

# DATA SHEET

## **PDTC143Z series**

**NPN resistor-equipped transistors;**

**R1 = 4.7 k $\Omega$ , R2 = 47 k $\Omega$**

Product specification  
Supersedes data of 2004 Apr 06

2004 Aug 16

## NPN resistor-equipped transistors; R1 = 4.7 k $\Omega$ , R2 = 47 k $\Omega$

## PDTC143Z 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	47	–	k $\Omega$

### 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		
PDTC143ZE	SOT416	SC-75	38	PDTA143ZE
PDTC143ZEF	SOT490	SC-89	53	PDTA143ZEF
PDTC143ZK	SOT346	SC-59	18	PDTA143ZK
PDTC143ZM	SOT883	SC-101	E3	PDTA143ZM
PDTC143ZS	SOT54 (TO-92)	SC-43	TC143Z	PDTA143ZS
PDTC143ZT	SOT23	–	*18 <sup>(1)</sup>	PDTA143ZT
PDTC143ZU	SOT323	SC-70	*54 <sup>(1)</sup>	PDTA143ZU

### Note

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

NPN resistor-equipped transistors;  
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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC143ZS		1 2 3	base collector emitter
PDTC143ZE PDTC143ZEF PDTC143ZK PDTC143ZT PDTC143ZU		1 2 3	base emitter collector
PDTC143ZM		1 2 3	base emitter collector

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PDTC143Z series

### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC143ZE	–	plastic surface mounted package; 3 leads	SOT416
PDTC143ZEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC143ZK	–	plastic surface mounted package; 3 leads	SOT346
PDTC143ZM	–	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTC143ZS	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC143ZT	–	plastic surface mounted package; 3 leads	SOT23
PDTC143ZU	–	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		–	–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
	SOT883	notes 2 and 3	–	250	mW
	SOT416	note 1	–	150	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.

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### 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
	SOT883	notes 2 and 3	500	K/W
	SOT416	note 1	833	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  $\mu$ m copper strip line.

### CHARACTERISTICS

T<sub>amb</sub> = 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	$\mu$ A
		V <sub>CE</sub> = 30 V; I <sub>B</sub> = 0 A; T <sub>j</sub> = 150 °C	–	–	50	$\mu$ A
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A	–	–	170	$\mu$ A
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 10 mA	100	–	–	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 5 mA; I <sub>B</sub> = 0.25 mA	–	–	100	mV
V <sub>i(off)</sub>	input-off voltage	I <sub>C</sub> = 100 $\mu$ A; V <sub>CE</sub> = 5 V	–	0.6	0.5	V
V <sub>i(on)</sub>	input-on voltage	I <sub>C</sub> = 5 mA; V <sub>CE</sub> = 0.3 V	1.3	0.9	–	V
R1	input resistor		3.3	4.7	6.1	k $\Omega$
$\frac{R2}{R1}$	resistor ratio		8	10	12	
C <sub>c</sub>	collector capacitance	I <sub>E</sub> = i <sub>e</sub> = 0 A; V <sub>CB</sub> = 10 V; f = 1 MHz	–	–	2.5	pF

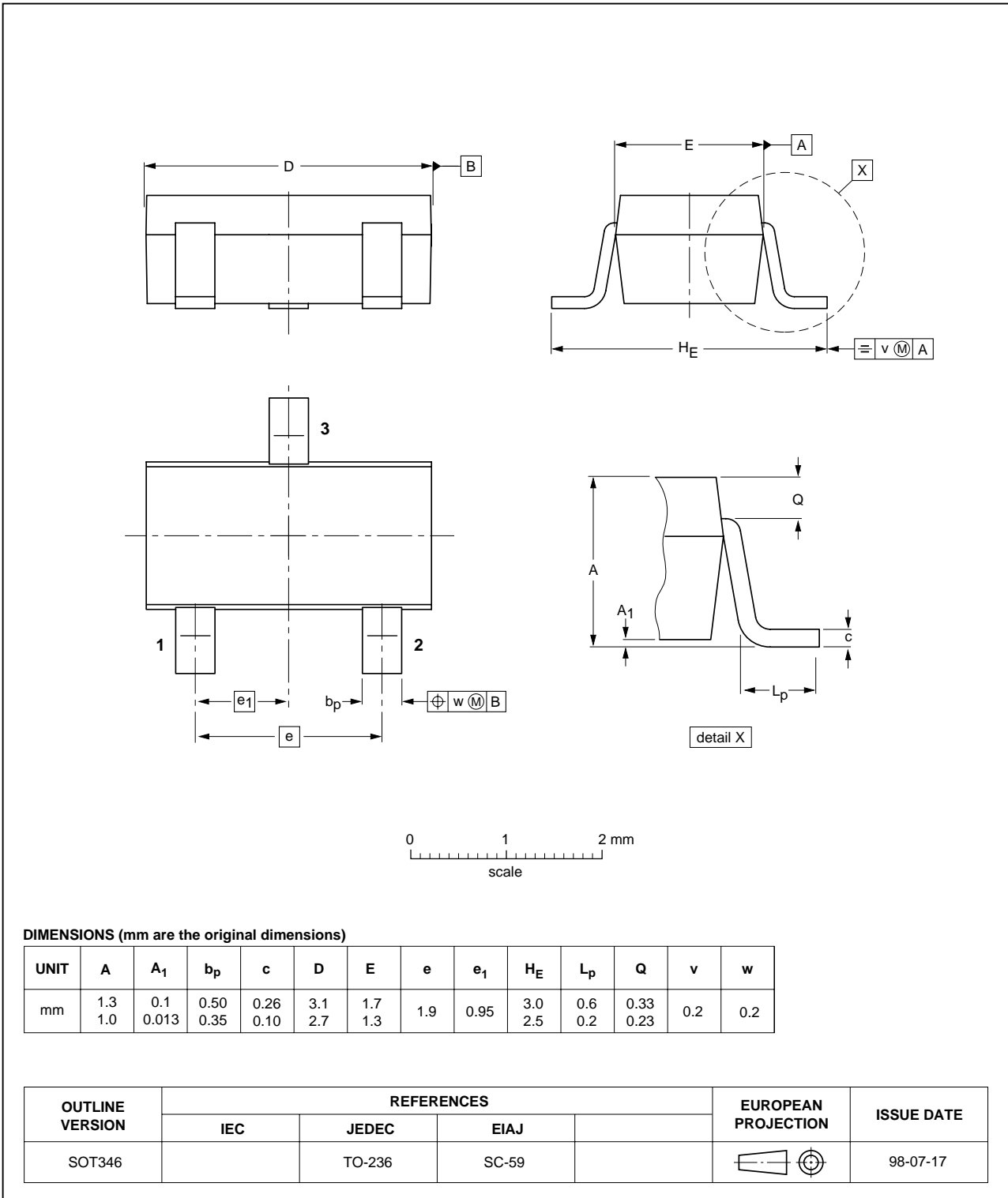
NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT346

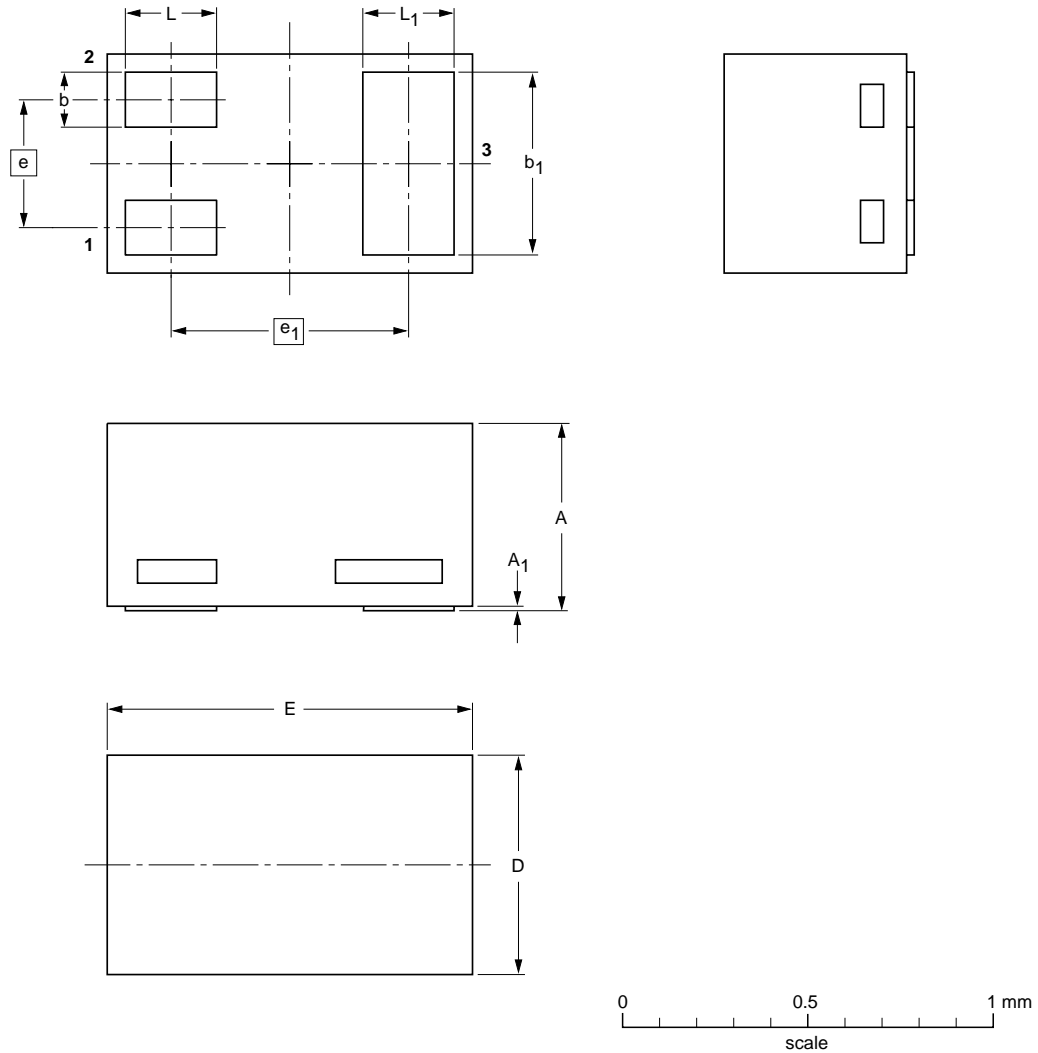


NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z 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 <sup>(1)</sup>	A <sub>1</sub> max.	b	b <sub>1</sub>	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
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

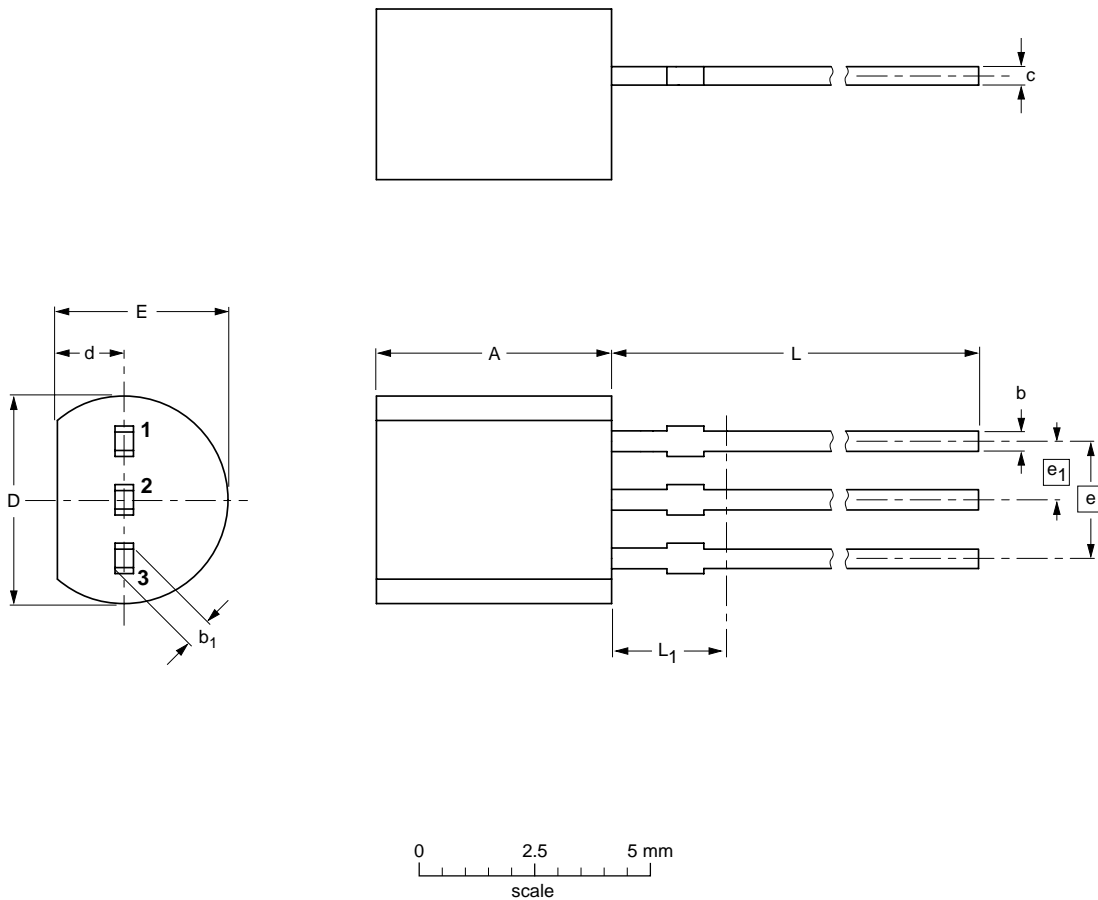
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT883			SC-101		03-02-05 03-04-03

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z 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> 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

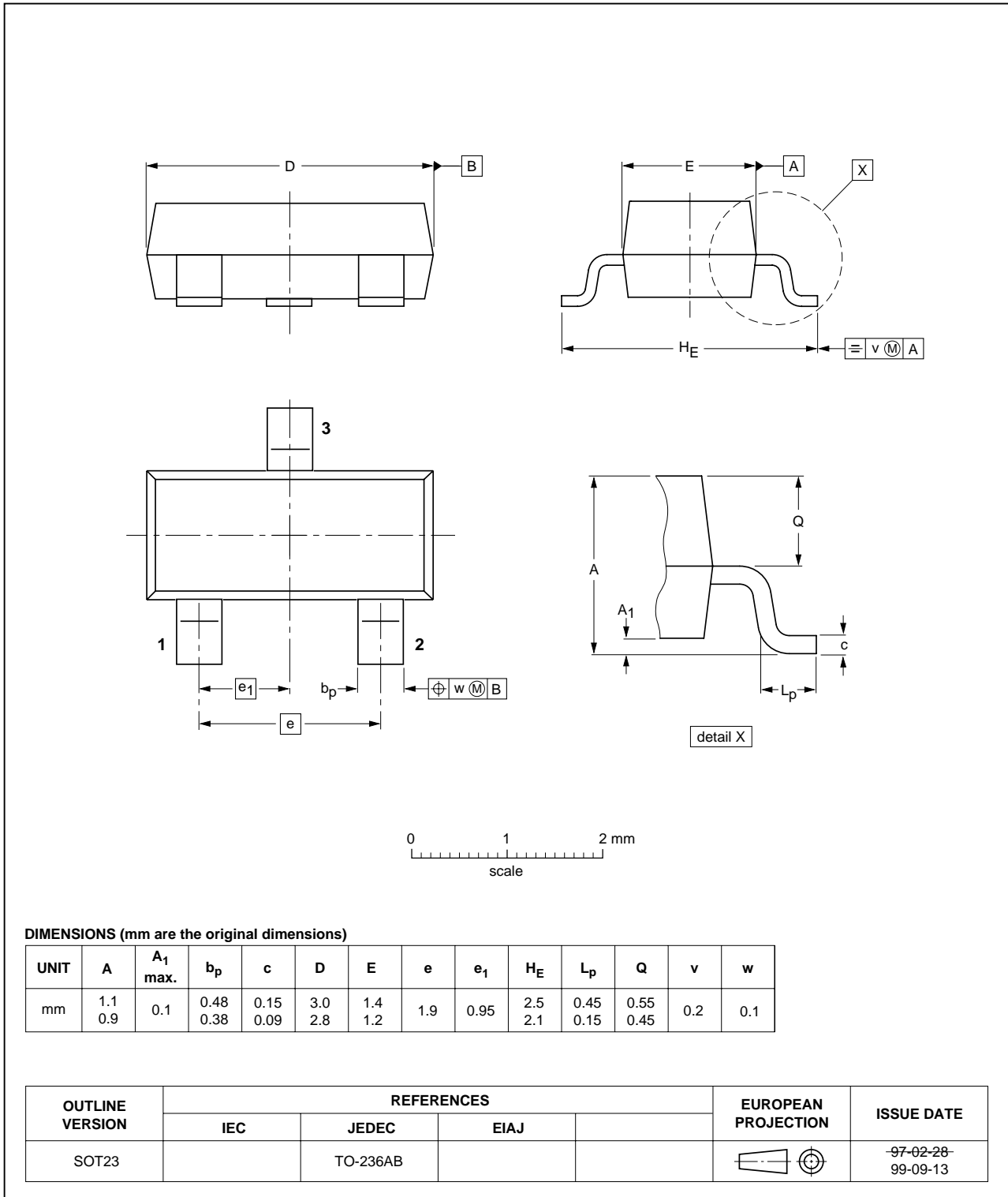


NPN resistor-equipped transistors;  
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PDTC143Z series

Plastic surface mounted package; 3 leads

SOT23

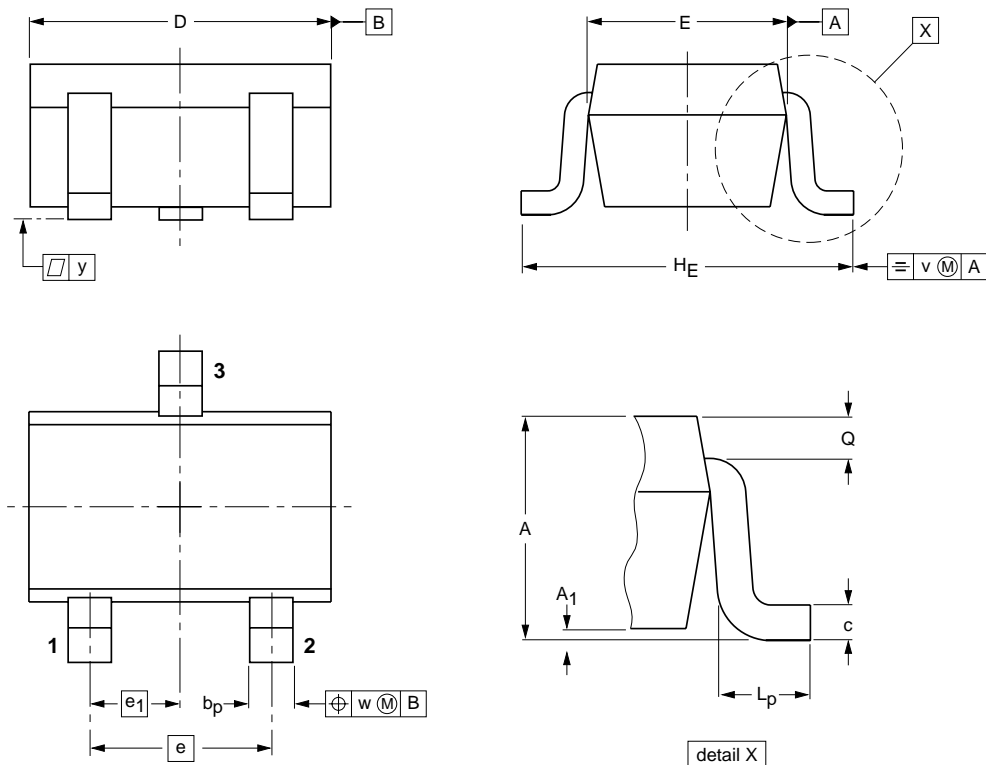


NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z 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

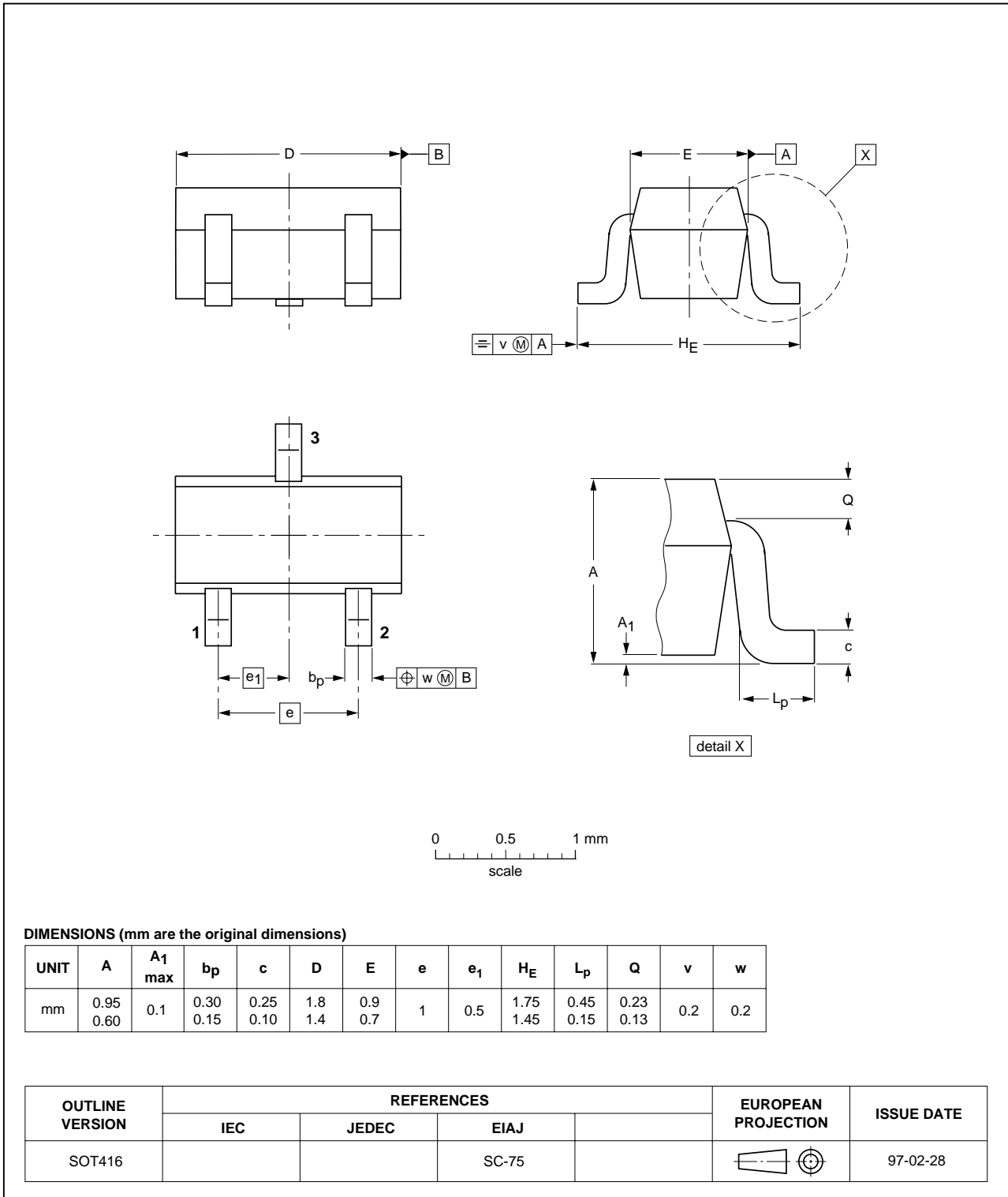
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z series

Plastic surface mounted package; 3 leads

SOT416

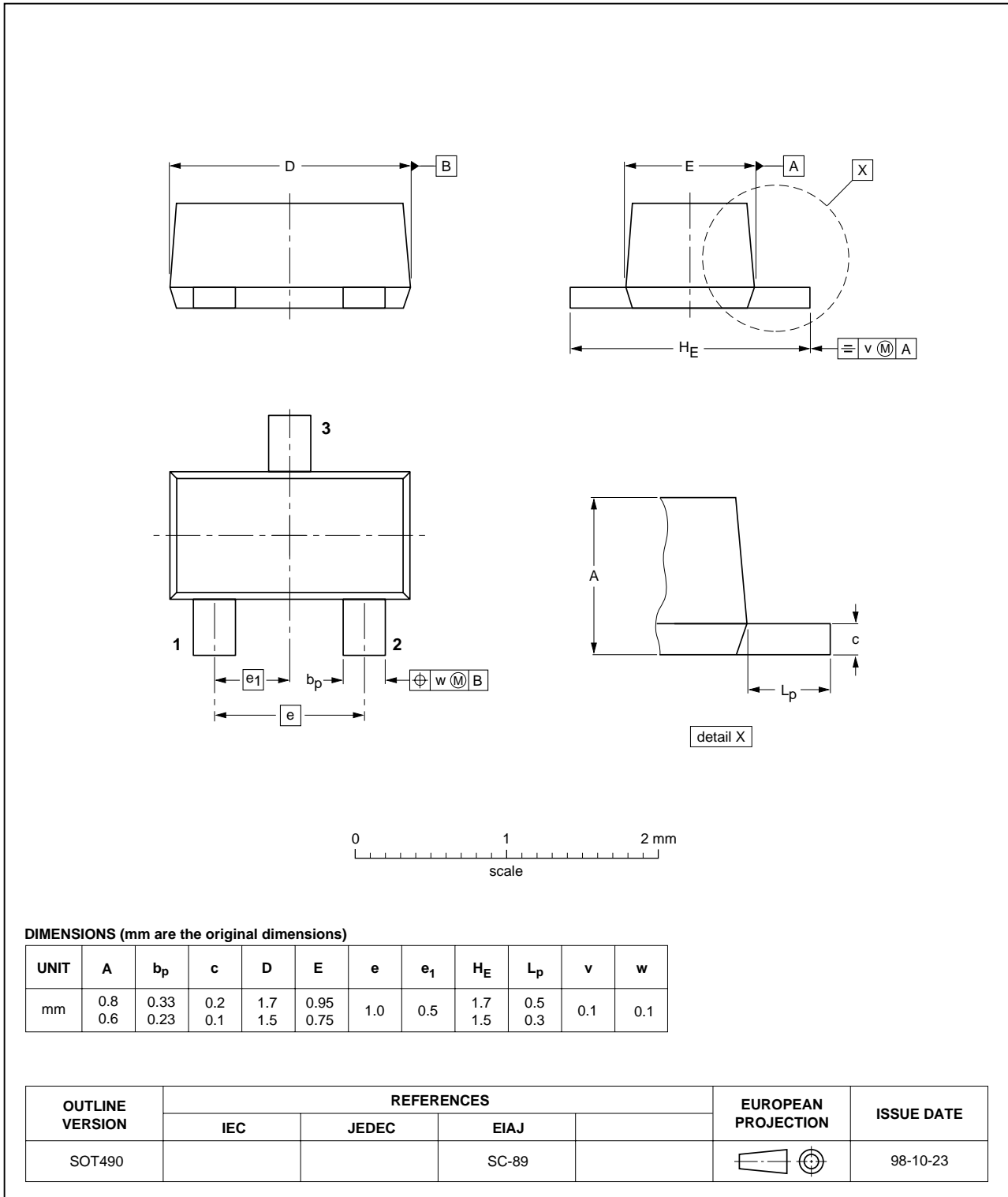


NPN resistor-equipped transistors;  
R1 = 4.7 kΩ, R2 = 47 kΩ

PDTC143Z series

Plastic surface mounted package; 3 leads

SOT490



NPN resistor-equipped transistors;  
R1 = 4.7 k $\Omega$ , R2 = 47 k $\Omega$

PDTC143Z series

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LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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