

Important notice

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Kind regards,

Team Nexperia

DATA SHEET

PDTC144W series
NPN resistor-equipped transistors;
 $R1 = 47 \text{ k}\Omega$, $R2 = 22 \text{ k}\Omega$

Product data sheet
Supersedes data of 2004 Mar 23

2004 Aug 17

**NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 22 kΩ**
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_{CEO}	collector-emitter voltage	–	50	V
I_o	output current (DC)	–	100	mA
R1	bias resistor	47	–	kΩ
R2	bias resistor	22	–	kΩ

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 ⁽¹⁾	PDTA144WT
PDTC144WU	SOT323	SC-70	*20 ⁽¹⁾	PDTA144WU

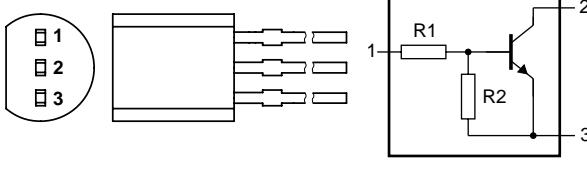
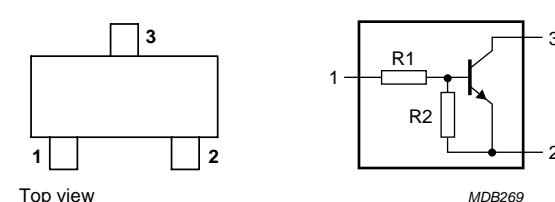
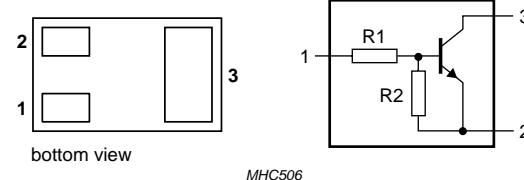
Note

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

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

PDTC144W series

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

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

PDTC144W series

ORDERING INFORMATION

TYPE NUMBER	PACKAGE			VERSION
	NAME	DESCRIPTION		
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_{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 negative		–	+40	V
–			–	–10	V
I_O	output current (DC)		–	100	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation SOT54 SOT23 SOT346 SOT323 SOT490 SOT883 SOT416	$T_{amb} \leq 25^\circ\text{C}$ note 1 note 1 note 1 note 1 notes 1 and 2 notes 2 and 3 note 1	–	500 250 250 200 250 250 150	mW mW mW mW mW mW 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 µm copper strip line.

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

PDTC144W series

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient SOT54 SOT23 SOT346 SOT323 SOT490 SOT883 SOT416	in free air		
		note 1	250	K/W
		note 1	500	K/W
		note 1	500	K/W
		note 1	625	K/W
		notes 1 and 2	500	K/W
		notes 2 and 3	500	K/W
		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 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	$V_{EB} = 5 \text{ V}$; $I_C = 0 \text{ A}$	–	–	110	μA
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}$; $I_C = 5 \text{ mA}$	60	–	–	
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	$I_C = 100 \text{ } \mu\text{A}$; $V_{CE} = 5 \text{ V}$	–	1.7	1.2	V
$V_{i(on)}$	input-on voltage	$I_C = 2 \text{ mA}$; $V_{CE} = 0.3 \text{ V}$	4	2.7	–	V
$R1$	input resistor		33	47	61	$\text{k}\Omega$
$\frac{R2}{R1}$	resistor ratio		0.37	0.47	0.57	
C_c	collector capacitance	$I_E = i_e = 0 \text{ A}$; $V_{CB} = 10 \text{ V}$; $f = 1 \text{ MHz}$	–	–	2.5	pF

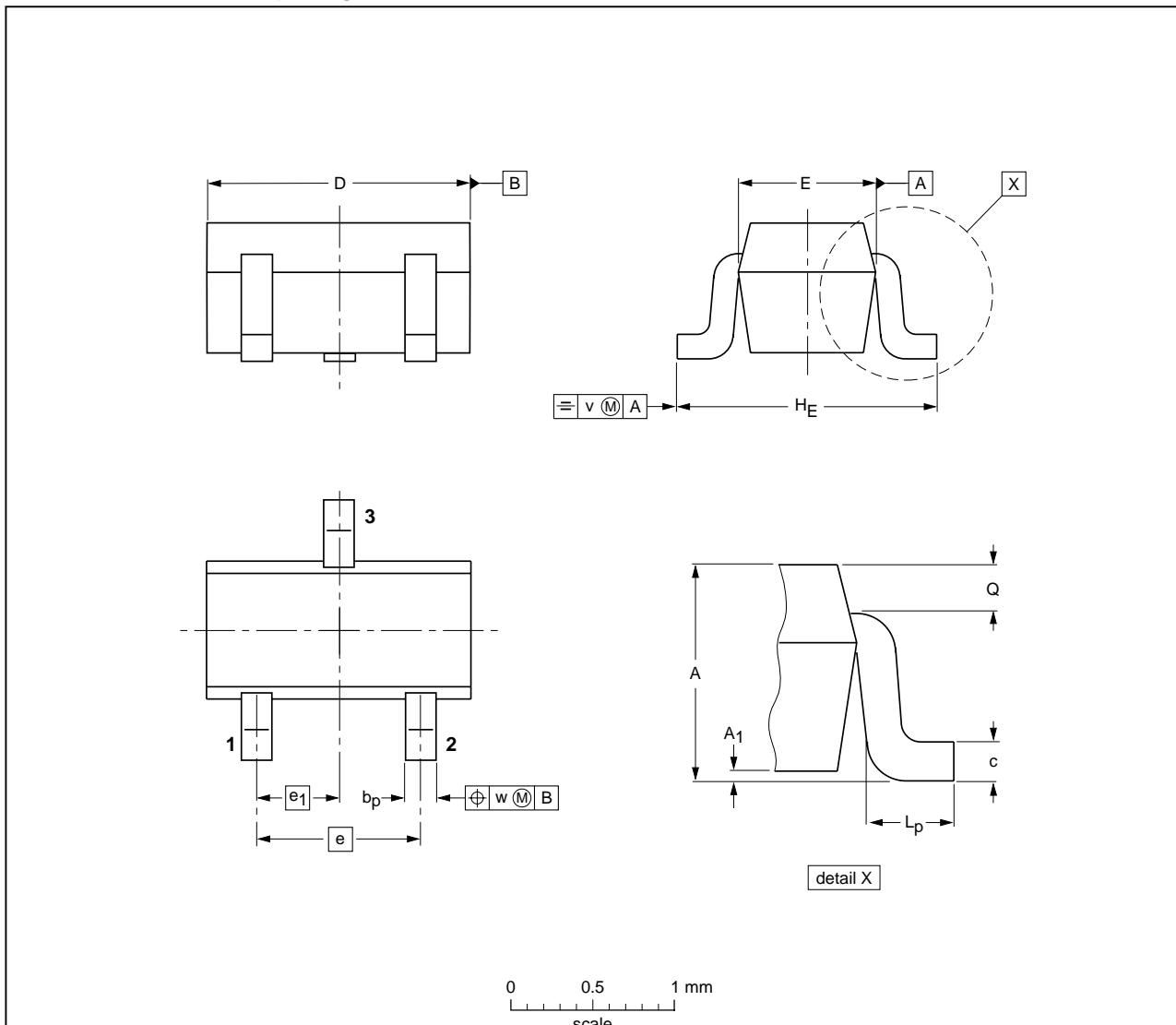
NPN resistor-equipped transistors;
 R1 = 47 kΩ, R2 = 22 kΩ

PDTC144W series

PACKAGE OUTLINES

Plastic surface-mounted package; 3 leads

SOT416



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	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

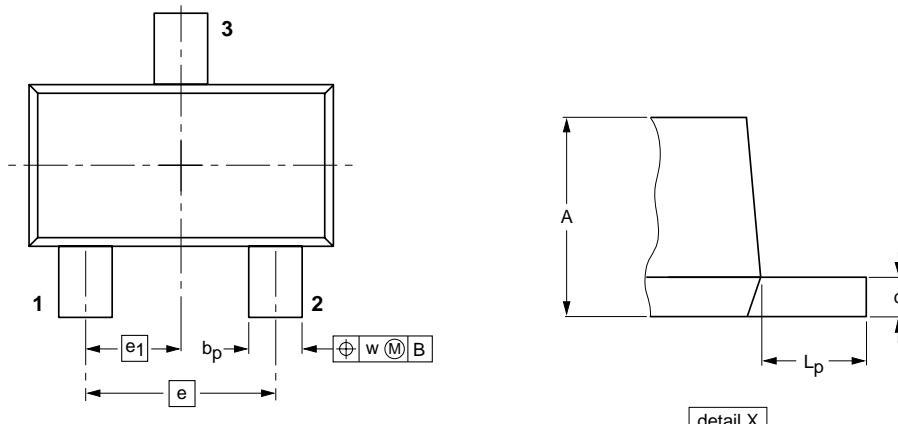
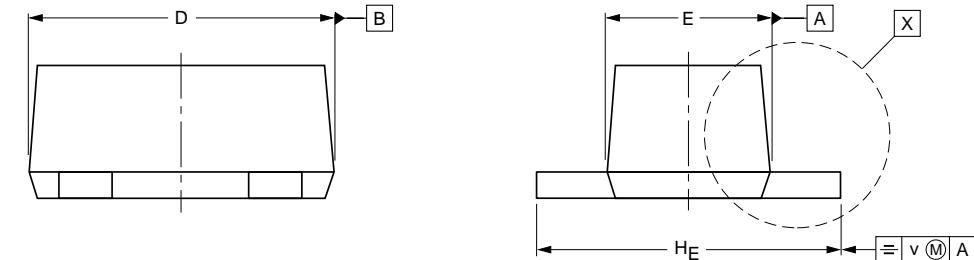
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT416			SC-75			-04-11-04 06-03-16

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

PDTC144W series

Plastic surface-mounted package; 3 leads

SOT490



0 1 2 mm
scale

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

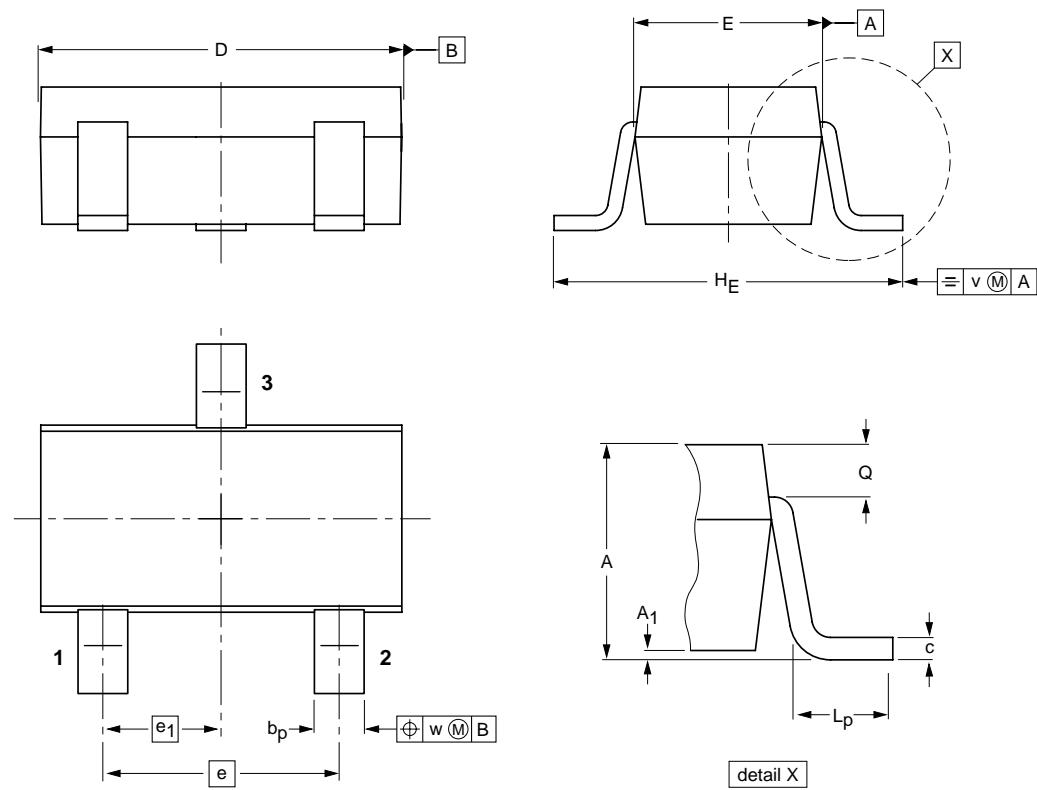
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT490			SC-89			05-07-28 06-03-16

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

PDTC144W series

Plastic surface-mounted package; 3 leads

SOT346



0 1 2 mm
 scale

DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b _p	c	D	E	e	e ₁	H _E	L _p	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

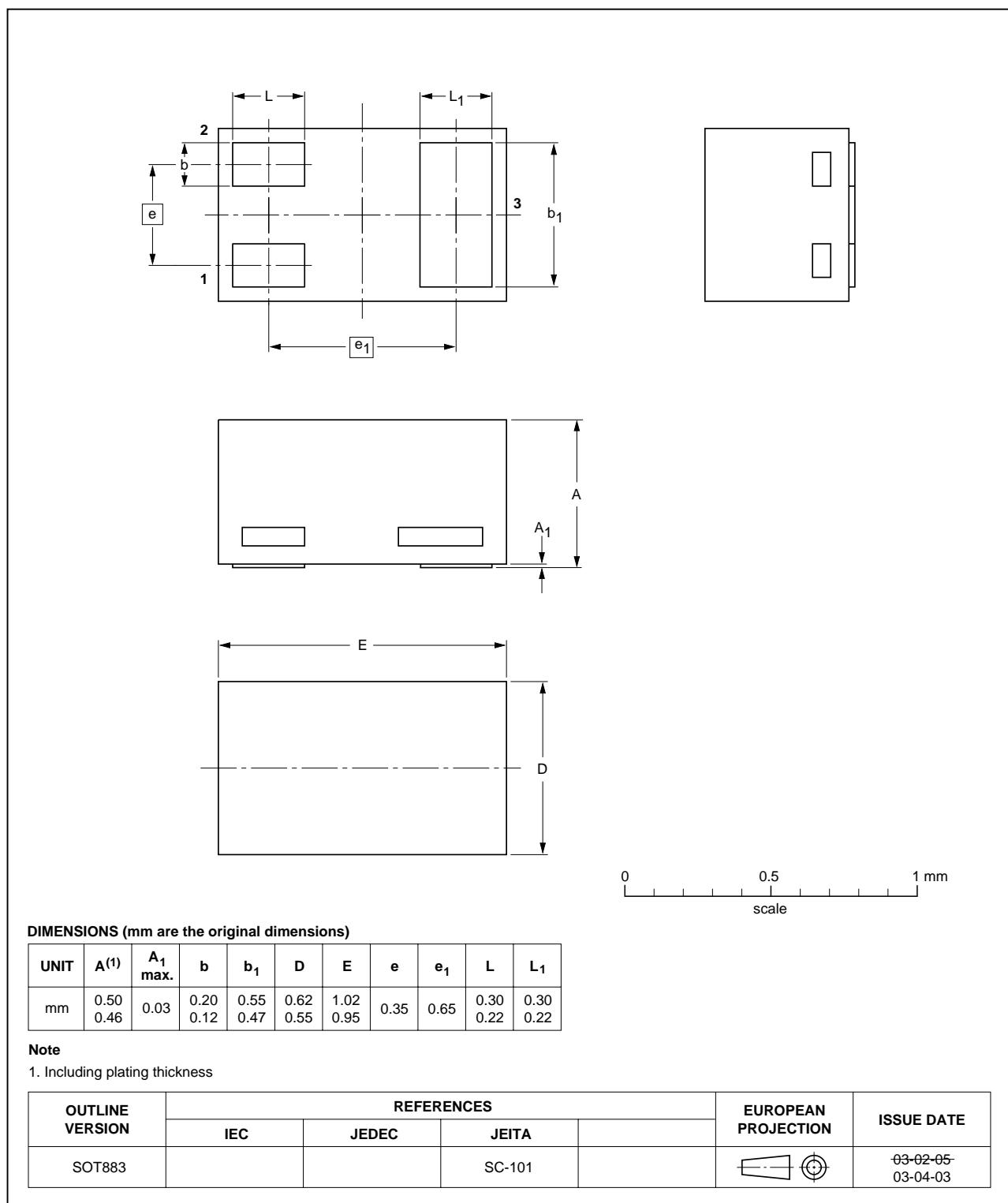
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT346		TO-236	SC-59A			04-11-11 06-03-16

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

PDTC144W series

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

SOT883

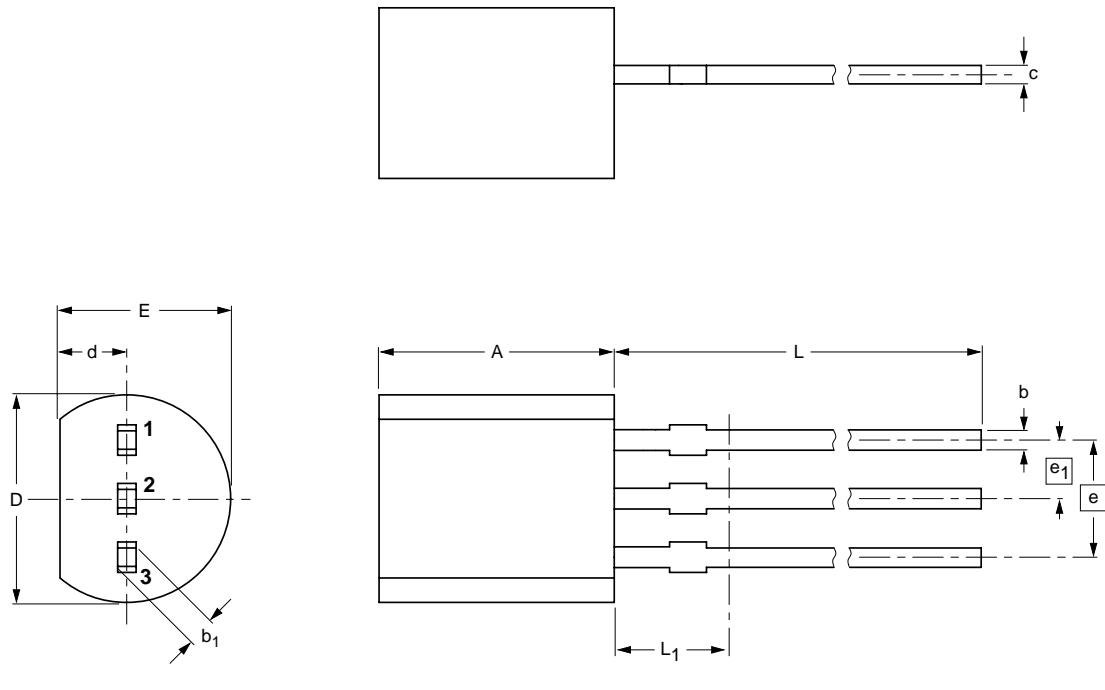


NPN resistor-equipped transistors;
R1 = 47 k Ω , R2 = 22 k Ω

PDTC144W series

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

SOT54



A horizontal scale bar with tick marks every 1 mm. The numbers 0, 2.5, and 5 mm are labeled above the bar. Below the bar, the word "scale" is written.

DIMENSIONS (mm are the original dimensions)

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.

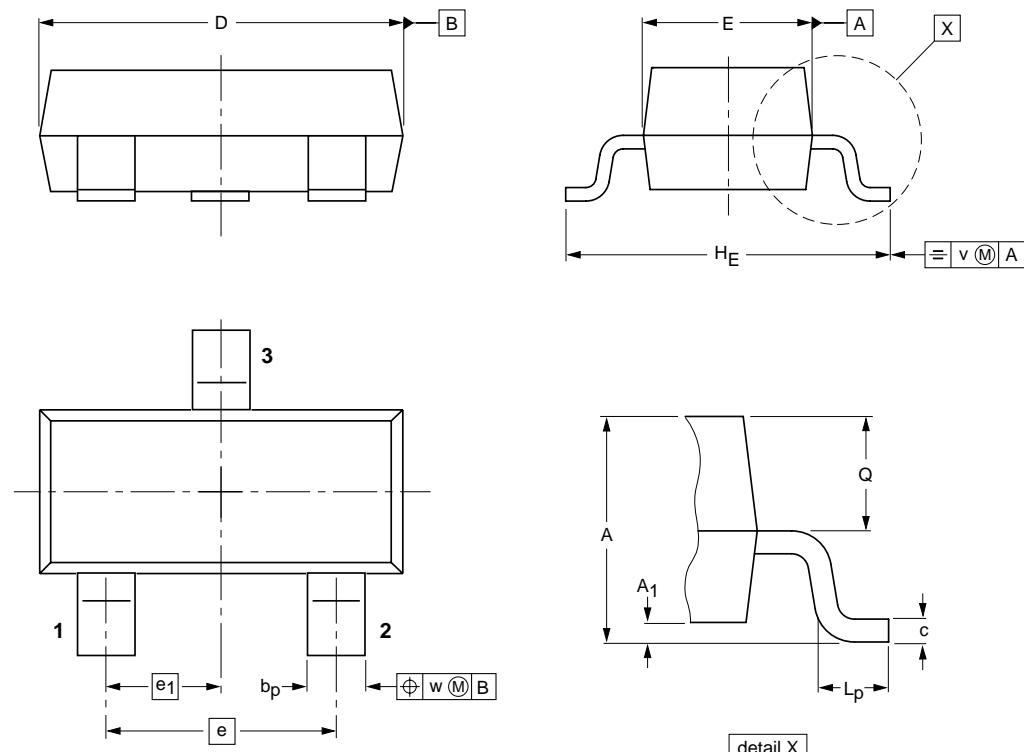
1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.						
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A		 	-04-06-28-04-11-16

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

PDTC144W series

Plastic surface-mounted package; 3 leads

SOT23



0 1 2 mm
scale

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 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

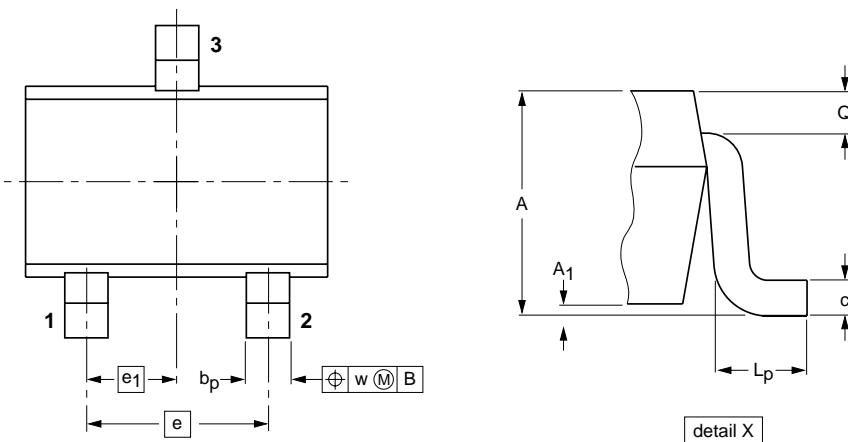
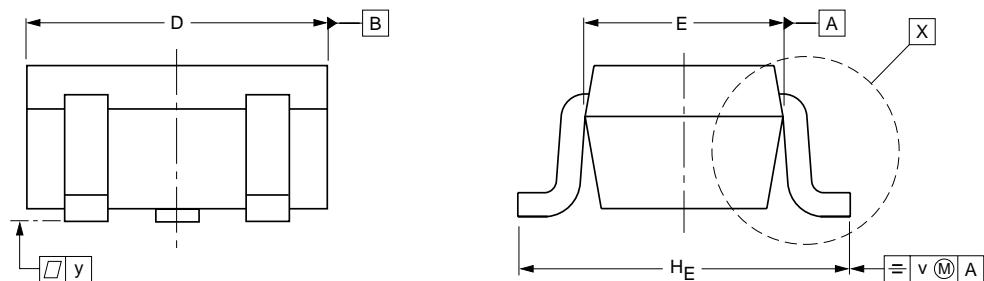
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	IEC	JEDEC	JEITA			
SOT23		TO-236AB				-04-11-04- 06-03-16

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

PDTC144W series

Plastic surface-mounted package; 3 leads

SOT323



0 1 2 mm
scale

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	JEITA			
SOT323			SC-70			-04-11-04- 06-03-16

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

PDTC144W series

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.

Notes

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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

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

For sales offices addresses send e-mail to: salesaddresses@nxp.com

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