DATA SHEET

PDTC115E series

NPN resistor-equipped transistors;
R1 = 100 kΩ, R2 = 100 kΩ

Product specification 2004 Aug 06
Supersedes data of 2004 Apr 06

Philips
Semiconductors

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PDTC115E 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)	–	20	mA
R1	bias resistor	100	–	kΩ
R2	bias resistor	100	–	kΩ

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		
PDTC115EE	SOT416	SC-75	46	PDTA115EE
PDTC115EEF	SOT490	SC-89	49	PDTA115EEF
PDTC115EK	SOT346	SC-59	56	PDTA115EK
PDTC115EM	SOT883	SC-101	DV	PDTA115EM
PDTC115ES	SOT54 (TO-92)	SC-43	TC115E	PDTA115ES
PDTC115ET	SOT23	–	*44[1]	PDTA115ET
PDTC115EU	SOT323	SC-70	*15[1]	PDTA115EU

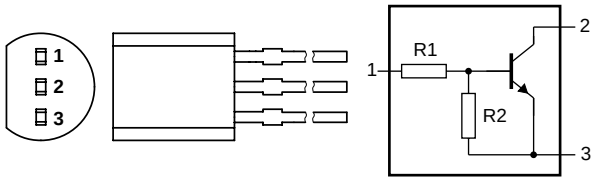
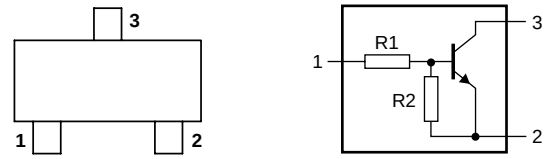
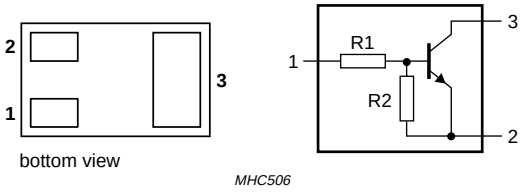
Note

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

NPN resistor-equipped transistors; R1 = 100 kΩ, R2 = 100 kΩ

PDTC115E series

SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC115ES	 MAM364	1 2 3	base collector emitter
PDTC115EE PDTC115EEF PDTC115EK PDTC115ET PDTC115EU	 Top view MDB269	1 2 3	base emitter collector
PDTC115EM	 bottom view MHC506	1 2 3	base emitter collector

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC115EE	–	plastic surface mounted package; 3 leads	SOT416
PDTC115EEF	–	plastic surface mounted package; 3 leads	SOT490
PDTC115EK	–	plastic surface mounted package; 3 leads	SOT346
PDTC115EM	–	leadless ultra small plastic package; 3 solder lands; body $1.0 \times 0.6 \times 0.5$ mm	SOT883
PDTC115ES	–	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC115ET	–	plastic surface mounted package; 3 leads	SOT23
PDTC115EU	–	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		–	+40	V
	negative		–	–10	V
I_O	output current (DC)		–	20	mA
I_{CM}	peak collector current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °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
	SOT883	notes 2 and 3	–	250	mW
	SOT490	notes 1 and 2	–	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 μm 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
	SOT833	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 μm copper strip line.

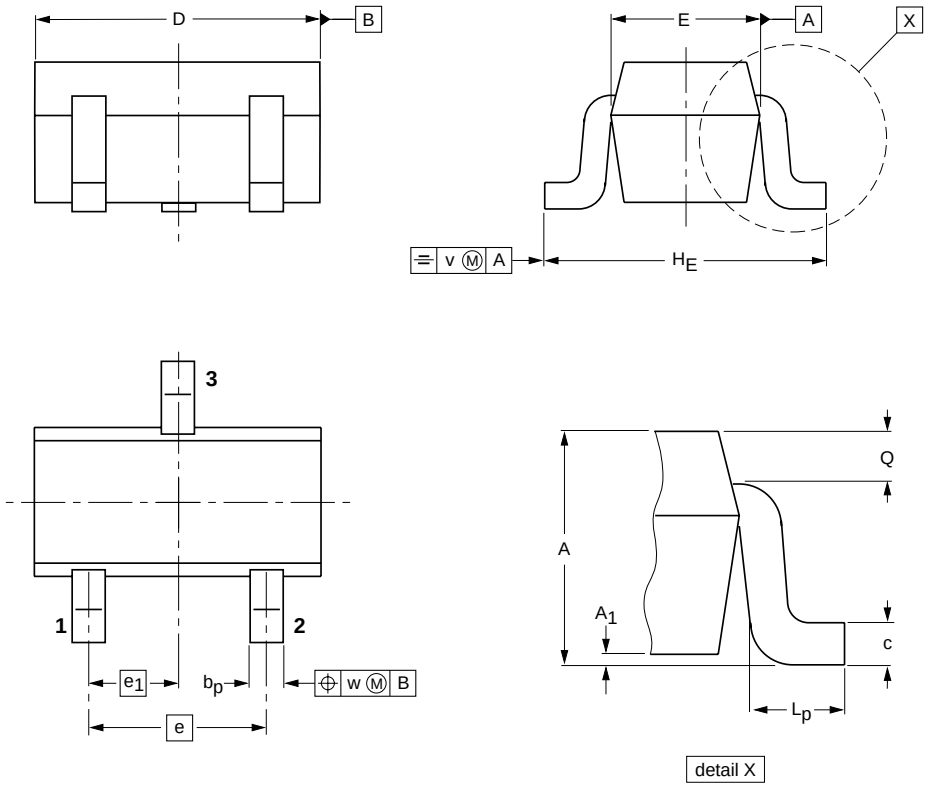
CHARACTERISTICS

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	–	–	50	μA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 5 mA	80	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 5 mA; I_B = 0.25 mA	–	–	150	mV
$V_{i(off)}$	input-off voltage	I_C = 100 μA; V_{CE} = 5 V	–	1.1	0.5	V
$V_{i(on)}$	input-on voltage	I_C = 1 mA; V_{CE} = 0.3 V	3	1.5	–	V
R1	input resistor		70	100	130	kΩ
$\frac{R2}{R1}$	resistor ratio		0.8	1	1.2	
C_c	collector capacitance	$I_E = i_e$ = 0 A; V_{CB} = 10 V; f = 1 MHz	–	–	2.5	pF

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads **SOT416**

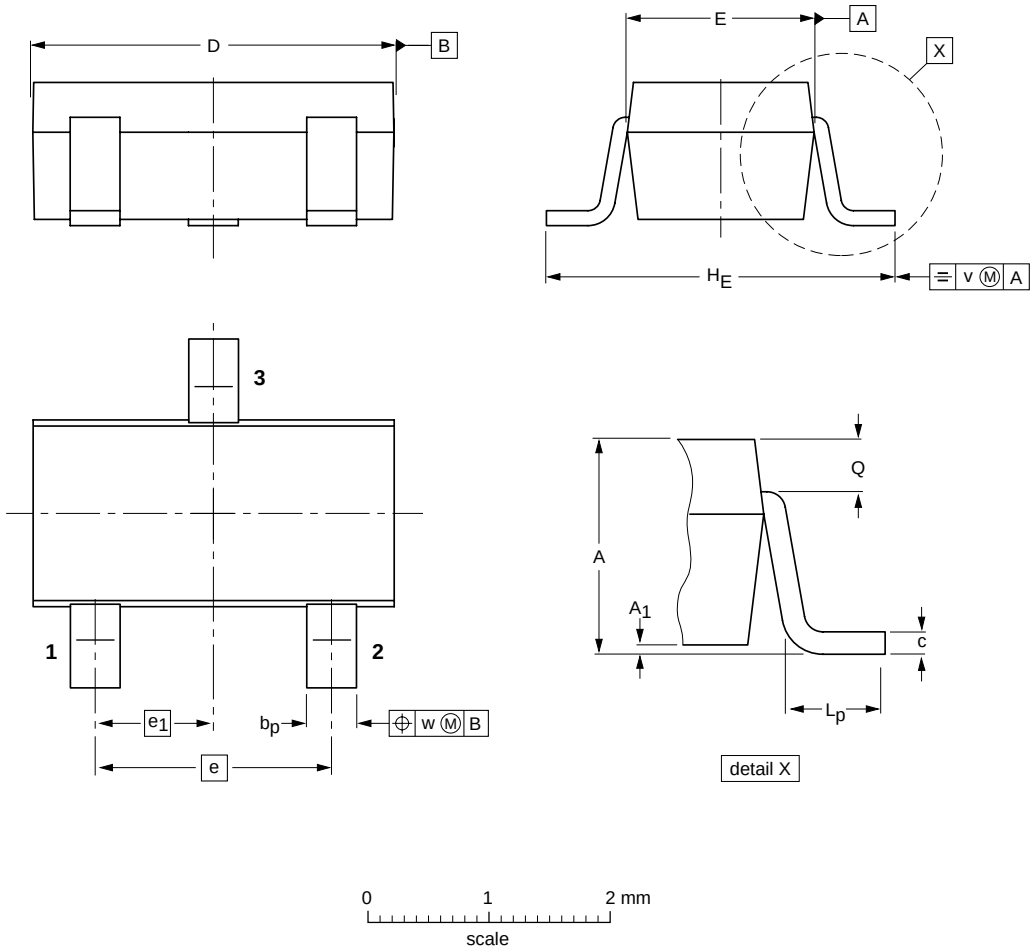


DIMENSIONS (mm are the original dimensions)

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			
SOT416			SC-75			97-02-28

Plastic surface mounted package; 3 leads **SOT346**

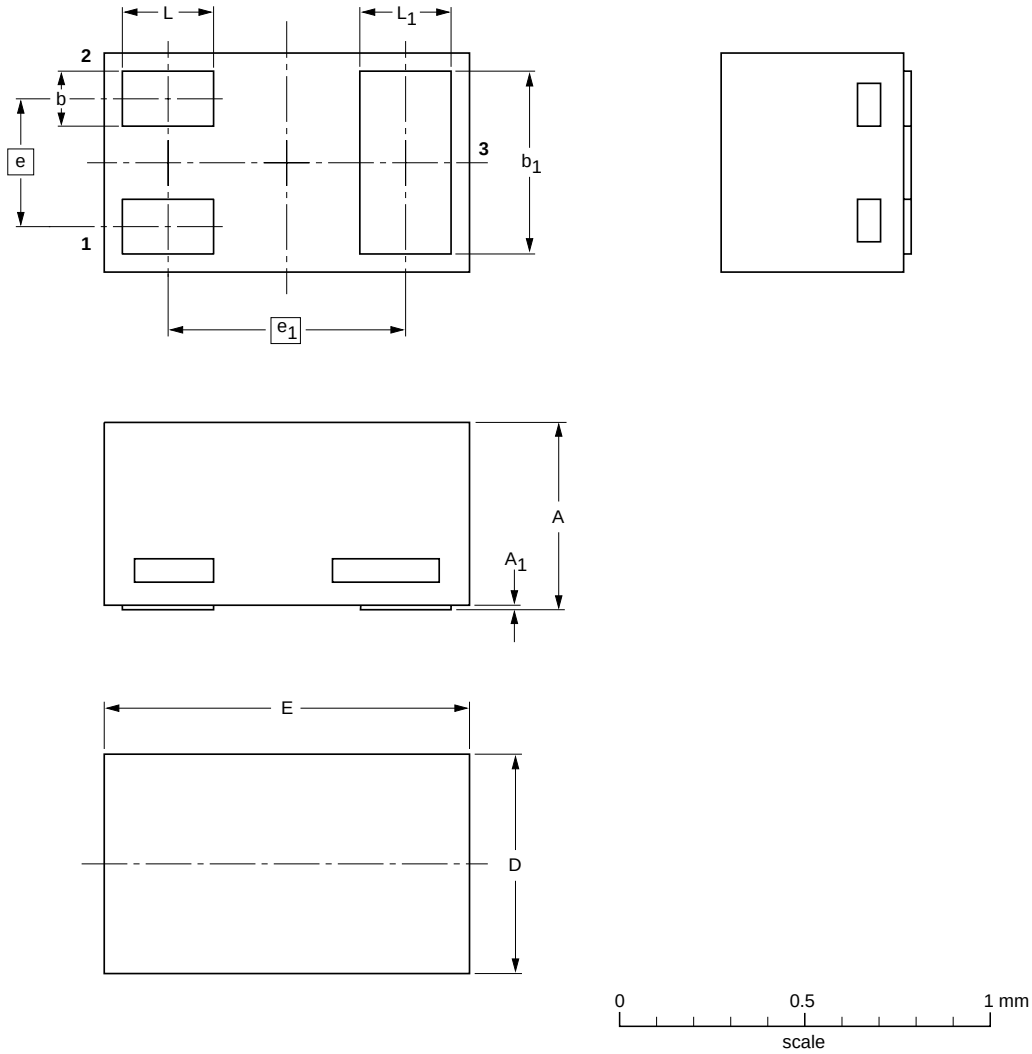


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.3 1.0	0.1 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

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)

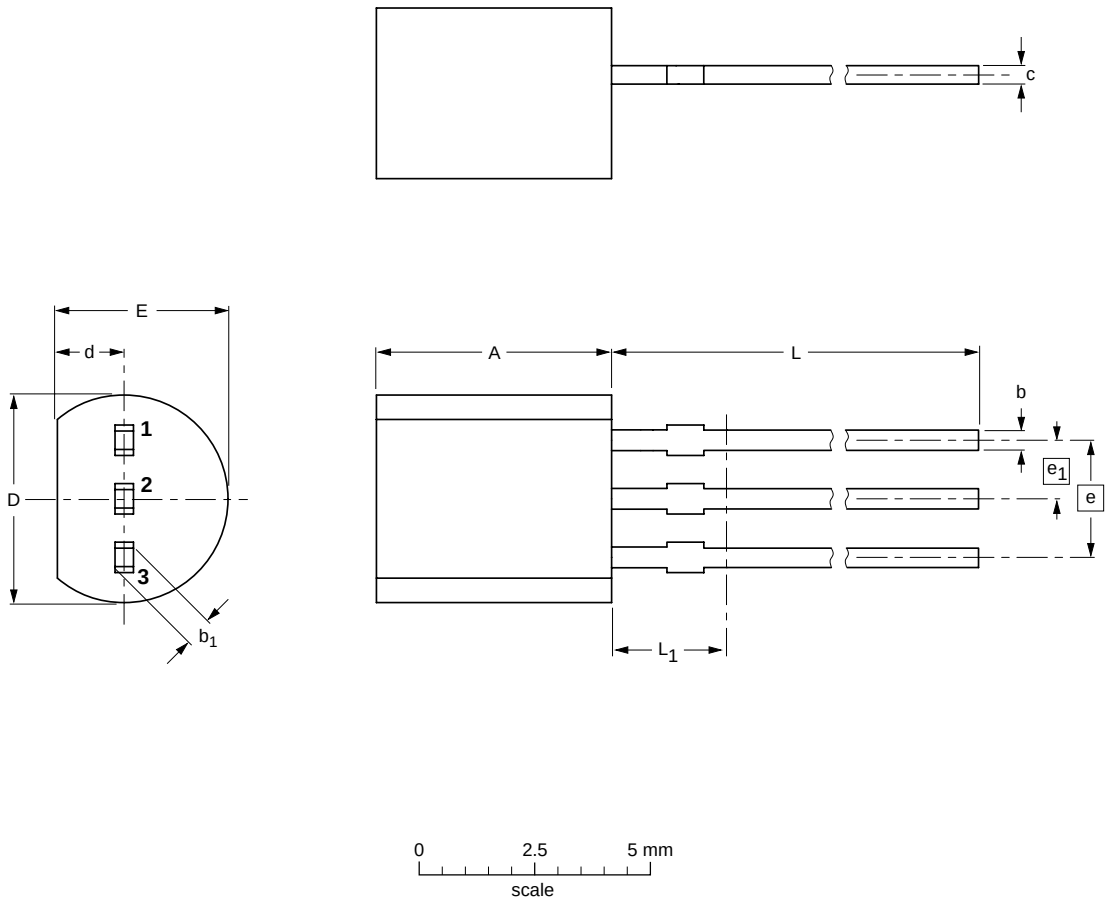
UNIT	A(1)	A_1 max.	b	b_1	D	E	e	e_1	L	L_1
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

Note

1. Including plating thickness

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

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

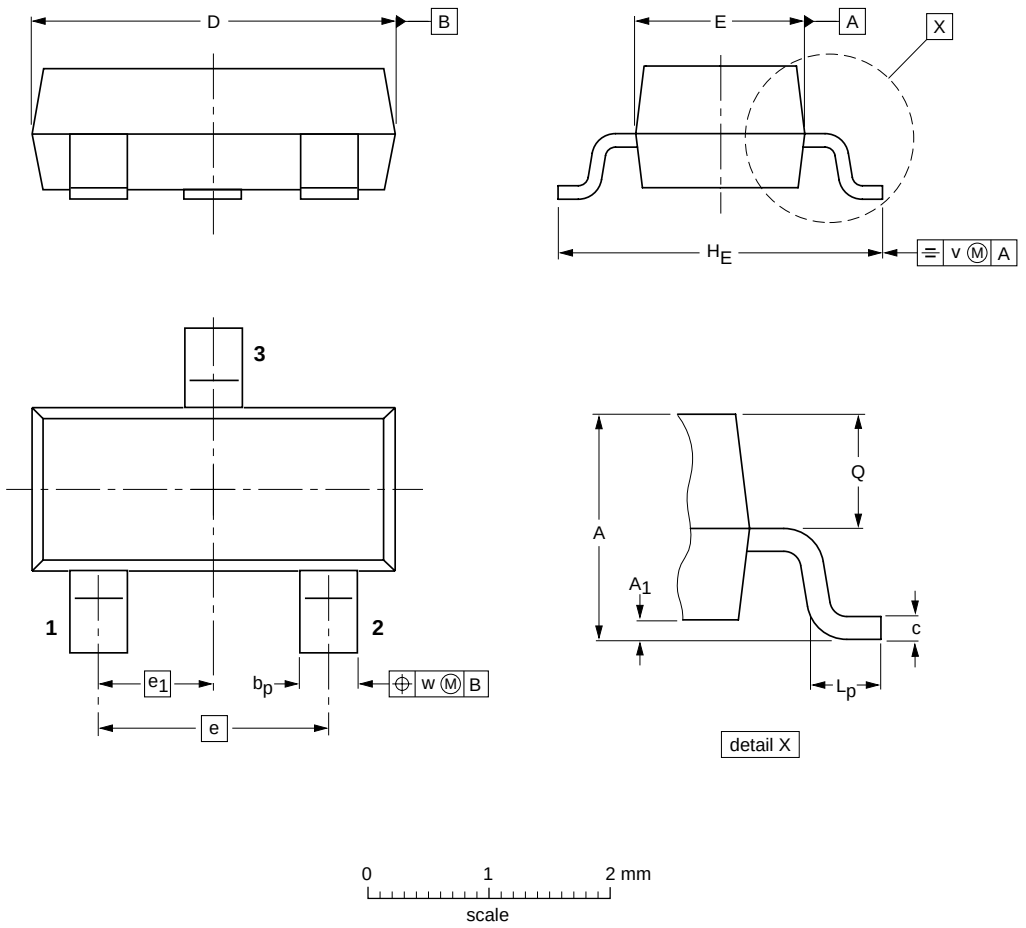
UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1 (1) max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

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

Plastic surface mounted package; 3 leads **SOT23**

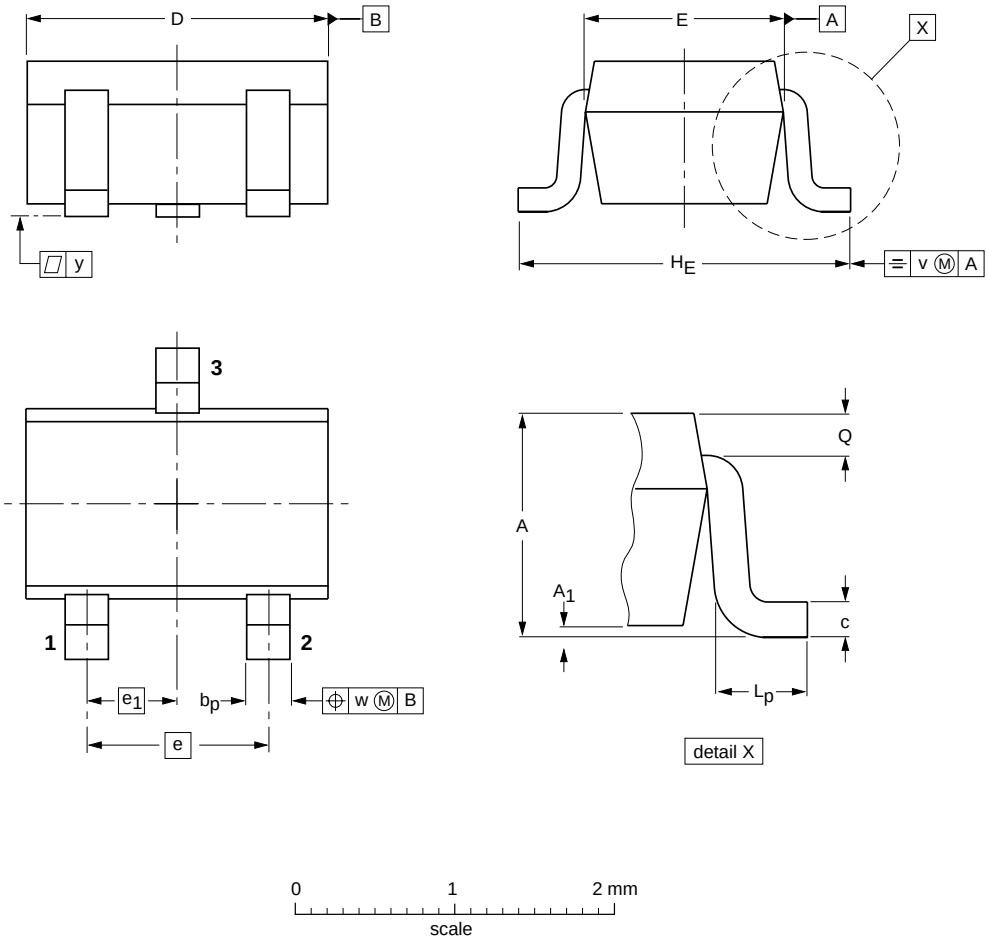


DIMENSIONS (mm are the original dimensions)

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

Plastic surface mounted package; 3 leads **SOT323**

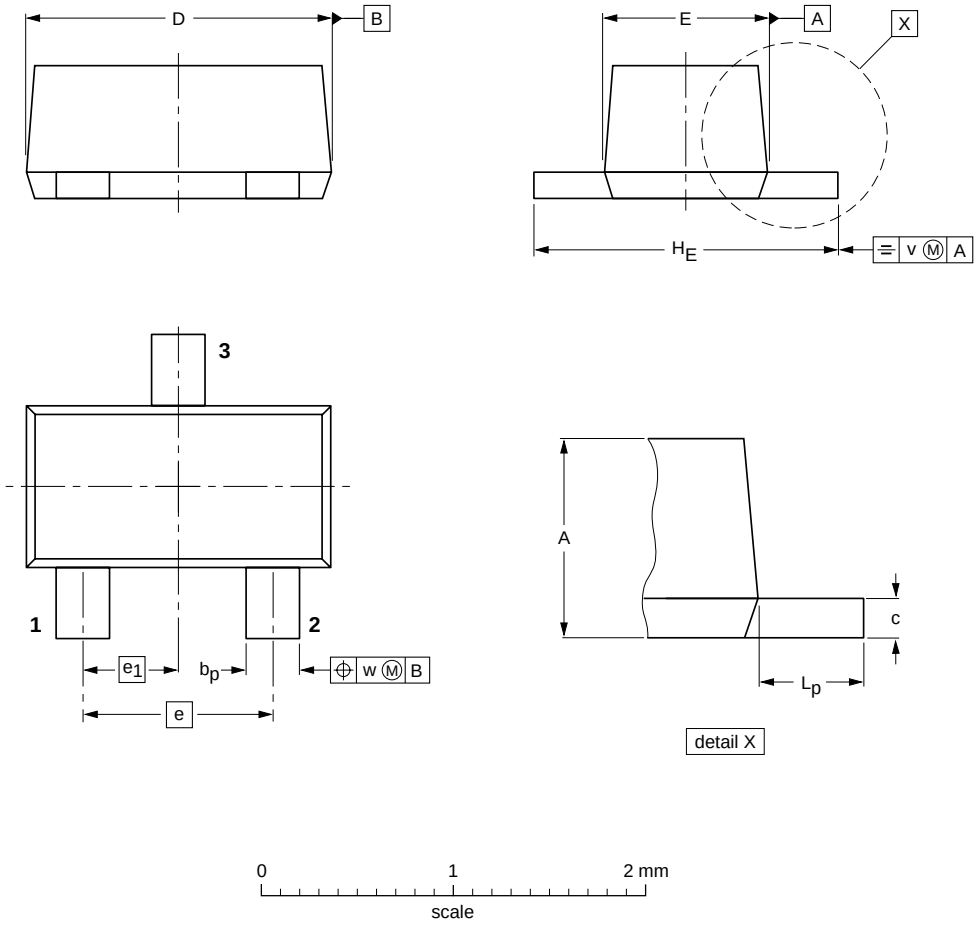


DIMENSIONS (mm are the original dimensions)

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

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

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.
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.
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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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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