## **DISCRETE SEMICONDUCTORS**

## DATA SHEET

## **PDTC143T series** NPN resistor-equipped transistors; R1 = 4.7 k $\Omega$ , R2 = open

Product specification Supersedes data of 2004 Apr 06 2004 Aug 06





### PDTC143T 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 applications.

#### **QUICK REFERENCE DATA**

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V <sub>CEO</sub>	collector-emitter voltage	_	50	V
lo	output current (DC)	_	100	mA
R1	bias resistor	4.7	_	kΩ
R2	open	_	_	_

#### **DESCRIPTION**

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

#### **PRODUCT OVERVIEW**

TYPE NUMBER	PAC	KAGE	MARKING CODE	DND COMPLEMENT	
I TPE NUMBER	PHILIPS	EIAJ	MARKING CODE	PNP COMPLEMENT	
PDTC143TE	SOT416	SC-75	40	PDTA143TE	
PDTC143TEF	SOT490	SC-89	11	PDTA143TEF	
PDTC143TK	SOT346	SC-59	52	PDTA143TK	
PDTC143TM	SOT883	SC-101	DM	PDTA143TM	
PDTC143TS	SOT54 (TO-92)	SC-43	TC143T	PDTA143TS	
PDTC143TT	SOT23	_	*33 <sup>(1)</sup>	PDTA143TT	
PDTC143TU	SOT323	SC-70	*52 <sup>(1)</sup>	PDTA143TU	

#### Note

<sup>1. \* =</sup> p: Made in Hong Kong.

<sup>\* =</sup> t: Made in Malaysia.

<sup>\* =</sup> W: Made in China.

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

## PDTC143T series

#### SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	CIMPLIFIED OUTLINE AND CVMDOL	PINNING		
I TPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PIN	DESCRIPTION	
PDTC143TS	1 R1 2 R1 3 MAM361	1 2 3	base collector emitter	
PDTC143TE PDTC143TEF PDTC143TK PDTC143TT PDTC143TU	3 1 R1 3 1 P1 2 Top view MDB270	1 2 3	base emitter collector	
PDTC143TM	2 R1 3 Bottom view  MHC507	1 2 3	base emitter collector	

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

### PDTC143T series

#### **ORDERING INFORMATION**

TYPE NUMBER		PACKAGE	
I TPE NUMBER	NAME	DESCRIPTION	VERSION
PDTC143TE	_	plastic surface mounted package; 3 leads	SOT416
PDTC143TEF	<ul> <li>plastic surface mounted package; 3 leads</li> </ul>		SOT490
PDTC143TK	_	plastic surface mounted package; 3 leads	SOT346
PDTC143TM	_	leadless ultra small plastic package; 3 solder lands; body $1.0 \times 0.6 \times 0.5$ mm	SOT883
PDTC143TS	_	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC143TT	_	plastic surface mounted package; 3 leads	SOT23
PDTC143TU	_	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 <sub>CBO</sub>	collector-base voltage	open emitter	_	50	V
V <sub>CEO</sub>	collector-emitter voltage	open base	_	50	V
V <sub>EBO</sub>	emitter-base voltage	open collector	_	5	V
Io	output current (DC)		_	100	mA
I <sub>CM</sub>	collector current		_	100	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °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 <sub>stg</sub>	storage temperature		-65	+150	°C
T <sub>j</sub>	junction temperature		_	150	°C
T <sub>amb</sub>	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  $\mu m$  copper strip line.

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

### PDTC143T series

#### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	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
	SOT490	notes 1 and 2	500	K/W
	SOT883	notes 2 and 3	500	K/W
	SOT416	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  $\mu m$  copper strip line.

#### **CHARACTERISTICS**

 $T_{amb}$  = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 50 V; I <sub>E</sub> = 0 A	_	_	100	nA
I <sub>CEO</sub>	collector-emitter cut-off current	V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0 A	_	_	1	μΑ
		$V_{CE} = 30 \text{ V}; I_{B} = 0 \text{ A}; T_{j} = 150 ^{\circ}\text{C}$	_	_	50	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A	_	_	100	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 1 mA	200	_	_	
V <sub>CEsat</sub>	collector-emitter saturation voltage	$I_C = 5 \text{ mA}; I_B = 0.25 \text{ mA}$	_	_	100	mV
R1	input resistor		3.3	4.7	6.1	kΩ
C <sub>c</sub>	collector capacitance	$I_E = I_e = 0 \text{ A}; V_{CB} = 10 \text{ V};$ f = 1 MHz	_	_	2.5	pF

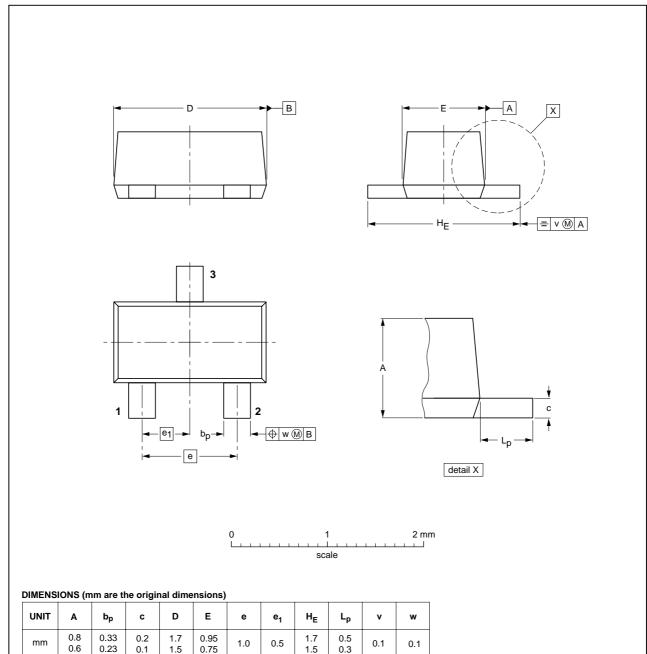
## NPN resistor-equipped transistors; R1 = 4.7 k $\Omega$ , R2 = open

### PDTC143T series

#### **PACKAGE OUTLINES**

#### Plastic surface mounted package; 3 leads

SOT490

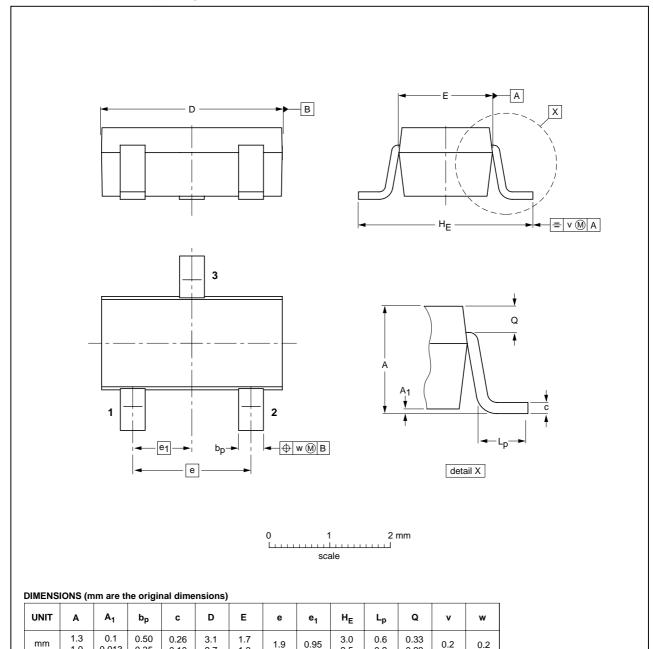


OUTLINE		REFER	ENCES	EUROPEAN	ICCUE DATE	
VERSION	IEC	JEDEC	EIAJ	PROJECTION	ISSUE DATE	
SOT490			SC-89	$\bigoplus \bigoplus$	98-10-23	

### PDTC143T series

#### Plastic surface mounted package; 3 leads

**SOT346** 



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

2004 Aug 06 7

1.0

0.013

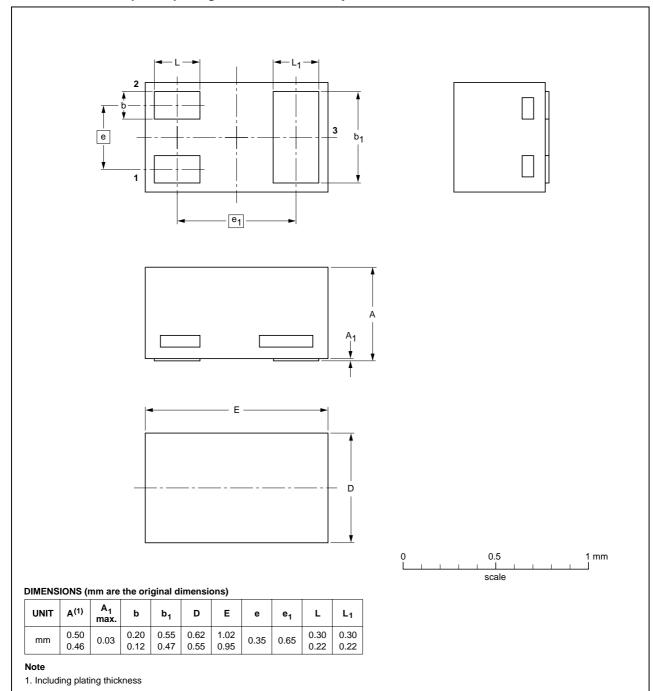
0.35

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

### PDTC143T series

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

**SOT883** 



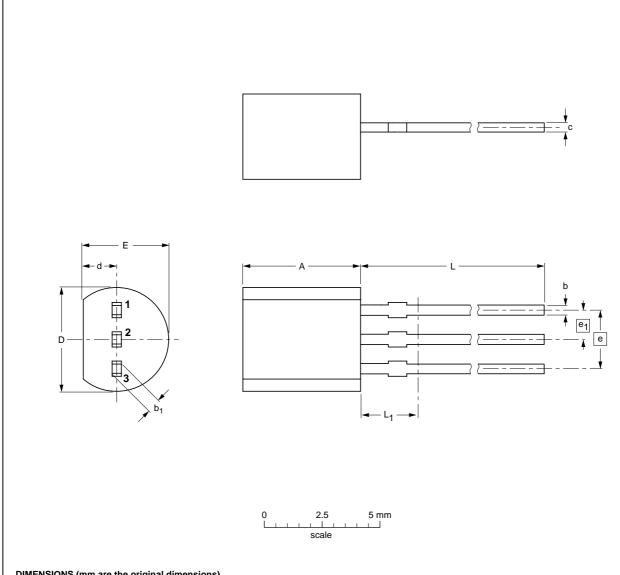
OUTLINE		REFER	ENCES	EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE	
SOT883			SC-101		<del>03-02-05</del> 03-04-03	

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

### PDTC143T series

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

SOT54



#### **DIMENSIONS** (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	С	D	d	E	е	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> 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

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

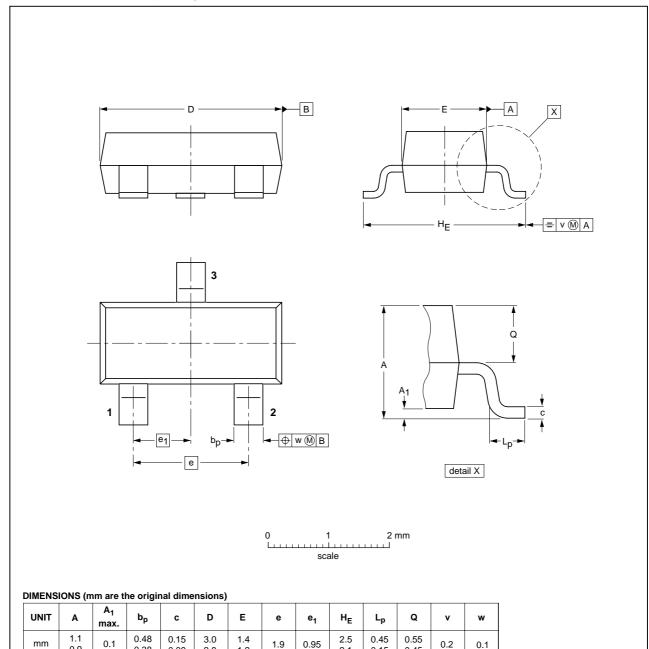
OUTLINE REFERENCES		EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE	
SOT54		TO-92	SC-43A		<del>97-02-28</del> 04-06-28	

2004 Aug 06 9

### PDTC143T series

#### Plastic surface mounted package; 3 leads

SOT23



OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT23		TO-236AB				<del>-97-02-28-</del> 99-09-13	

2004 Aug 06 10

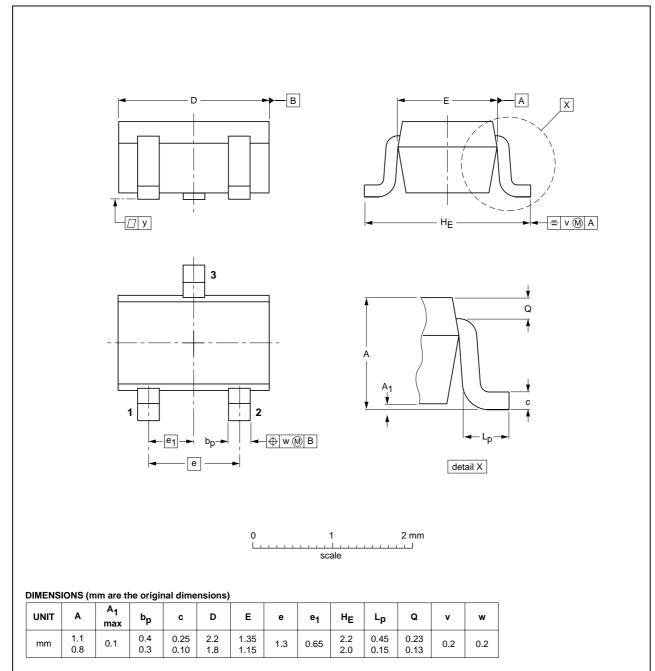
0.38

0.9

### PDTC143T series

#### Plastic surface mounted package; 3 leads

**SOT323** 

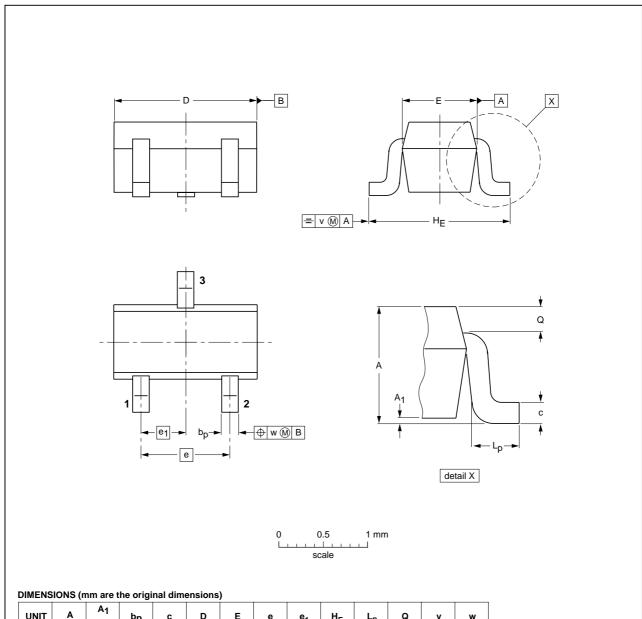


OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT323			SC-70			97-02-28	

## PDTC143T series

#### Plastic surface mounted package; 3 leads

**SOT416** 



UNI	ГА	A <sub>1</sub> max	bp	С	D	E	e	e <sub>1</sub>	HE	Lp	Q	v	w
mn	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		REFER	EUROPEAN	IOOUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT416			SC-75			97-02-28	

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

#### PDTC143T series

#### **DATA SHEET STATUS**

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

#### **Notes**

- 1. Please consult the most recently issued data sheet before initiating or completing a design.
- 2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.
- 3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

#### **DEFINITIONS**

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

#### **DISCLAIMERS**

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

## Philips Semiconductors – a worldwide company

#### **Contact information**

For additional information please visit http://www.semiconductors.philips.com. Fax: +31 40 27 24825 For sales offices addresses send e-mail to: sales.addresses@www.semiconductors.philips.com.

© Koninklijke Philips Electronics N.V. 2004

SCA76

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands

R75/06/pp14

Date of release: 2004 Aug 06

Document order number: 9397 750 13675

Let's make things better.

Philips Semiconductors



