

# DATA SHEET



**PBSS4320T**

20 V NPN low  $V_{CEsat}$  transistor

Product data sheet  
Supersedes data of 2002 Aug 08

2004 Mar 18

# 20 V NPN low $V_{CEsat}$ transistor

# PBSS4320T

### FEATURES

- Low collector-emitter saturation voltage  $V_{CEsat}$  and corresponding low  $R_{CEsat}$
- High collector current capability
- High collector current gain
- Improved efficiency due to reduced heat generation.

### APPLICATIONS

- Power management applications
- Low and medium power DC/DC convertors
- Supply line switching
- Battery chargers
- Linear voltage regulation with low voltage drop-out (LDO).

### DESCRIPTION

NPN low  $V_{CEsat}$  transistor in a SOT23 plastic package. PNP complement: PBSS5320T.

### MARKING

TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PBSS4320T	ZG*

### Note

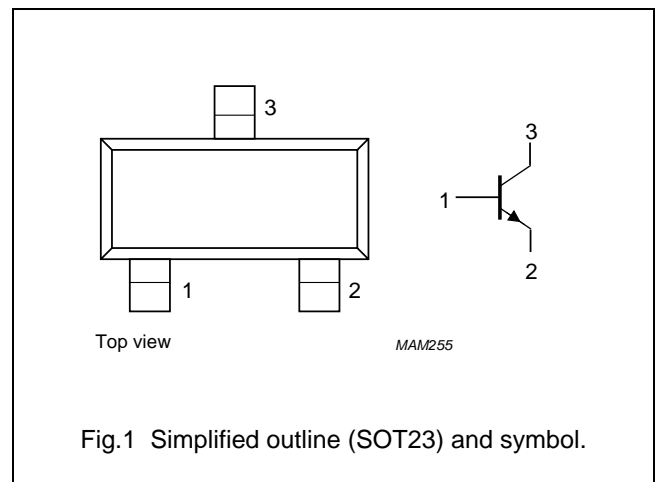
- \* = p: Made in Hong Kong.  
 \* = t: Made in Malaysia.  
 \* = W: Made in China.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	20	V
$I_C$	collector current (DC)	2	A
$I_{CRP}$	repetitive peak collector current	3	A
$R_{CEsat}$	equivalent on-resistance	105	m $\Omega$

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS4320T	–	plastic surface mounted package; 3 leads	SOT23

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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	–	20	V
$V_{CEO}$	collector-emitter voltage	open base	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	2	A
$I_{CRP}$	repetitive peak collector current	note 1	–	3	A
$I_{CM}$	peak collector current	single peak	–	5	A
$I_B$	base current (DC)		–	0.5	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 2	–	300	mW
		$T_{amb} \leq 25\text{ °C}$ ; note 3	–	480	mW
		$T_{amb} \leq 25\text{ °C}$ ; note 4	–	540	mW
		$T_{amb} \leq 25\text{ °C}$ ; notes 1 and 2	–	1.2	W
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Notes**

- Operated under pulsed conditions: pulse width  $t_p \leq 100\text{ ms}$ ; duty cycle  $\delta \leq 0.25$ .
- Device mounted on a printed-circuit board; single sided copper; tinplated; standard footprint.
- Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector  $1\text{ cm}^2$ .
- Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector  $6\text{ cm}^2$ .

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; note 1	417	K/W
		in free air; note 2	260	K/W
		in free air; note 3	230	K/W
		in free air; notes 1 and 4	104	K/W

**Notes**

- Device mounted on a printed-circuit board; single sided copper; tinplated; standard footprint.
- Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector  $1\text{ cm}^2$ .
- Device mounted on a printed-circuit board; single sided copper; tinplated; mounting pad for collector  $6\text{ cm}^2$ .
- Operated under pulsed conditions: pulse width  $t_p \leq 100\text{ ms}$ ; duty cycle  $\delta \leq 0.25$ .

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**CHARACTERISTICS** $T_{amb} = 25\text{ °C}$  unless otherwise specified.

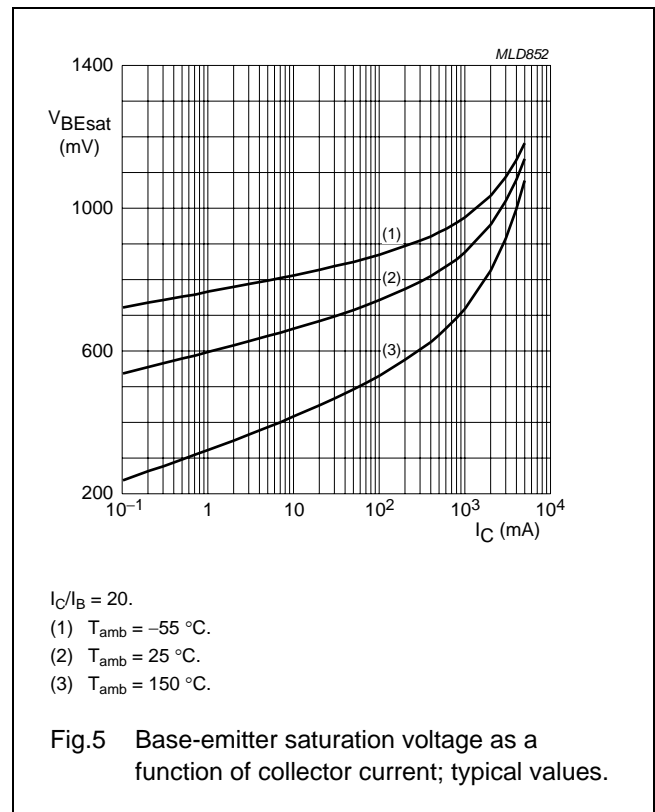
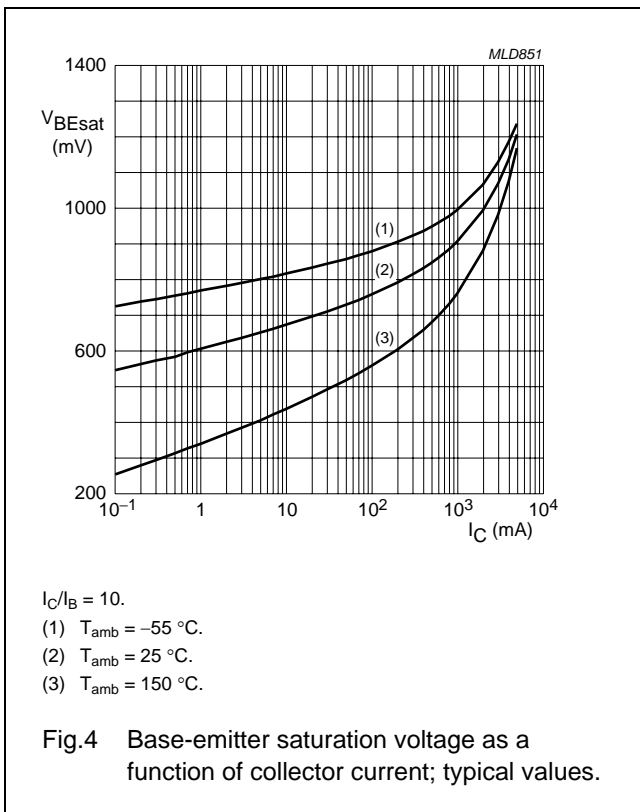
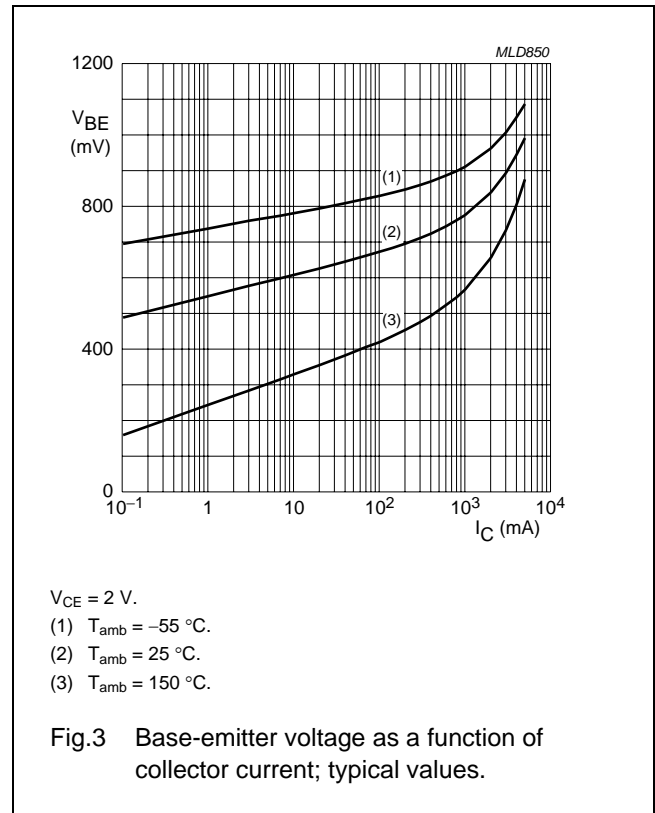
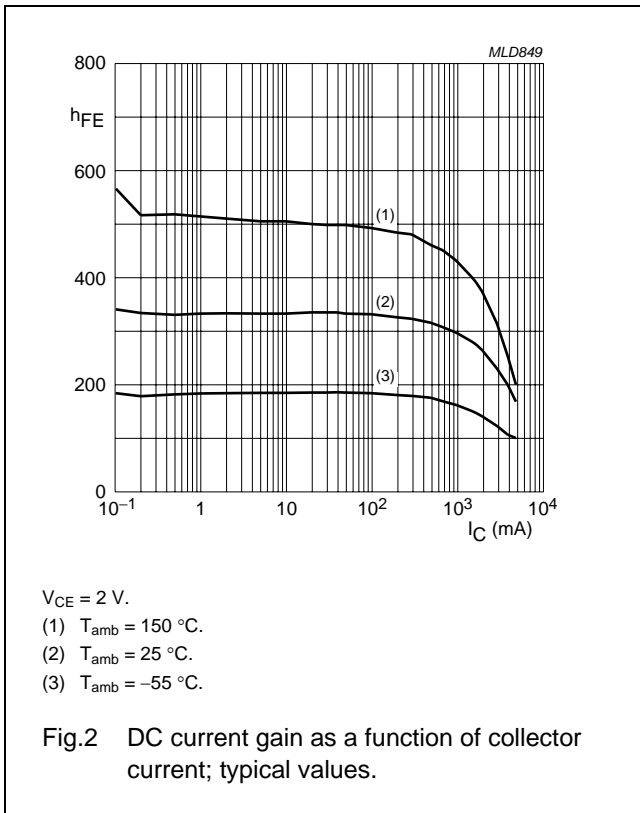
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$I_E = 0\text{ A}; V_{CB} = 20\text{ V}$	–	–	100	nA
		$I_E = 0\text{ A}; V_{CB} = 20\text{ V}; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$I_C = 0\text{ A}; V_{EB} = 5\text{ V}$	–	–	100	nA
$h_{FE}$	DC current gain	$I_C = 100\text{ mA}; V_{CE} = 2\text{ V}$	220	–	–	
		$I_C = 500\text{ mA}; V_{CE} = 2\text{ V}$	220	–	–	
		$I_C = 1\text{ A}; V_{CE} = 2\text{ V}; \text{note 1}$	220	–	–	
		$I_C = 2\text{ A}; V_{CE} = 2\text{ V}; \text{note 1}$	200	–	–	
		$I_C = 3\text{ A}; V_{CE} = 2\text{ V}; \text{note 1}$	150	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	70	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}$	–	–	120	mV
		$I_C = 2\text{ A}; I_B = 40\text{ mA}; \text{note 1}$	–	–	230	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$	–	–	210	mV
		$I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$	–	–	310	mV
$R_{CEsat}$	equivalent on-resistance	$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$	–	80	105	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 2\text{ A}; I_B = 40\text{ mA}; \text{note 1}$	–	–	1.1	V
		$I_C = 3\text{ A}; I_B = 300\text{ mA}; \text{note 1}$	–	–	1.2	V
$V_{BEon}$	base-emitter turn-on voltage	$I_C = 1\text{ A}; V_{CE} = 2\text{ V}; \text{note 1}$	1.2	–	–	V
$f_T$	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 5\text{ V};$ $f = 100\text{ MHz}$	100	–	–	MHz
$C_c$	collector capacitance	$I_E = I_e = 0\text{ A}; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	35	pF

**Note**

1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

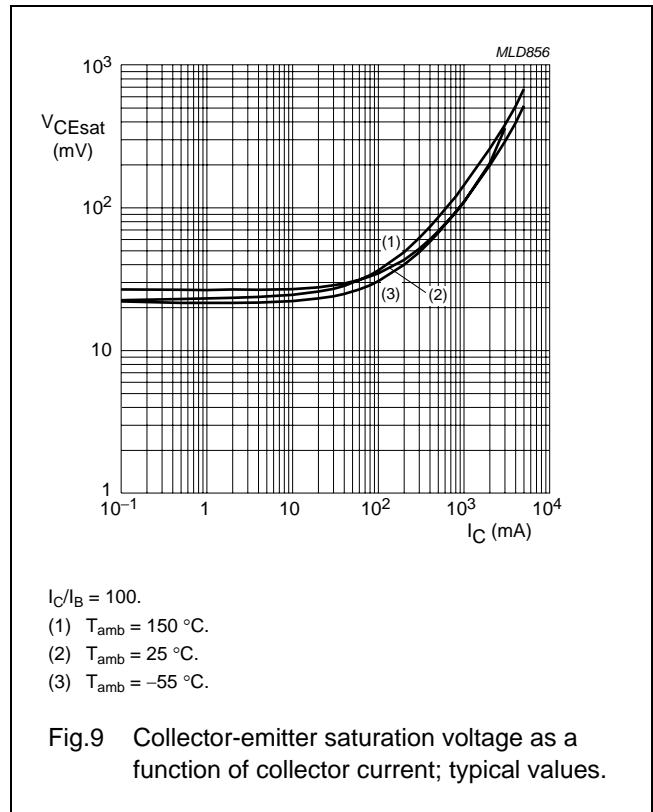
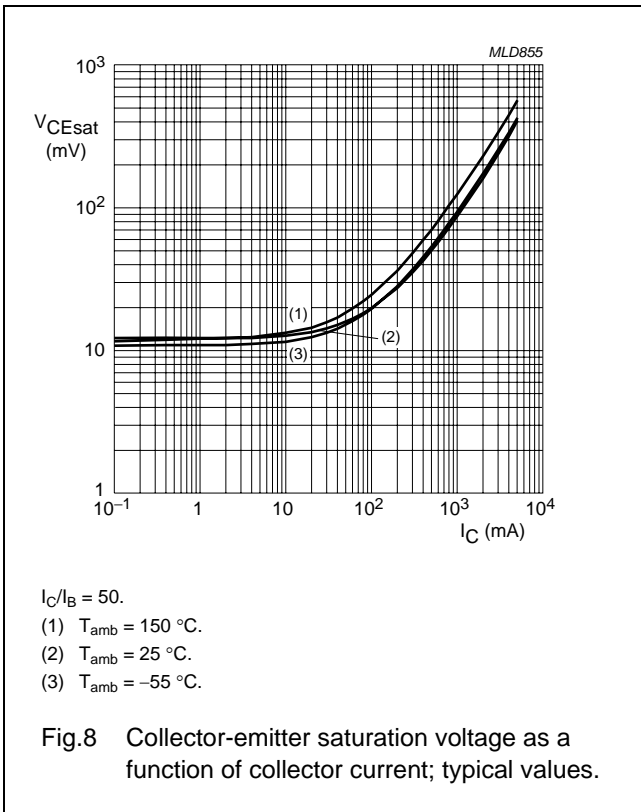
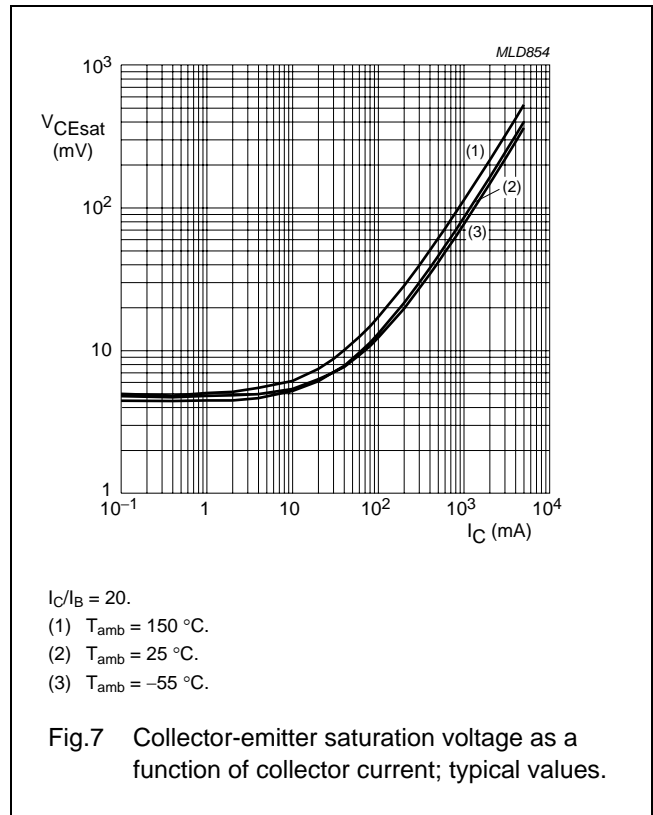
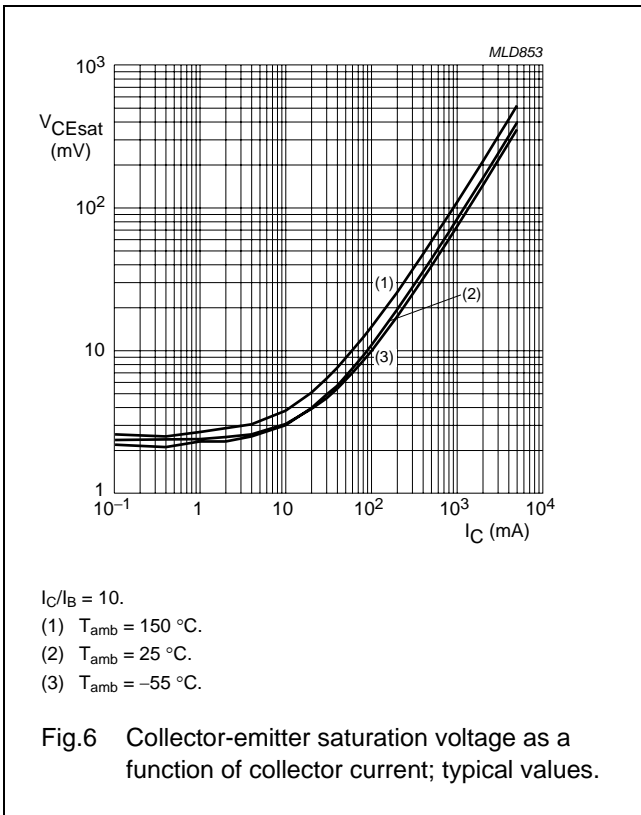
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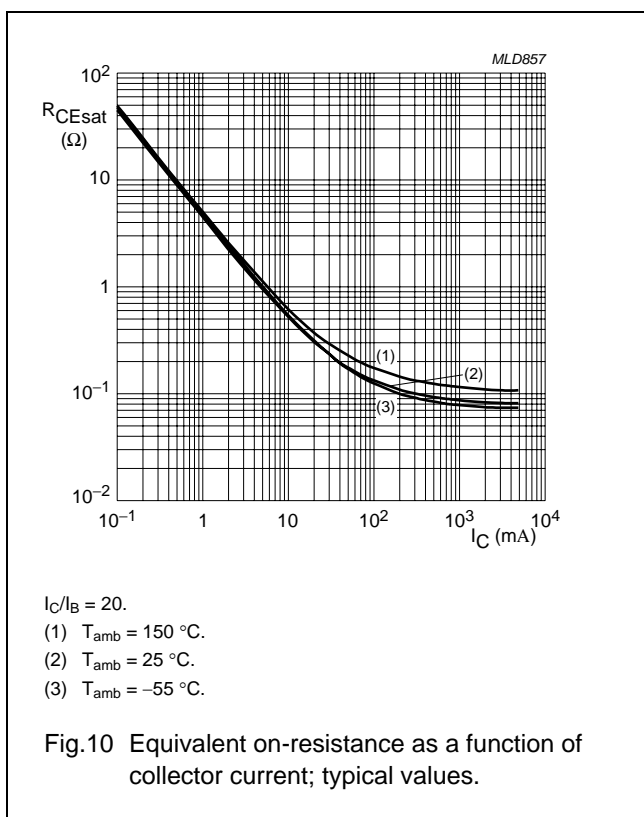
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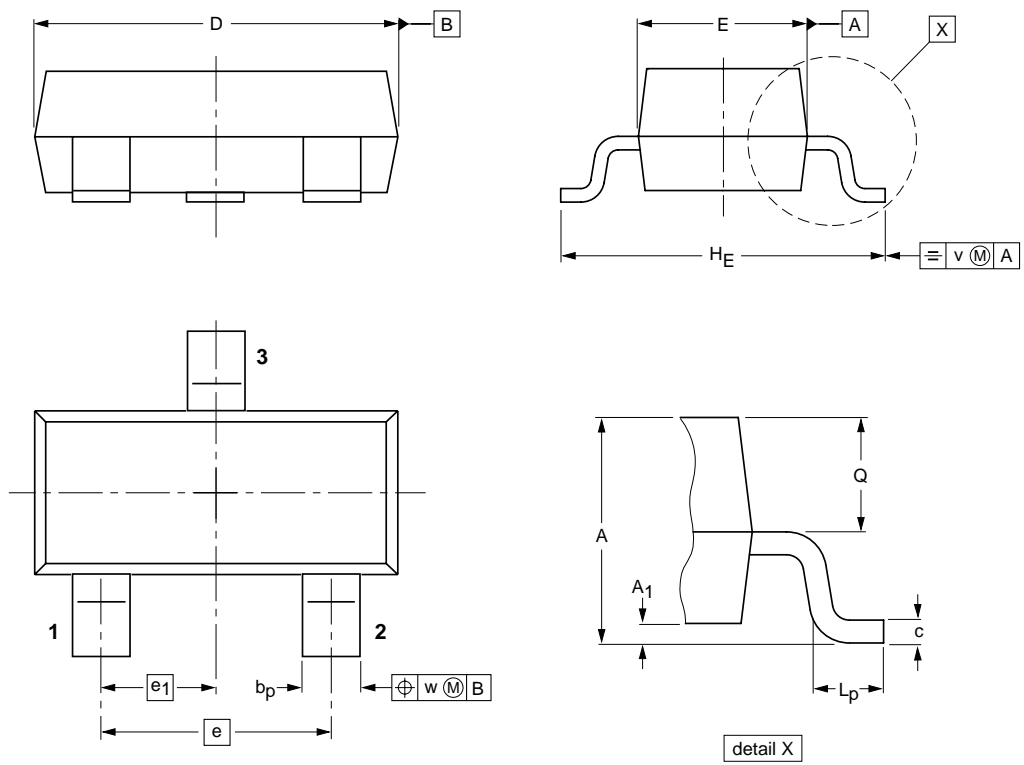
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PACKAGE OUTLINE

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16



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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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## **Customer notification**

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

## **Contact information**

For additional information please visit: <http://www.nxp.com>

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