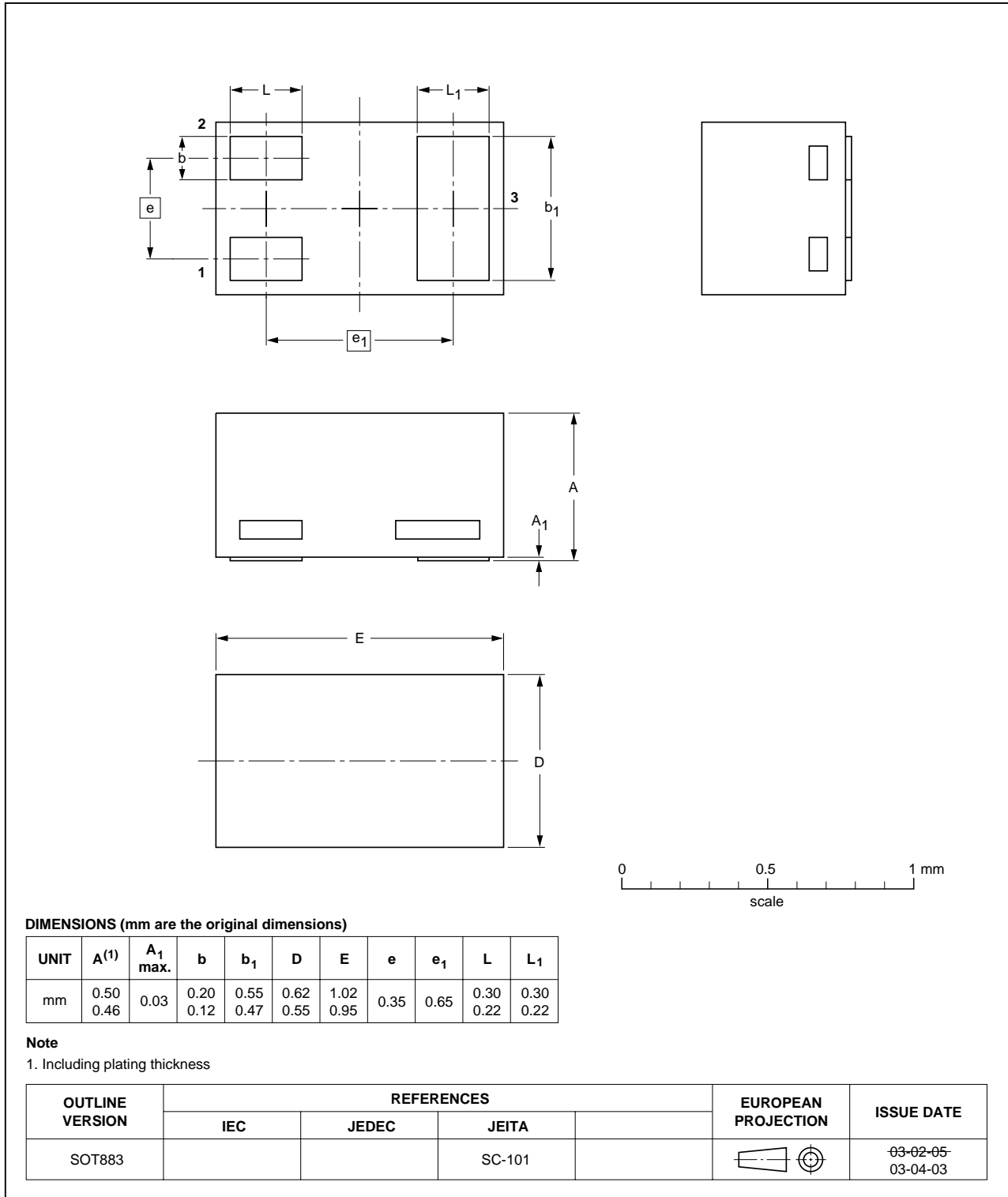
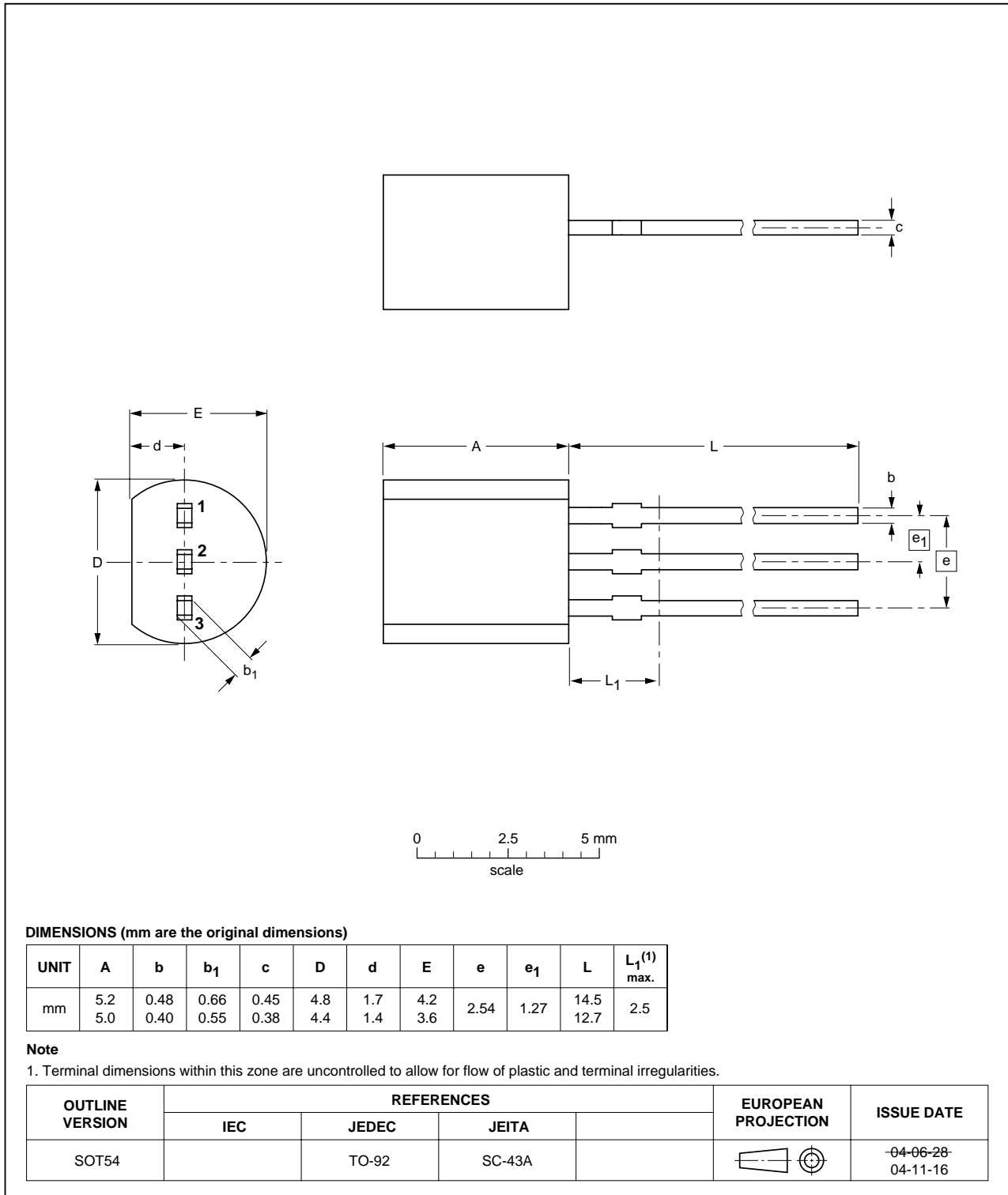


Fig 7. Package outline SOT883 (SC-101)

Plastic single-ended leaded (through hole) package; 3 leads

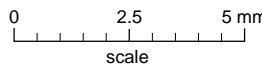
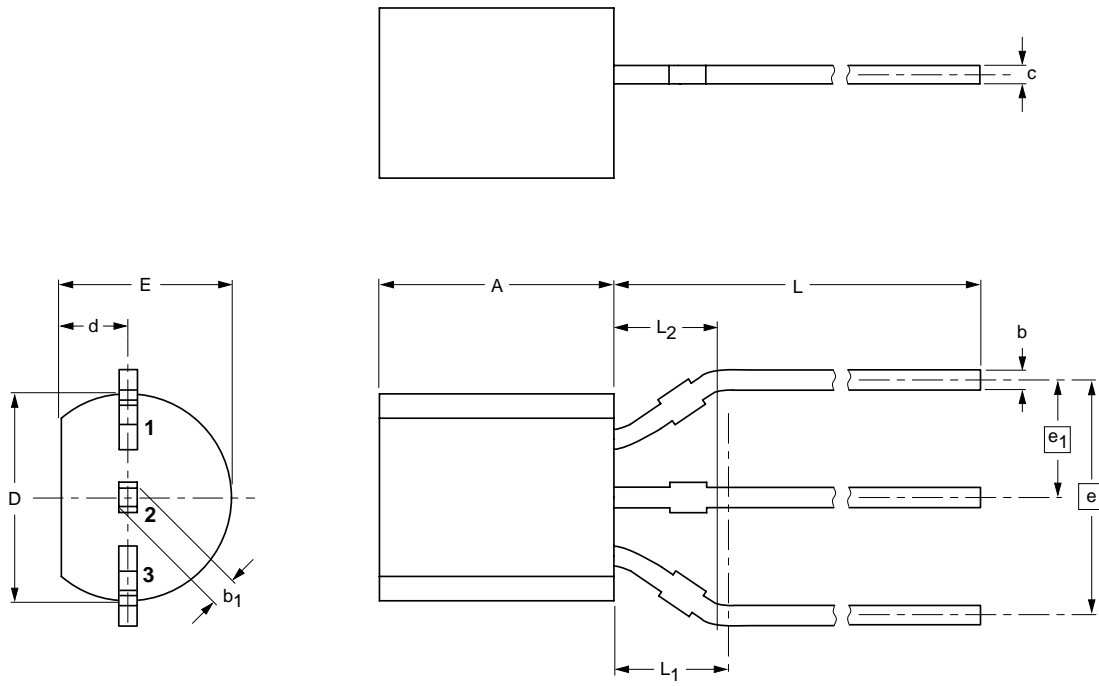
SOT54



**Fig 8. Package outline SOT54 (SC-43A/TO-92)**

Plastic single-ended leaded (through hole) package; 3 leads (wide pitch)

SOT54A



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max.	L <sub>2</sub>
mm	5.2	0.48	0.66	0.45	4.8	1.7	4.2	5.08	2.54	14.5	3	3
	5.0	0.40	0.55	0.38	4.4	1.4	3.6			12.7		2

**Note**

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT54A					97-05-13- 04-06-28

**Fig 9. Package outline SOT54A**

Plastic single-ended leaded (through hole) package; 3 leads (on-circle)

SOT54 variant

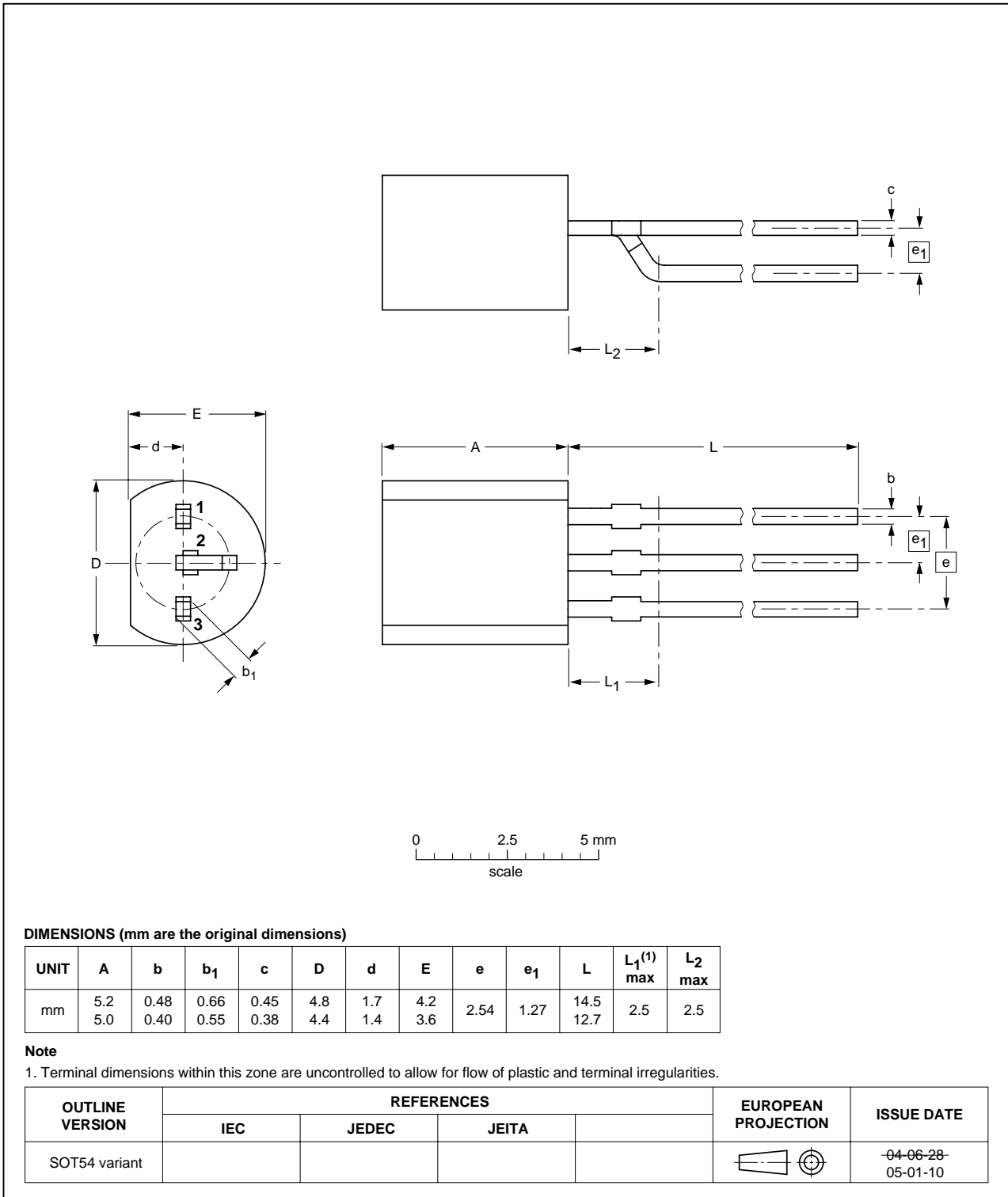


Fig 10. Package outline SOT54 variant

Plastic surface-mounted package; 3 leads

SOT23

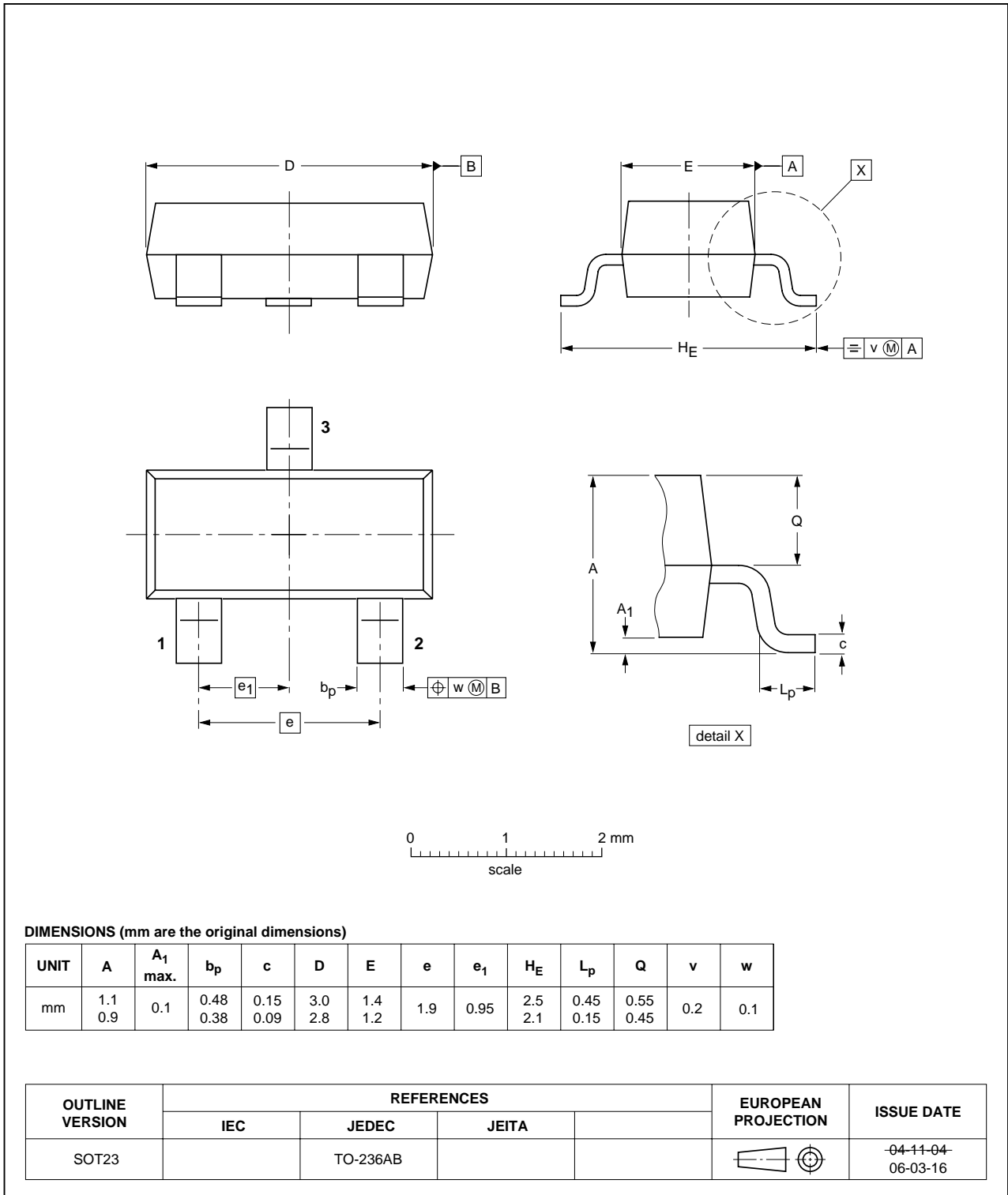


Fig 11. Package outline SOT23 (TO-236AB)

Plastic surface-mounted package; 3 leads

SOT323

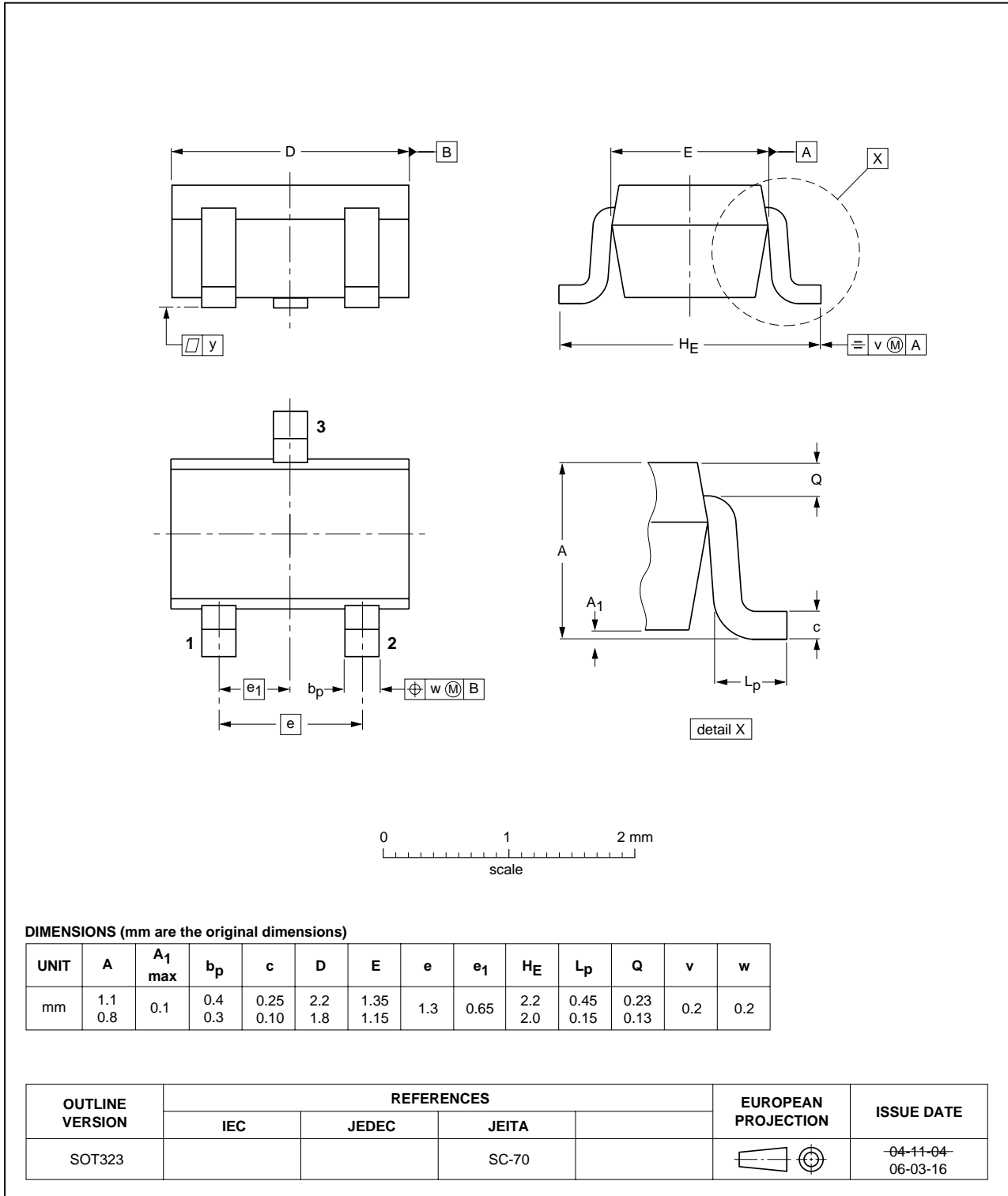


Fig 12. Package outline SOT323 (SC-70)

## 9. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code. [1]

Type number	Package	Description	Packing quantity		
			3000	5000	10000
PDTA144VE	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA144VK	SOT346	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA144VM	SOT883	2 mm pitch, 8 mm tape and reel	-	-	-315
PDTA144VS	SOT54	bulk, straight leads	-	-412	-
	SOT54A	tape and reel, wide pitch	-	-	-116
		tape ammopack, wide patch	-	-	-126
	SOT54 variant	bulk, delta pinning	-	-112	-
PDTA144VT	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-235
PDTA144VU	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-135

[1] For further information and the availability of packing methods, see [Section 12](#).

## 10. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTA144V_SER_4	20090903	Product data sheet	-	PDTA144V_SER_3
Modifications:	<ul style="list-style-type: none"> <li>• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content</li> <li>• <a href="#">Figure 5 "Package outline SOT416 (SC-75)":</a> updated</li> <li>• <a href="#">Figure 6 "Package outline SOT346 (SC-59A/TO-236)":</a> updated</li> <li>• <a href="#">Figure 11 "Package outline SOT23 (TO-236AB)":</a> updated</li> <li>• <a href="#">Figure 12 "Package outline SOT323 (SC-70)":</a> updated</li> </ul>			
PDTA144V_SER_3	20050222	Product data sheet	-	PDTA144VT_2
PDTA144VT_2	20040514	Objective data sheet	-	PDTA144VT_1
PDTA144VT_1	20040305	Objective data sheet	-	-



## 11. Legal information

### 11.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.



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Date of release: 3 September 2009

Document identifier: PDTA144V\_SER\_4

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