

DATA SHEET

PDTC124E series

NPN resistor-equipped transistors;

R1 = 22 k Ω , R2 = 22 k Ω

Product specification
Supersedes data of 2003 Apr 14

2004 Aug 17

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

PDTC124E 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	–	k Ω
R2	bias resistor	22	–	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		
PDTC124EE	SOT416	SC-75	06	PDTA124EE
PDTC124EEF	SOT490	SC-89	36	PDTA124EEF
PDTC124EK	SOT346	SC-59	06	PDTA124EK
PDTC124EM	SOT883	SC-101	DX	PDTA124EM
PDTC124ES	SOT54 (TO-92)	SC-43	TC124E	PDTA124ES
PDTC124ET	SOT23	–	*17 ⁽¹⁾	PDTA124ET
PDTC124EU	SOT323	SC-70	*06 ⁽¹⁾	PDTA124EU

Note

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

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

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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC124ES		1	base
		2	collector
		3	emitter
PDTC124EE PDTC124EEF PDTC124EK PDTC124ET PDTC124EU		1	base
		2	emitter
		3	collector
PDTC124EM		1	base
		2	emitter
		3	collector

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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} ≤ 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
	SOT490	notes 1 and 2	–	250	mW
SOT883	notes 2 and 3	–	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.

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.
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CHARACTERISTICS

$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{\text{CB}} = 50 \text{ V}$; $I_{\text{E}} = 0$	–	–	100	nA
I_{CEO}	collector-emitter cut-off current	$V_{\text{CE}} = 30 \text{ V}$; $I_{\text{B}} = 0$	–	–	1	μA
		$V_{\text{CE}} = 30 \text{ V}$; $I_{\text{B}} = 0$; $T_{\text{j}} = 150 \text{ }^\circ\text{C}$	–	–	50	μA
I_{EBO}	emitter-base cut-off current	$V_{\text{EB}} = 5 \text{ V}$; $I_{\text{C}} = 0$	–	–	180	μA
h_{FE}	DC current gain	$V_{\text{CE}} = 5 \text{ V}$; $I_{\text{C}} = 5 \text{ mA}$	60	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_{\text{C}} = 10 \text{ mA}$; $I_{\text{B}} = 0.5 \text{ mA}$	–	–	150	mV
$V_{\text{i(off)}}$	input-off voltage	$I_{\text{C}} = 100 \text{ }\mu\text{A}$; $V_{\text{CE}} = 5 \text{ V}$	–	1.1	0.8	V
$V_{\text{i(on)}}$	input-on voltage	$I_{\text{C}} = 5 \text{ mA}$; $V_{\text{CE}} = 0.3 \text{ V}$	2.5	1.7	–	V
R1	input resistor		15.4	22	28.6	$\text{k}\Omega$
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
C_{c}	collector capacitance	$I_{\text{E}} = i_{\text{e}} = 0$; $V_{\text{CB}} = 10 \text{ V}$; $f = 1 \text{ MHz}$	–	–	2.5	pF

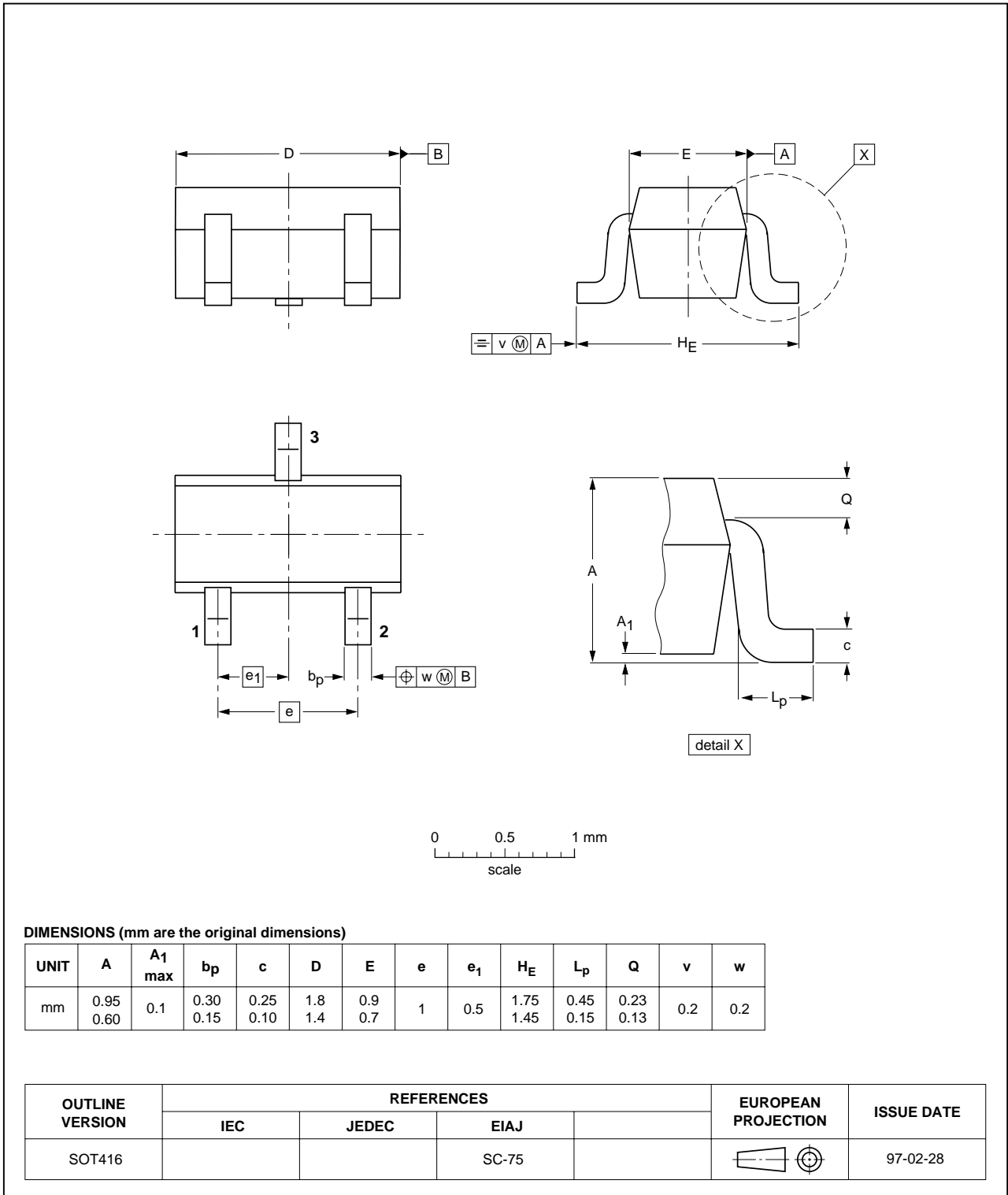
NPN resistor-equipped transistors;
R1 = 22 kΩ, R2 = 22 kΩ

PDTC124E series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT416

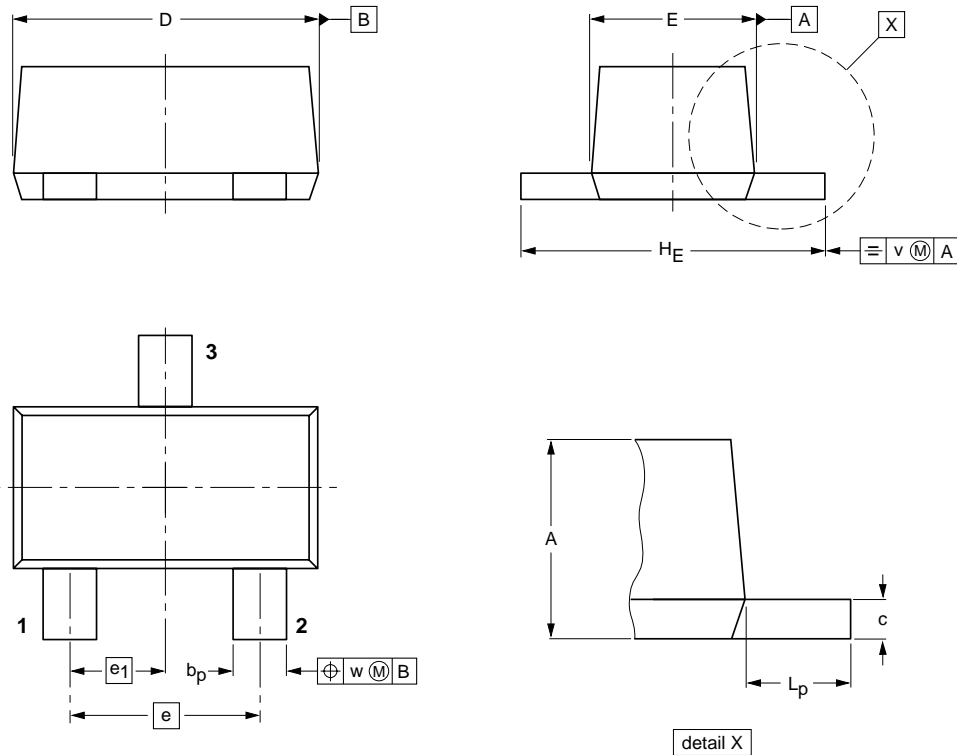


NPN resistor-equipped transistors;
R1 = 22 kΩ, R2 = 22 kΩ

PDTC124E series

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

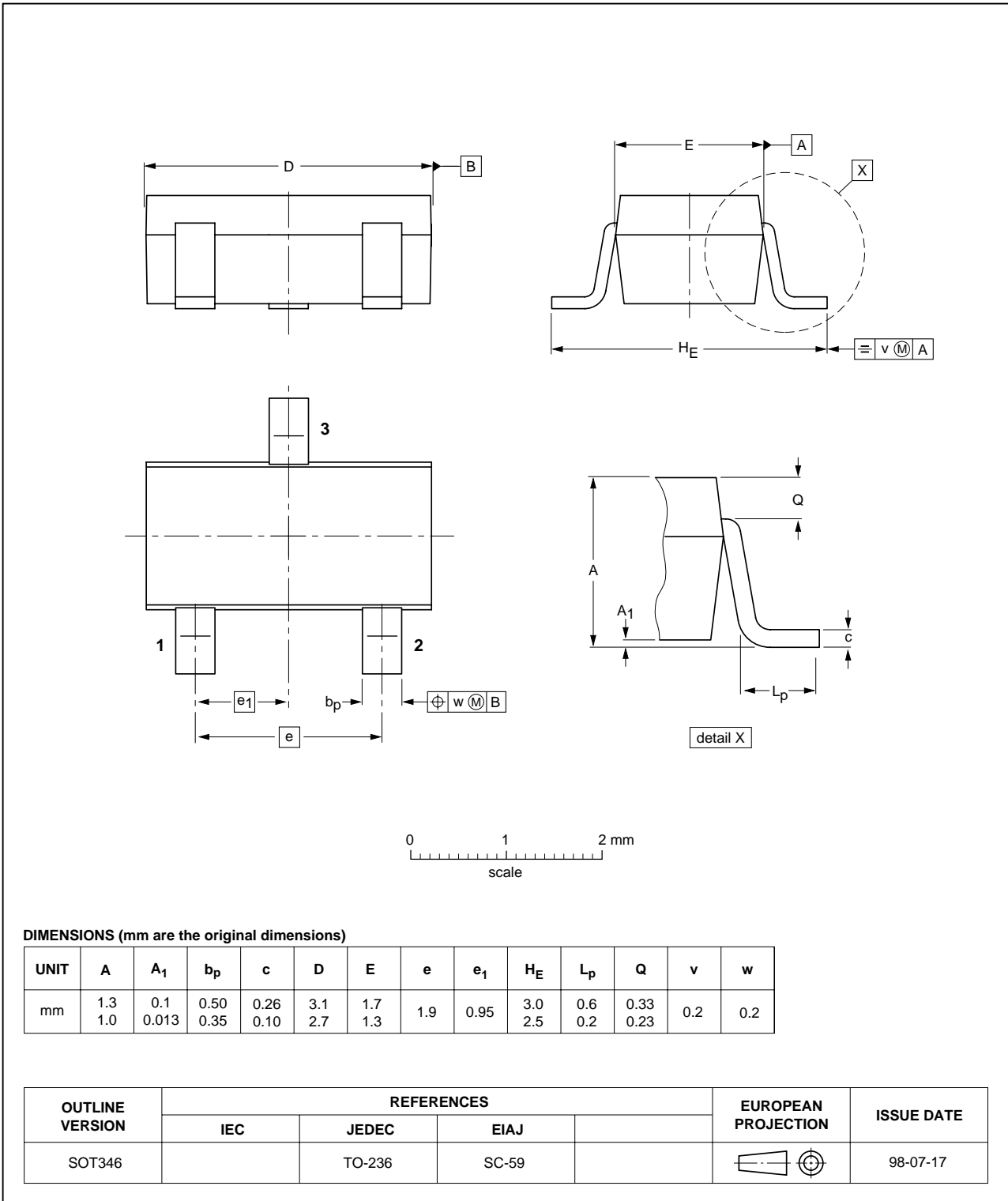
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT490			SC-89		98-10-23

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

PDTC124E series

Plastic surface mounted package; 3 leads

SOT346

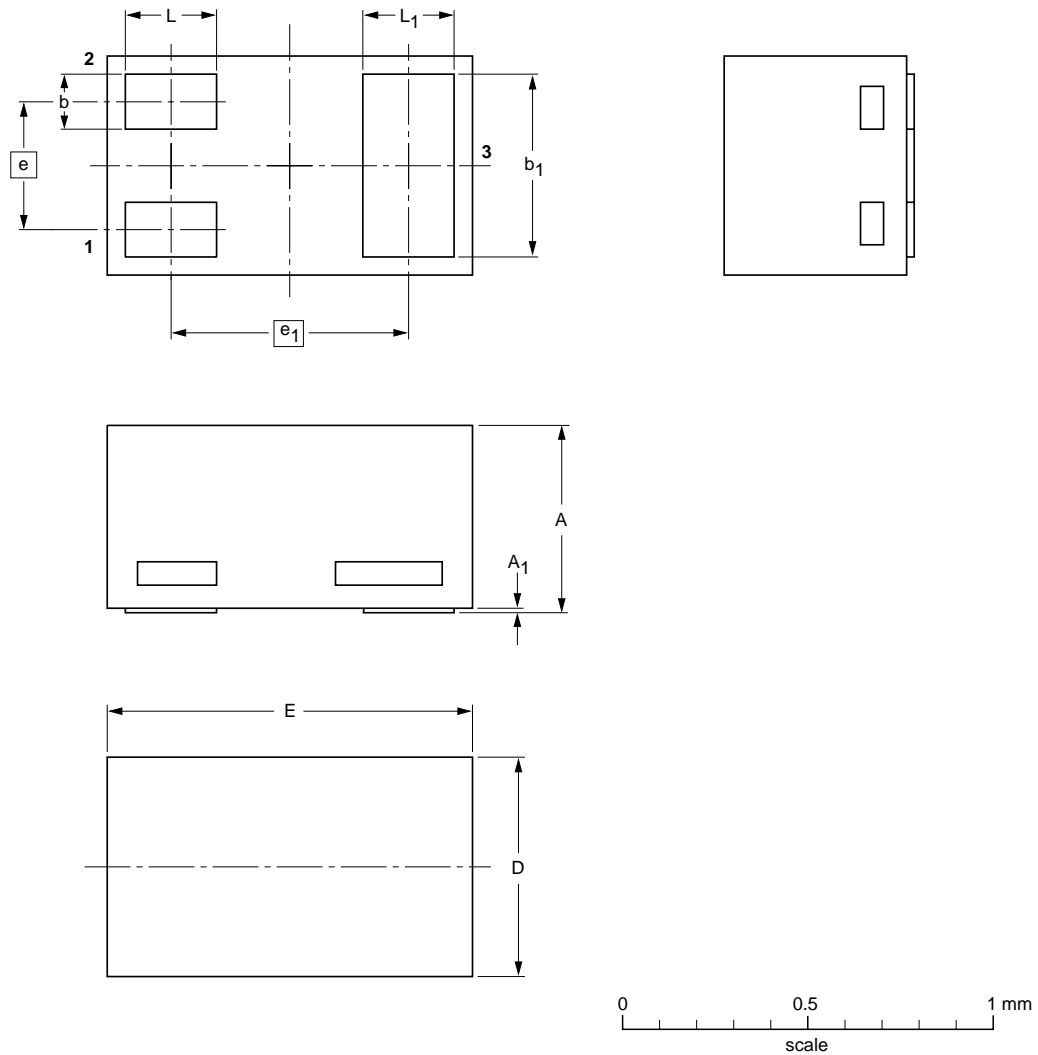


NPN resistor-equipped transistors;
R1 = 22 kΩ, R2 = 22 kΩ

PDTC124E series

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

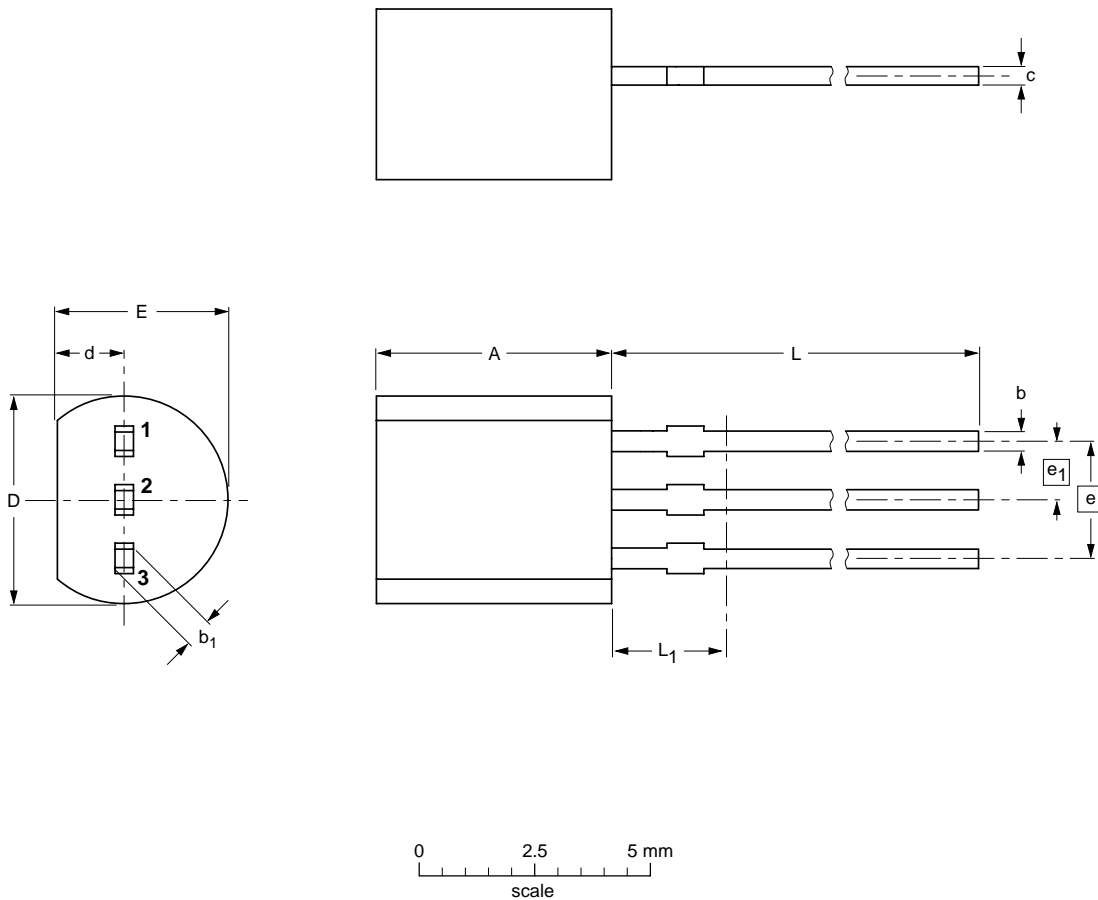
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT883			SC-101		03-02-05 03-04-03

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

PDTC124E 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.

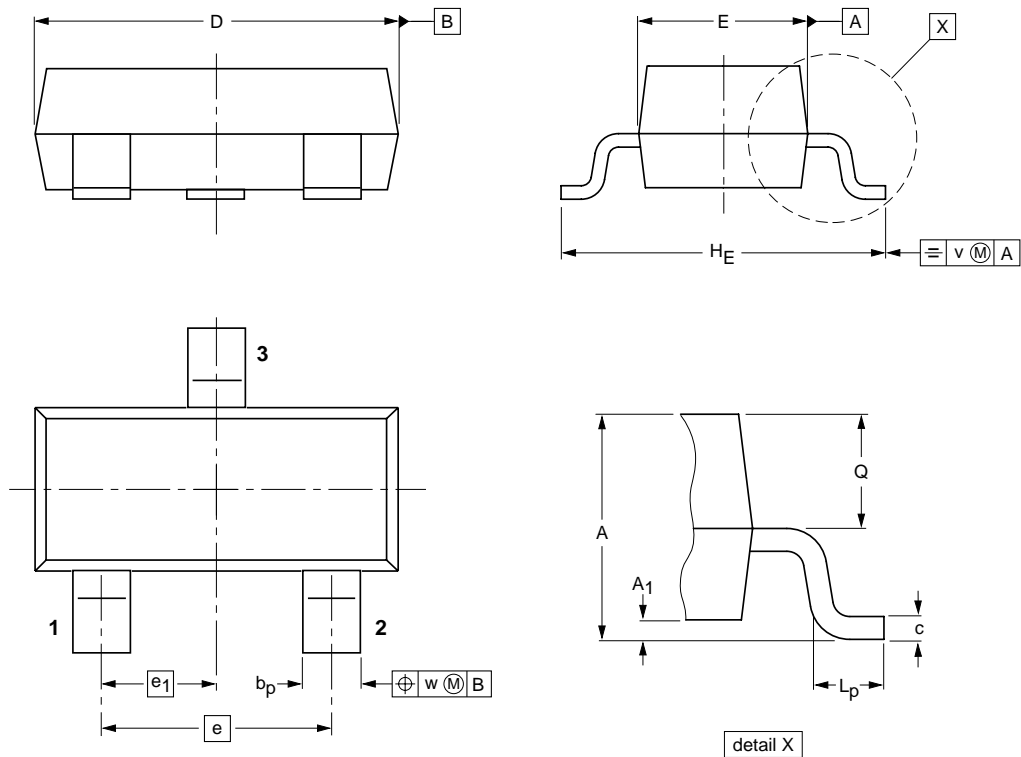
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT54		TO-92	SC-43A		-97-02-28 04-06-28

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

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Plastic surface mounted package; 3 leads

SOT23



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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				97-02-28 99-09-13

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

PDTC124E 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;
R1 = 22 k Ω , R2 = 22 k Ω

PDTC124E series

DATA SHEET STATUS

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