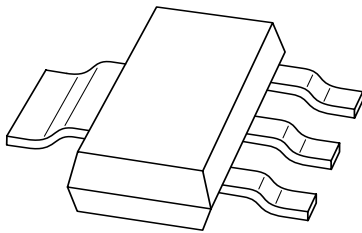


# DATA SHEET



## **BCP68**

**NPN medium power transistor;  
20 V, 1 A**

Product data sheet  
Supersedes data of 1999 Apr 08

2003 Nov 25

# NPN medium power transistor; 20 V, 1 A

**BCP68**

**FEATURES**

- High current
- Two current gain selections
- 1.4 W total power dissipation.

**APPLICATIONS**

- Linear voltage regulators
- Low side switches
- Supply line switch for negative voltages
- MOSFET drivers
- Audio pre-amplifiers.

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	–	20	V
$I_C$	collector current (DC)	–	1	A
$I_{CM}$	peak collector current	–	2	A
$h_{FE}$	DC current gain			
	BCP68	85	375	
	BCP68-25	160	375	

**DESCRIPTION**

NPN medium power transistor (see “Simplified outline, symbol and pinning”) for package details.

**PRODUCT OVERVIEW**

TYPE NUMBER	PACKAGE		MARKING CODE
	PHILIPS	EIAJ	
BCP68	SOT223	SC-73	BCP68
BCP68-25	SOT223	SC-73	BCP68/25

**SIMPLIFIED OUTLINE, SYMBOL AND PINNING**

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
BCP68	<p>Top view <span style="margin-left: 100px;">MAM287</span></p>	1	base
		2	collector
		3	emitter
		4	collector

**RELATED PRODUCTS**

TYPE NUMBER	DESCRIPTION	FEATURE
BCP69	PNP medium power transistor	PNP complement
BC868	NPN medium power transistor	SOT89, 20 V
BC368	NPN medium power transistor	SOT54, 20 V

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**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BCP68	–	plastic surface mounted package; collector pad for good heat transfer; 4 leads	SOT223
BCP68-25			

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

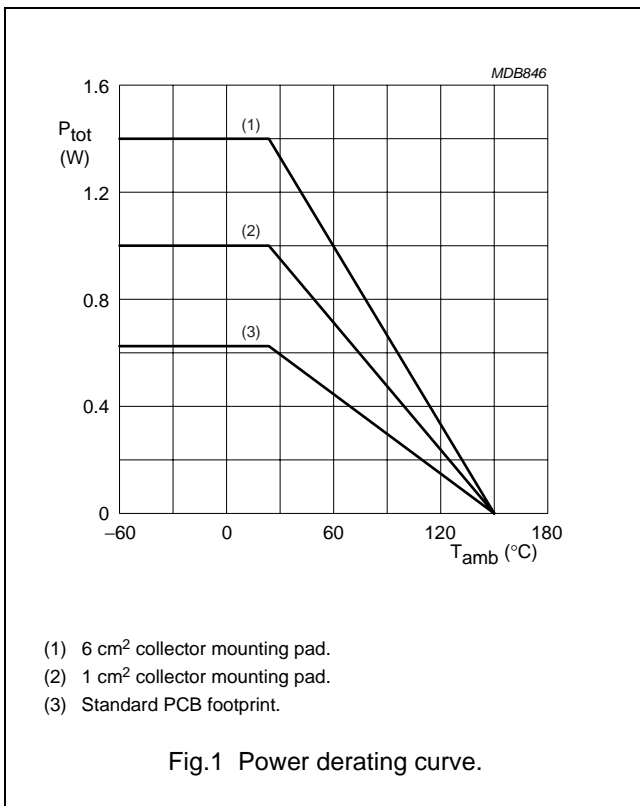
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	32	V
$V_{CEO}$	collector-emitter voltage	open base	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	1	A
$I_{CM}$	peak collector current		–	2	A
$I_{BM}$	peak base current		–	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; notes 1 and 2	–	0.625	W
		$T_{amb} \leq 25\text{ °C}$ ; notes 1 and 3	–	1	W
		$T_{amb} \leq 25\text{ °C}$ ; notes 1 and 4	–	1.4	W
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Notes**

1. See SOT223 (SC-73) standard mounting conditions.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; standard footprint for SOT223.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 1 cm<sup>2</sup> collector mounting pad.
4. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 6 cm<sup>2</sup> collector mounting pad.

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**THERMAL CHARACTERISTICS**

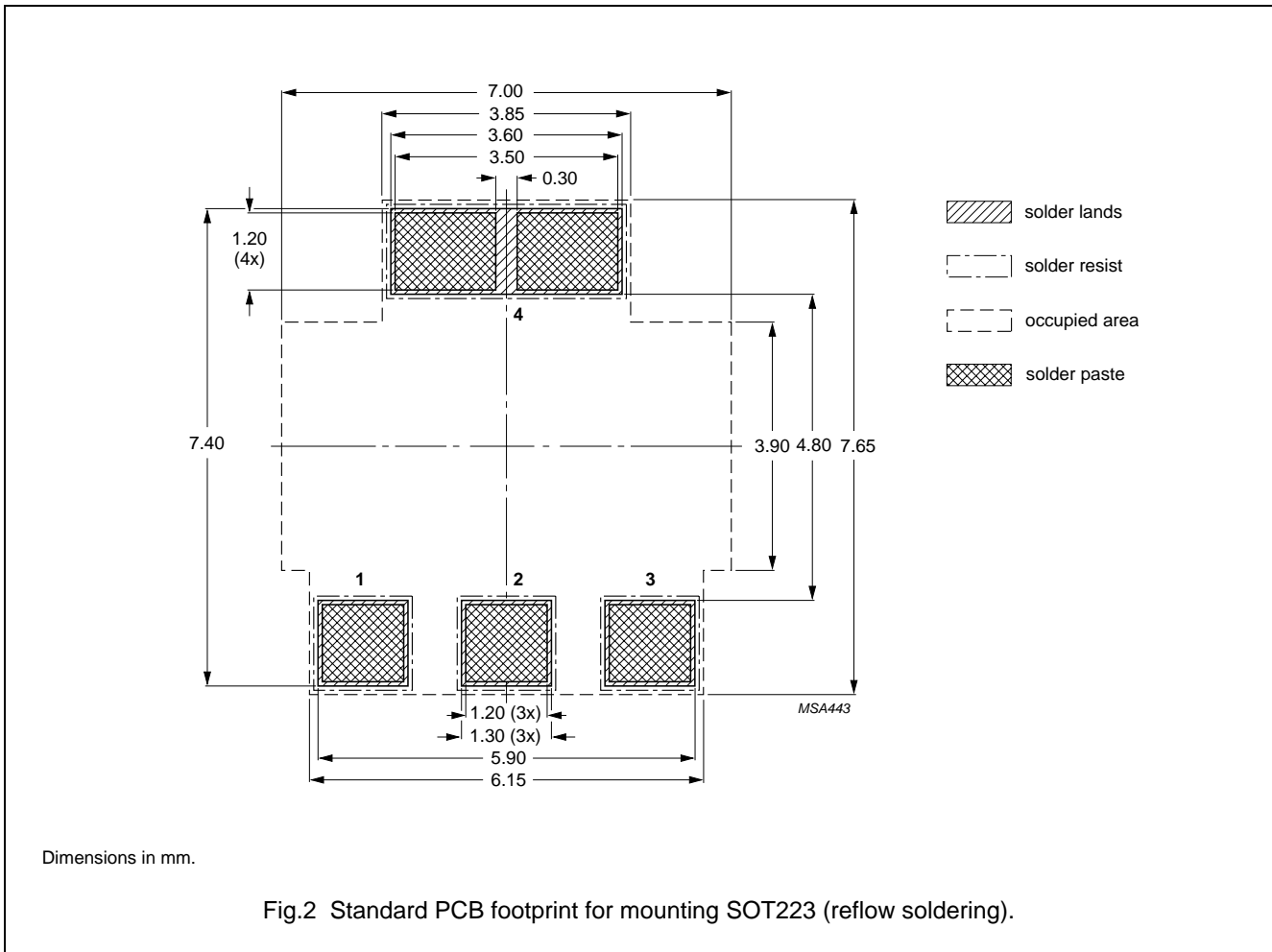
SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °C; notes 1 and 3	200	K/W
		T <sub>amb</sub> ≤ 25 °C; notes 1 and 4	125	K/W
		T <sub>amb</sub> ≤ 25 °C; notes 1 and 4	89	K/W
R <sub>th(j-s)</sub>	thermal resistance from junction to solder point	T <sub>amb</sub> ≤ 25 °C	15	K/W

**Notes**

1. See SOT223 (SC-73) standard mounting conditions.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; standard footprint for SOT223.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 1 cm<sup>2</sup> collector mounting pad.
4. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 6 cm<sup>2</sup> collector mounting pad.

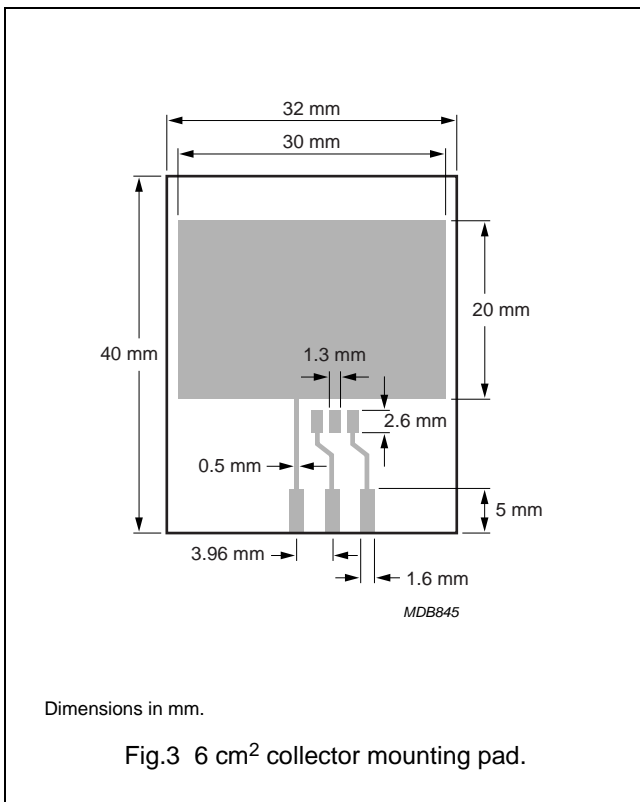
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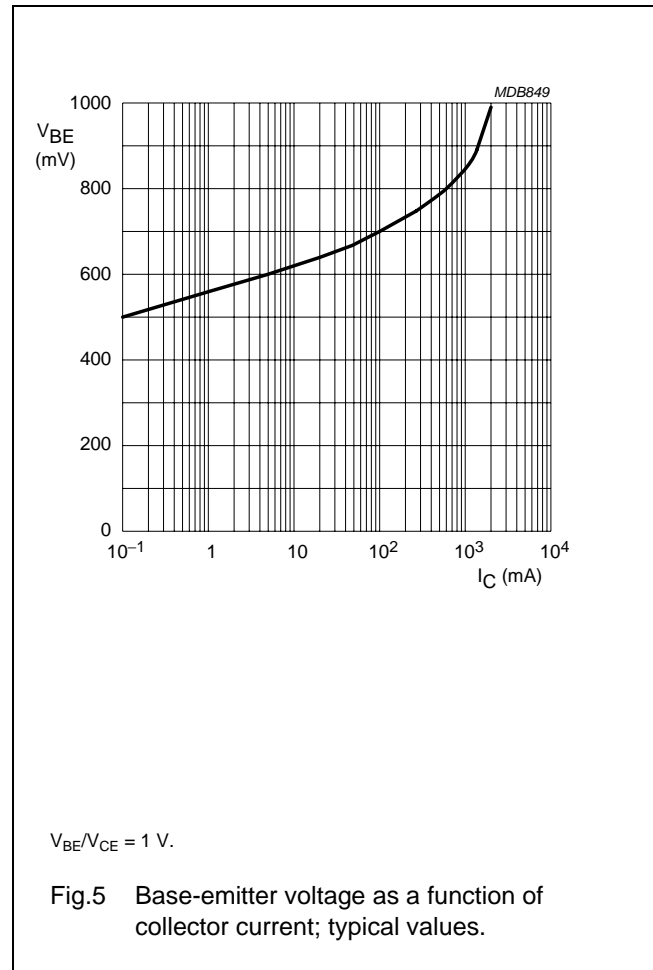
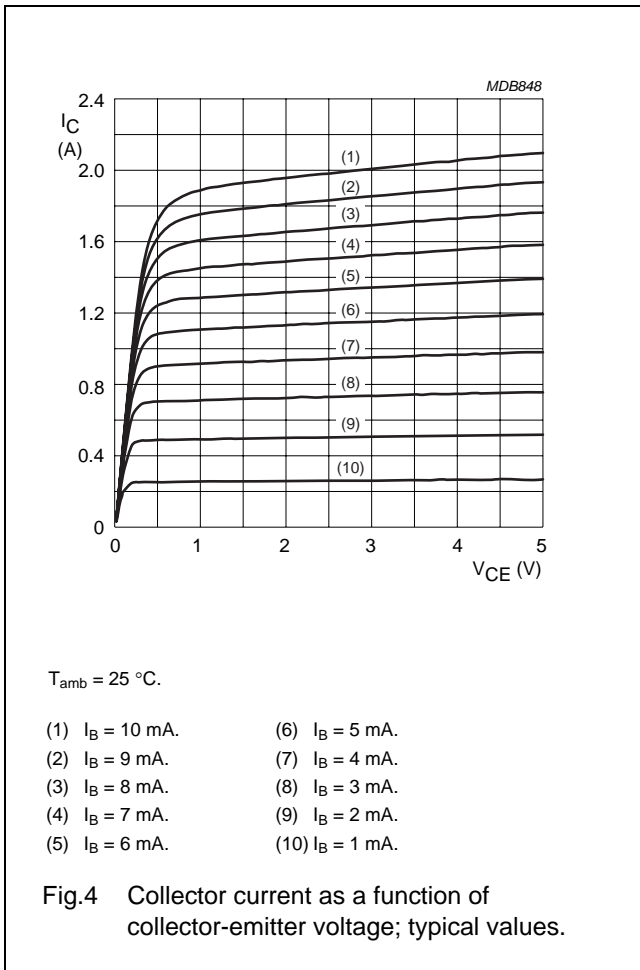
**CHARACTERISTICS**

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> = 25 V; I <sub>E</sub> = 0	–	–	100	nA
		V <sub>CB</sub> = 25 V; I <sub>E</sub> = 0; T <sub>j</sub> = 150 °C	–	–	10	μA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0	–	–	100	nA
h <sub>FE</sub>	DC current gain	<b>BCP68</b>				
		V <sub>CE</sub> = 10 V; I <sub>C</sub> = 5 mA	50	–	–	
		V <sub>CE</sub> = 1 V; I <sub>C</sub> = 500 mA	85	–	375	
		V <sub>CE</sub> = 1 V; I <sub>C</sub> = 1 A	60	–	–	
		<b>BCP68-25</b>				
		V <sub>CE</sub> = 1 V; I <sub>C</sub> = 500 mA	160	–	375	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 1 A; I <sub>B</sub> = 100 mA	–	–	500	mV
V <sub>BE</sub>	base-emitter voltage	V <sub>CE</sub> = 10 V; I <sub>C</sub> = 5 mA	–	–	700	mV
		V <sub>CE</sub> = 1 V; I <sub>C</sub> = 1 A	–	–	1	V
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = 10 V; I <sub>E</sub> = I <sub>e</sub> = 0; f = 1 MHz	–	22	–	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 50 mA; f = 100 MHz	40	170	–	MHz

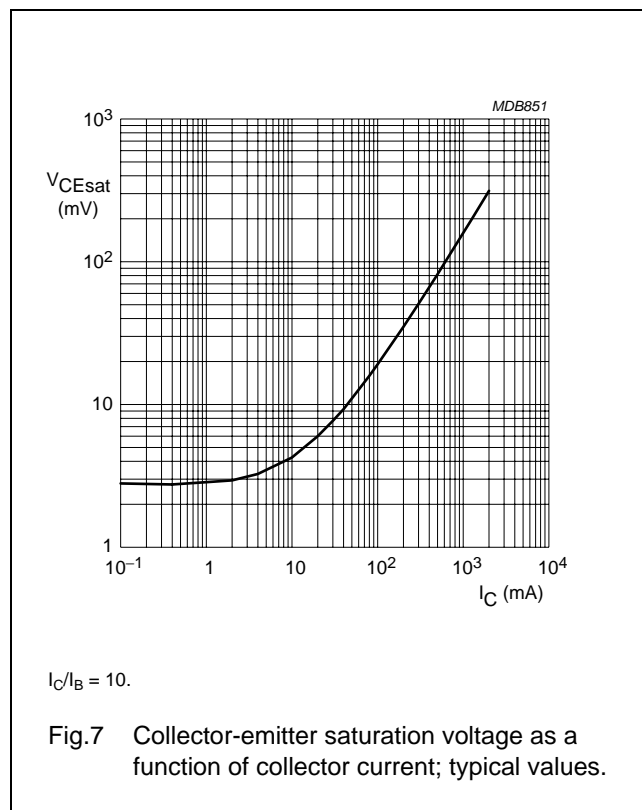
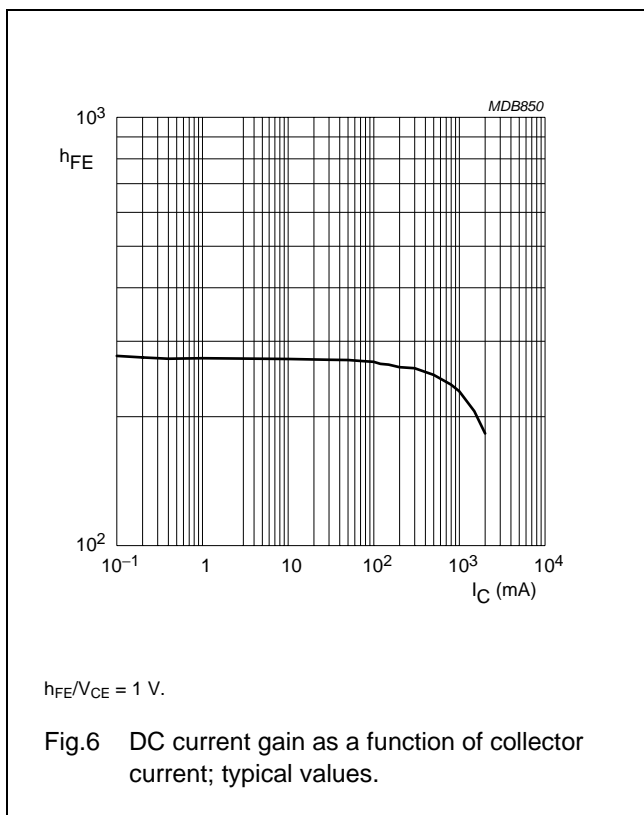
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NPN medium power transistor;  
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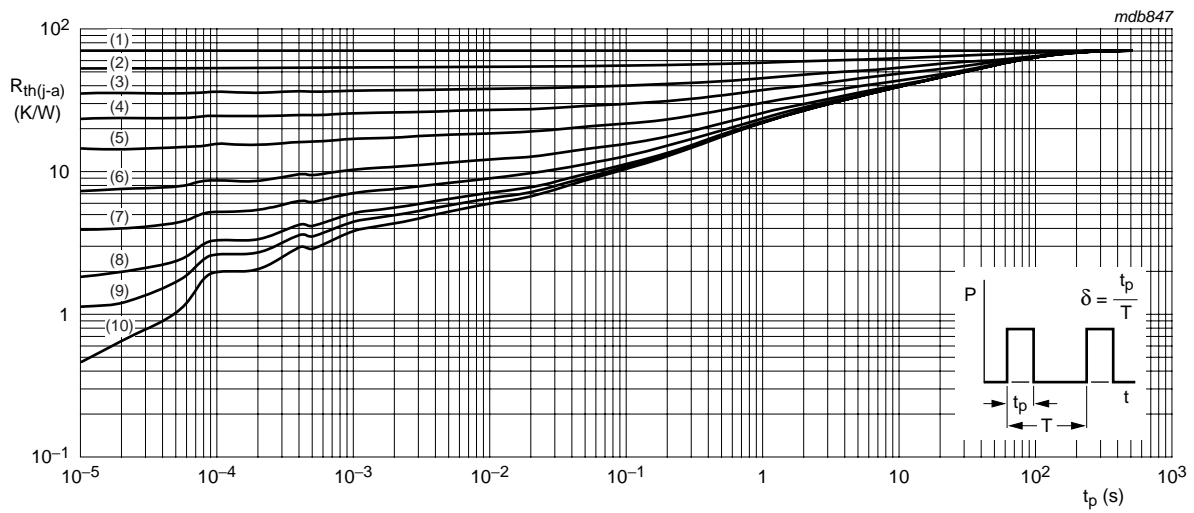
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- (1)  $\delta = 1.0.$       (3)  $\delta = 0.5.$       (5)  $\delta = 0.2.$       (7)  $\delta = 0.05.$       (9)  $\delta = 0.01.$
- (2)  $\delta = 0.75.$     (4)  $\delta = 0.33.$     (6)  $\delta = 0.1.$       (8)  $\delta = 0.02.$     (10)  $\delta = 0.0.$

Fig.8 Transient thermal resistance from junction to ambient as a function of pulse time for 6 cm<sup>2</sup> collector mounting pad.

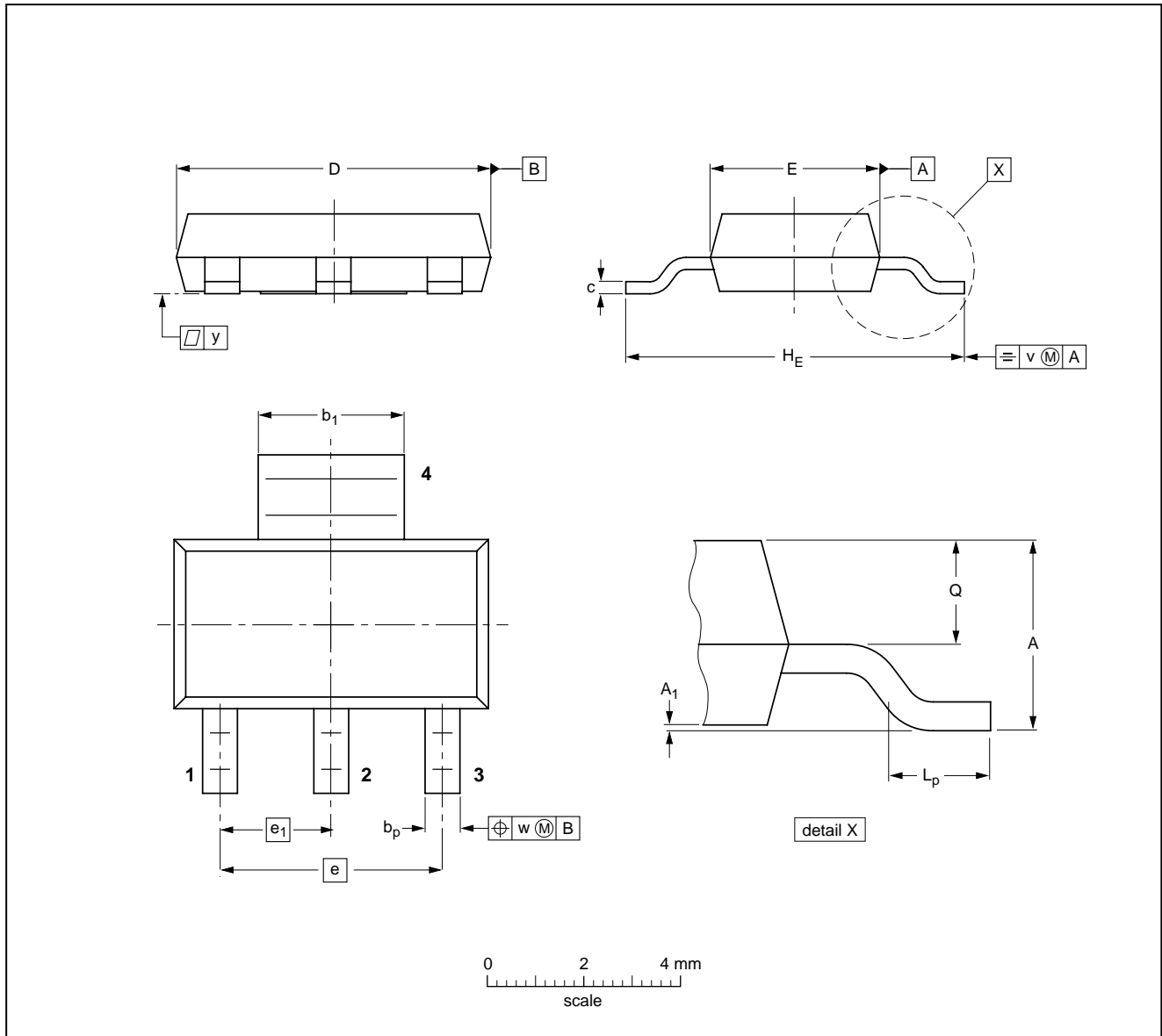
NPN medium power transistor;  
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.8	0.10	0.80	3.1	0.32	6.7	3.7	4.6	2.3	7.3	1.1	0.95	0.2	0.1	0.1
	1.5	0.01	0.60	2.9	0.22	6.3	3.3			6.7	0.7	0.85			

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223			SC-73			97-02-28 99-09-13

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**DATA SHEET STATUS**

<b>DOCUMENT STATUS<sup>(1)</sup></b>	<b>PRODUCT STATUS<sup>(2)</sup></b>	<b>DEFINITION</b>
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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