

# DATA SHEET



**BC868**

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

Product specification  
Data supersedes data of 1999 Apr 08

2003 Dec 02

# NPN medium power transistor; 20 V, 1 A

**BC868**

**FEATURES**

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

**APPLICATIONS**

- Linear voltage regulators
- Low side switch
- Supply line switch for negative voltages
- MOSFET driver
- Audio (pre-) amplifier.

**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			
	BC869	85	375	–
	BC869-25	100	375	–

**DESCRIPTION**

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

**PRODUCT OVERVIEW**

TYPE NUMBER	PACKAGE		MARKING CODE
	PHILIPS	EIAJ	
BC868	SOT89	SC-62	CAC
BC868-25	SOT89	SC-62	CDC

**SIMPLIFIED OUTLINE, SYMBOL AND PINNING**

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
BC868		1 2 3	emitter collector base

**RELATED PRODUCTS**

TYPE NUMBER	DESCRIPTION	FEATURES
BC869	PNP medium power transistor	PNP complement
BCP68	NPN medium power transistor	SOT223, 20 V
B3P68	NPN medium power transistor	SOT54, 20 V

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**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BC868	–	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89
BC868-25	–	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89

**LIMITING VALUES**

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

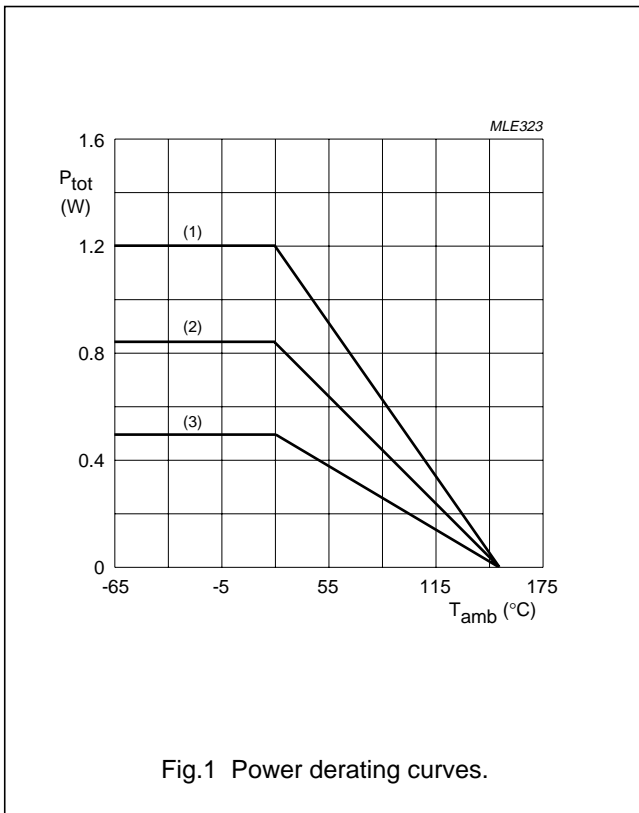
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	32	V
$V_{CEO}$	collector-emitter voltage	open base	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	output current (DC)		–	1	mA
$I_{CM}$	peak collector current		–	2	mA
$I_{BM}$	peak collector current		–	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$			
		notes 1 and 2	–	0.5	W
		notes 1 and 3	–	0.85	W
		notes 1 and 4	–	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**

1. Refer to SOT89 standard mounting conditions.
2. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated footprint.
3. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.
4. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 6 cm<sup>2</sup>.

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**THERMAL CHARACTERISTICS**

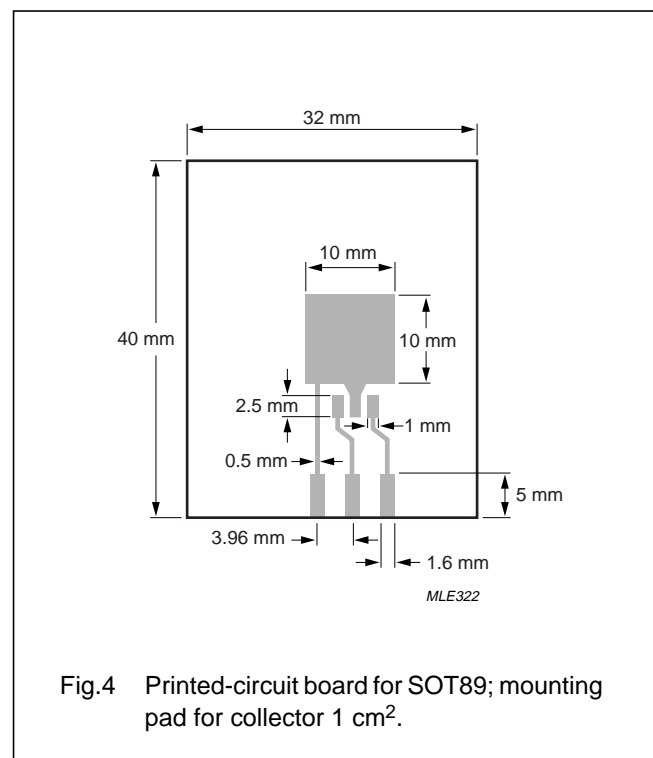
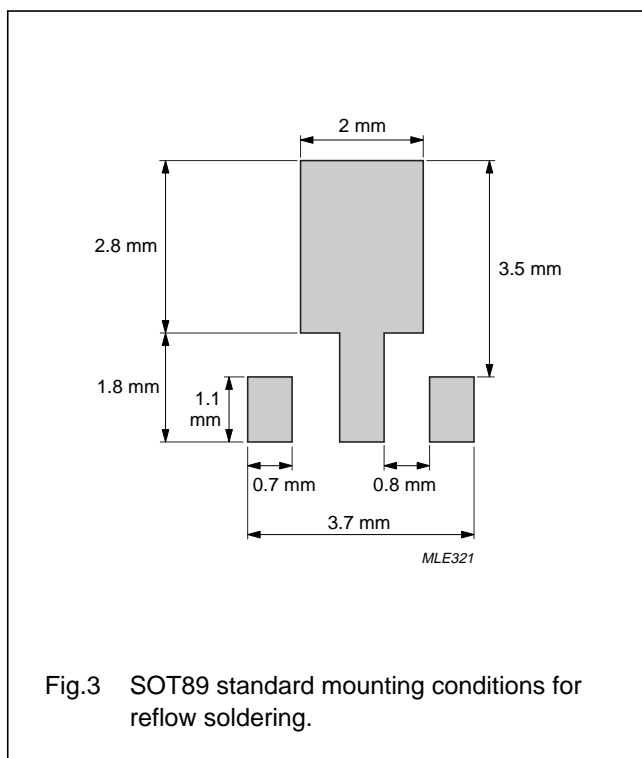
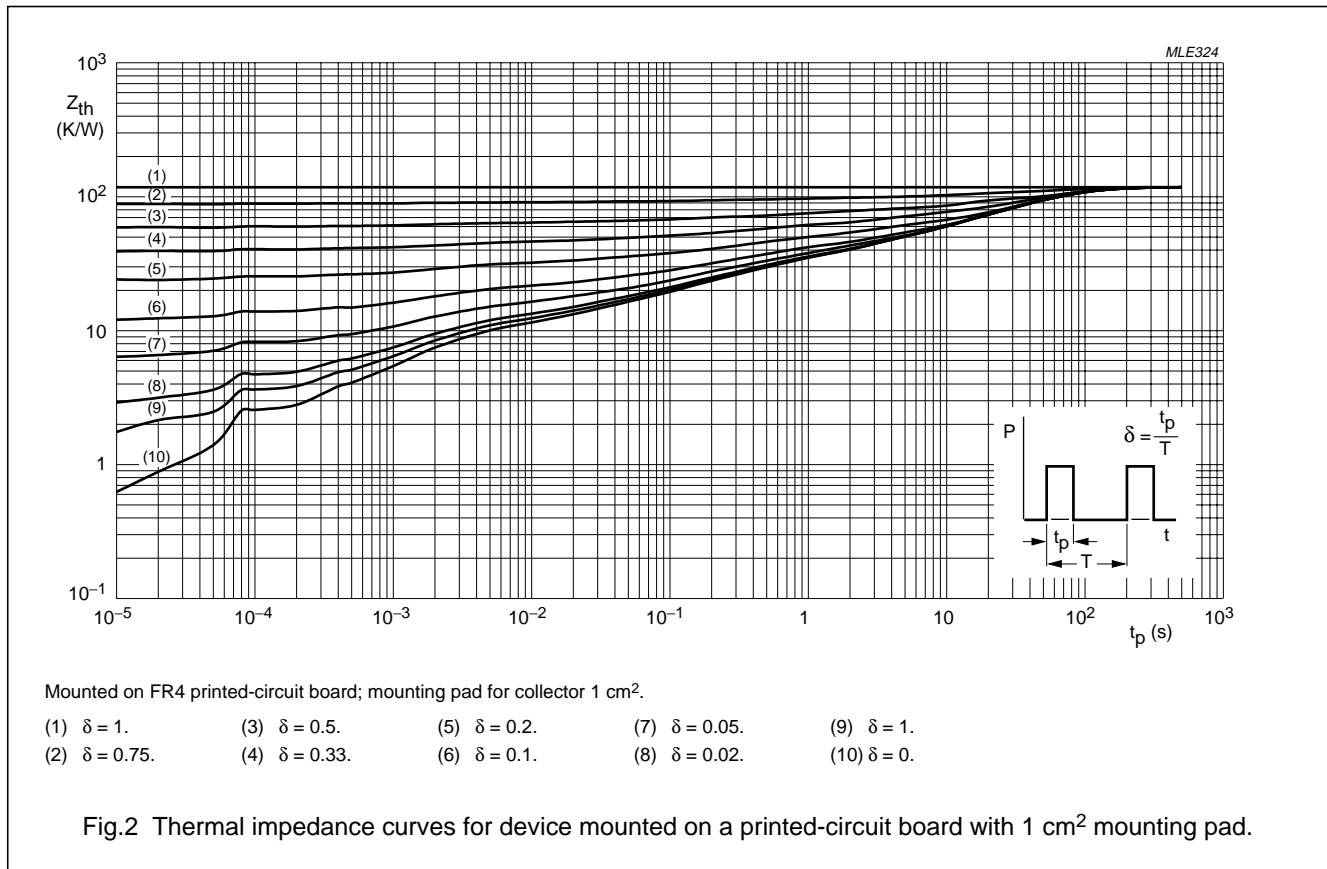
SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	T <sub>amb</sub> ≤ 25 °C		
		notes 1 and 2	250	K/W
		notes 1 and 3	147	K/W
		notes 1 and 4	104	K/W
R <sub>th(j-s)</sub>	thermal resistance from junction to solder point	T <sub>amb</sub> ≤ 25 °C	20	K/W

**Notes**

1. Refer to SOT89 standard mounting conditions.
2. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated footprint.
3. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.
4. Device mounted on an FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 6 cm<sup>2</sup>.

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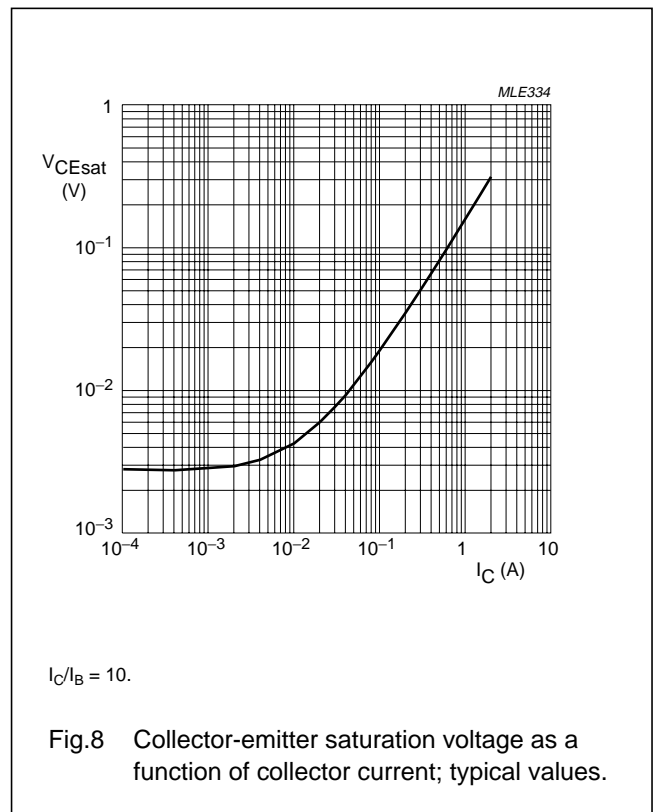
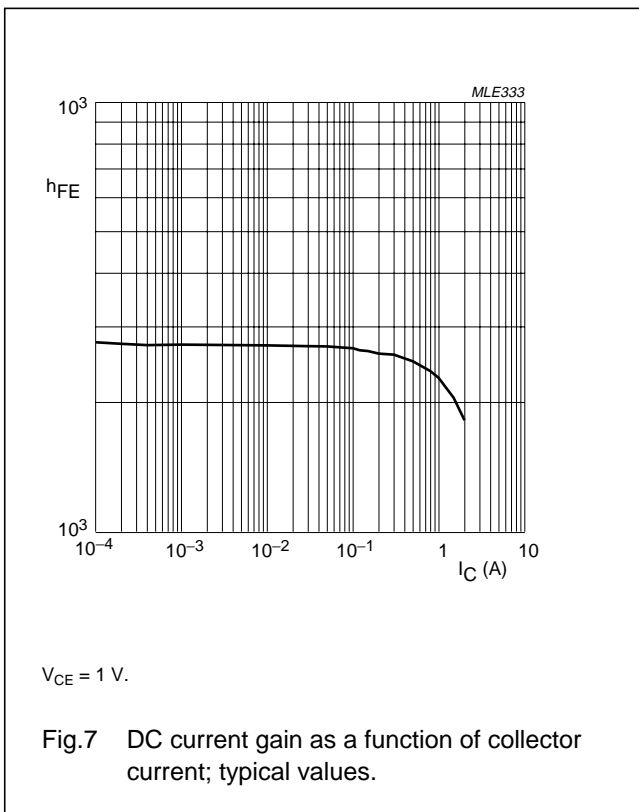
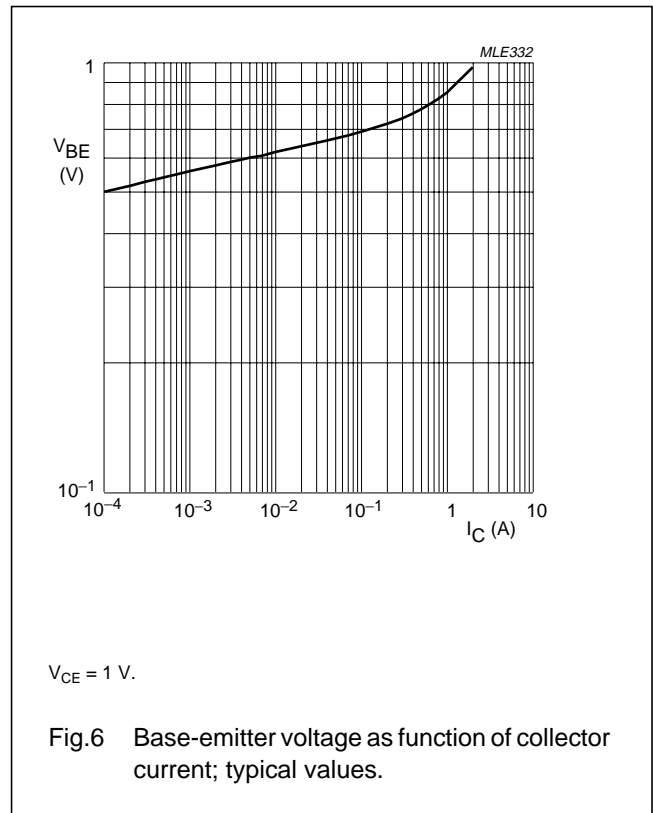
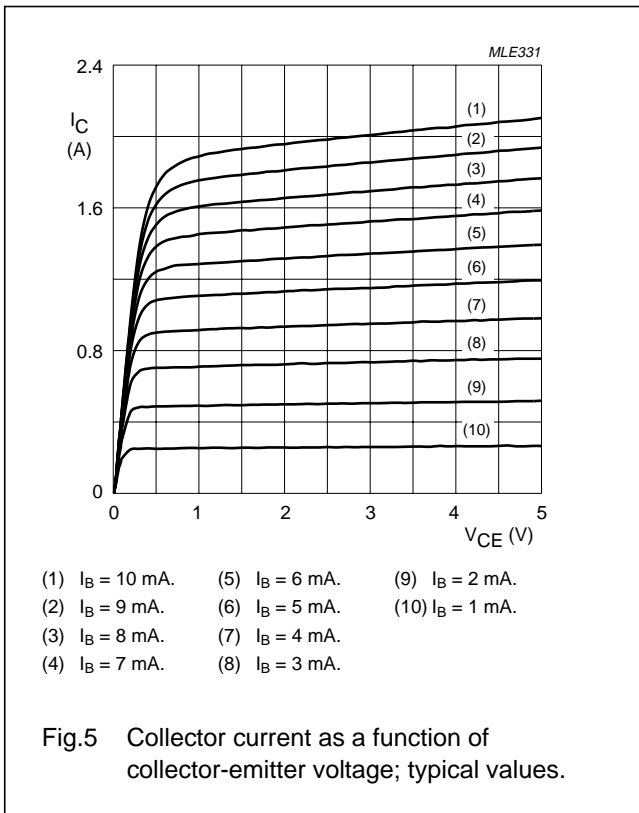
**BC868****CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 25\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 25\text{ V}; I_E = 0; T_J = 25\text{ °C}$	–	–	10	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
$h_{FE}$	DC current gain	BC868				
		$V_{CE} = 10\text{ V}; I_C = 5\text{ mA}$	50	–	–	
		$V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$	85	–	375	
		$V_{CE} = 1\text{ V}; I_C = 1\text{ A}$	60	–	–	
$h_{FE}$	DC current gain	BC868-25				
		$V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$	160	–	375	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	500	mV
$V_{BE}$	base-emitter voltage	$V_{CE} = 10\text{ V}; I_C = 5\text{ mA}$	–	–	700	mV
		$V_{CE} = 1\text{ V}; I_C = 1\text{ A}$	–	–	1	V
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	22	–	pF
$f_T$	transition frequency	$V_{CE} = 5\text{ V}; I_C = 50\text{ mA};$ $f = 100\text{ MHz}$	40	170	–	MHz

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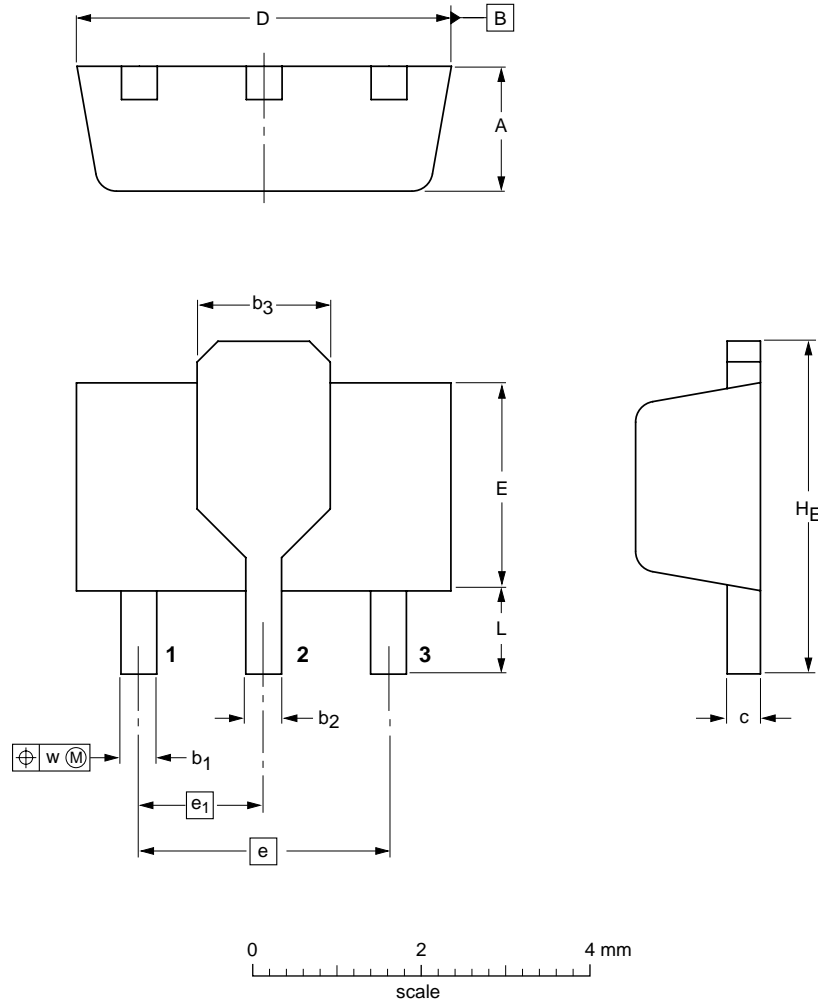
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT89		TO-243	SC-62		97-02-28 99-09-13



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#### DATA SHEET STATUS

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