

DATA SHEET

PDTC124T series
NPN resistor-equipped transistors;
R1 = 22 k Ω , R2 = open

Product specification
Supersedes data of 2004 Apr 06

2004 Aug 13

**NPN resistor-equipped transistors;
R1 = 22 kΩ, R2 = open**
PDTC124T 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	22	–	kΩ
R2	open	–	–	–

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		
PDTC124TE	SOT416	SC-75	41	PDTA124TE
PDTC124TEF	SOT490	SC-89	35	PDTA124TEF
PDTC124TK	SOT346	SC-59	50	PDTA124TK
PDTC124TM	SOT883	SC-101	DY	PDTA124TM
PDTC124TS	SOT54 (TO-92)	SC-43	TC124T	PDTA124TS
PDTC124TT	SOT23	–	*45 ⁽¹⁾	PDTA124TT
PDTC124TU	SOT323	SC-70	*50 ⁽¹⁾	PDTA124TU

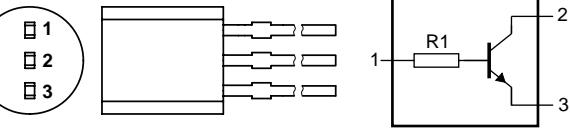
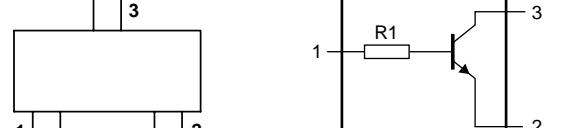
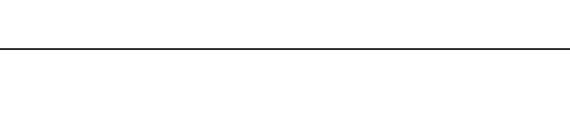
Note

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

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PDTC124T series

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC124TS	 MAM361	1 2 3	base collector emitter
PDTC124TE PDTC124TEF PDTC124TK PDTC124TT PDTC124TU	 Top view MDB270	1 2 3	base emitter collector
PDTC124TM	 Bottom view MHC507	1 2 3	base emitter collector

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ORDERING INFORMATION

TYPE NUMBER	PACKAGE			VERSION
	NAME	DESCRIPTION		
PDTC124TE	–	plastic surface mounted package; 3 leads		SOT416
PDTC124TEF	–	plastic surface mounted package; 3 leads		SOT490
PDTC124TK	–	plastic surface mounted package; 3 leads		SOT346
PDTC124TM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm		SOT883
PDTC124TS	–	plastic single-ended leaded (through hole) package; 3 leads		SOT54
PDTC124TT	–	plastic surface mounted package; 3 leads		SOT23
PDTC124TU	–	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	–	5	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
	SOT490	notes 1 and 2	–	250	mW
	SOT883	notes 2 and 3	–	250	mW
	SOT416	note 1	–	150	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		
		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 °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	µA
		$V_{CE} = 30$ V; $I_B = 0$ A; $T_j = 150$ °C	–	–	50	µA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5$ V; $I_C = 0$ A	–	–	100	nA
h_{FE}	DC current gain	$V_{CE} = 5$ V; $I_C = 1$ mA	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10$ mA; $I_B = 0.5$ mA	–	–	150	mV
R_1	input resistor		15.4	22	28.6	kΩ
C_c	collector capacitance	$I_E = i_e = 0$ A; $V_{CB} = 10$ V; $f = 1$ MHz	–	–	2.5	pF

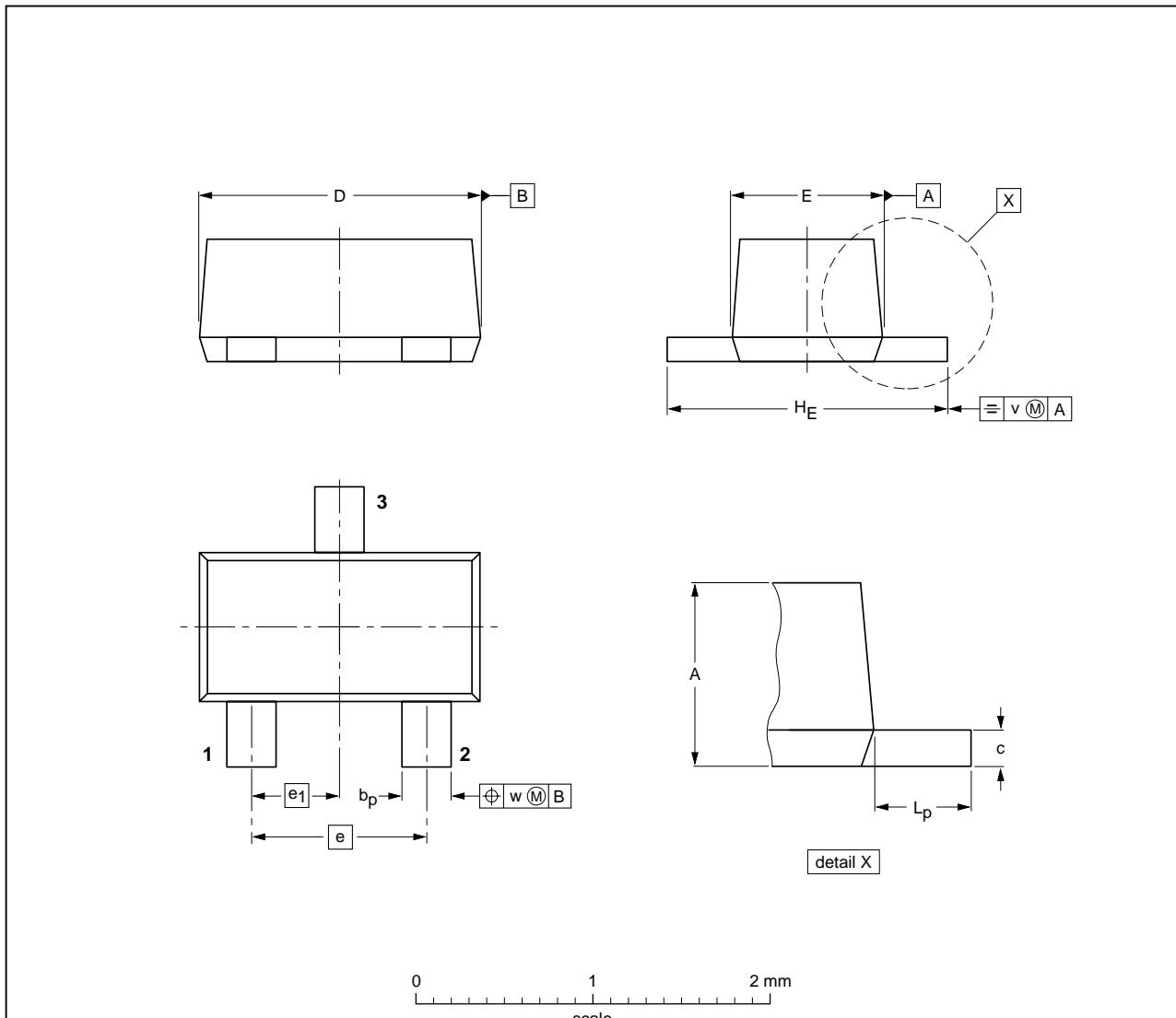
NPN resistor-equipped transistors;
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PACKAGE OUTLINES

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

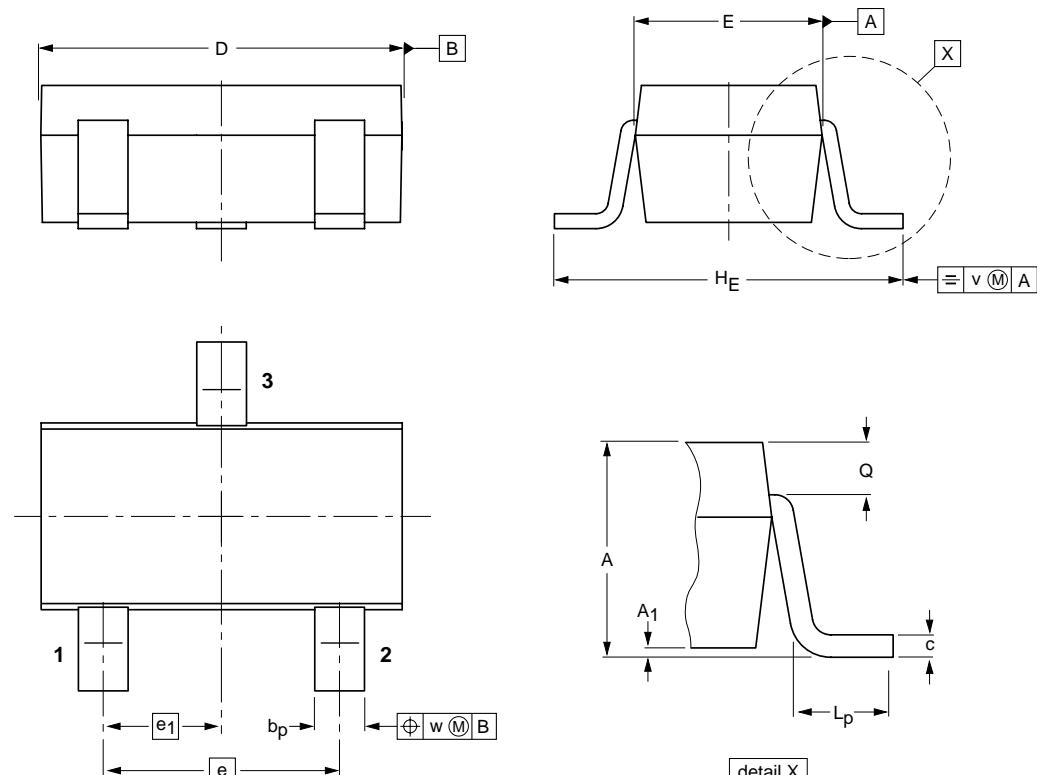
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ	SC-89		
SOT490						98-10-23

NPN resistor-equipped transistors;
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PDTC124T 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	0.013 0.35	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

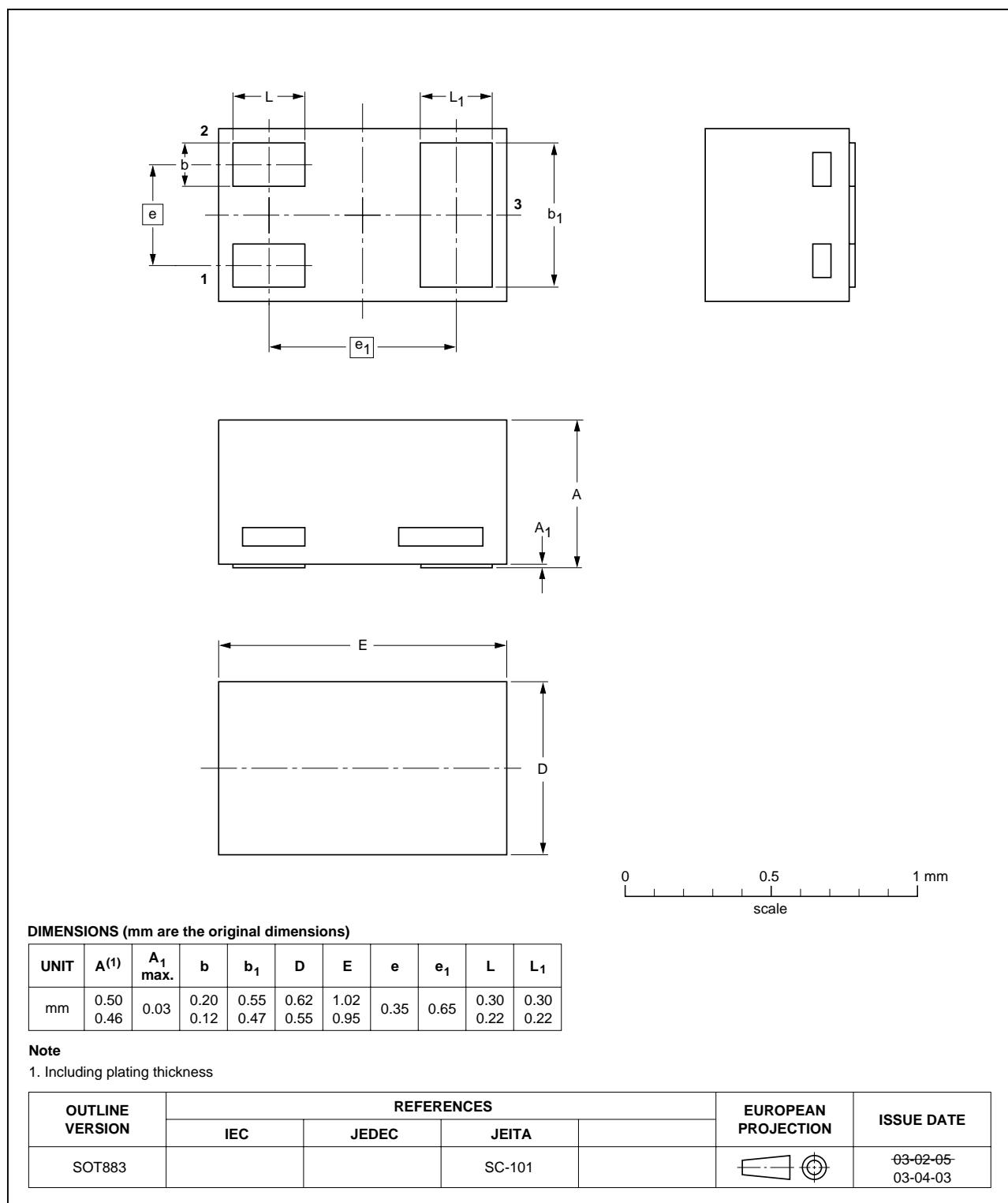
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT346		TO-236	SC-59			98-07-17

NPN resistor-equipped transistors;
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PDTC124T series

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

SOT883

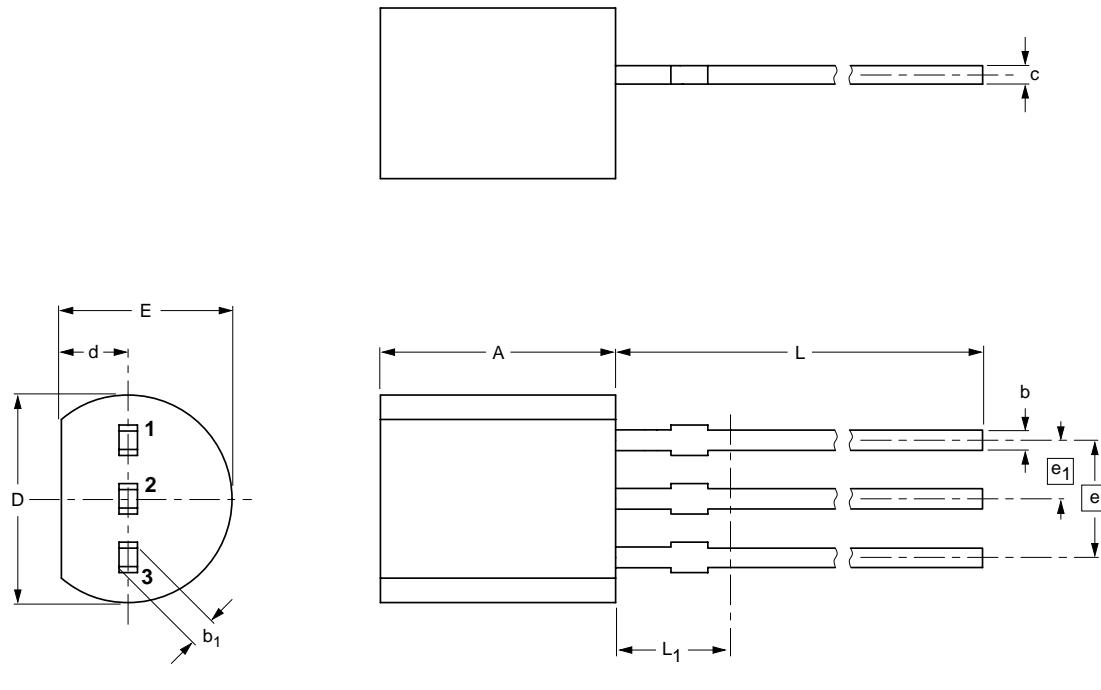


NPN resistor-equipped transistors;
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PDTC124T series

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

SOT54



0 2.5 5 mm
scale

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.

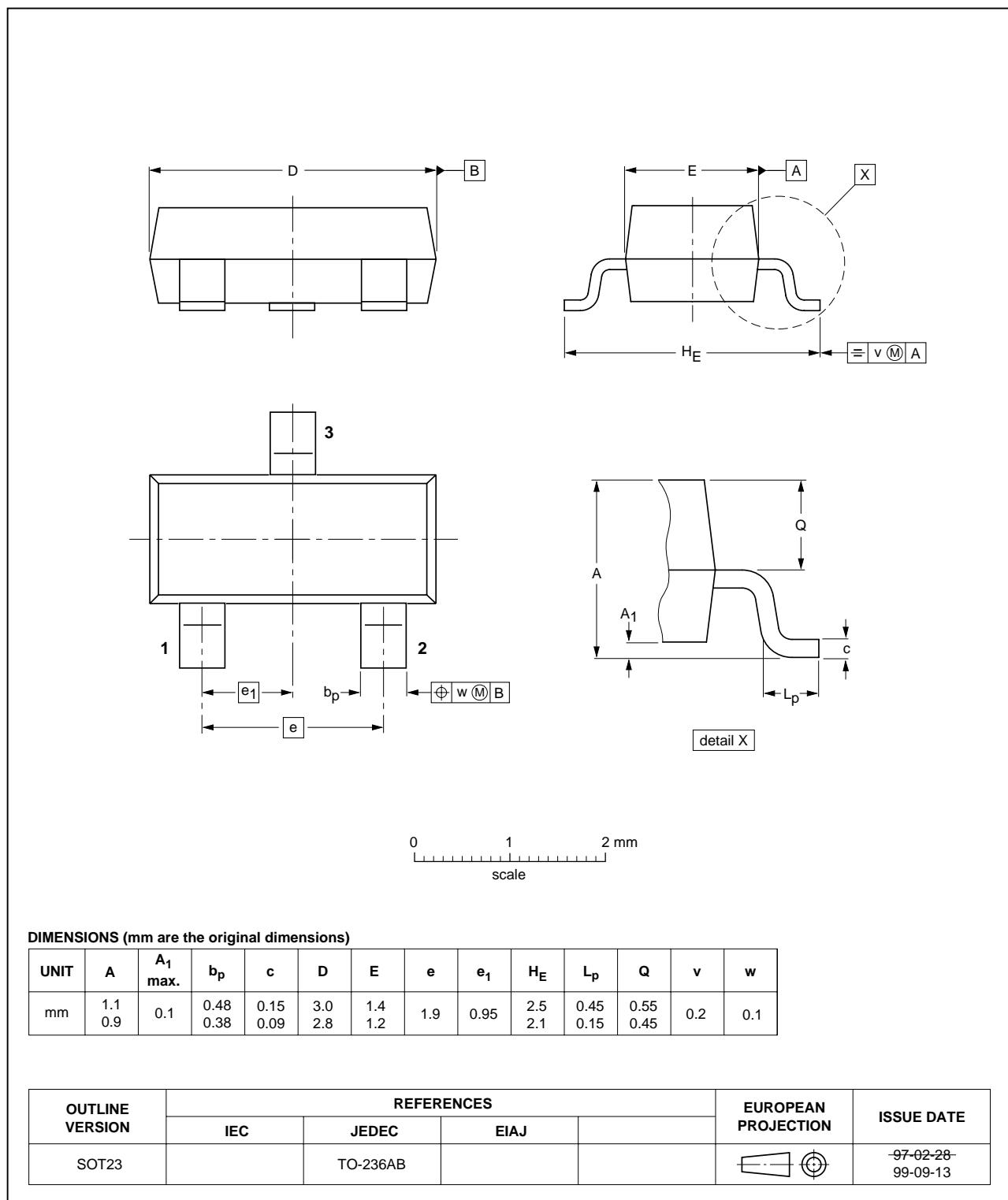
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	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A			-97-02-28 04-06-28

NPN resistor-equipped transistors;
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PDTC124T series

Plastic surface mounted package; 3 leads

SOT23

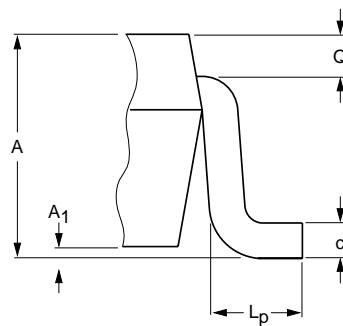
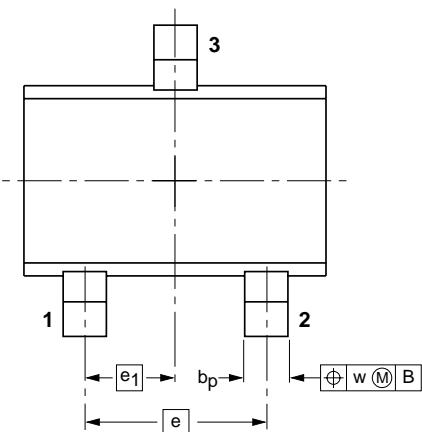
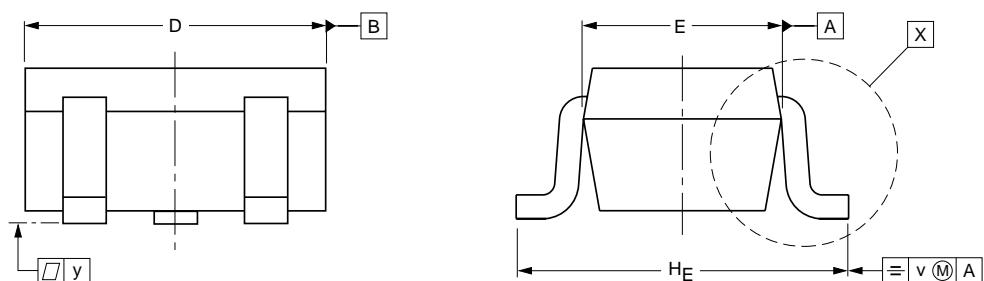


NPN resistor-equipped transistors;
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PDTC124T series

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

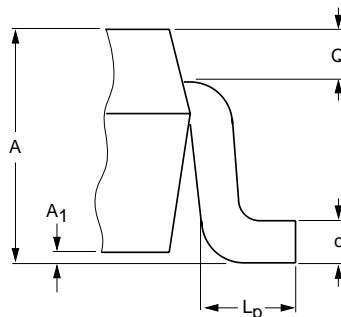
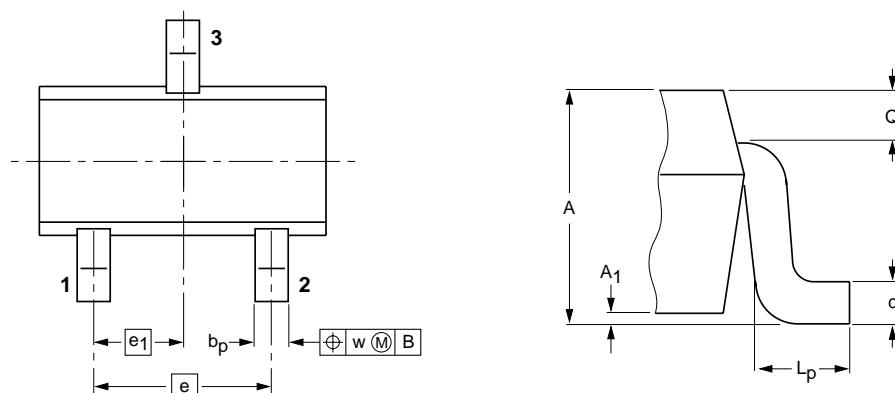
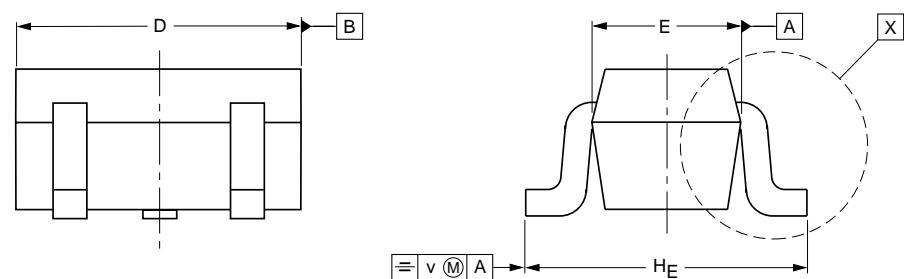
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	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

NPN resistor-equipped transistors;
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PDTC124T series

Plastic surface mounted package; 3 leads

SOT416



0 0.5 1 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	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	EIAJ	SC-75		
SOT416						97-02-28

NPN resistor-equipped transistors;
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PDTC124T series

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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