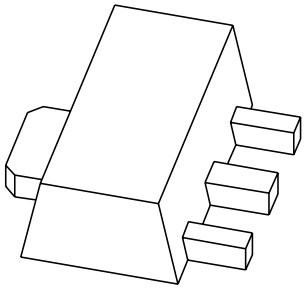
DATA SHEET



BC868

NPN medium power transistor; 20 V, 1 A

Product specification

2004 Nov 08

Supersedes data of 2003 Dec 02

Philips Semiconductors

PHILIPS

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			
	BC868	85	375	–
	BC868-25	160	375	–

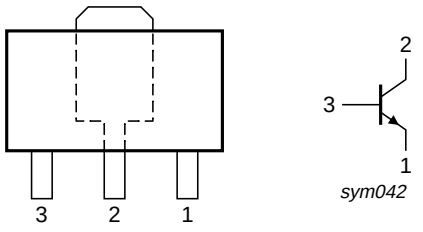
DESCRIPTION

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

PRODUCT OVERVIEW

TYPE NUMBER	PACKAGE		MARKING CODE
	PHILIPS	EIAJ	
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

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BC868	SC-62	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89
BC868-25			

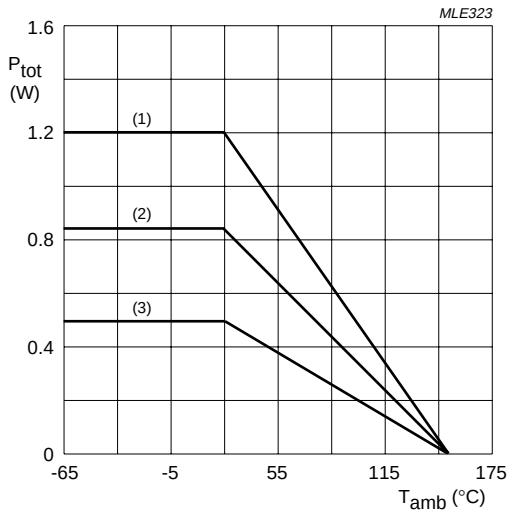
LIMITING VALUES

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	$T_{amb} \leq 25$ °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}	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, tin-plated footprint.
3. Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.
4. Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.



(1) FR4 PCB; 6 cm^2 mounting pad for collector.
(2) FR4 PCB; 1 cm^2 mounting pad for collector.
(3) Standard footprint.

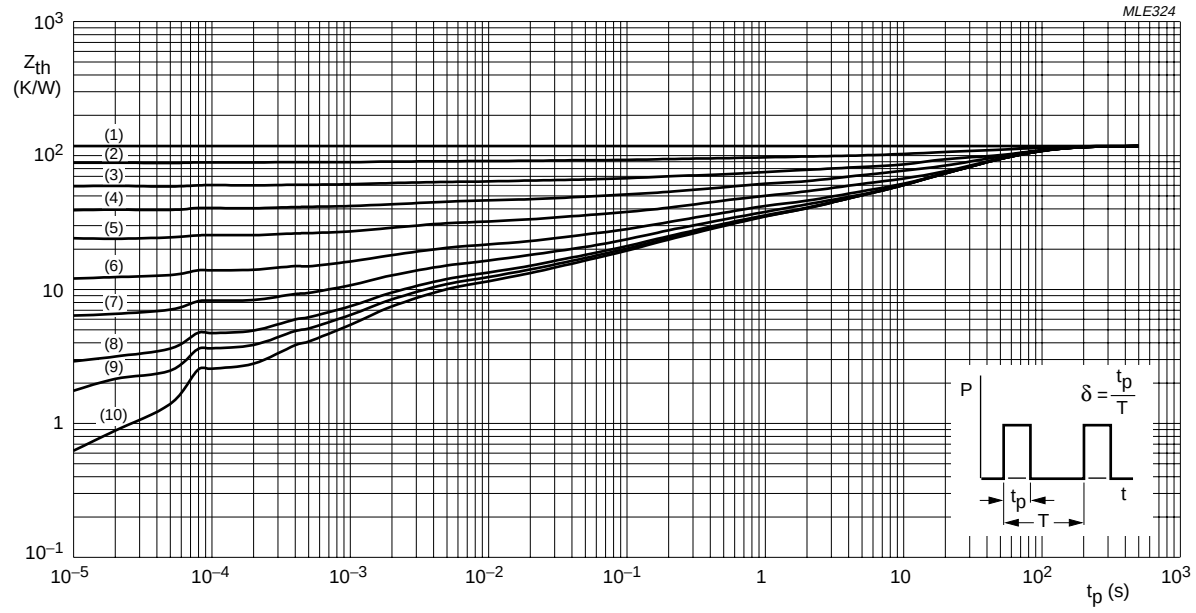
Fig.1 Power derating curves.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	$T_{amb} \leq 25$ °C		
		notes 1 and 2	250	K/W
		notes 1 and 3	147	K/W
		notes 1 and 4	104	K/W
$R_{th(j-s)}$	thermal resistance from junction to solder point	$T_{amb} \leq 25$ °C	20	K/W

Notes

1. Refer to SOT89 standard mounting conditions.
2. Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated footprint.
3. Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.
4. Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated, mounting pad for collector 6 cm^2.



Mounted on FR4 printed-circuit board; mounting pad for collector 1 cm^2.

(1) δ = 1. (3) δ = 0.5. (5) δ = 0.2. (7) δ = 0.05. (9) δ =0.01.
(2) δ = 0.75. (4) δ = 0.33. (6) δ = 0.1. (8) δ = 0.02. (10) δ = 0.

Fig.2 Transient thermal impedance as a function of pulse time; typical values.

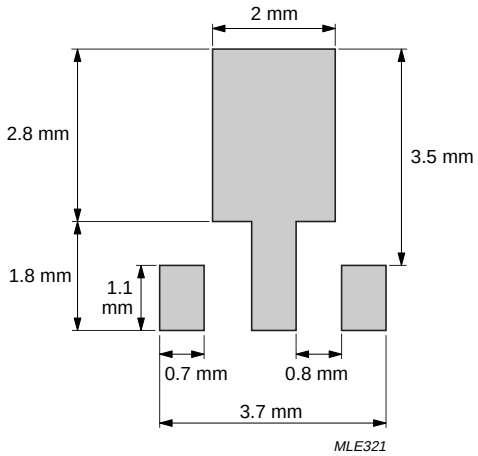


Fig.3 SOT89 standard mounting conditions for reflow soldering.

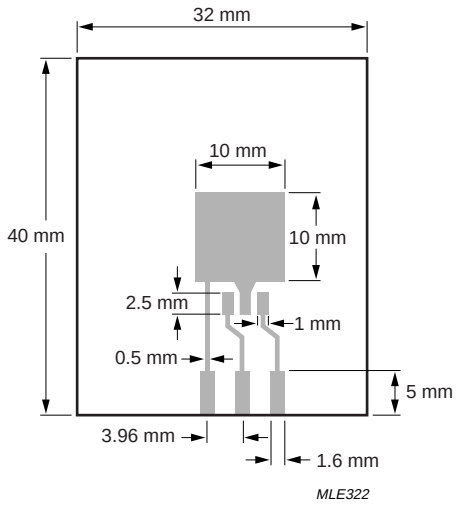
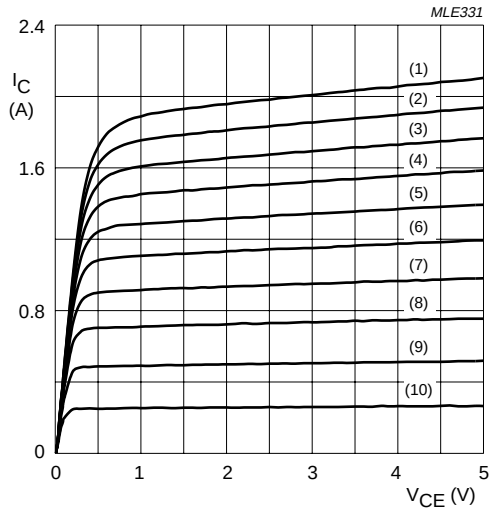


Fig.4 Printed-circuit board for SOT89; mounting pad for collector 1 cm^2.

CHARACTERISTICS

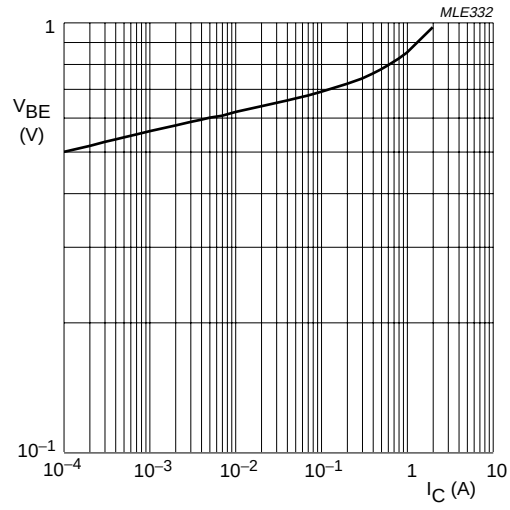
T_{amb} = 25 °C unless otherwise specified.

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



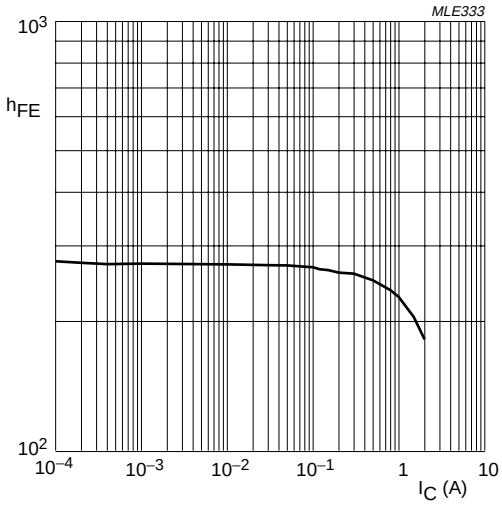
(1) I_B = 10 mA.
(2) I_B = 9 mA.
(3) I_B = 8 mA.
(4) I_B = 7 mA.
(5) I_B = 6 mA.
(6) I_B = 5 mA.
(7) I_B = 4 mA.
(8) I_B = 3 mA.
(9) I_B = 2 mA.
(10) I_B = 1 mA.

Fig.5 Collector current as a function of collector-emitter voltage; typical values.



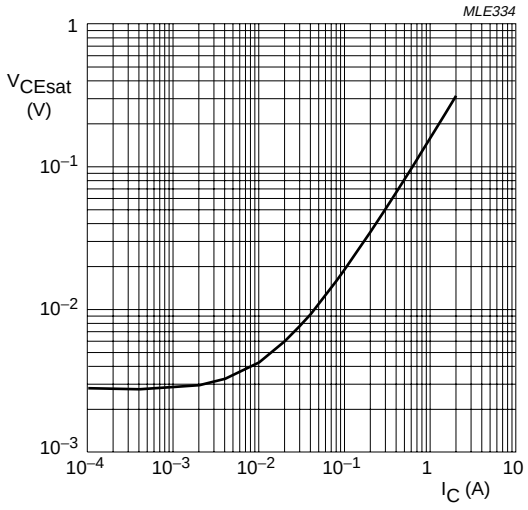
V_{CE} = 1 V.

Fig.6 Base-emitter voltage as function of collector current; typical values.



V_{CE} = 1 V.

Fig.7 DC current gain as a function of collector current; typical values.

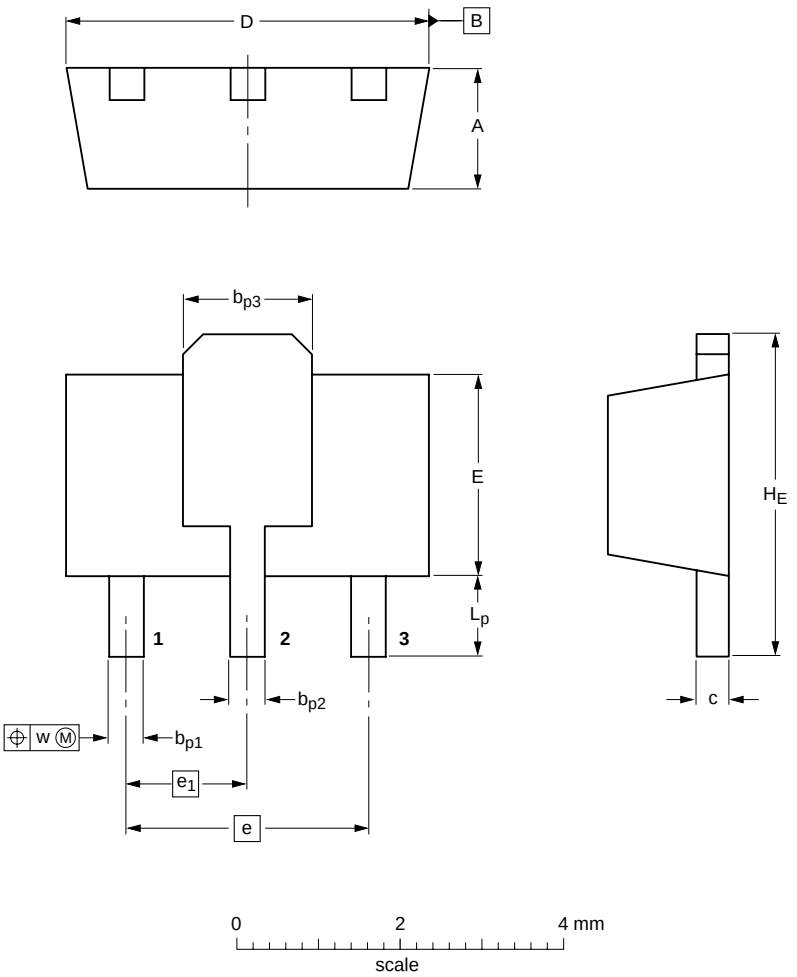


I_C/I_B = 10.

Fig.8 Collector-emitter saturation voltage as a function of collector current; typical values.

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads **SOT89**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_{p1}	b_{p2}	b_{p3}	c	D	E	e	e_1	H_E	L_p	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.23	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	1.2 0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT89		TO-243	SC-62			~~99-09-13~~ 04-08-03

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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