

DATA SHEET

PDTC123E series

NPN resistor-equipped transistors;

R1 = 2.2 k Ω , R2 = 2.2 k Ω

Product specification
Supersedes data of 2004 Mar 18

2004 Aug 06

NPN resistor-equipped transistors; R1 = 2.2 k Ω , R2 = 2.2 k Ω

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FEATURES

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

APPLICATIONS

- General purpose switching and amplification
- Inverter and interface circuits
- Circuit driver.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V _{CEO}	collector-emitter voltage	–	50	V
I _O	output current (DC)	–	100	mA
R1	bias resistor	2.2	–	k Ω
R2	bias resistor	2.2	–	k Ω

DESCRIPTION

NPN resistor-equipped transistor (see “Simplified outline, symbol and pinning” for package details).

PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE	PNP COMPLEMENT
	PHILIPS	EIAJ		
PDTC123EE	SOT416	SC-75	5A	PDTA123EE
PDTC123EEF	SOT490	SC-89	6A	PDTA123EEF
PDTC123EK	SOT346	SC-59	48	PDTA123EK
PDTC123EM	SOT883	SC-101	G1	PDTA123EM
PDTC123ES	SOT54 (TO-92)	SC-43	TC123E	PDTA123ES
PDTC123ET	SOT23	–	*26 ⁽¹⁾	PDTA123ET
PDTC123EU	SOT323	SC-70	*48 ⁽¹⁾	PDTA123EU

Note

- * = p: Made in Hong Kong.
* = t: Made in Malaysia.
* = W: Made in China.

NPN resistor-equipped transistors;
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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC123ES		1 2 3	base collector emitter
PDTC123EE PDTC123EEF PDTC123EK PDTC123ET PDTC123EU		1 2 3	base emitter collector
PDTC123EM		1 2 3	base emitter collector

NPN resistor-equipped transistors;
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ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC123EE	–	plastic surface mounted package; 3 leads	SOT416
PDTC123EEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC123EK	–	plastic surface mounted package; 3 leads	SOT346
PDTC123EM	–	leadless ultra small package; 3 solder lands; body $1.0 \times 0.6 \times 0.5 \text{ mm}$	SOT883
PDTC123ES	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC123ET	–	plastic surface mounted package; 3 leads	SOT23
PDTC123EU	–	plastic surface mounted package; 3 leads	SOT323

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		–	+12	V
	negative		–	–10	V
I_o	output current (DC)		–	100	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$			
	SOT54	note 1	–	500	mW
	SOT23	note 1	–	250	mW
	SOT346	note 1	–	250	mW
	SOT323	note 1	–	200	mW
	SOT416	note 1	–	150	mW
	SOT490	notes 1 and 2	–	250	mW
	SOT883	notes 2 and 3	–	250	mW
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_j	junction temperature		–	150	$^\circ\text{C}$
T_{amb}	operating ambient temperature		–65	+150	$^\circ\text{C}$

Notes

1. Refer to standard mounting conditions.
2. Reflow soldering is the only recommended soldering method.
3. Refer to SOT883 standard mounting conditions; FR4 with $60 \text{ }\mu\text{m}$ copper strip line.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		
	SOT54	note 1	250	K/W
	SOT23	note 1	500	K/W
	SOT346	note 1	500	K/W
	SOT323	note 1	625	K/W
	SOT416	note 1	833	K/W
	SOT490	notes 1 and 2	500	K/W
	SOT883	notes 2 and 3	500	K/W

Notes

1. Refer to standard mounting conditions.
2. Reflow soldering is the only recommended soldering method.
3. Refer to SOT883 standard mounting conditions; FR4 with 60 μm copper strip line.

CHARACTERISTICS

$T_{amb} = 25 \text{ }^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 50 \text{ V}$; $I_E = 0 \text{ A}$	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$; $I_B = 0 \text{ A}$	–	–	1	μA
		$V_{CE} = 30 \text{ V}$; $I_B = 0 \text{ A}$; $T_j = 150 \text{ }^\circ\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$; $I_C = 0 \text{ A}$	–	–	2	mA
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}$; $I_C = 20 \text{ mA}$	30	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10 \text{ mA}$; $I_B = 0.5 \text{ mA}$	–	–	150	mV
$V_{i(off)}$	input-off voltage	$I_C = 1 \text{ mA}$; $V_{CE} = 5 \text{ V}$	–	1.2	0.5	V
$V_{i(on)}$	input-on voltage	$I_C = 20 \text{ mA}$; $V_{CE} = 0.3 \text{ V}$	2	1.6	–	V
R1	input resistor		1.54	2.2	2.86	$\text{k}\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
C_c	collector capacitance	$V_{CB} = 10 \text{ V}$; $I_E = I_e = 0 \text{ A}$; $f = 1 \text{ MHz}$	–	–	2.5	pF

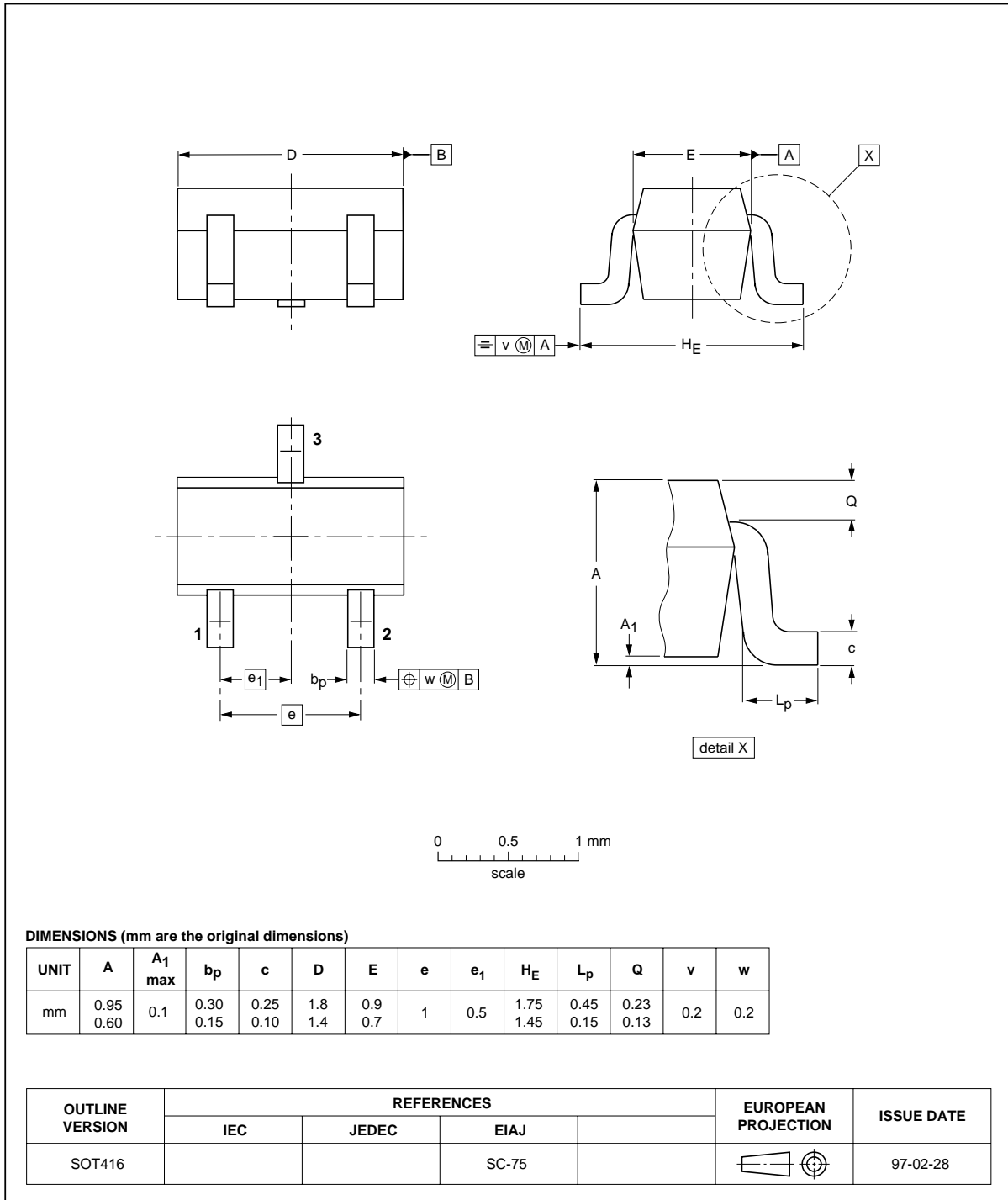
NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT416

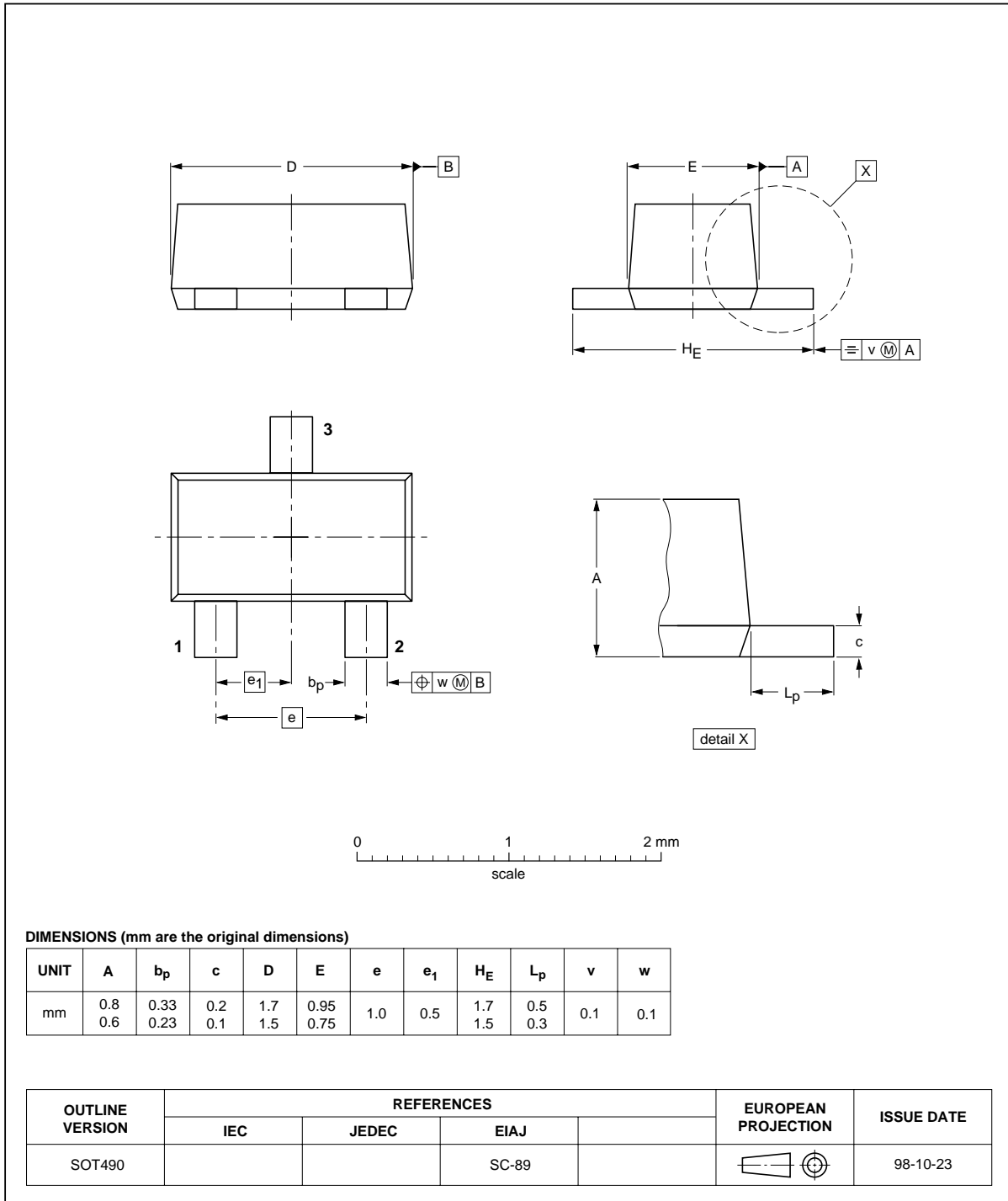


NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

Plastic surface mounted package; 3 leads

SOT490

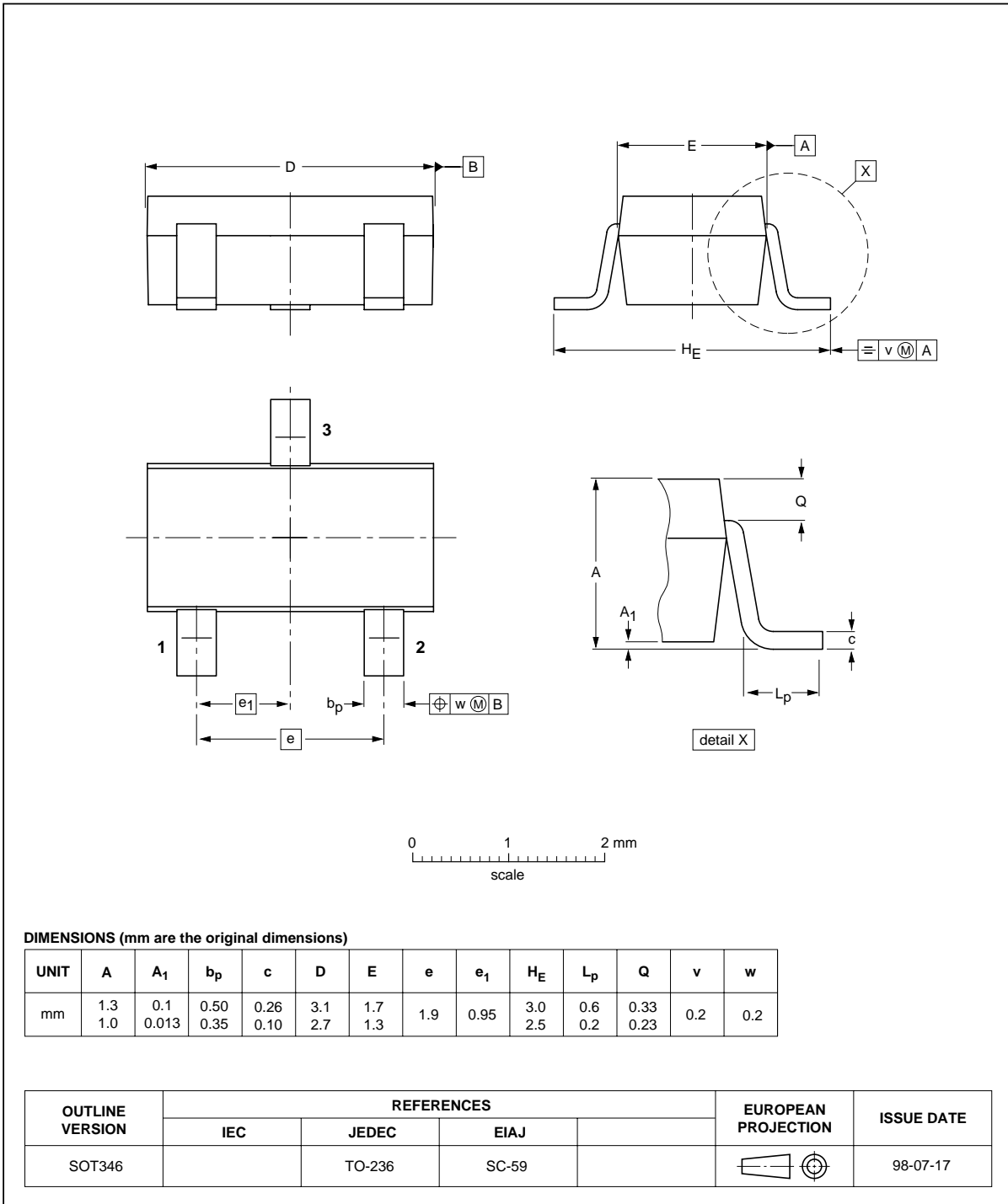


NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

Plastic surface mounted package; 3 leads

SOT346

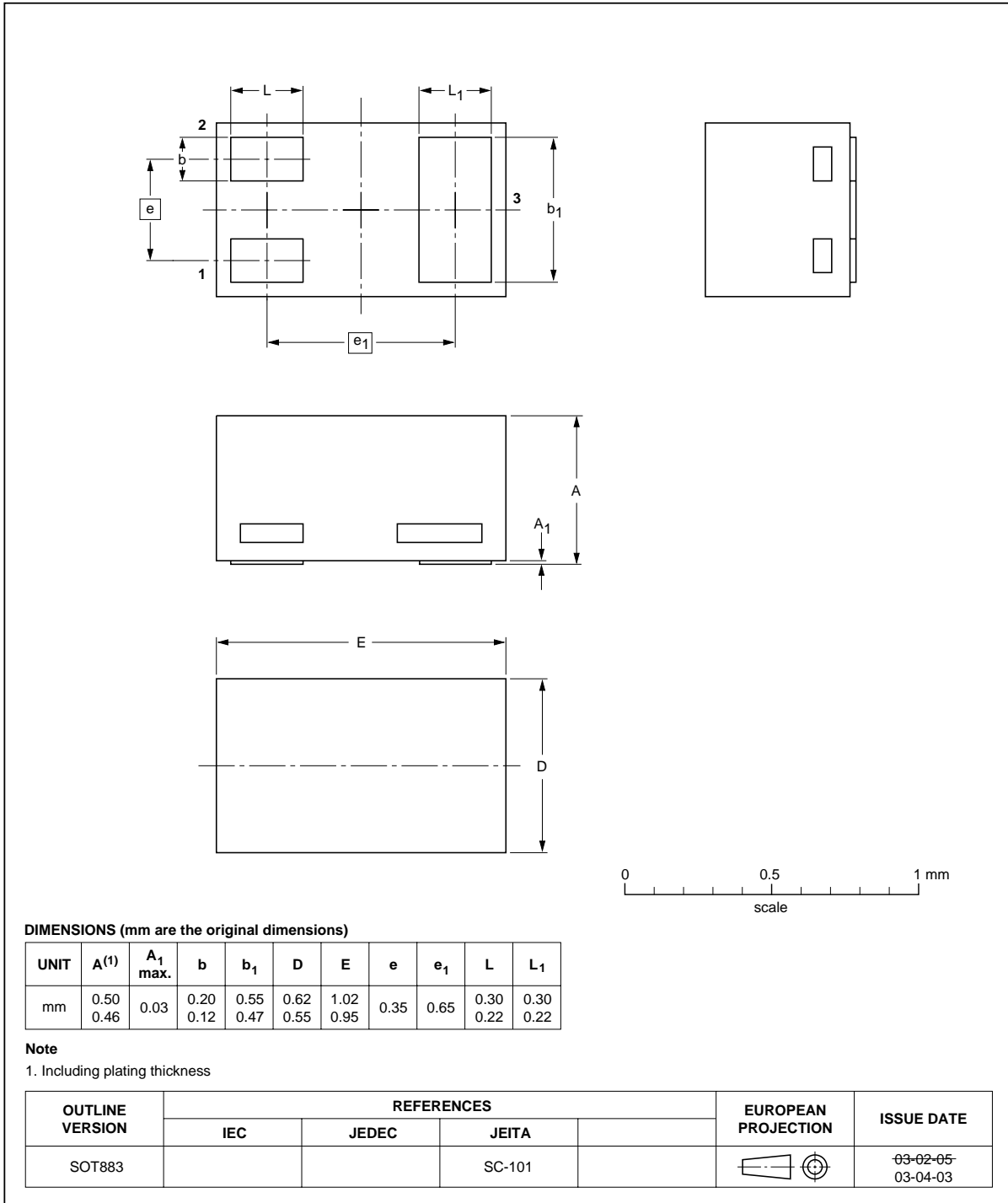


NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

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

SOT883

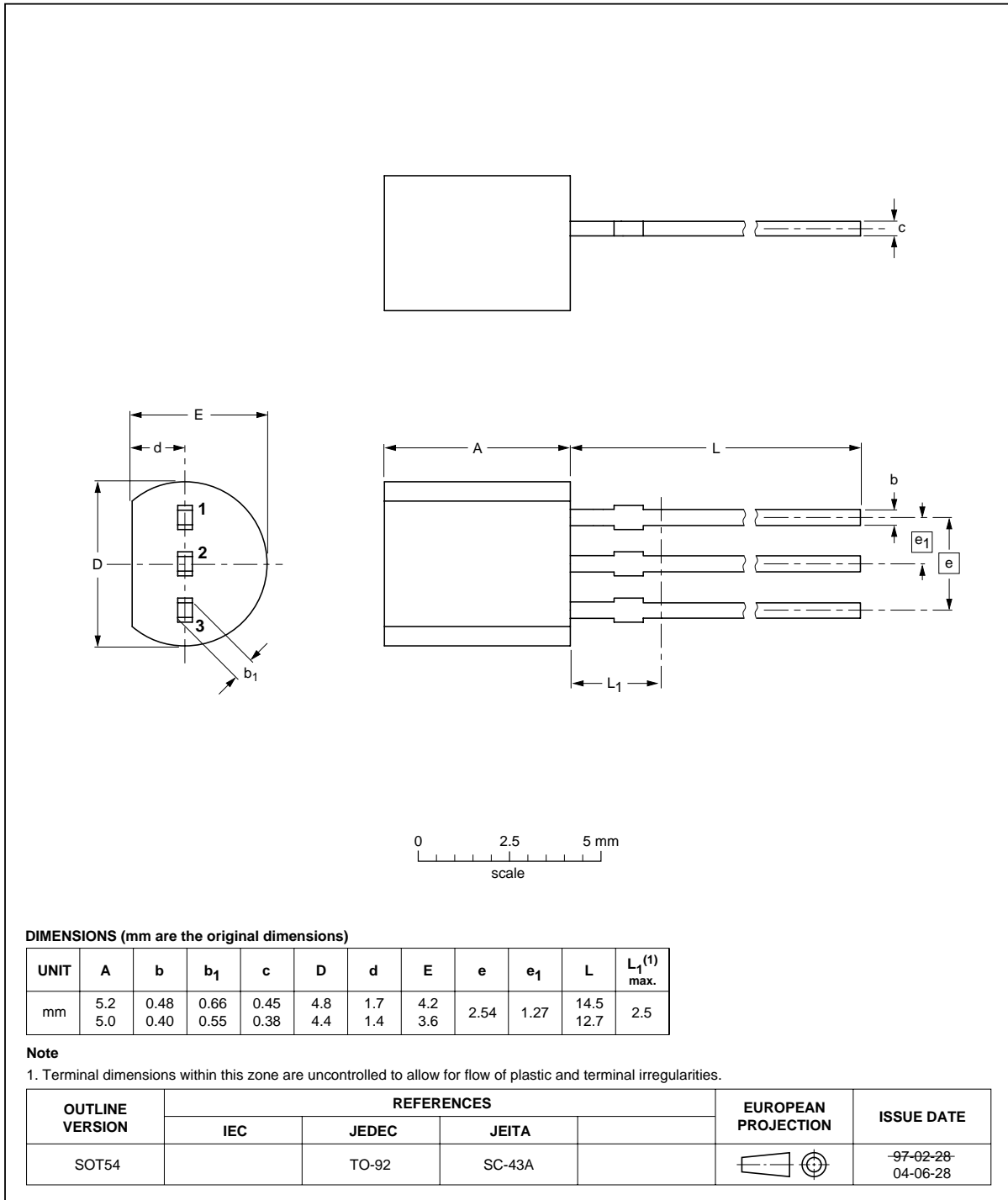


NPN resistor-equipped transistors;
 R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

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

SOT54

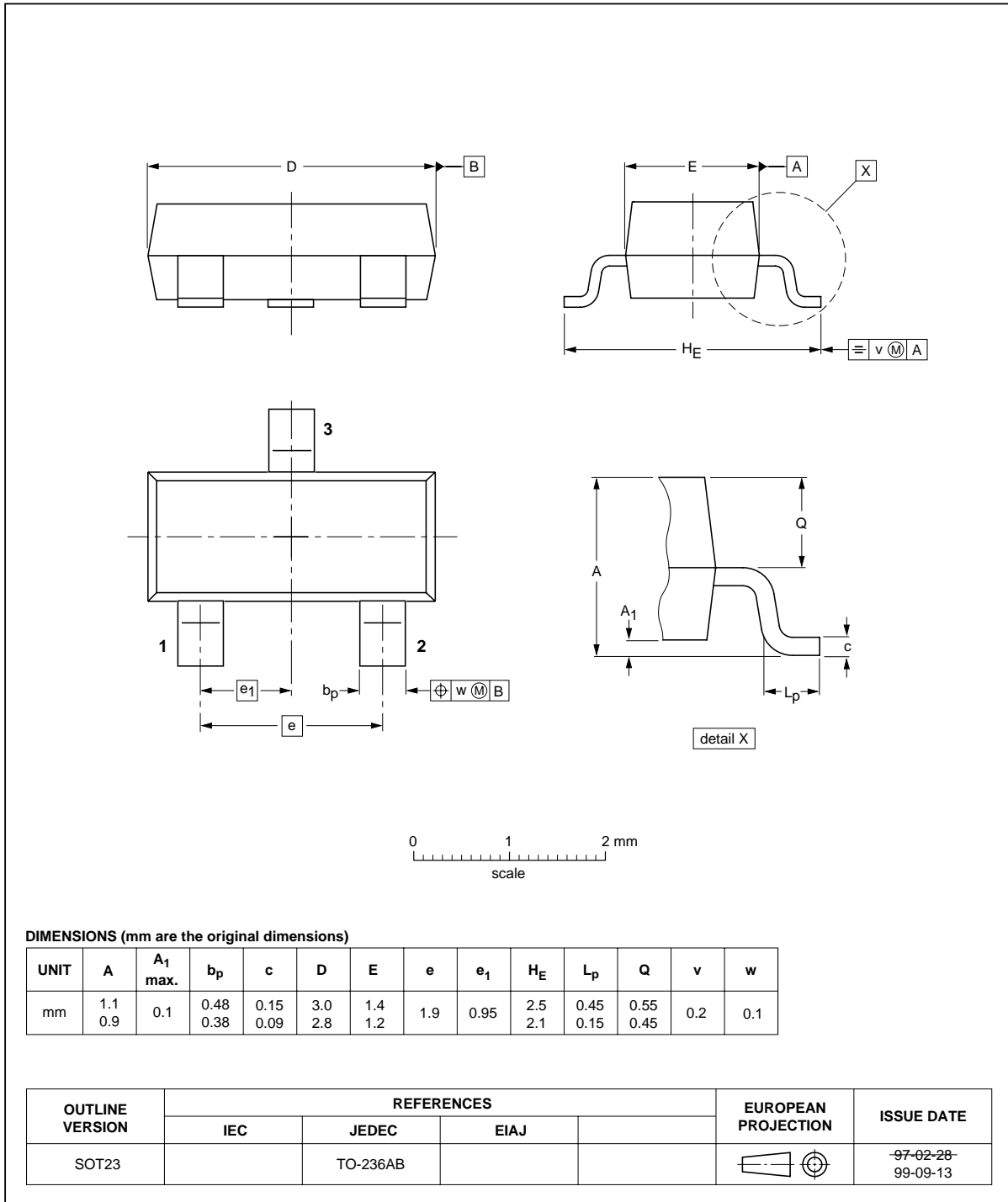


NPN resistor-equipped transistors;
R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

Plastic surface mounted package; 3 leads

SOT23

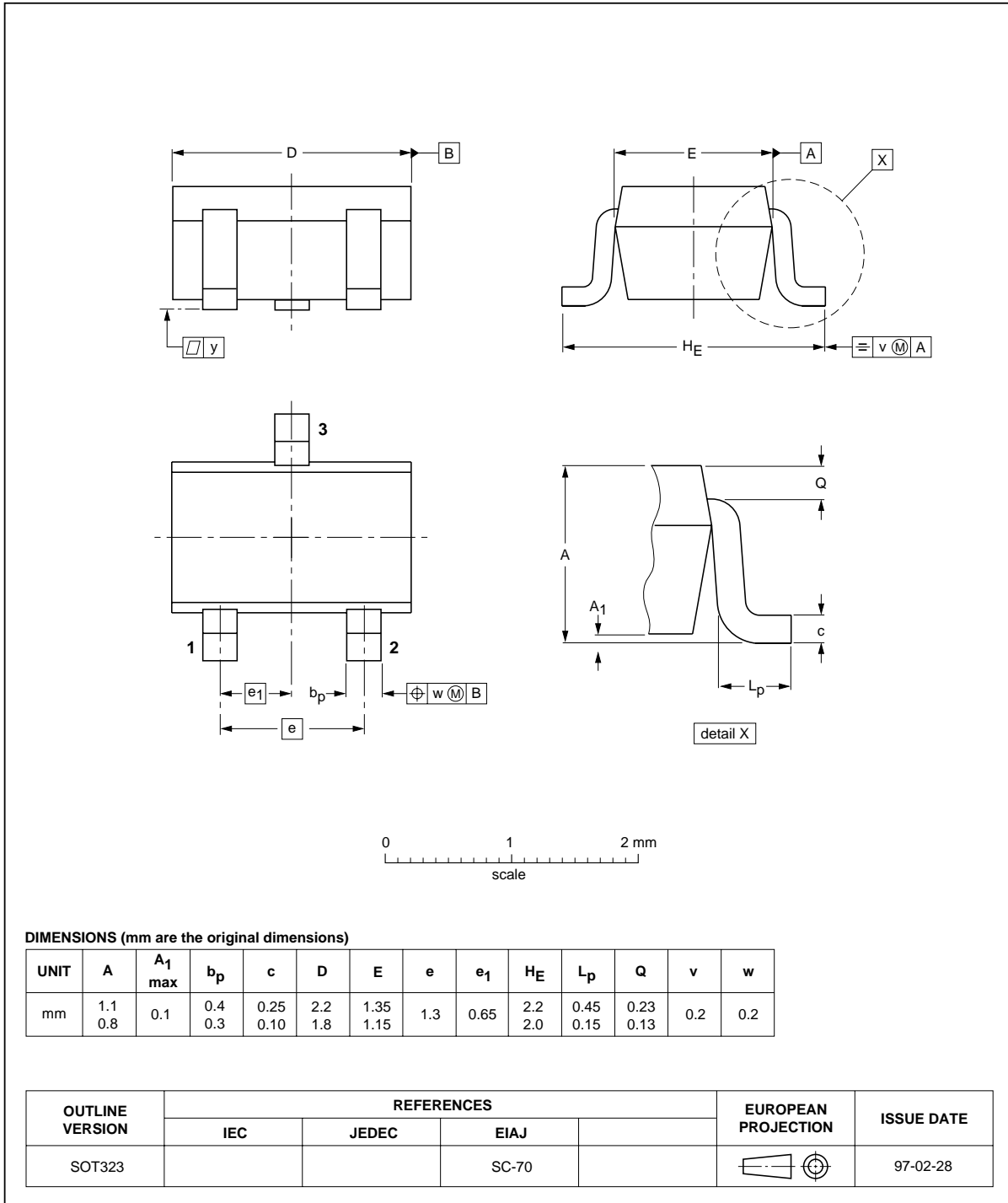


NPN resistor-equipped transistors;
 R1 = 2.2 kΩ, R2 = 2.2 kΩ

PDTC123E series

Plastic surface mounted package; 3 leads

SOT323



NPN resistor-equipped transistors;
R1 = 2.2 k Ω , R2 = 2.2 k Ω

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DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Notes

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