

DATA SHEET

PDTC115E series

NPN resistor-equipped transistors;

R1 = 100 k Ω , R2 = 100 k Ω

Product data sheet
Supersedes data of 2004 Apr 06

2004 Aug 06

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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)	–	20	mA
R1	bias resistor	100	–	k Ω
R2	bias resistor	100	–	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		
PDTC115EE	SOT416	SC-75	46	PDTA115EE
PDTC115EEF	SOT490	SC-89	49	PDTA115EEF
PDTC115EK	SOT346	SC-59	56	PDTA115EK
PDTC115EM	SOT883	SC-101	DV	PDTA115EM
PDTC115ES	SOT54 (TO-92)	SC-43	TC115E	PDTA115ES
PDTC115ET	SOT23	–	*44 ⁽¹⁾	PDTA115ET
PDTC115EU	SOT323	SC-70	*15 ⁽¹⁾	PDTA115EU

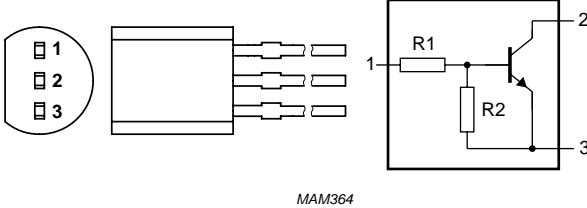
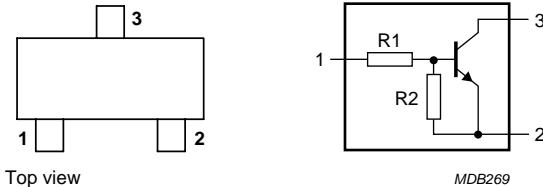
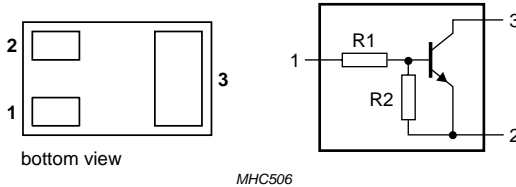
Note

- * = 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
PDTC115ES		1 2 3	base collector emitter
PDTC115EE PDTC115EEF PDTC115EK PDTC115ET PDTC115EU		1 2 3	base emitter collector
PDTC115EM		1 2 3	base emitter collector

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ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC115EE	–	plastic surface mounted package; 3 leads	SOT416
PDTC115EEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC115EK	–	plastic surface mounted package; 3 leads	SOT346
PDTC115EM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTC115ES	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC115ET	–	plastic surface mounted package; 3 leads	SOT23
PDTC115EU	–	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		–	+40	V
	negative		–	–10	V
I _O	output current (DC)		–	20	mA
I _{CM}	peak collector current		–	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °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
	SOT883	notes 2 and 3	–	250	mW
	SOT490	notes 1 and 2	–	250	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°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 μ 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
	SOT833	notes 2 and 3	500	K/W
	SOT490	notes 1 and 2	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 μ m copper strip line.

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	–	–	50	μ A
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 5 mA	80	–	–	
V _{CEsat}	collector-emitter saturation voltage	I _C = 5 mA; I _B = 0.25 mA	–	–	150	mV
V _{i(off)}	input-off voltage	I _C = 100 μ A; V _{CE} = 5 V	–	1.1	0.5	V
V _{i(on)}	input-on voltage	I _C = 1 mA; V _{CE} = 0.3 V	3	1.5	–	V
R1	input resistor		70	100	130	k Ω
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
C _c	collector capacitance	I _E = I _e = 0 A; V _{CB} = 10 V; f = 1 MHz	–	–	2.5	pF

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PACKAGE OUTLINES

Plastic surface-mounted package; 3 leads

SOT416

Technical drawing of the SOT416 package showing top, side, and lead views with dimensions A, A1, bp, c, D, E, e, e1, HE, Lp, Q, v, w, and detail X.

0 0.5 1 mm
scale

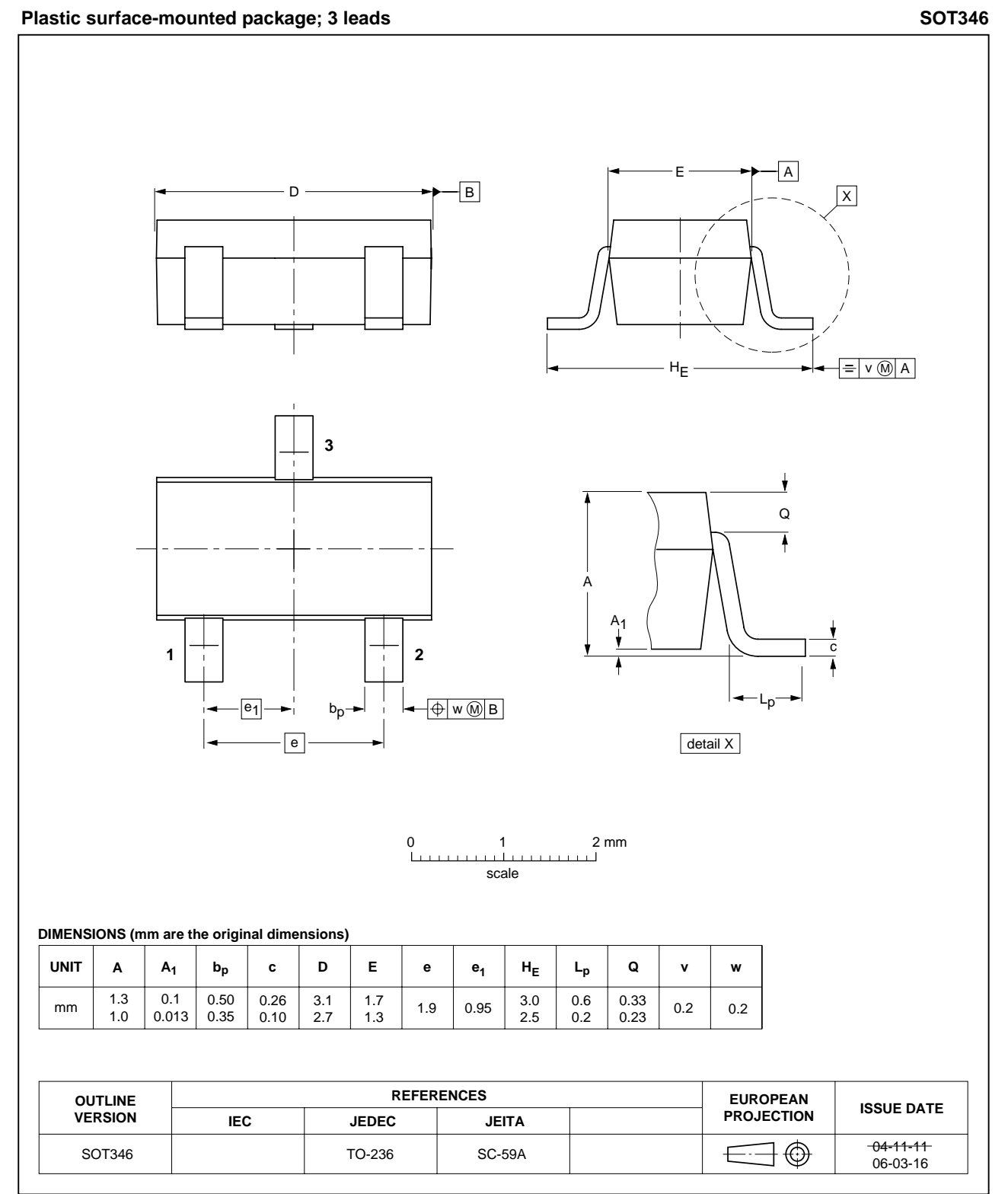
DIMENSIONS (mm are the original dimensions)

UNIT	A	A1 max	bp	c	D	E	e	e1	HE	Lp	Q	v	w
mm	0.95 0.60	0.1	0.30 0.15	0.25 0.10	1.8 1.4	0.9 0.7	1	0.5	1.75 1.45	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT416			SC-75			04-11-04 06-03-16

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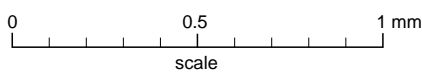
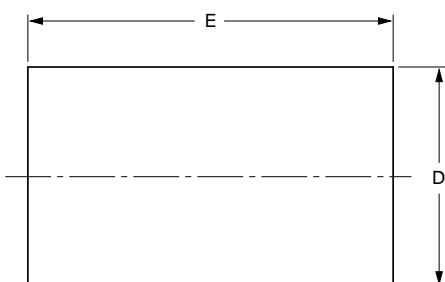
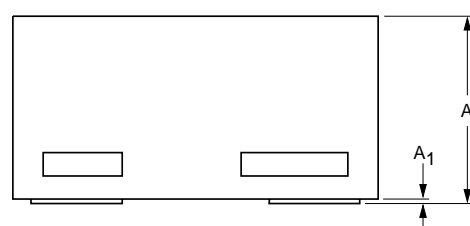
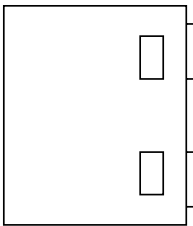
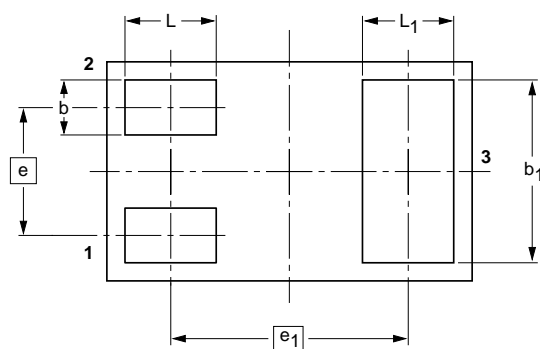


NPN resistor-equipped transistors;
R1 = 100 kΩ, R2 = 100 kΩ

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

SOT883

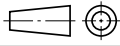


DIMENSIONS (mm are the original dimensions)

UNIT	A ⁽¹⁾	A ₁ max.	b	b ₁	D	E	e	e ₁	L	L ₁
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

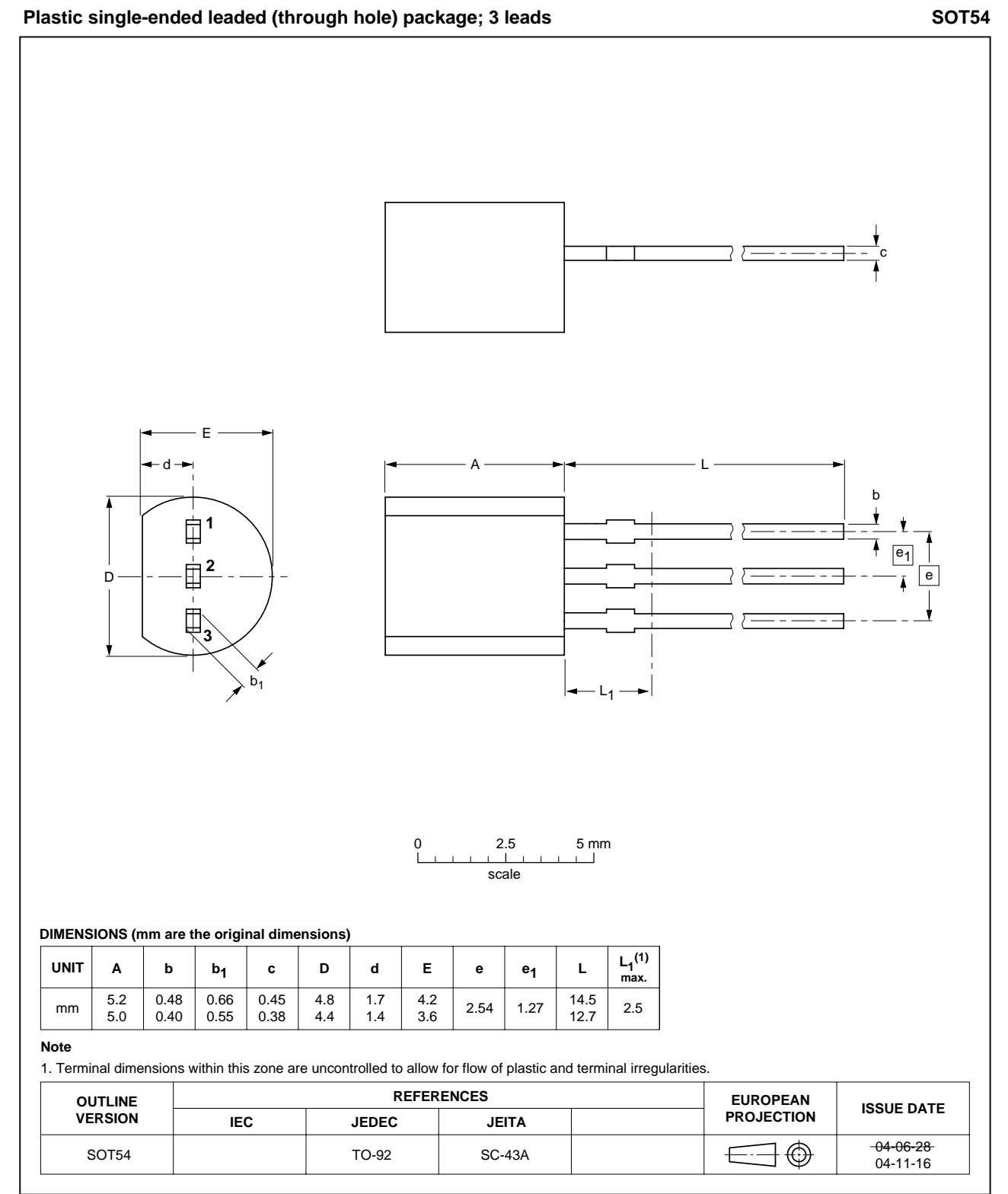
Note

1. Including plating thickness

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT883			SC-101			03-02-05 03-04-03

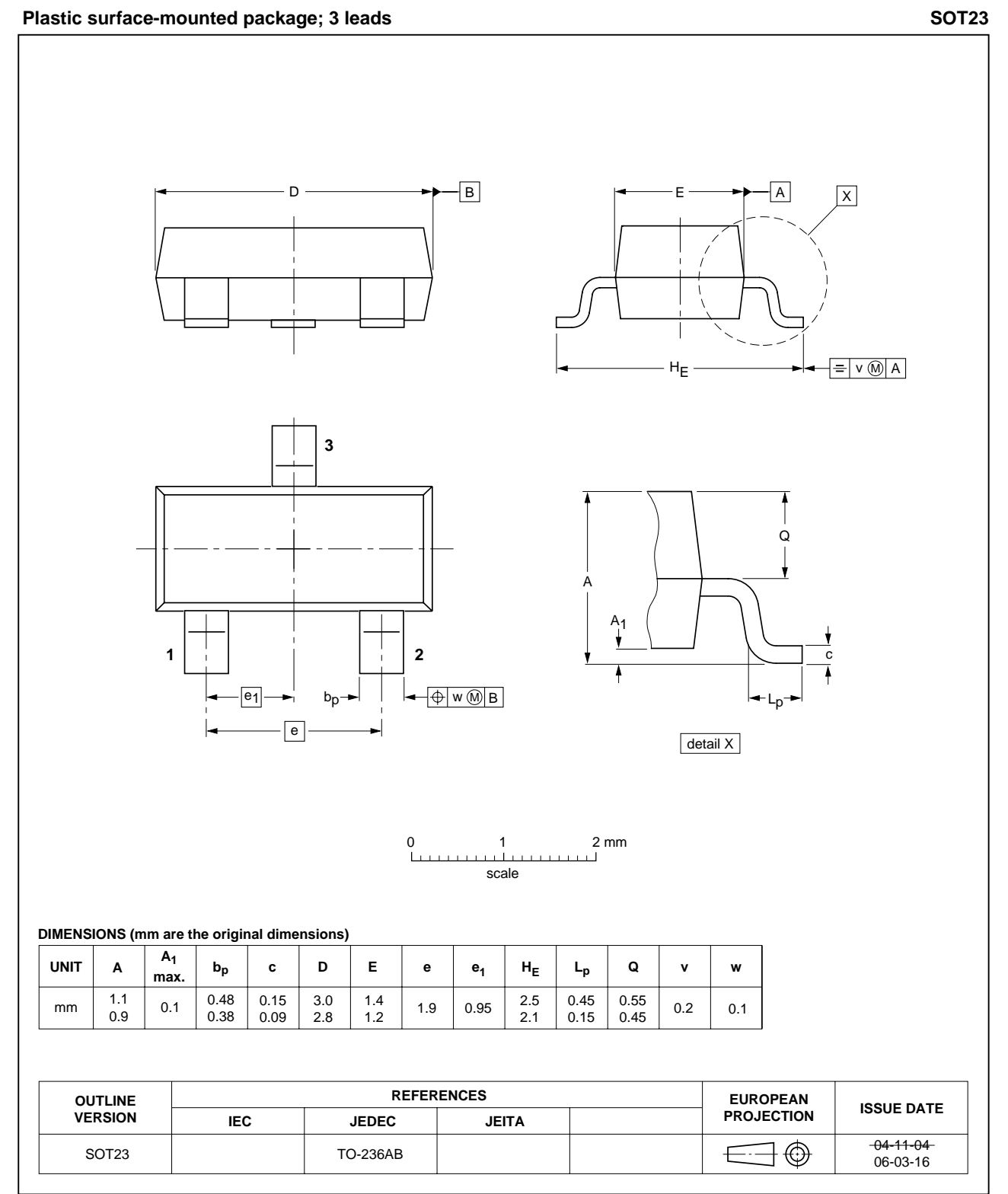
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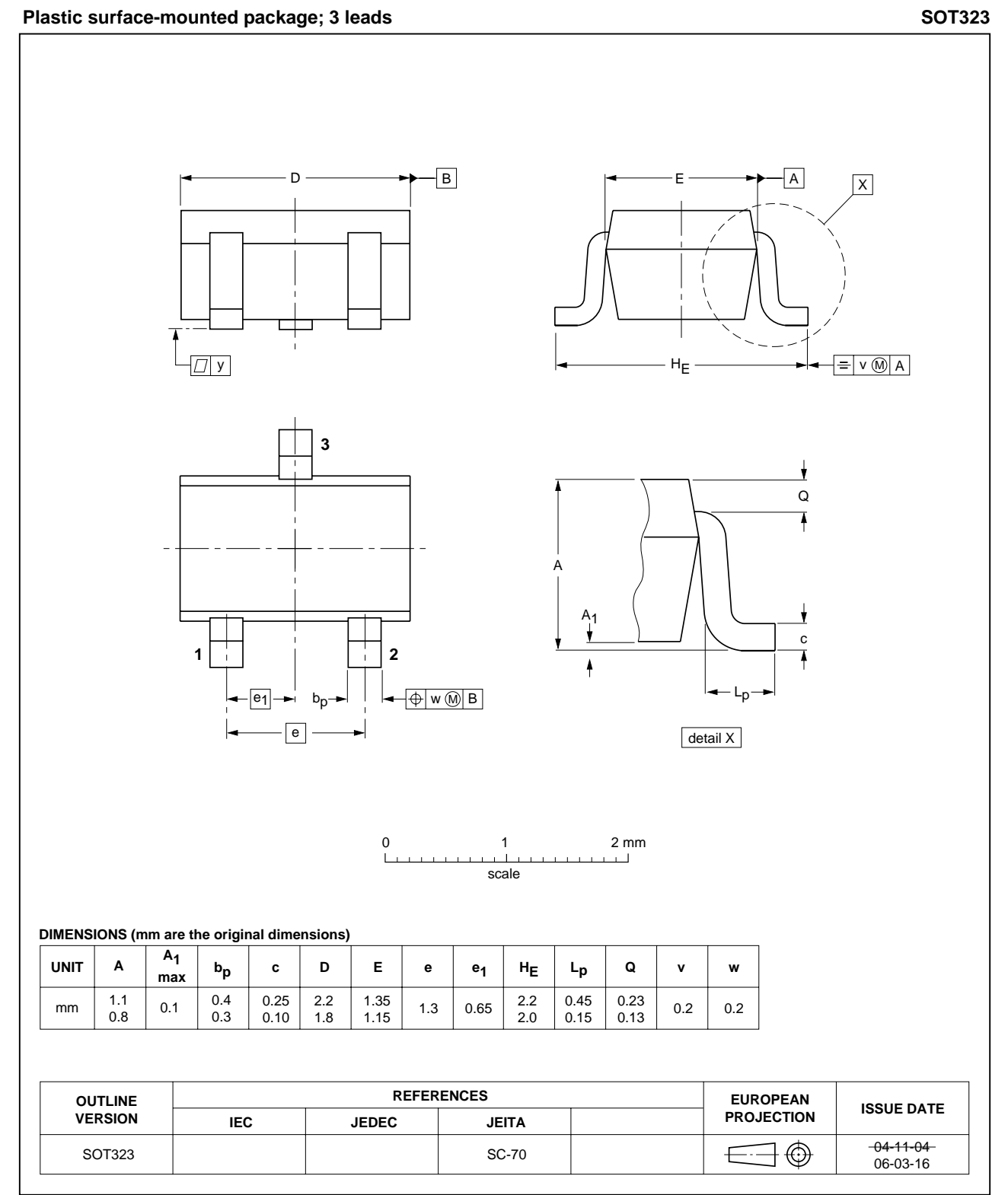
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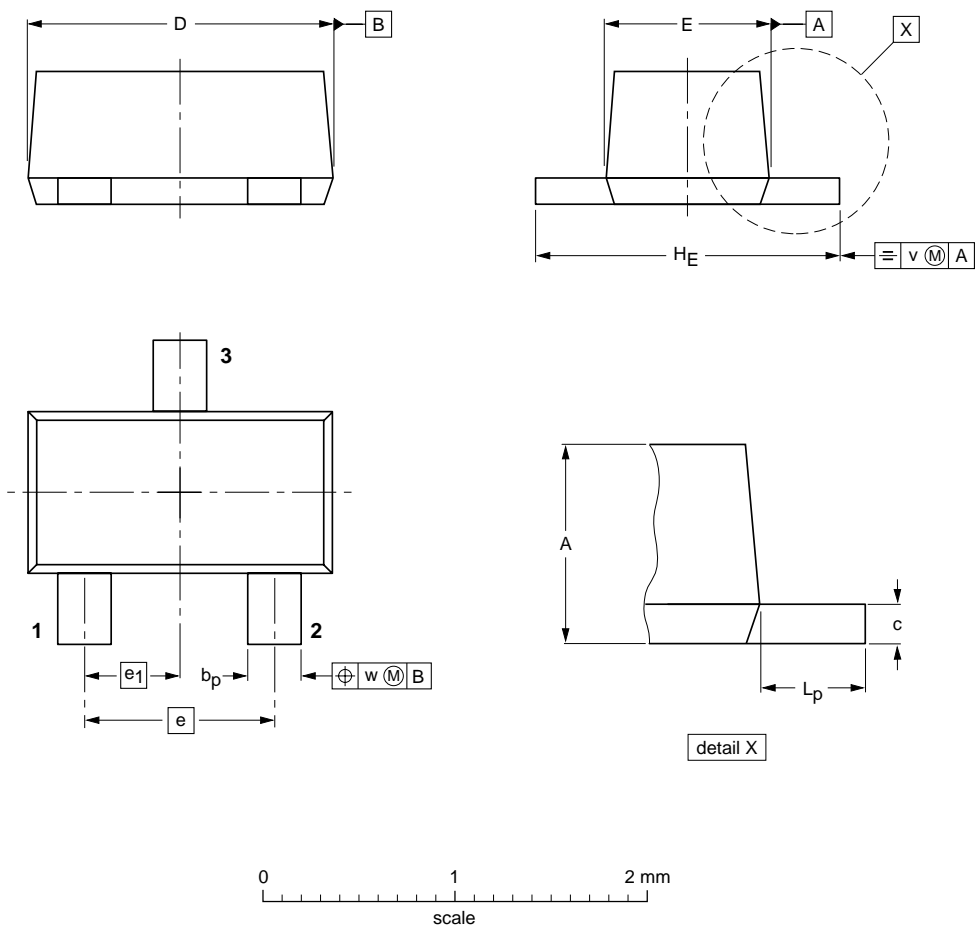


NPN resistor-equipped transistors;
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Plastic surface-mounted package; 3 leads

SOT490



DIMENSIONS (mm are the original dimensions)

UNIT	A	b _p	c	D	E	e	e ₁	H _E	L _p	v	w
mm	0.8 0.6	0.33 0.23	0.2 0.1	1.7 1.5	0.95 0.75	1.0	0.5	1.7 1.5	0.5 0.3	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT490			SC-89			05-07-28 06-03-16

NPN resistor-equipped transistors; R1 = 100 kΩ, R2 = 100 kΩ

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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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NXP Semiconductors

Customer notification

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, except for package outline drawings which were updated to the latest version.

Contact information

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