

DATA SHEET

PDTC144E series

NPN resistor-equipped transistors;

R1 = 47 k Ω , R2 = 47 k Ω

Product specification
Supersedes data of 2004 Mar 23

2004 Aug 17

NPN resistor-equipped transistors; R1 = 47 k Ω , R2 = 47 k Ω

PDTC144E 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 _{CEO}	collector-emitter voltage	–	50	V
I _O	output current (DC)	–	100	mA
R1	bias resistor	47	–	k Ω
R2	bias resistor	47	–	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		
PDTC144EE	SOT416	SC-75	08	PDTA144EE
PDTC144EEF	SOT490	SC-89	08	PDTA144EEF
PDTC144EK	SOT346	SC-59	08	PDTA144EK
PDTC144EM	SOT883	SC-101	E7	PDTA144EM
PDTC144ES	SOT54 (TO-92)	SC-43	TC144E	PDTA144ES
PDTC144ET	SOT23	–	*08 ⁽¹⁾	PDTA144ET
PDTC144EU	SOT323	SC-70	*08 ⁽¹⁾	PDTA144EU

Note

1. * = 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
PDTC144ES	<p style="text-align: center;"><i>MAM364</i></p>	1 2 3	base collector emitter
PDTC144EE PDTC144EEF PDTC144EK PDTC144ET PDTC144EU	<p style="text-align: center;">Top view <i>MDB269</i></p>	1 2 3	base emitter collector
PDTC144EM	<p style="text-align: center;">bottom view <i>MHC506</i></p>	1 2 3	base emitter collector

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ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC144EE	–	plastic surface mounted package; 3 leads	SOT416
PDTC144EEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC144EK	–	plastic surface mounted package; 3 leads	SOT346
PDTC144EM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTC144ES	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC144ET	–	plastic surface mounted package; 3 leads	SOT23
PDTC144EU	–	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)		–	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 μm 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 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	–	–	90	μ A
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 5 mA	80	–	–	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA	–	–	150	mV
V _{i(off)}	input-off voltage	I _C = 100 μ A; V _{CE} = 5 V	–	1.2	0.8	V
V _{i(on)}	input-on voltage	I _C = 2 mA; V _{CE} = 0.3 V	3	1.6	–	V
R1	input resistor		33	47	61	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

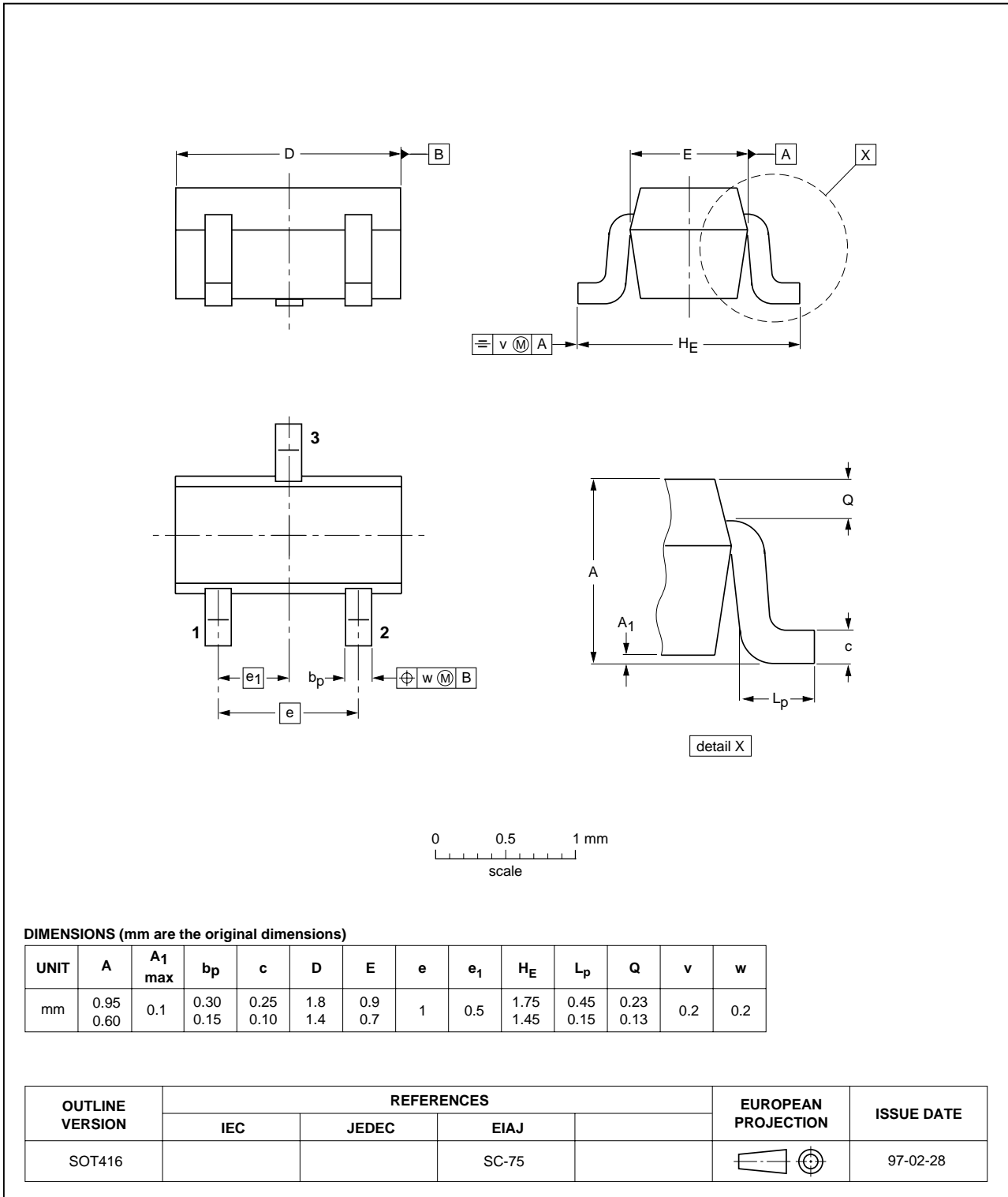
NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT416

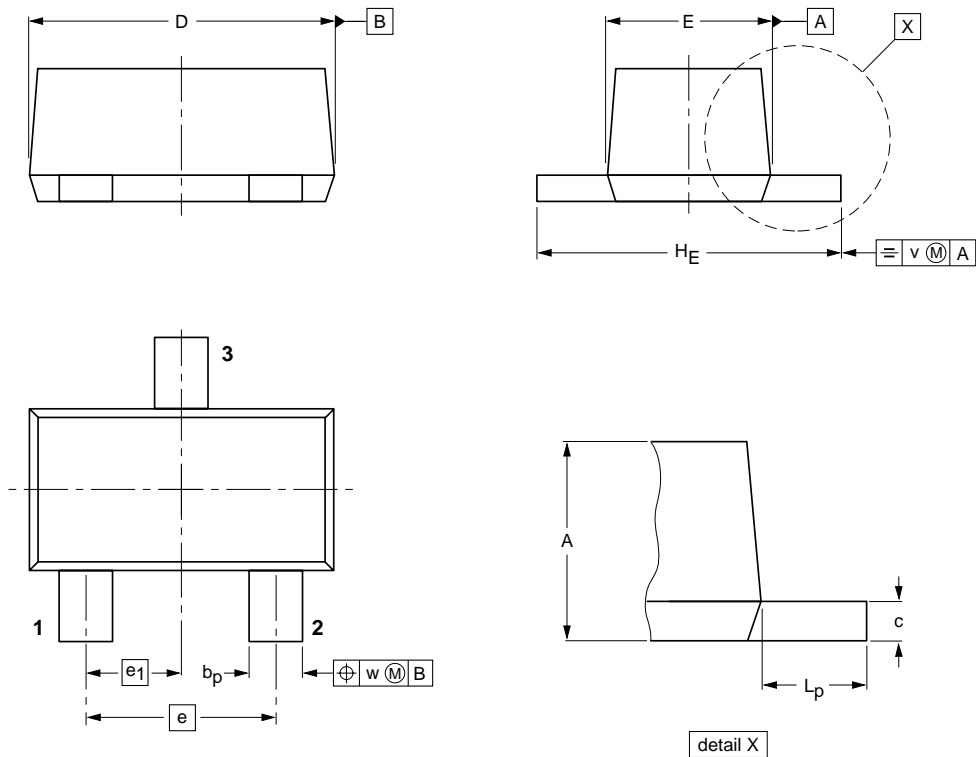


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

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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

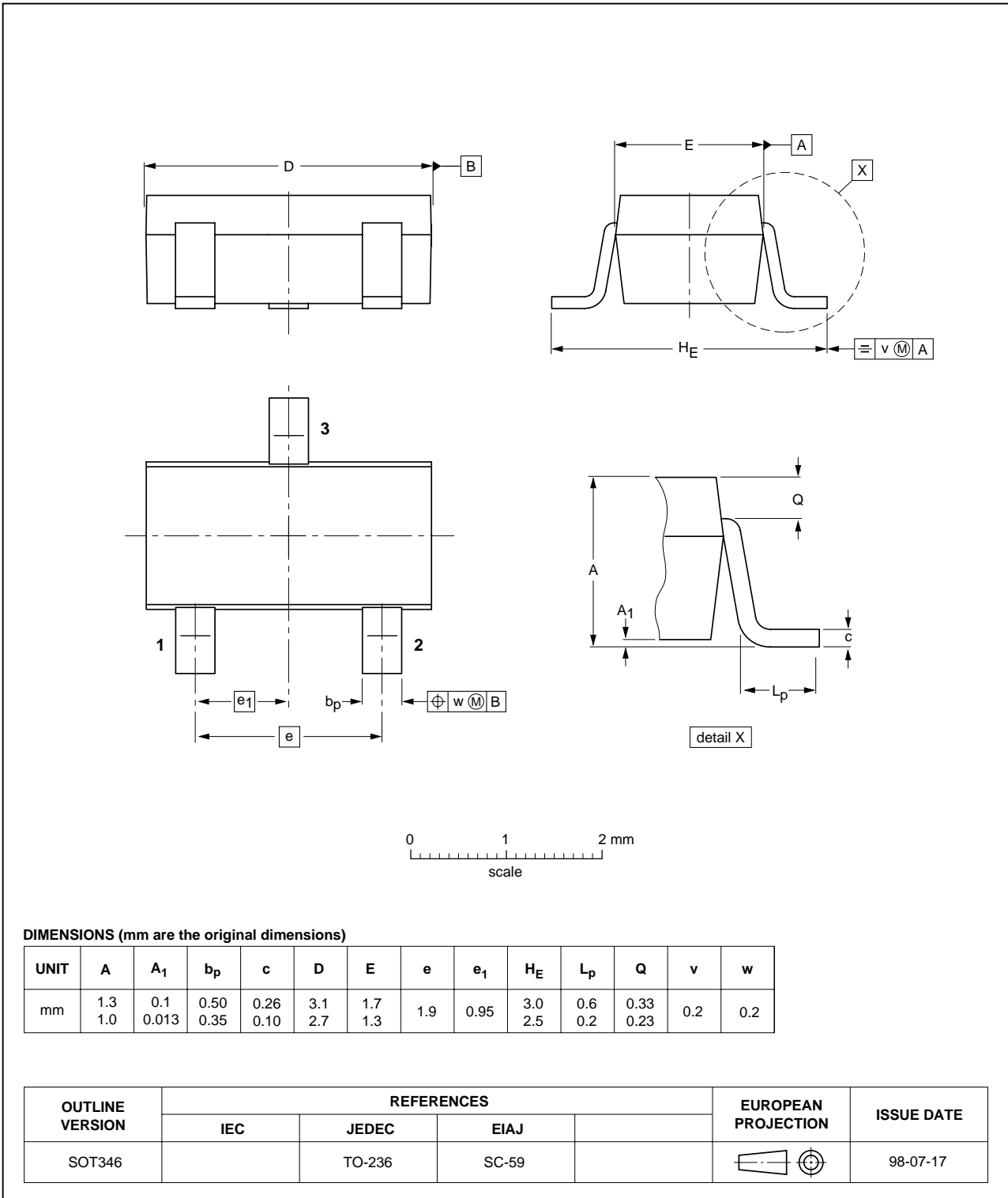
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT490			SC-89		98-10-23

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

PDTC144E series

Plastic surface mounted package; 3 leads

SOT346

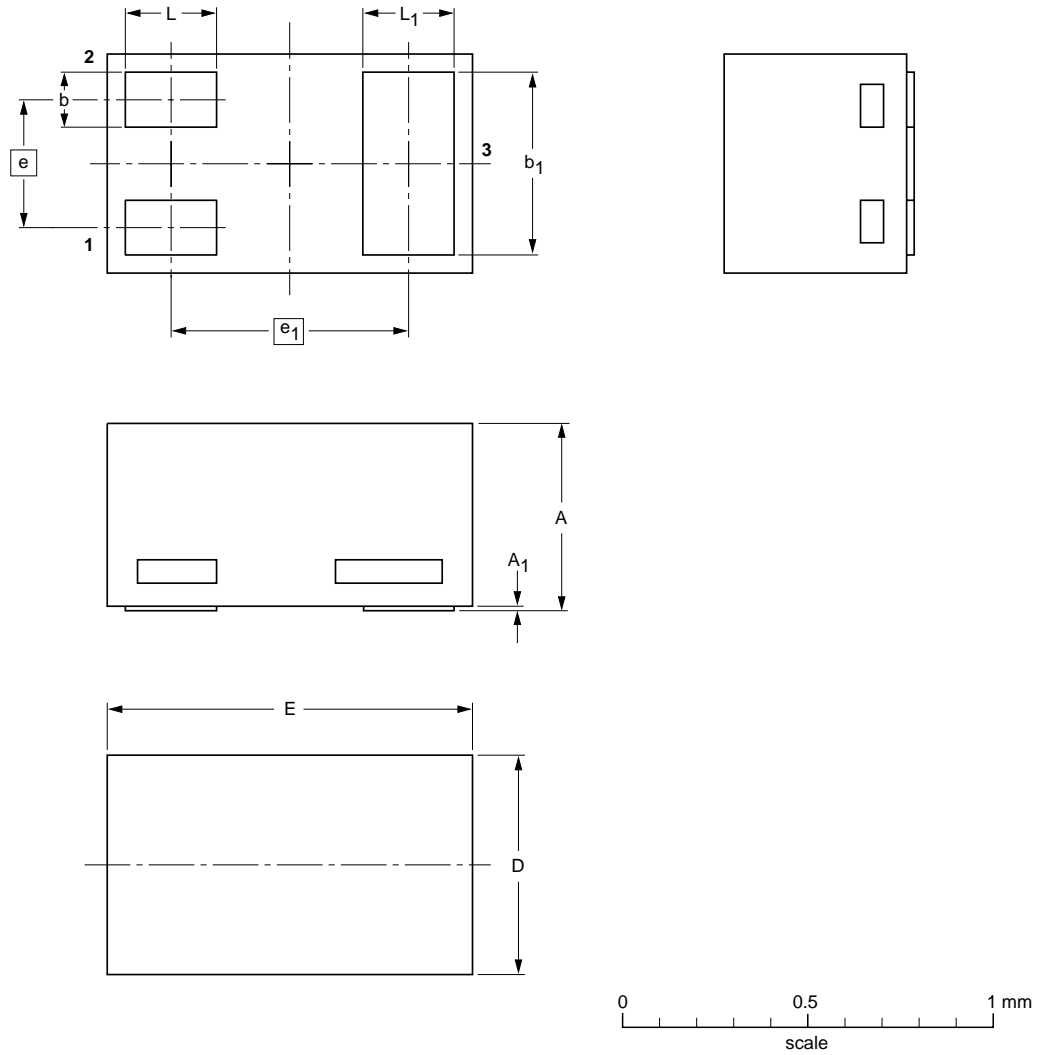


NPN resistor-equipped transistors;
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Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm

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

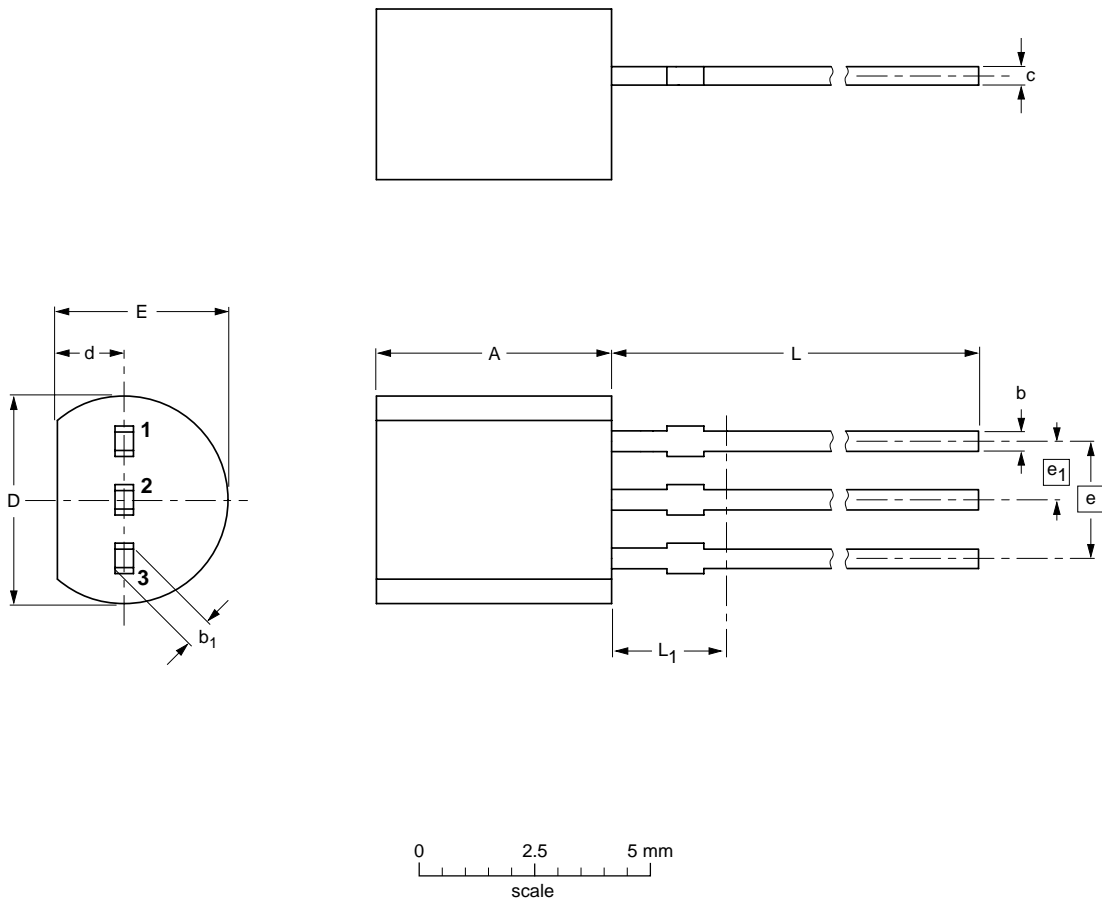
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT883			SC-101		03-02-05 03-04-03

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

PDTC144E series

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

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾ max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

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

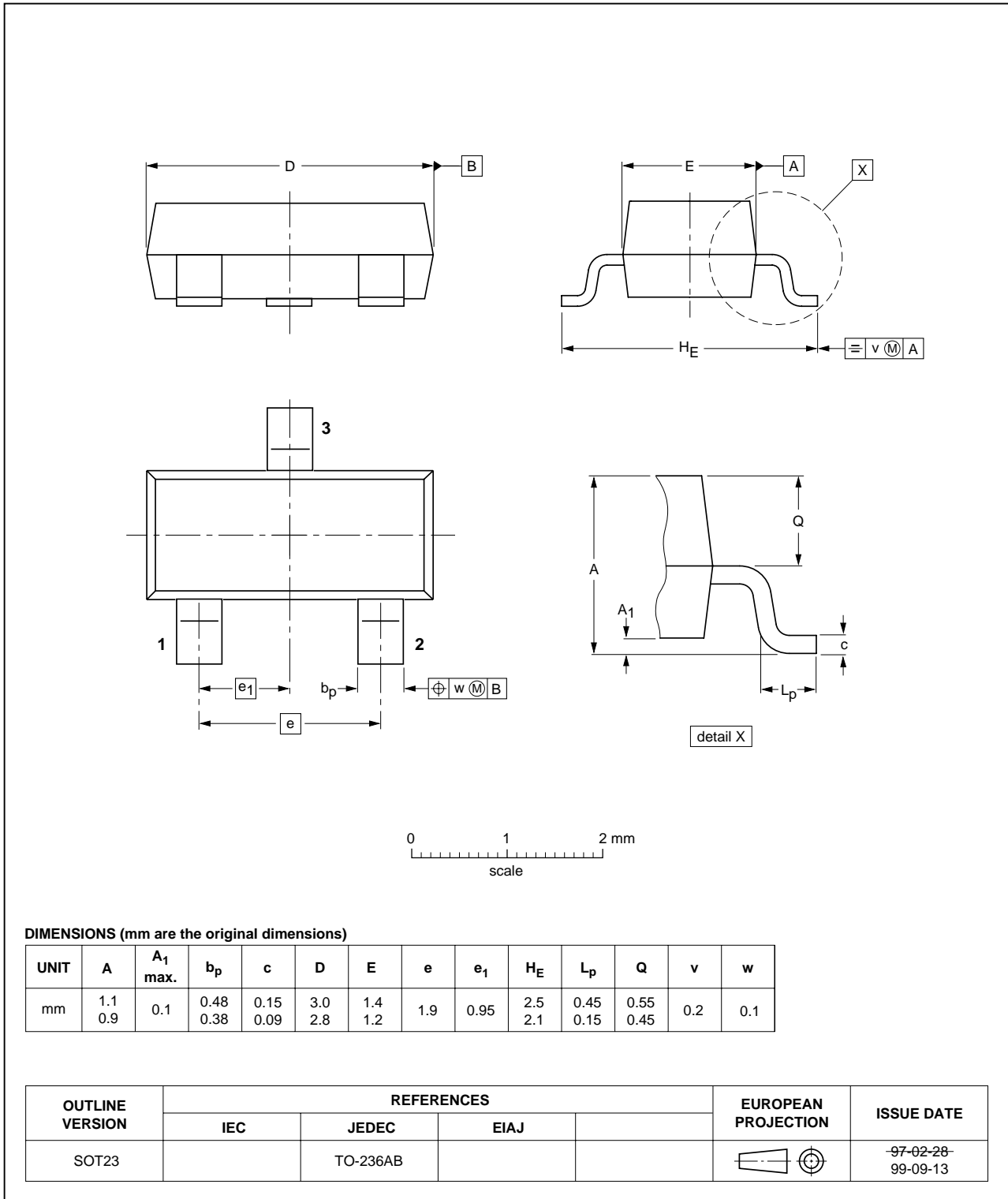
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT54		TO-92	SC-43A		-97-02-28 04-06-28

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

SOT23

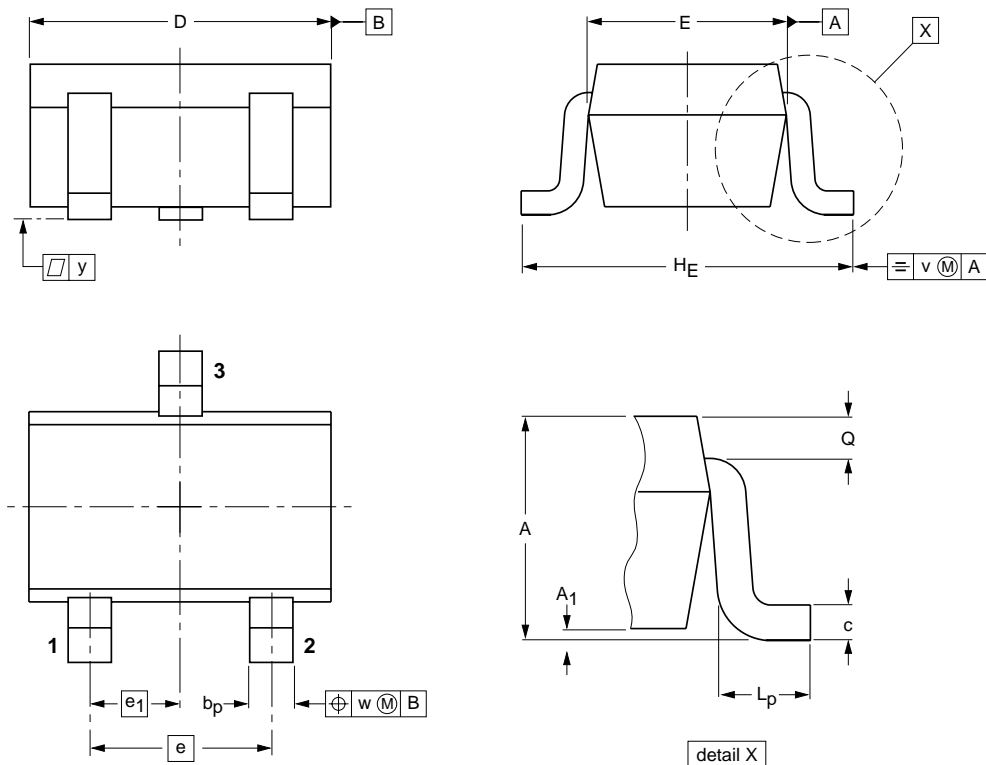


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E series

Plastic surface mounted package; 3 leads

SOT323



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

NPN resistor-equipped transistors;
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DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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