

# DATA SHEET

## **PDTC143E series**

NPN resistor-equipped transistors;

$R1 = 4.7\text{ k}\Omega$ ,  $R2 = 4.7\text{ k}\Omega$

Product specification  
Supersedes data of 2004 Jan 12

2004 Mar 18

## NPN resistor-equipped transistors; R1 = 4.7 k $\Omega$ , R2 = 4.7 k $\Omega$

## PDTC143E 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	4.7	–	k $\Omega$
R2	bias resistor	4.7	–	k $\Omega$

### DESCRIPTION

NPN resistor-equipped transistor (see “Simplified outline, symbol and pinning” for package details).

### PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE <sup>(1)</sup>	PNP COMPLEMENT
	PHILIPS	EIAJ		
PDTC143EE	SOT416	SC-75	02	PDTA143EE
PDTC143EEF	SOT490	SC-89	51	PDTA143EEF
PDTC143EK	SOT346	SC-59	02	PDTA143EK
PDTC143EM	SOT883	SC-101	E1	PDTA143EM
PDTC143ES	SOT54 (TO-92)	SC-43	TC143E	PDTA143ES
PDTC143ET	SOT23	–	*02	PDTA143ET
PDTC143EU	SOT323	SC-70	*02	PDTA143EU

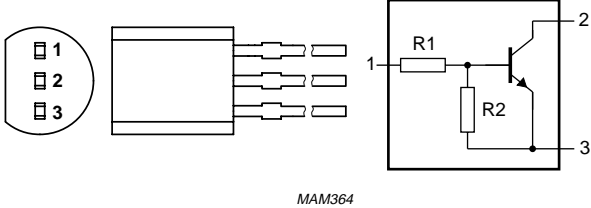
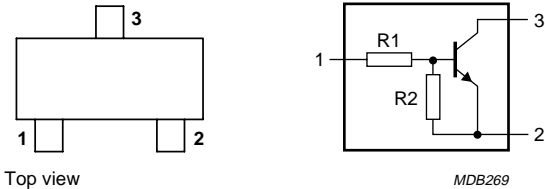
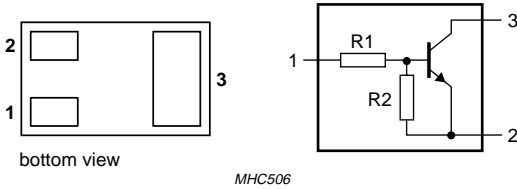
### Note

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

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC143ES		1 2 3	base collector emitter
PDTC143EE PDTC143EEF PDTC143EK PDTC143ET PDTC143EU		1 2 3	base emitter collector
PDTC143EM		1 2 3	base emitter collector

NPN resistor-equipped transistors;  
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PDTC143E series

## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC143EE	–	plastic surface mounted package; 3 leads	SOT416
PDTC143EEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC143EK	–	plastic surface mounted package; 3 leads	SOT346
PDTC143EM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm	SOT883
PDTC143ES	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC143ET	–	plastic surface mounted package; 3 leads	SOT23
PDTC143EU	–	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		–	+30	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
	SOT883	notes 2 and 3	–	250	mW
	SOT490	notes 1 and 2	–	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  $\mu\text{m}$  copper strip line.

NPN resistor-equipped transistors;  
 $R_1 = 4.7 \text{ k}\Omega$ ,  $R_2 = 4.7 \text{ k}\Omega$

PDTC143E series

#### 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
	SOT883	notes 2 and 3	500	K/W
	SOT490	notes 1 and 2	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  $\mu\text{m}$  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	$\mu\text{A}$
		$V_{CE} = 30 \text{ V}$ ; $I_B = 0 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5 \text{ V}$ ; $I_C = 0 \text{ A}$	–	–	900	$\mu\text{A}$
$h_{FE}$	DC current gain	$V_{CE} = 5 \text{ V}$ ; $I_C = 10 \text{ mA}$	30	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10 \text{ mA}$ ; $I_B = 0.5 \text{ mA}$	–	–	150	mV
$V_{i(off)}$	input-off voltage	$I_C = 100 \text{ }\mu\text{A}$ ; $V_{CE} = 5 \text{ V}$	–	1.1	0.5	V
$V_{i(on)}$	input-on voltage	$I_C = 20 \text{ mA}$ ; $V_{CE} = 0.3 \text{ V}$	2.5	1.9	–	V
$R_1$	input resistor		3.3	4.7	6.1	$\text{k}\Omega$
$\frac{R_2}{R_1}$	resistor ratio		0.8	1	1.2	
$C_c$	collector capacitance	$I_E = i_e = 0 \text{ A}$ ; $V_{CB} = 10 \text{ V}$ ; $f = 1 \text{ MHz}$	–	–	2.5	pF

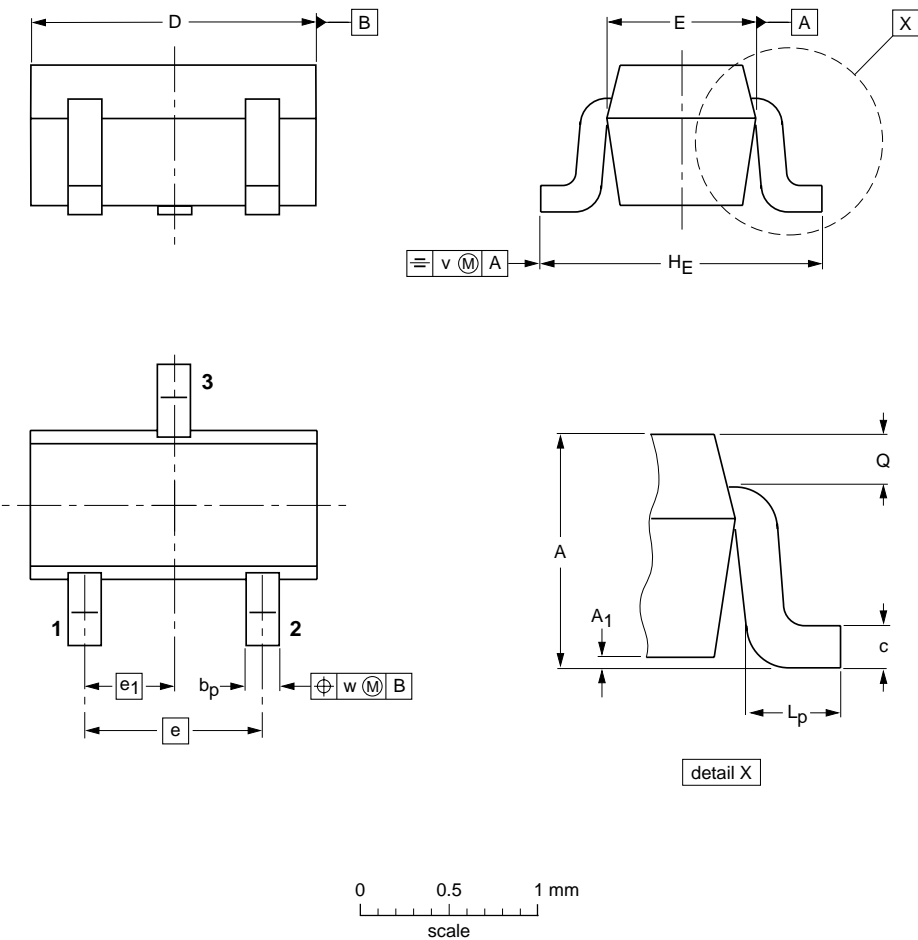
NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

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

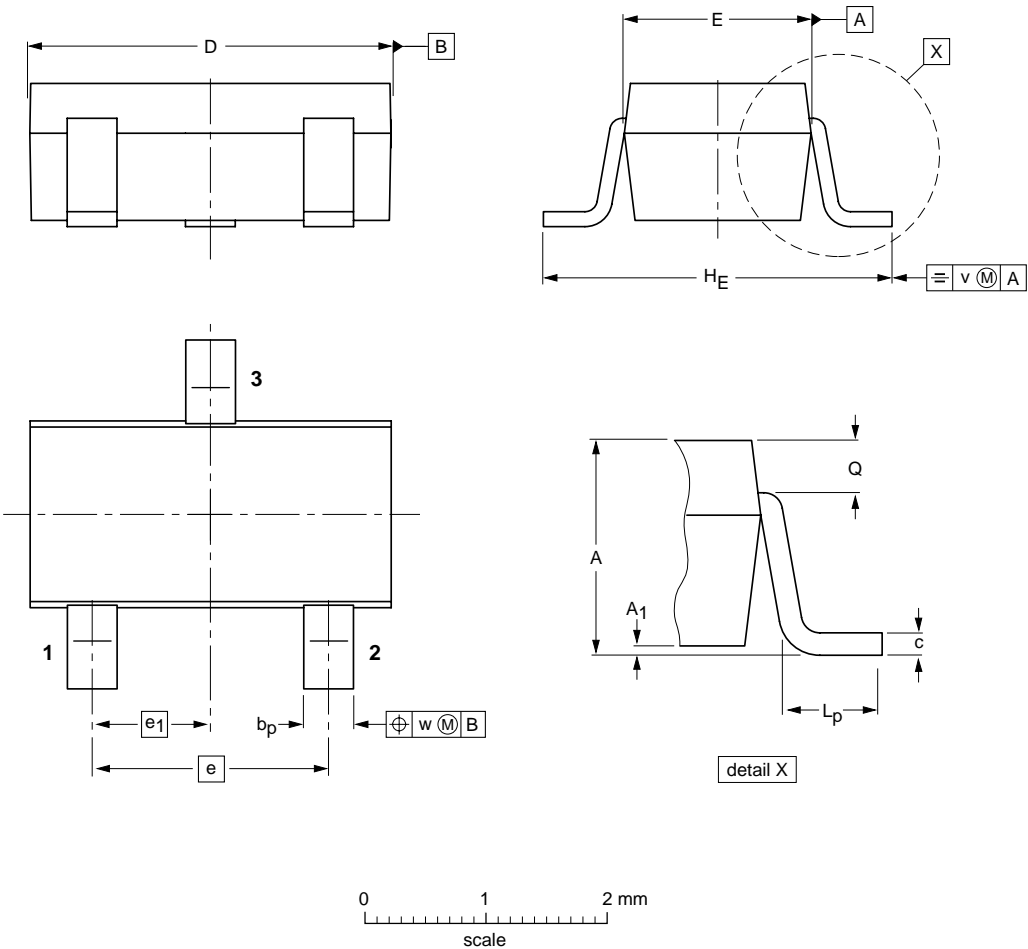
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT416			SC-75			97-02-28

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E 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

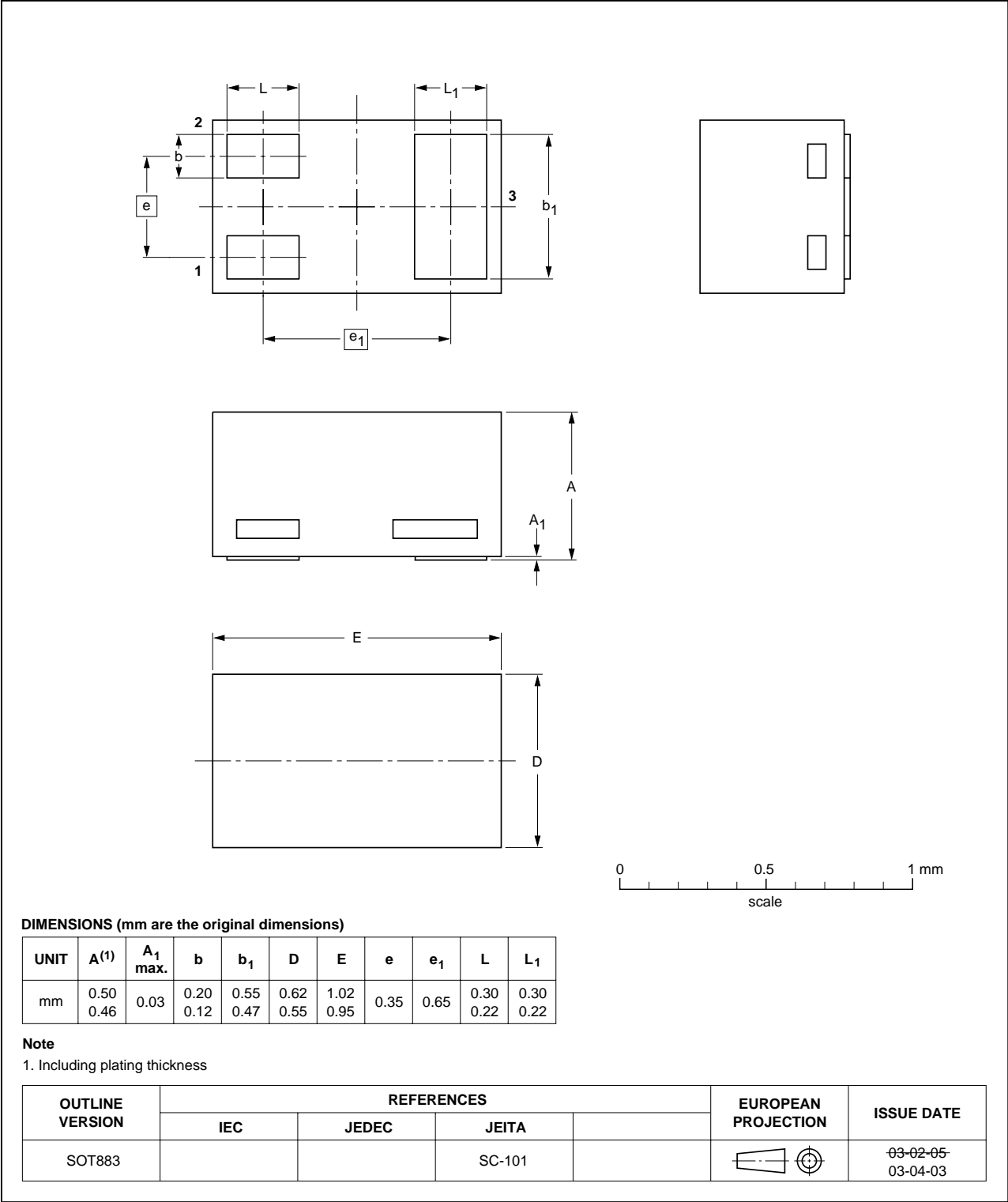
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT346		TO-236	SC-59			98-07-17

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

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

SOT883



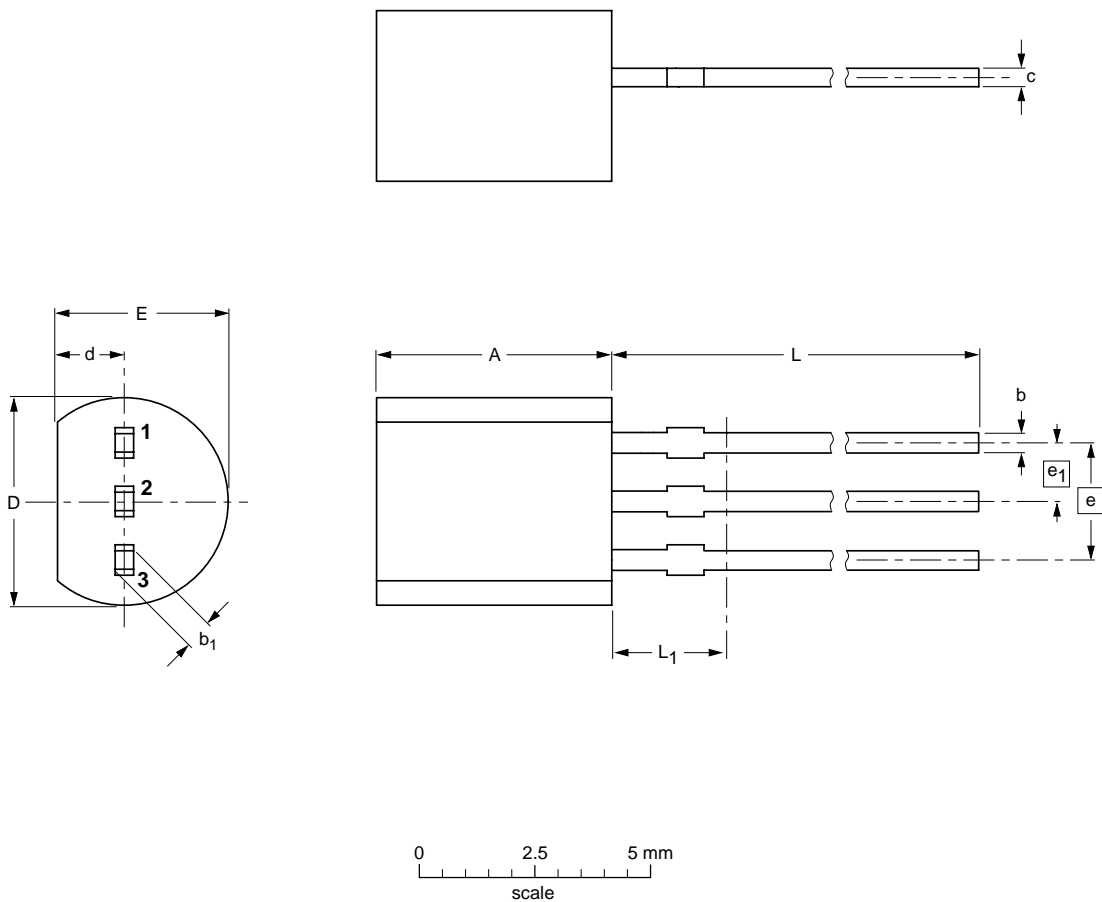


NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

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

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup>
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	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.

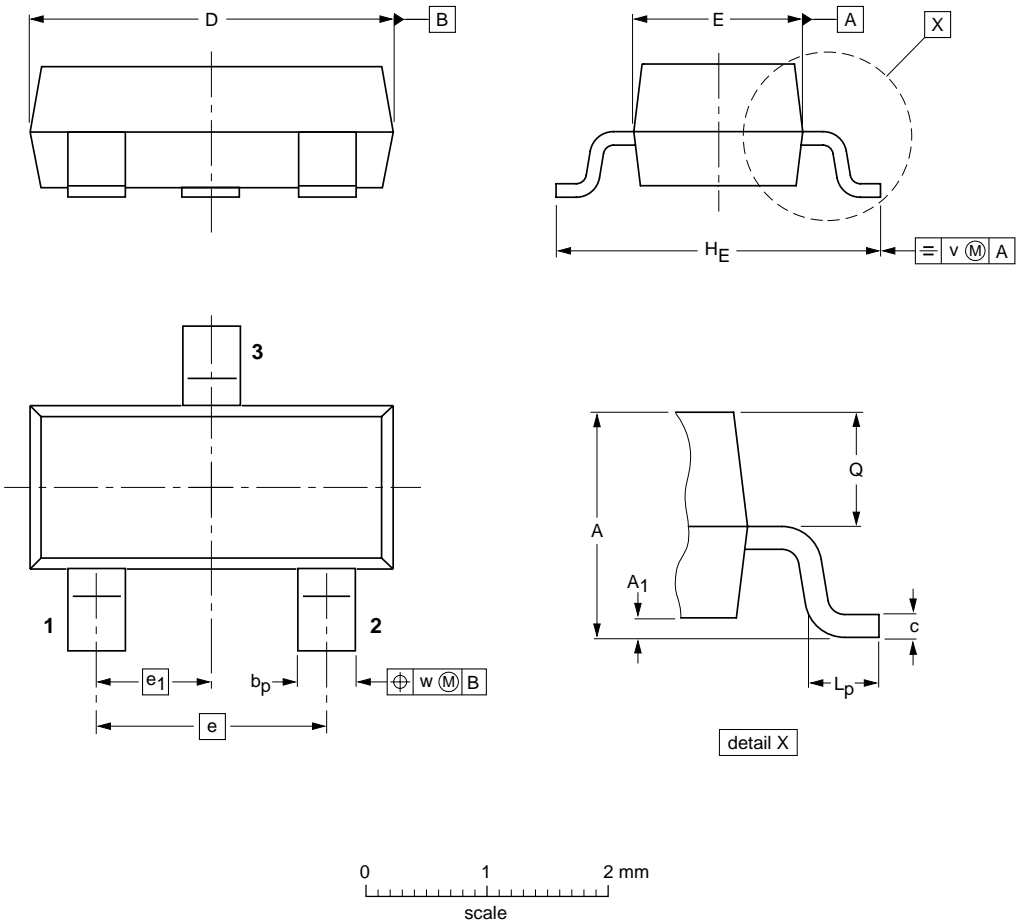
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 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

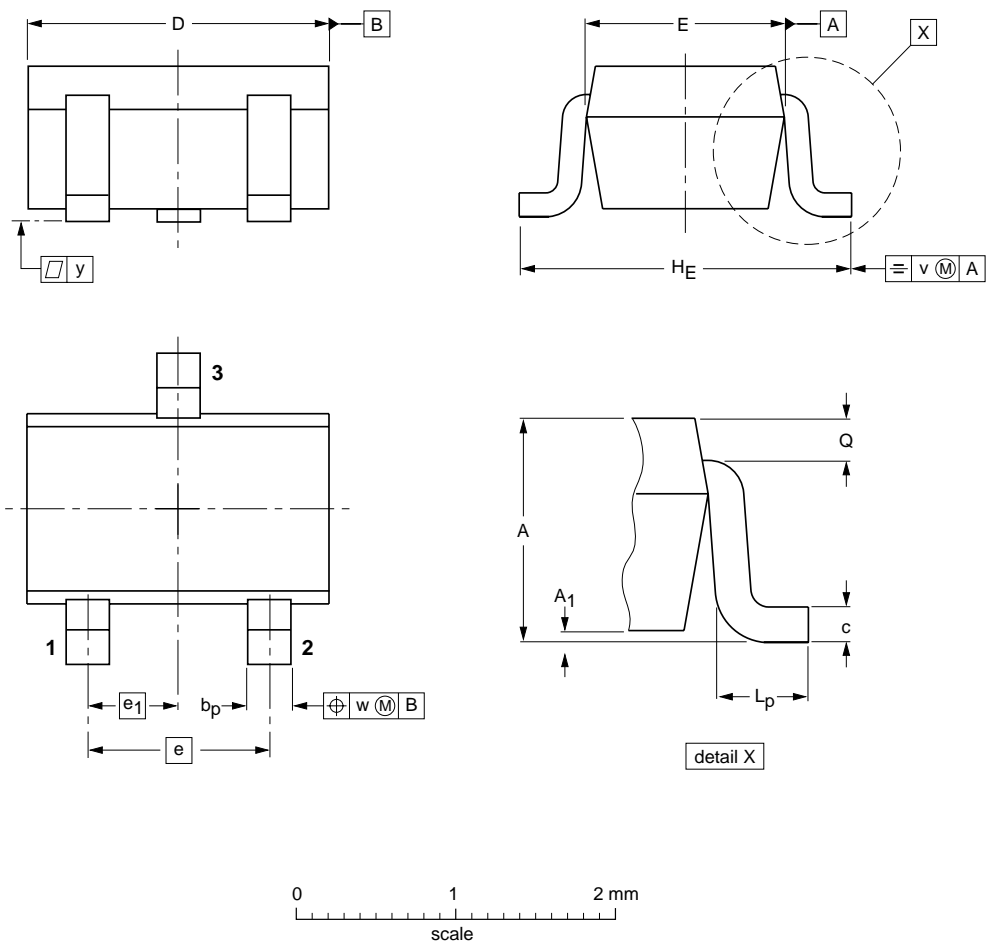
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	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				97-02-28 99-09-13

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

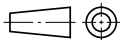
Plastic surface mounted package; 3 leads

SOT323



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 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

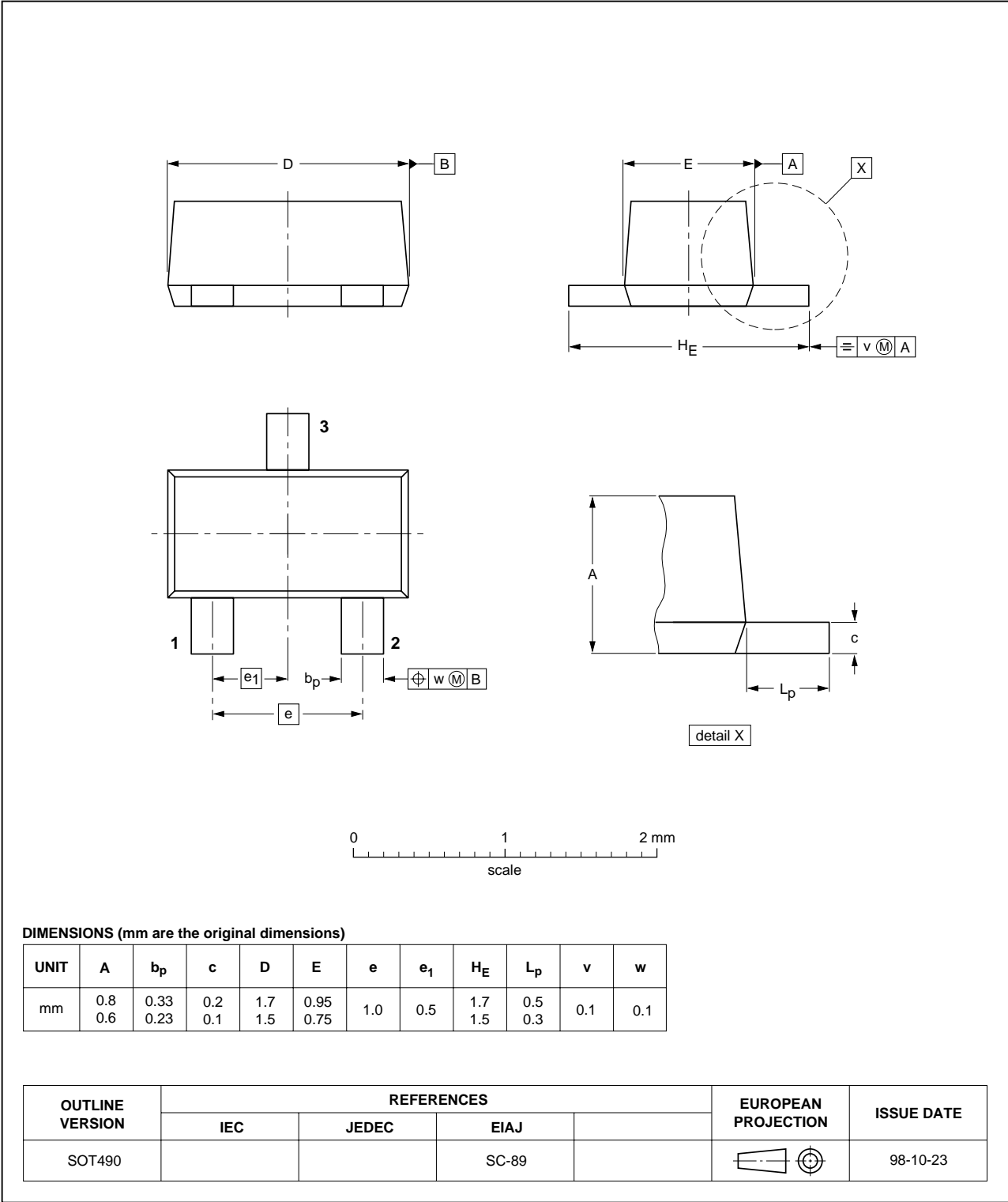
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	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 4.7 kΩ

PDTC143E series

Plastic surface mounted package; 3 leads

SOT490



NPN resistor-equipped transistors;  
R1 = 4.7 k $\Omega$ , R2 = 4.7 k $\Omega$

PDTC143E series

#### DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	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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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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