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Team Nexperia

PDTA113E series

PNP resistor-equipped transistors; R1 = 1 k Ω , R2 = 1 k Ω

Rev. 05 — 2 September 2009

Product data sheet

1. Product profile

1.1 General description

PNP Resistor-Equipped Transistors (RET).

Table 1. Product overview

Type number	Package			NPN complement
	NXP	JEITA	JEDEC	
PDTA113EE	SOT416	SC-75	-	PDTC113EE
PDTA113EK	SOT346	SC-59A	TO-236	PDTC113EK
PDTA113EM	SOT883	SC-101	-	PDTC113EM
PDTA113ES ^[1]	SOT54 (TO-92)	SC-43A	TO-92	PDTC113ES
PDTA113ET	SOT23	-	TO-236AB	PDTC113ET
PDTA113EU	SOT323	SC-70	-	PDTC113EU

[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

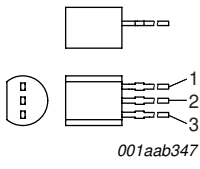
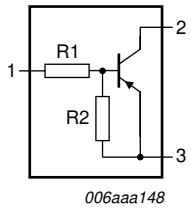
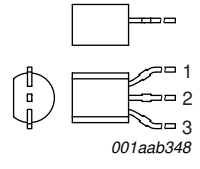
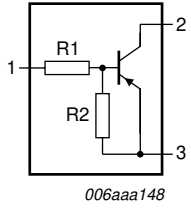
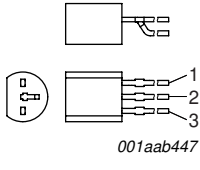
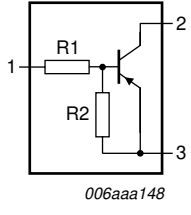
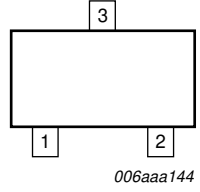
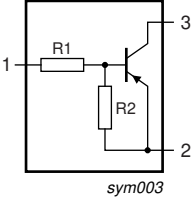
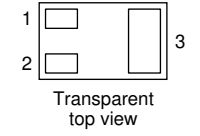
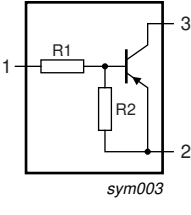
1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-50	V
I _O	output current (DC)		-	-	-100	mA
R1	bias resistor 1 (input)		0.7	1	1.3	k Ω
R2/R1	bias resistor ratio		0.8	1	1.2	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
SOT54			
1	input (base)	 <p>001aab347</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
SOT54A			
1	input (base)	 <p>001aab348</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
SOT54 variant			
1	input (base)	 <p>001aab447</p>	 <p>006aaa148</p>
2	output (collector)		
3	GND (emitter)		
SOT23, SOT323, SOT346, SOT416			
1	input (base)	 <p>006aaa144</p>	 <p>sym003</p>
2	GND (emitter)		
3	output (collector)		
SOT883			
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
PDTA113EE	SC-75	plastic surface mounted package; 3 leads	SOT416
PDTA113EK	SC-59A	plastic surface mounted package; 3 leads	SOT346
PDTA113EM	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTA113ES ^[1]	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTA113ET	-	plastic surface mounted package; 3 leads	SOT23
PDTA113EU	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 ^[1]
PDTA113EE	16
PDTA113EK	17
PDTA113EM	G4
PDTA113ES	TA113E
PDTA113ET	*15
PDTA113EU	*14

[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 _{CBO}	collector-base voltage	open emitter	-	-50	V
V _{CEO}	collector-emitter voltage	open base	-	-50	V
V _{EBO}	emitter-base voltage	open collector	-	-10	V
V _I	input voltage				
	positive		-	+10	V
	negative		-	-10	V
I _O	output current (DC)		-	-100	mA
I _{CM}	peak collector current		-	-100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 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 _{stg}	storage temperature		-65	+150
T _j	junction temperature		-	150	°C
T _{amb}	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 _{th(j-a)}	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.

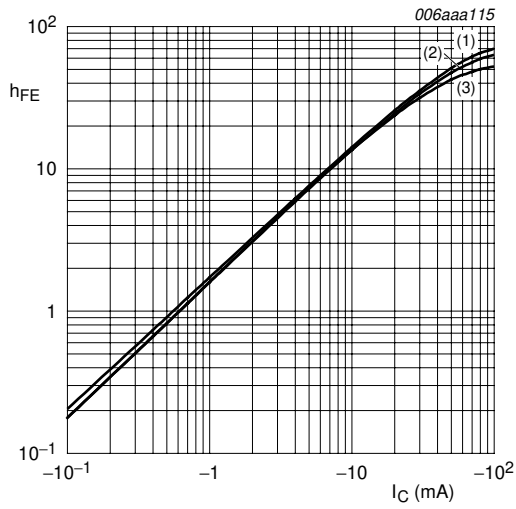
[2] Reflow soldering is the only recommended soldering method.

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

7. Characteristics

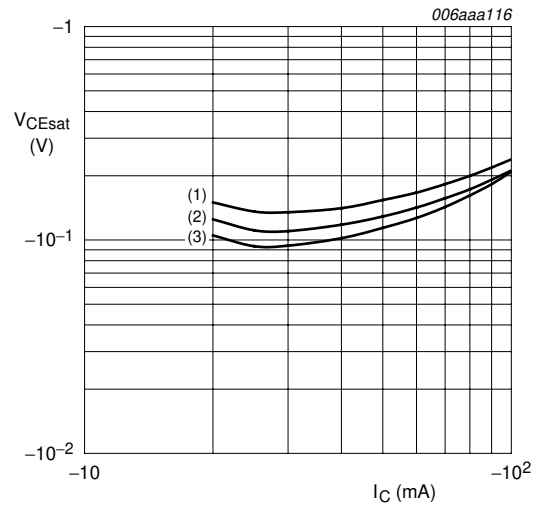
Table 8. Characteristics
T_{amb} = 25 °C unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = -50 V; I _E = 0 A	-	-	-100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = -30 V; I _B = 0 A	-	-	-1	μ A
		V _{CE} = -30 V; I _B = 0 A; T _j = 150 °C	-	-	-50	μ A
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A	-	-	-4	mA
h _{FE}	DC current gain	V _{CE} = -5 V; I _C = -40 mA	30	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -30 mA; I _B = -1.5 mA	-	-	-150	mV
V _{I(off)}	off-state input voltage	V _{CE} = -5 V; I _C = -100 μ A	-	-1.3	-0.5	V
V _{I(on)}	on-state input voltage	V _{CE} = -300 mV; I _C = -20 mA	-2	-1.7	-	V
R1	bias resistor 1 (input)		0.7	1	1.3	k Ω
R2/R1	bias resistor ratio		0.8	1	1.2	
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 1 MHz	-	-	2	pF



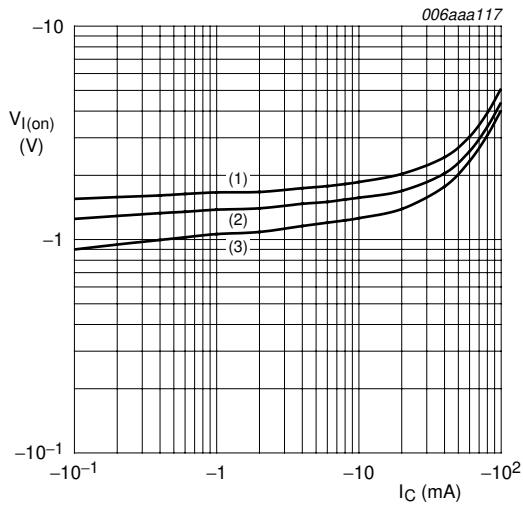
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

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



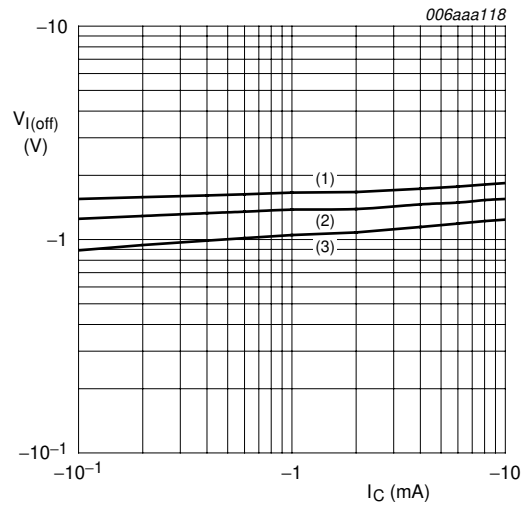
$I_C/I_B = 20$
 (1) $T_{amb} = 100 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -40 \text{ }^\circ\text{C}$

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

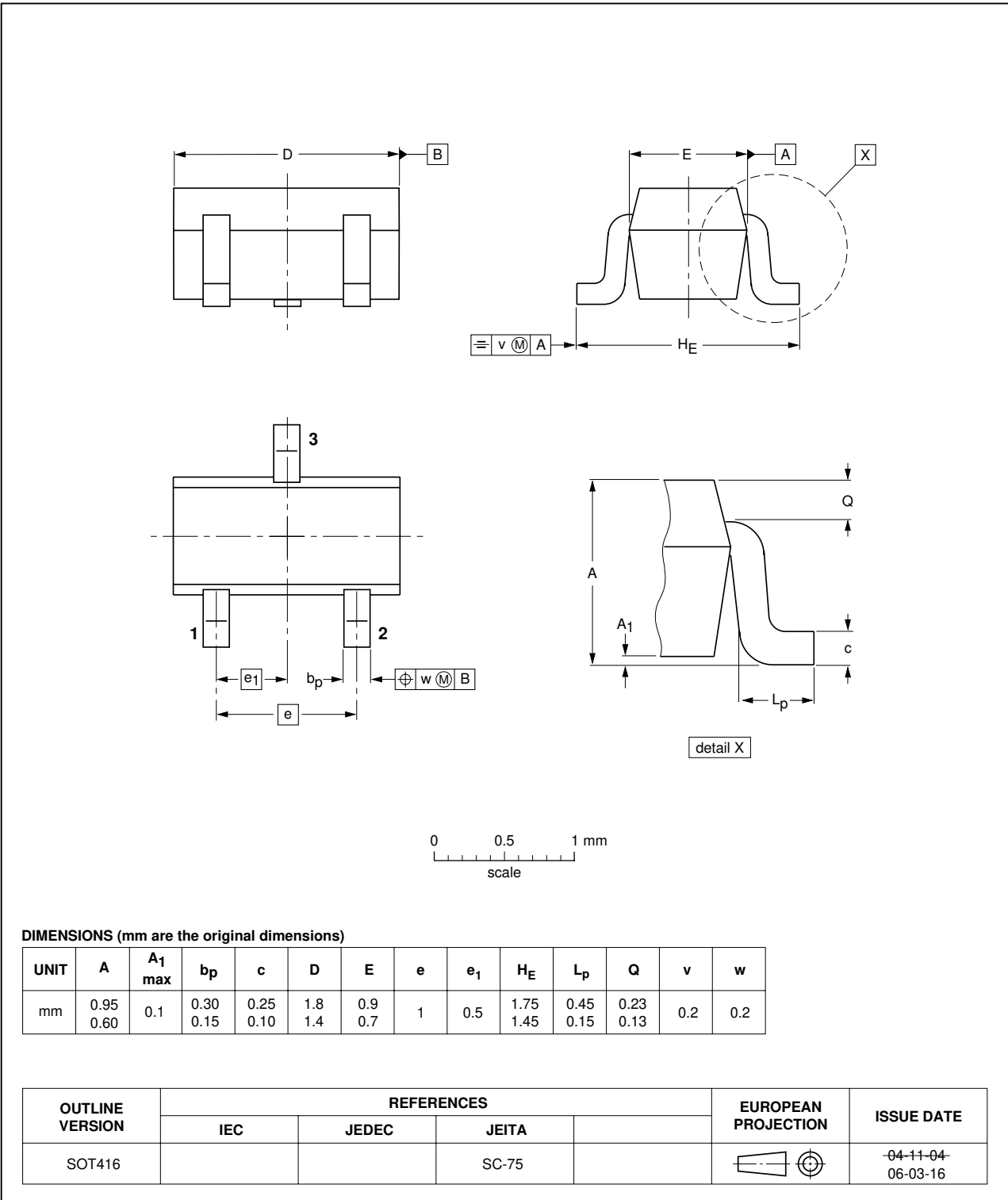


Fig 5. Package outline SOT416 (SC-75)

Plastic surface-mounted package; 3 leads

SOT346

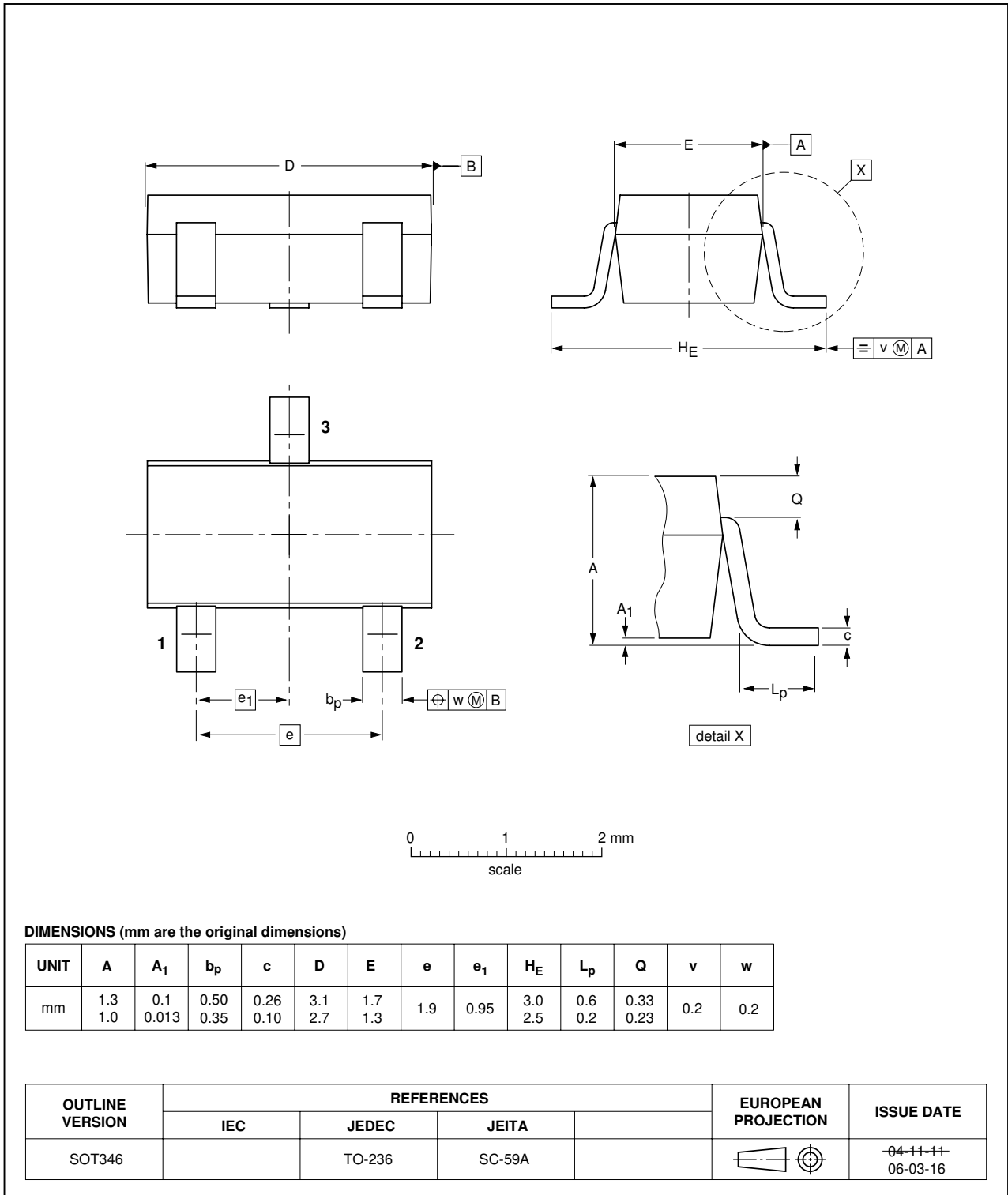


Fig 6. Package outline SOT346 (SC-59A/TO-236)

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

SOT883

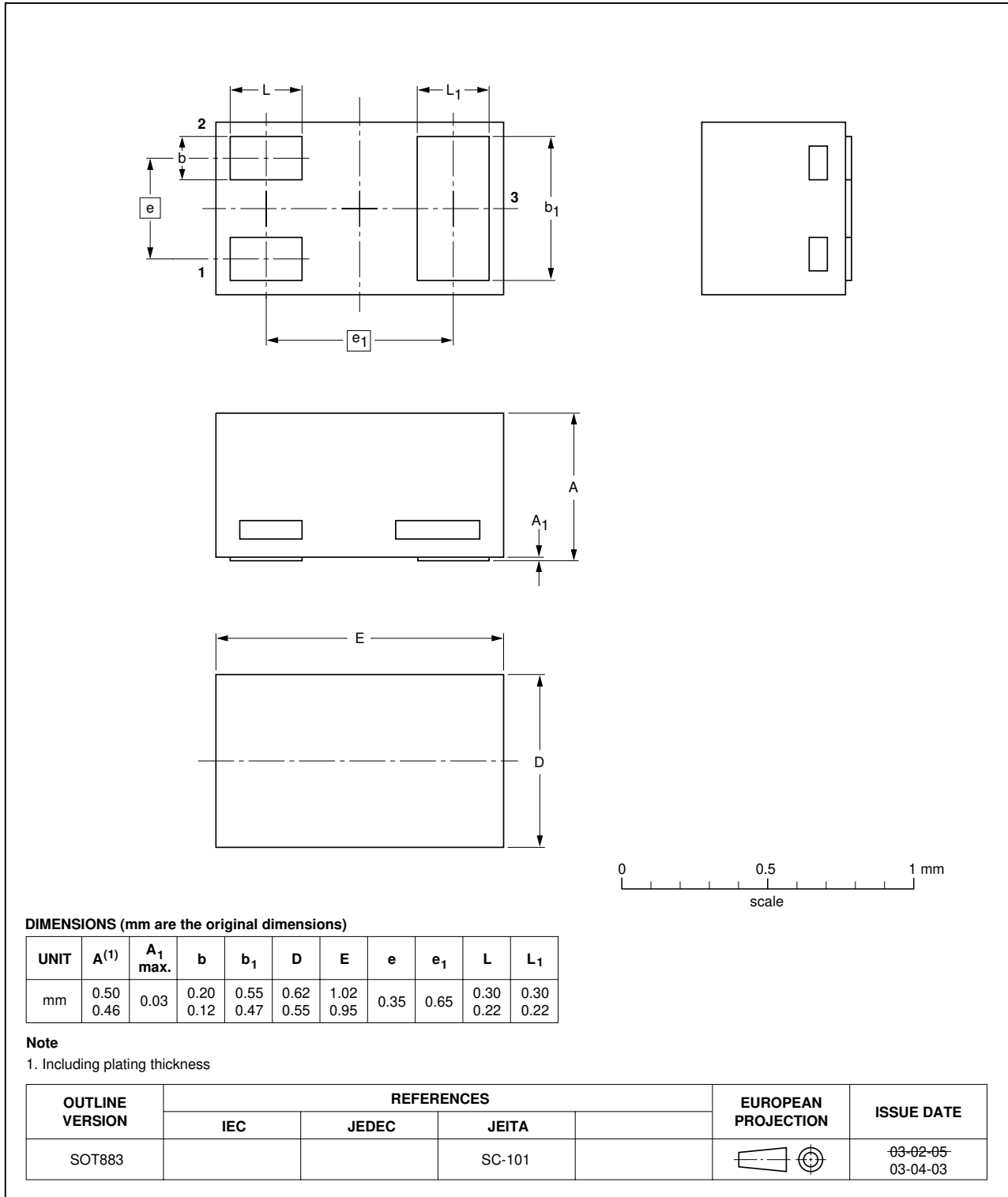


Fig 7. Package outline SOT883 (SC-101)

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

SOT54

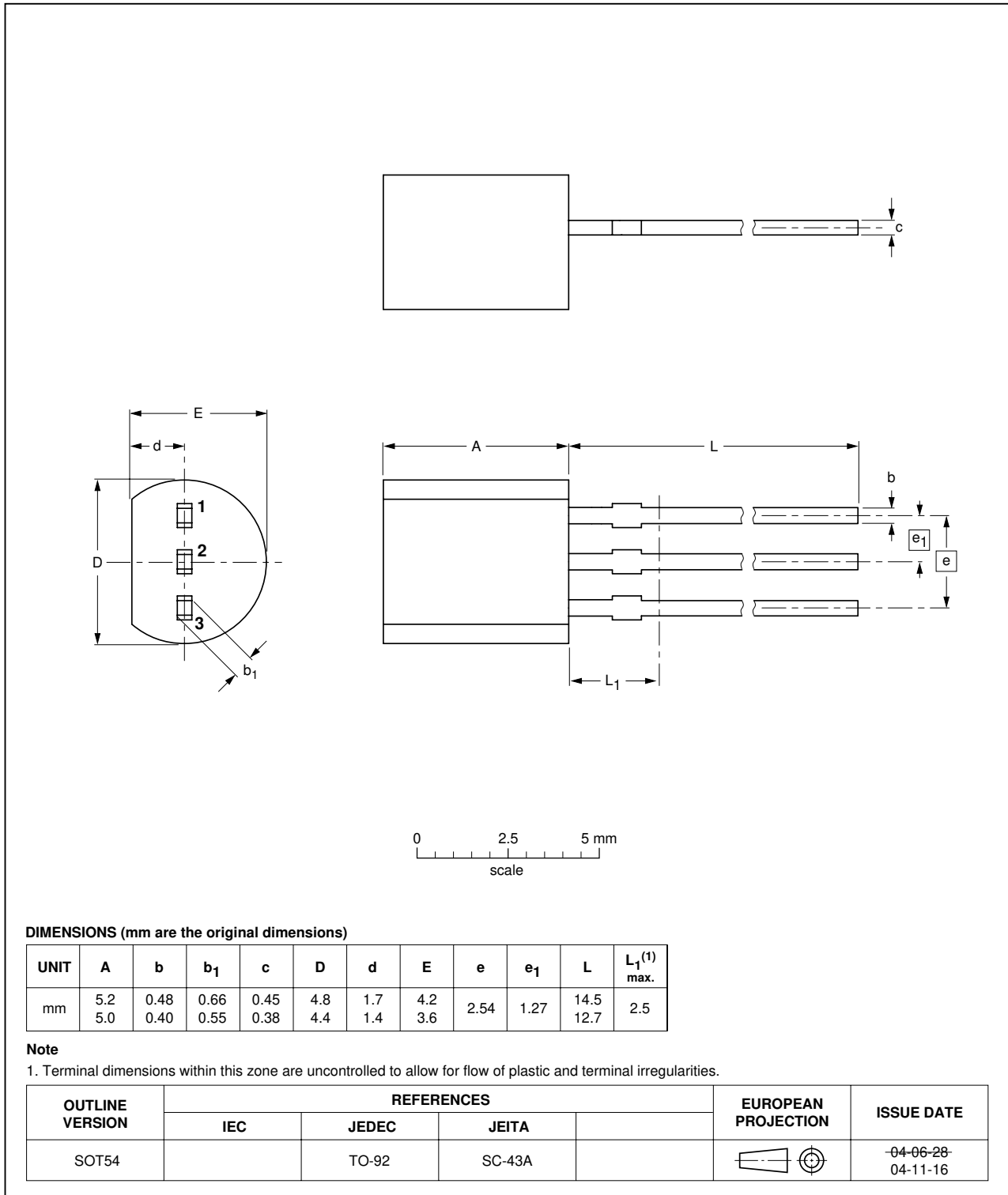


Fig 8. Package outline SOT54 (SC-43A/TO-92)

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

SOT54A

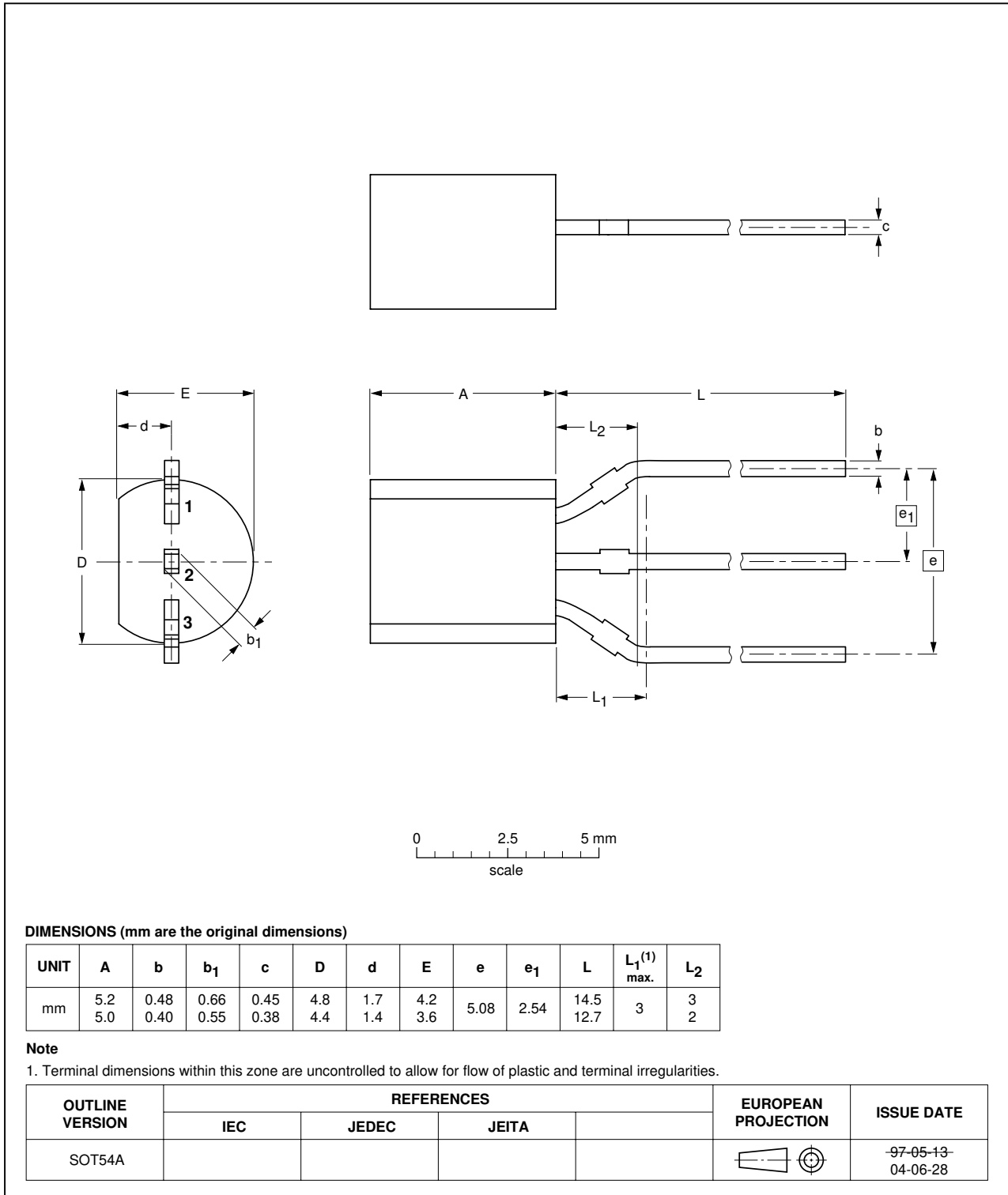


Fig 9. Package outline SOT54A

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

SOT54 variant

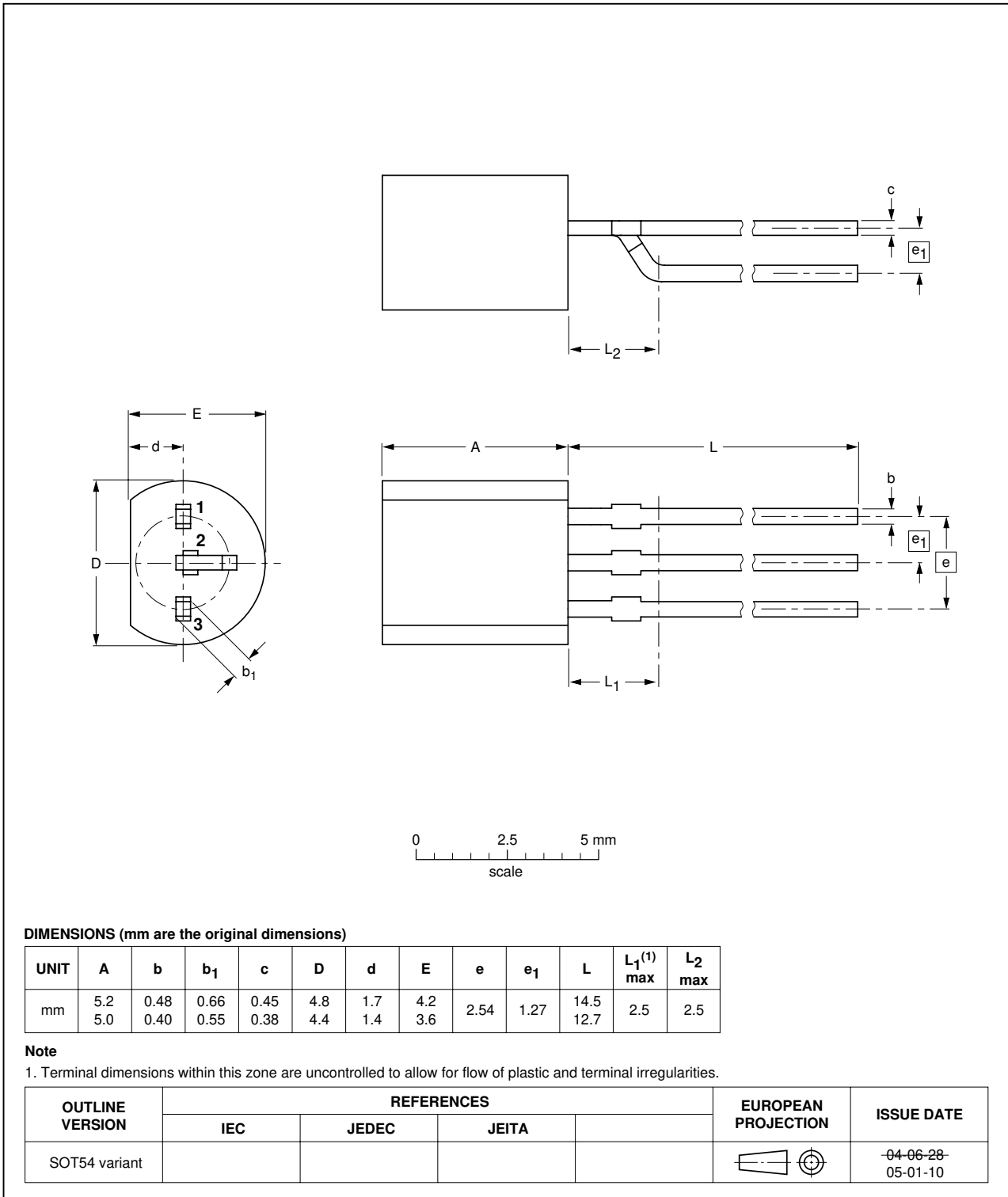


Fig 10. Package outline SOT54 variant

Plastic surface-mounted package; 3 leads

SOT23

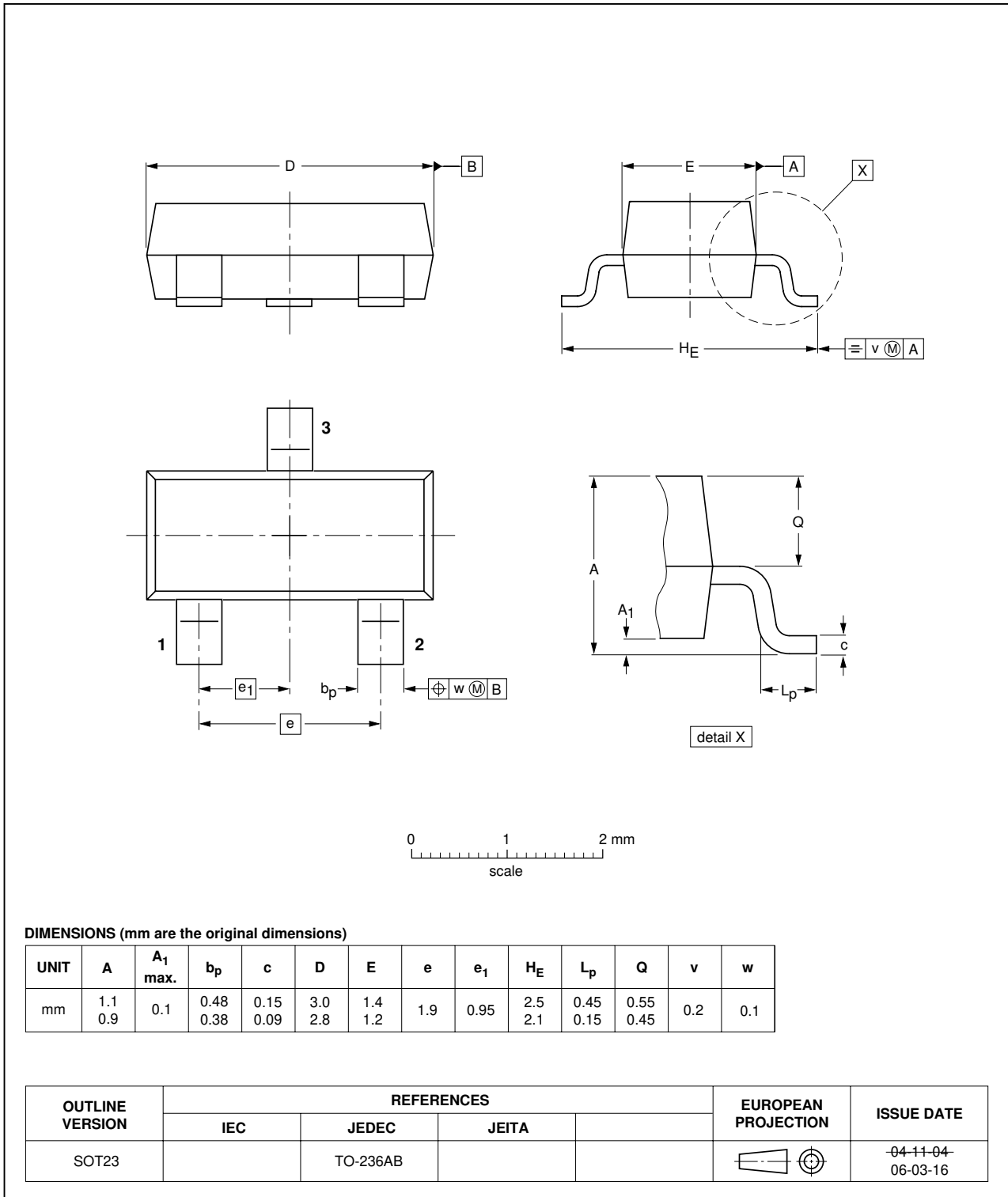


Fig 11. Package outline SOT23 (TO-236AB)

Plastic surface-mounted package; 3 leads

SOT323

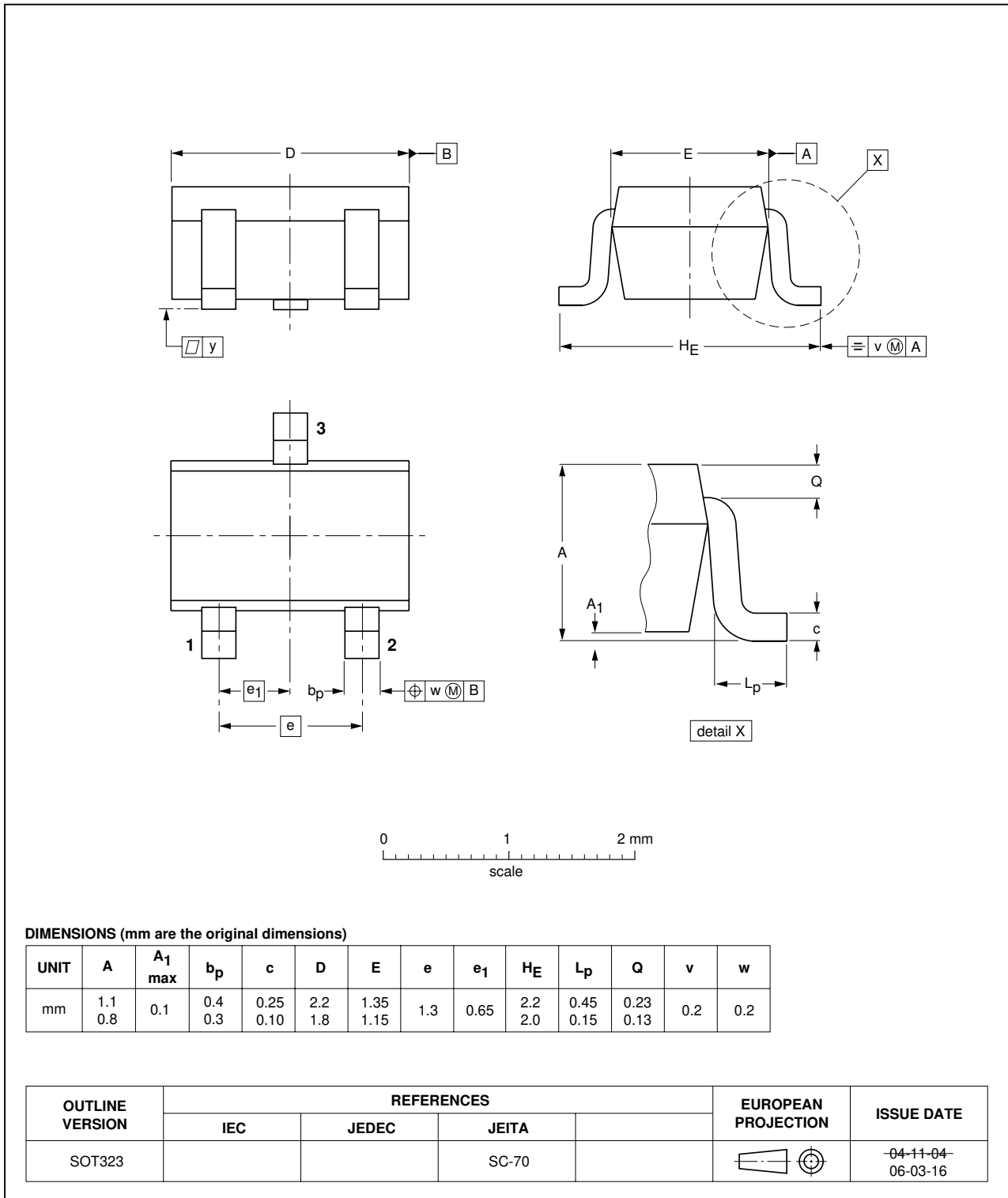


Fig 12. Package outline SOT323 (SC-70)

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
PDTA113EE	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA113EK	SOT346	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA113EM	SOT883	2 mm pitch, 8 mm tape and reel	-	-	-315
PDTA113ES	SOT54	bulk, straight leads	-	-412	-
	SOT54A	tape and reel, wide pitch	-	-	-116
	SOT54A	tape ammopack, wide patch	-	-	-126
	SOT54 variant	bulk, delta pinning	-	-112	-
PDTA113ET	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-235
PDTA113EU	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
PDTA113E_SER_5	20090902	Product data sheet	-	PDTA113E_SER_4
Modifications:		<ul style="list-style-type: none"> 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. Figure 5 "Package outline SOT416 (SC-75)" updated Figure 6 "Package outline SOT346 (SC-59A/TO-236)" updated Figure 11 "Package outline SOT23 (TO-236AB)" updated Figure 12 "Package outline SOT323 (SC-70)" updated 		
PDTA113E_SER_4	20050405	Product data sheet	-	PDTA113ET_3
PDTA113ET_3	20040720	Objective data sheet	-	PDTA113ET_2
PDTA113ET_2	20040415	Objective data sheet	-	PDTA113ET_1
PDTA113ET_1	20040316	Objective data sheet	-	-

11. Legal information

11.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	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.
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[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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