

# DATA SHEET

## **PDTC144W series**

NPN resistor-equipped transistors;  
R1 = 47 k $\Omega$ , R2 = 22 k $\Omega$

Product data sheet  
Supersedes data of 2004 Mar 23

2004 Aug 17

# NPN resistor-equipped transistors; R1 = 47 k $\Omega$ , R2 = 22 k $\Omega$

## PDTC144W series

### 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 <sub>CEO</sub>	collector-emitter voltage	–	50	V
I <sub>O</sub>	output current (DC)	–	100	mA
R1	bias resistor	47	–	k $\Omega$
R2	bias resistor	22	–	k $\Omega$

### 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		
PDTC144WE	SOT416	SC-75	42	PDTA144WE
PDTC144WEF	SOT490	SC-89	34	PDTA144WEF
PDTC144WK	SOT346	SC-59	41	PDTA144WK
PDTC144WM	SOT883	SC-101	DD	PDTA144WM
PDTC144WS	SOT54 (TO-92)	SC-43	TC144W	PDTA144WS
PDTC144WT	SOT23	–	*20 <sup>(1)</sup>	PDTA144WT
PDTC144WU	SOT323	SC-70	*20 <sup>(1)</sup>	PDTA144WU

### Note

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

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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC144WS	<p>MAM364</p>	1 2 3	base collector emitter
PDTC144WE PDTC144WEF PDTC144WK PDTC144WT PDTC144WU	<p>Top view</p> <p>MDB269</p>	1 2 3	base emitter collector
PDTC144WM	<p>bottom view</p> <p>MHC506</p>	1 2 3	base emitter collector

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## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC144WE	–	plastic surface mounted package; 3 leads	SOT416
PDTC144WEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC144WK	–	plastic surface mounted package; 3 leads	SOT346
PDTC144WM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTC144WS	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC144WT	–	plastic surface mounted package; 3 leads	SOT23
PDTC144WU	–	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 <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	–	10	V
V <sub>i</sub>	input voltage				
	positive		–	+40	V
	negative		–	–10	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			
	SOT54	note 1	–	500	mW
	SOT23	note 1	–	250	mW
	SOT346	note 1	–	250	mW
	SOT323	note 1	–	200	mW
	SOT490	notes 1 and 2	–	250	mW
	SOT883	notes 2 and 3	–	250	mW
	SOT416	note 1	–	150	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	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  $\mu$ m copper strip line.

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### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	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
	SOT490	notes 1 and 2	500	K/W
	SOT883	notes 2 and 3	500	K/W
	SOT416	note 1	833	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  $\mu$ m copper strip line.

### 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	–	–	110	$\mu$ A
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 5 mA	60	–	–	
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>	input-off voltage	I <sub>C</sub> = 100 $\mu$ A; V <sub>CE</sub> = 5 V	–	1.7	1.2	V
V <sub>i(on)</sub>	input-on voltage	I <sub>C</sub> = 2 mA; V <sub>CE</sub> = 0.3 V	4	2.7	–	V
R1	input resistor		33	47	61	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		0.37	0.47	0.57	
C <sub>c</sub>	collector capacitance	I <sub>E</sub> = I <sub>e</sub> = 0 A; V <sub>CB</sub> = 10 V; f = 1 MHz	–	–	2.5	pF

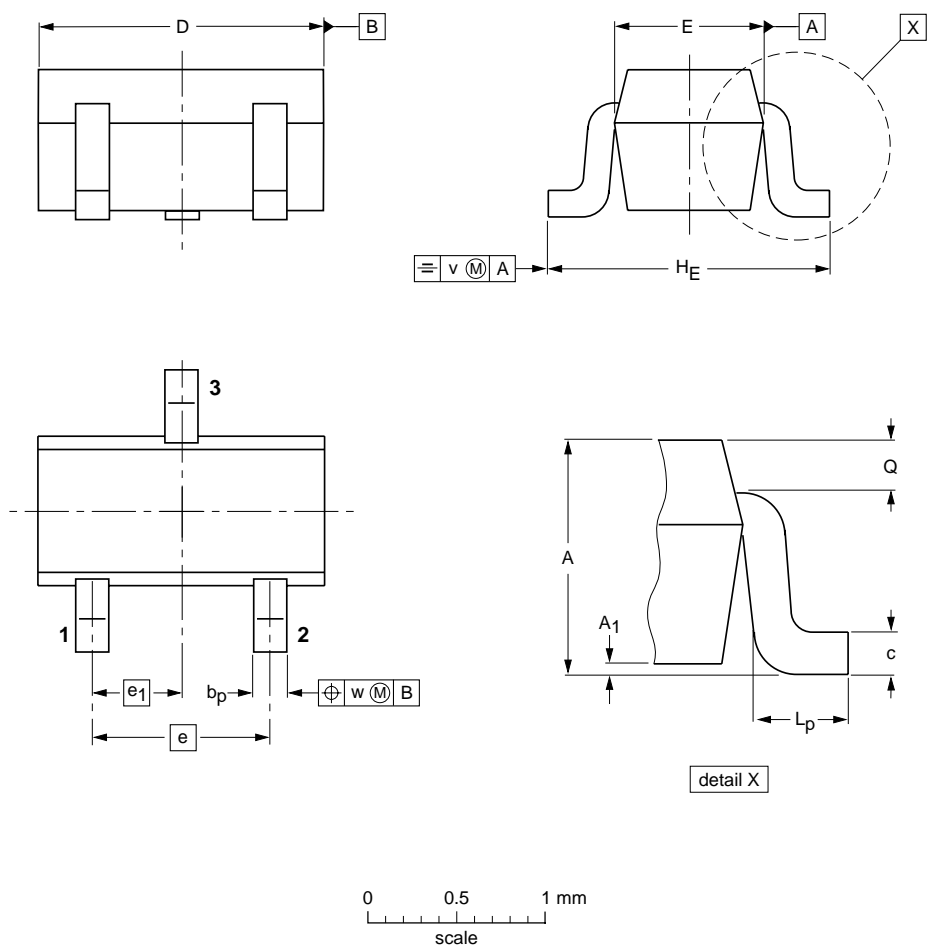
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PACKAGE OUTLINES


Plastic surface-mounted package; 3 leads

SOT416



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

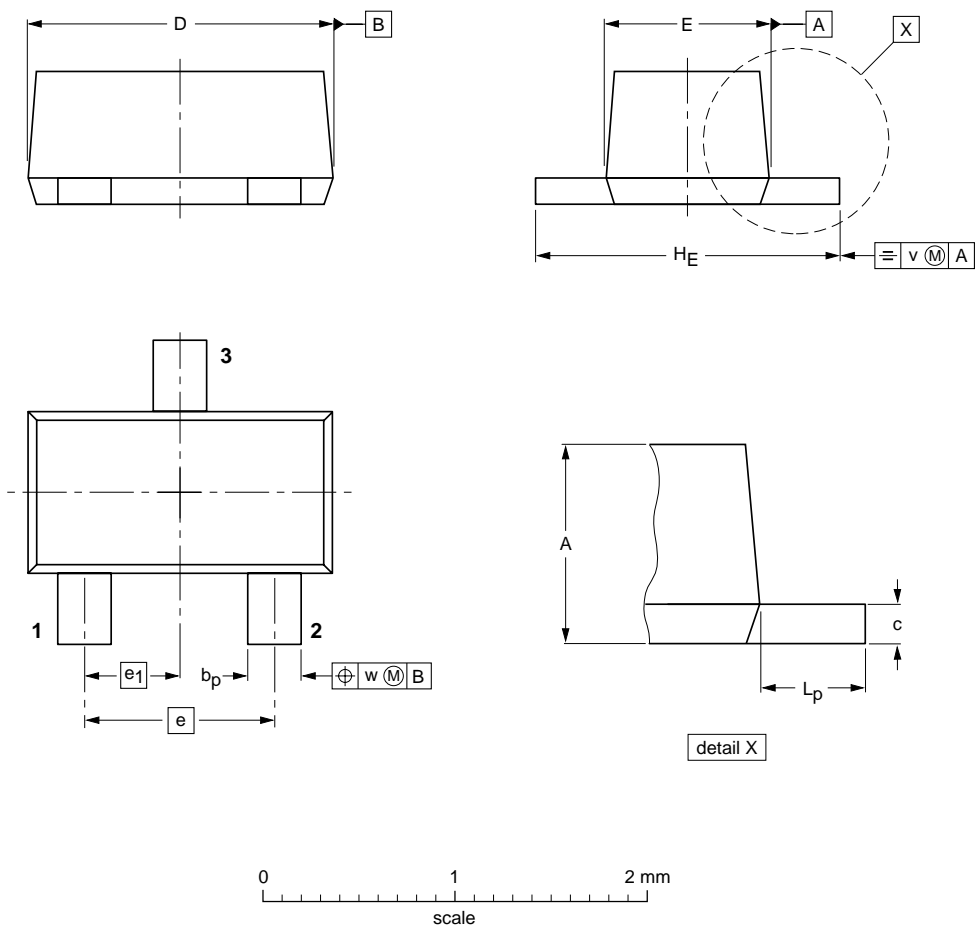
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	IEC	JEDEC	JEITA			
SOT416			SC-75			<del>04-11-04</del> 06-03-16

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

SOT490



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	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

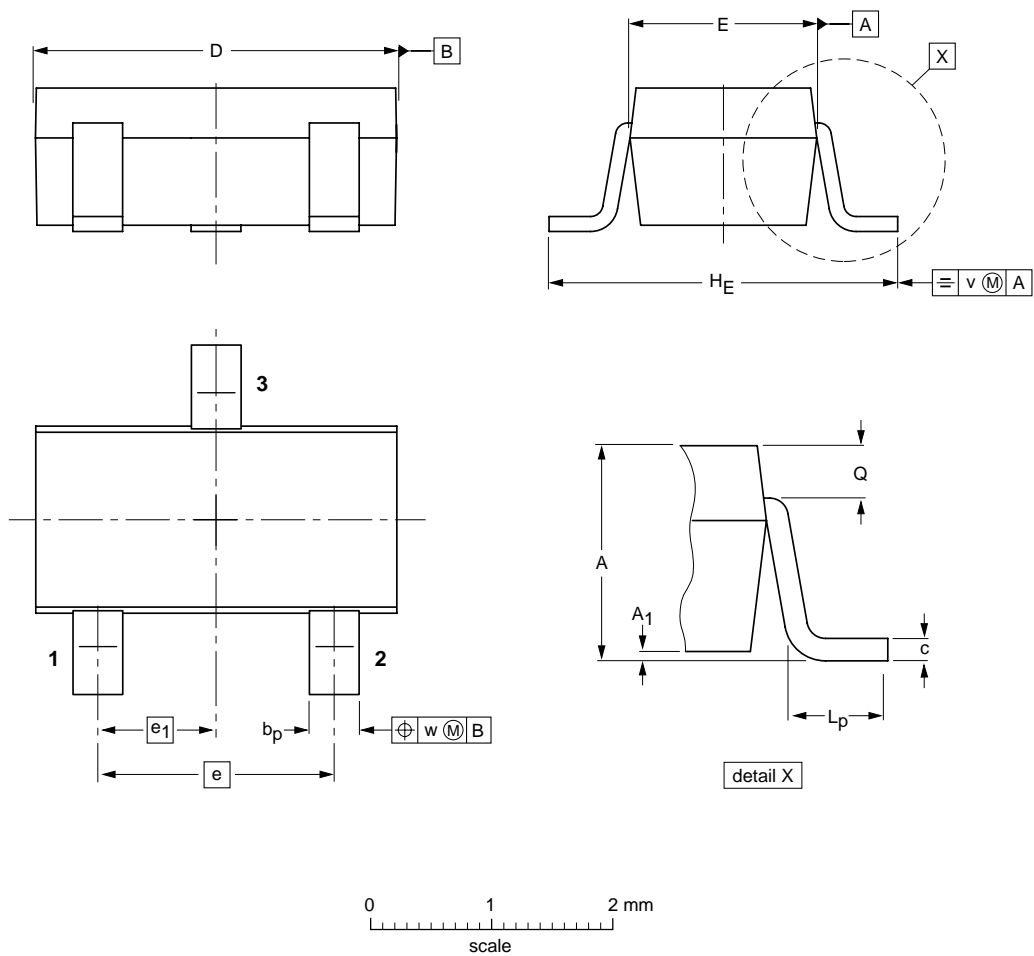
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	IEC	JEDEC	JEITA			
SOT490			SC-89			05-07-28 06-03-16

NPN resistor-equipped transistors;  
R1 = 47 kΩ, R2 = 22 kΩ

PDTC144W series


Plastic surface-mounted package; 3 leads

SOT346



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.3 1.0	0.1 0.013	0.50 0.35	0.26 0.10	3.1 2.7	1.7 1.3	1.9	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT346		TO-236	SC-59A			04-11-11 06-03-16

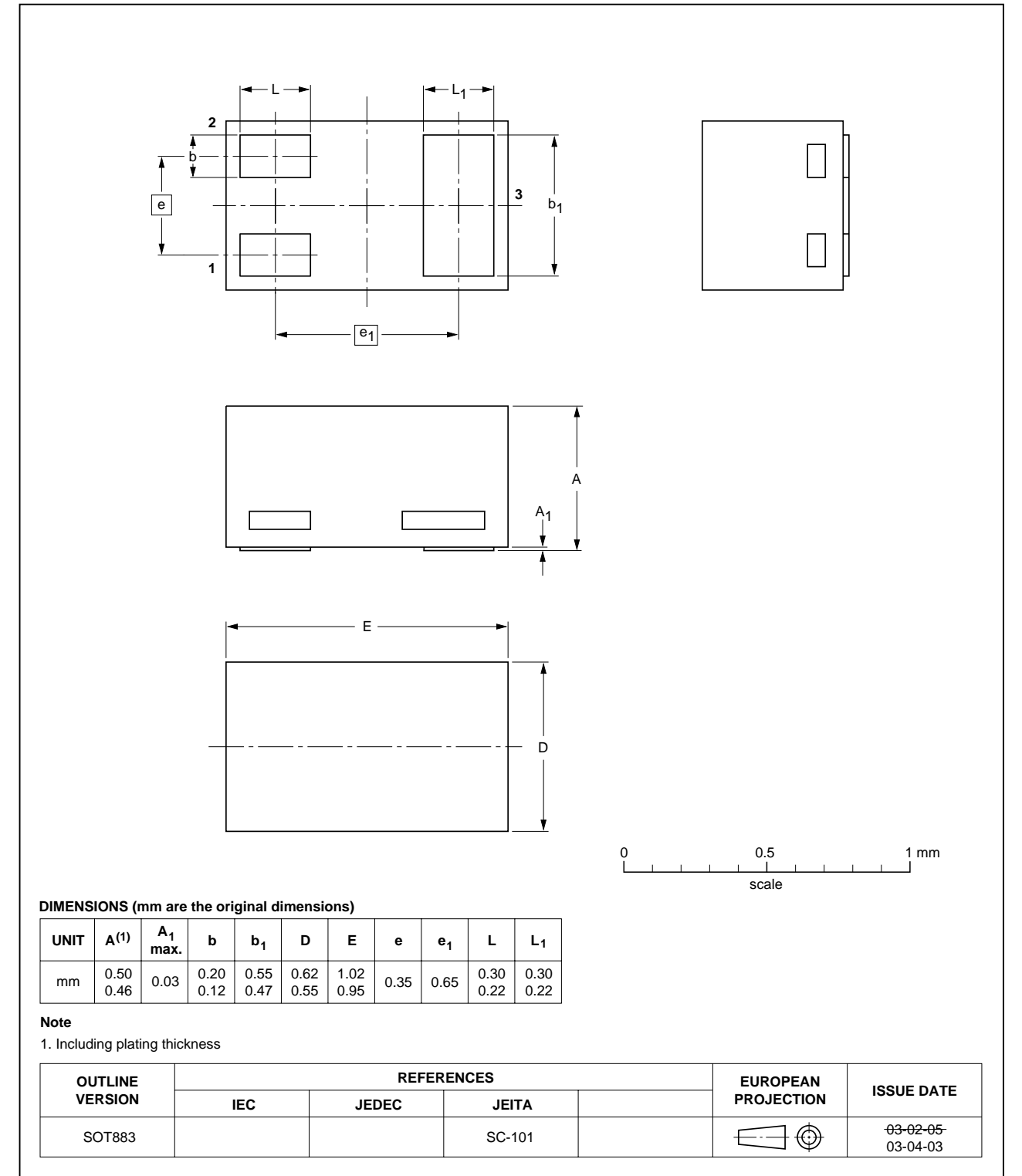


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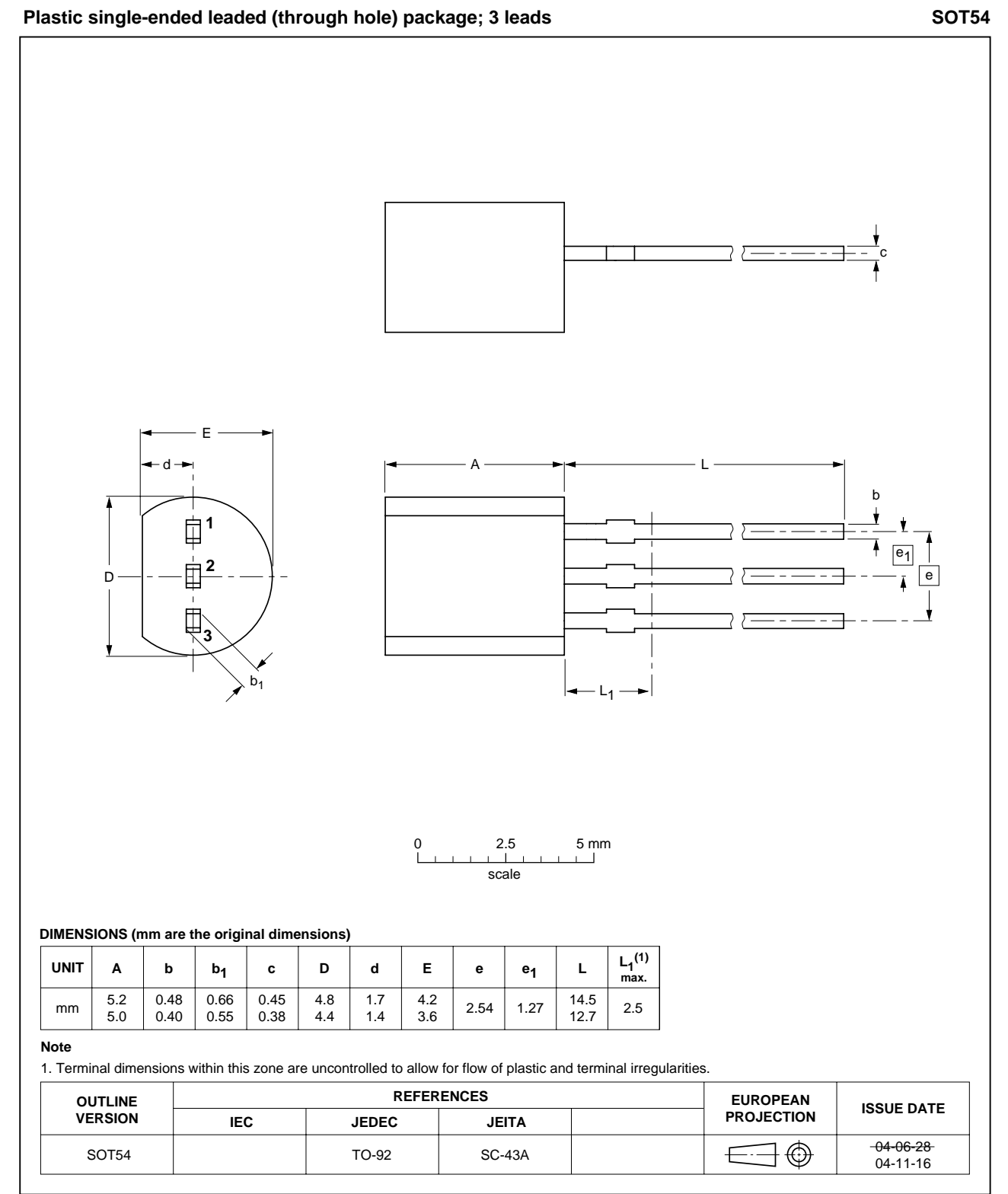
Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm

SOT883



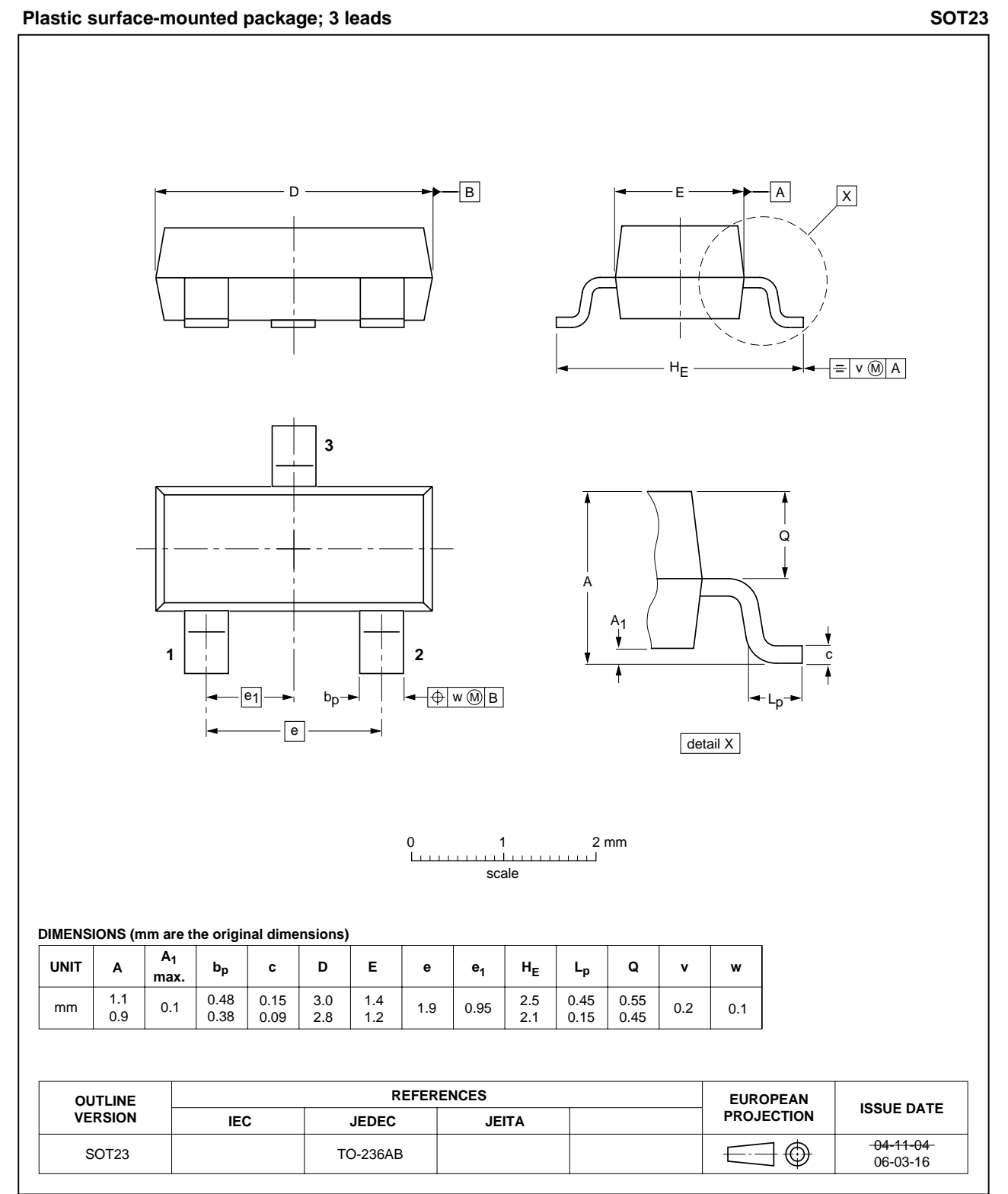
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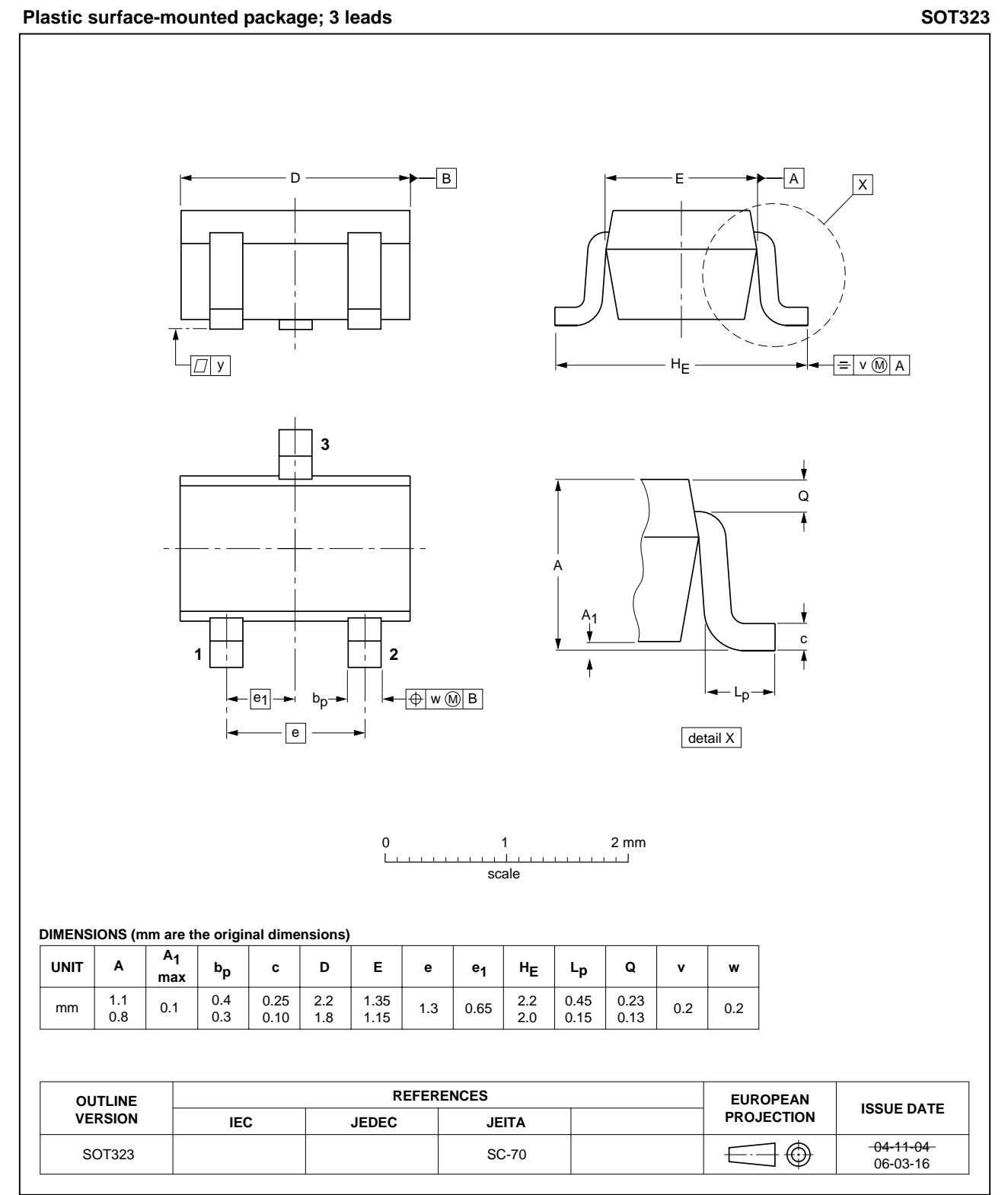
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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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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## **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**

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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Printed in The Netherlands

R75/07/pp14

Date of release: 2004 Aug 17

Document order number: 9397 750 13681

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