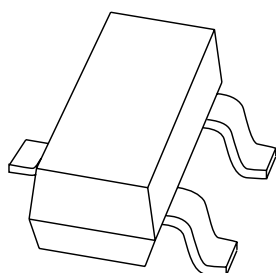


DATA SHEET



BC846; BC847; BC848 NPN general purpose transistors

Product specification
Supersedes data of 2002 Feb 04

2004 Feb 06

NPN general purpose transistors

BC846; BC847; BC848

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 65 V).

APPLICATIONS

- General purpose switching and amplification.

DESCRIPTION

NPN transistor in a SOT23 plastic package.
PNP complements: BC856, BC857 and BC858.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
BC846	1D*
BC846A	1A*
BC846B	1B*
BC847	1H*
BC847A	1E*
BC847B	1F*
BC847C	1G*
BC848B	1K*

Note

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

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

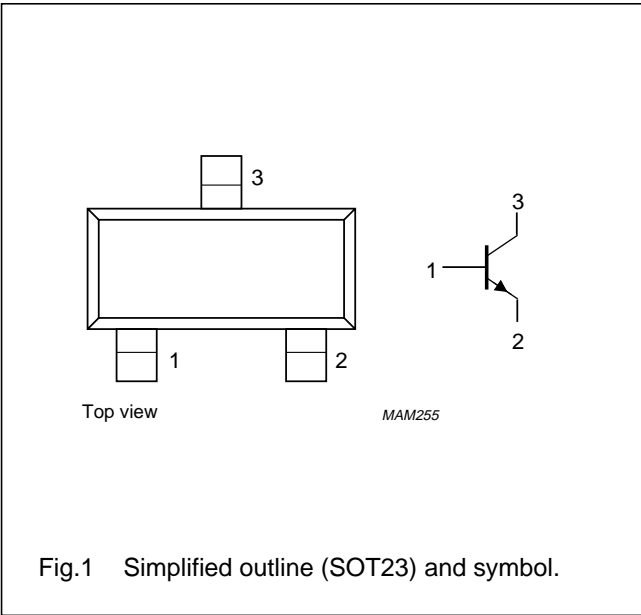


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BC846	—	plastic surface mounted package; 3 leads	SOT23
BC846A			
BC846B			
BC847			
BC847A			
BC847B			
BC847C			
BC848B			

NPN general purpose transistors

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BC846		–	80	V
	BC847		–	50	V
	BC848		–	30	V
V_{CEO}	collector-emitter voltage	open base			
	BC846		–	65	V
	BC847		–	45	V
	BC848		–	30	V
V_{EBO}	emitter-base voltage	open collector			
	BC846; BC847		–	6	V
	BC848		–	5	V
I_C	collector current (DC)		–	100	mA
I_{CM}	peak collector current		–	200	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Note

1. Transistor mounted on an FR4 printed-circuit board, standard footprint.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board, standard footprint.

NPN general purpose transistors

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CHARACTERISTICS

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

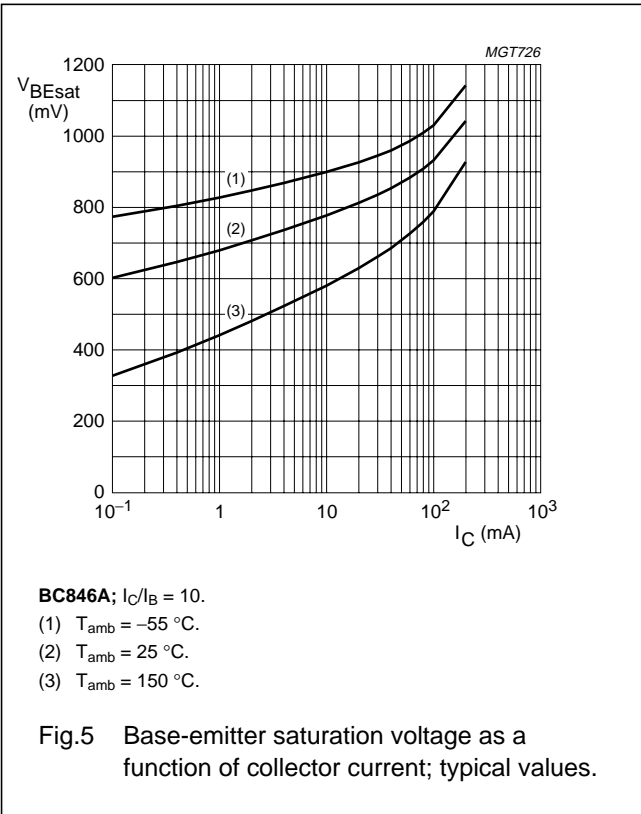
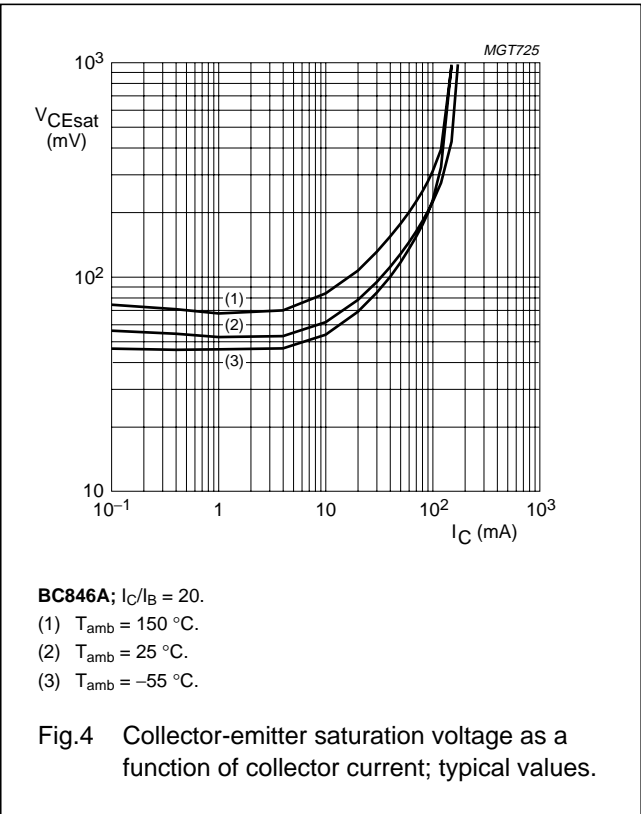
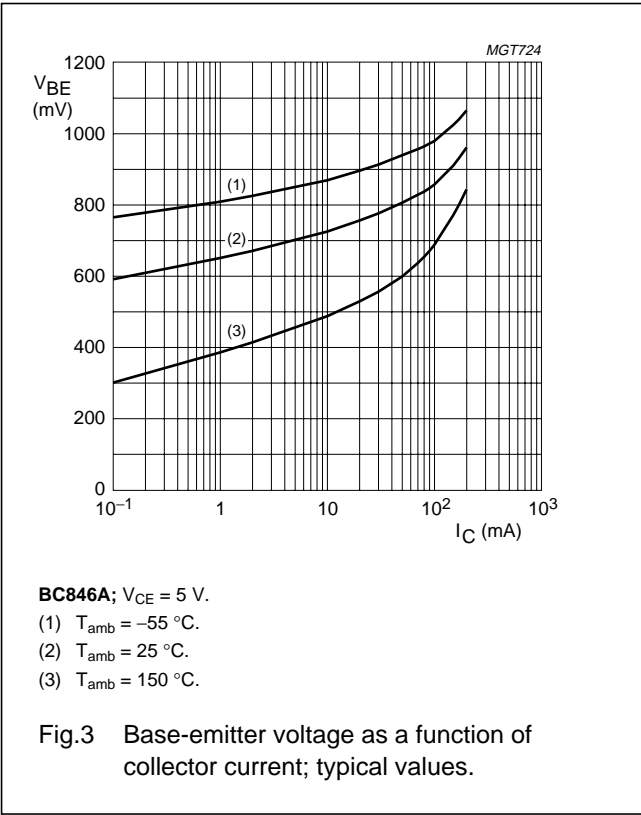
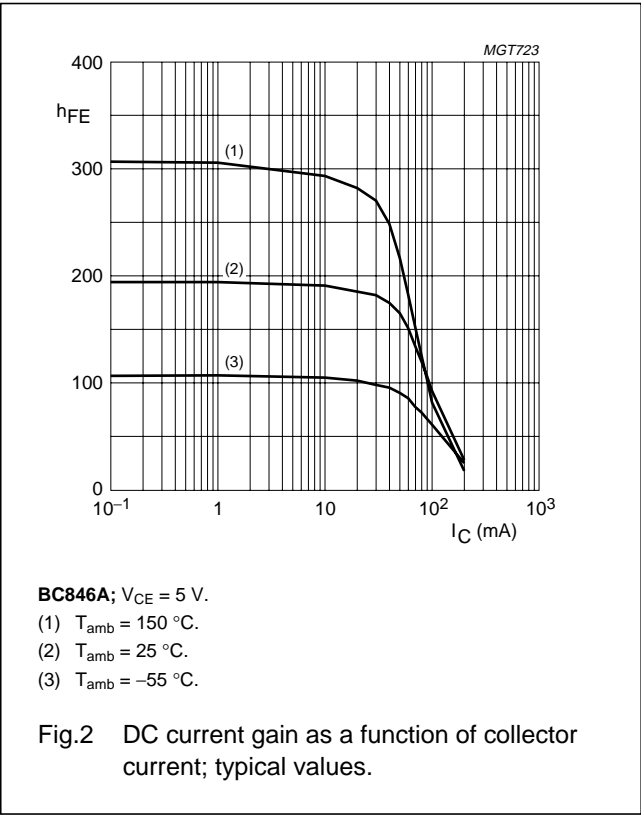
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0$	–	–	15	nA
		$V_{CB} = 30\text{ V}; I_E = 0$; $T_J = 150\text{ °C}$	–	–	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
h_{FE}	DC current gain	$I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$				
	BC846A; BC847A		–	90	–	
	BC846B; BC847B; BC848B		–	150	–	
	BC847C		–	270	–	
	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$				
	BC846		110	–	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	90	250	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$; note 1	–	200	600	mV
		$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	700	–	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$; note 1	–	900	–	mV
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	580	660	700	mV
V_{BE}	base-emitter voltage	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	–	–	770	mV
		$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	–	–	770	mV
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0$; $f = 1\text{ MHz}$	–	2.5	–	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}$; $f = 100\text{ MHz}$	100	–	–	MHz
F	noise figure	$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$; $R_S = 2\text{ k}\Omega; f = 1\text{ kHz}$; $B = 200\text{ Hz}$	–	2	10	dB

Note

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

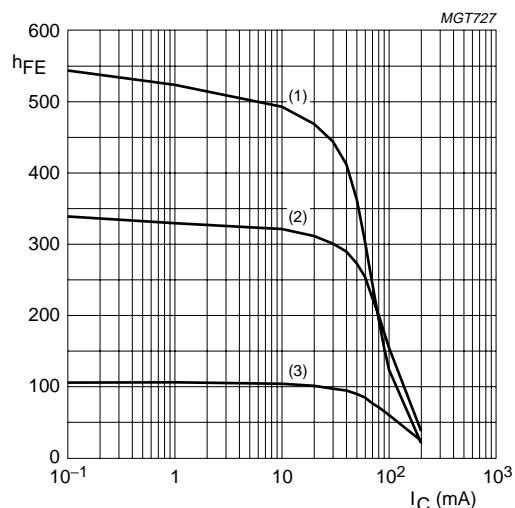
NPN general purpose transistors

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NPN general purpose transistors

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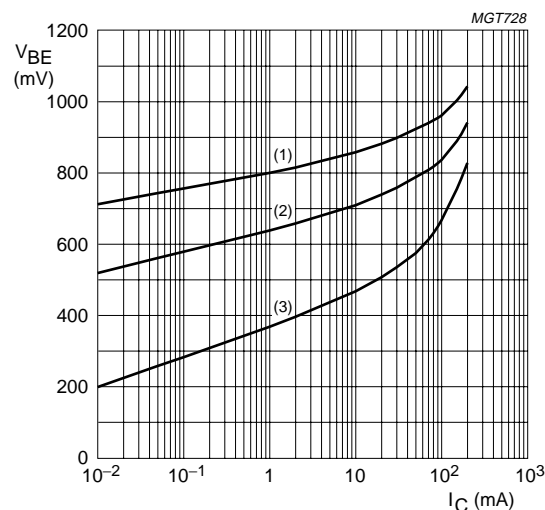
BC847B; $V_{CE} = 5\text{ V}$.

(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.

(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

Fig.6 DC current gain as a function of collector current; typical values.



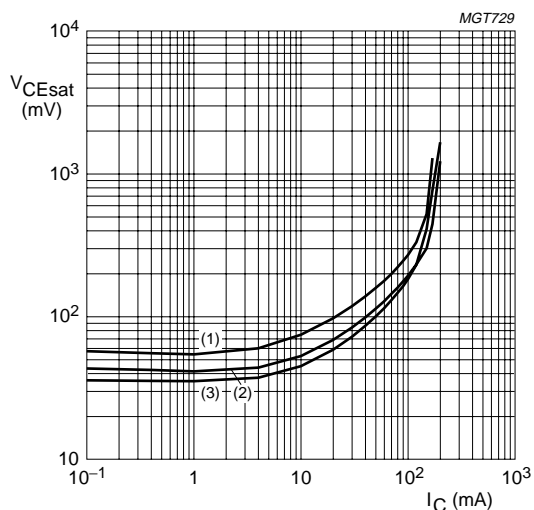
BC847B; $V_{CE} = 5\text{ V}$.

(1) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.

(3) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

Fig.7 Base-emitter voltage as a function of collector current; typical values.



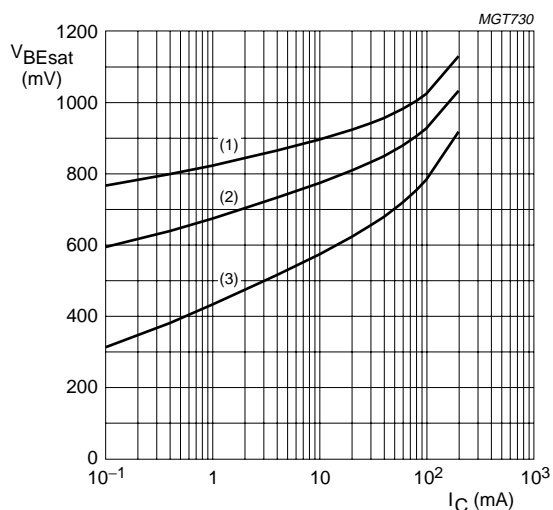
BC847B; $I_C/I_B = 20$.

(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.

(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

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



BC847B; $I_C/I_B = 10$.

(1) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

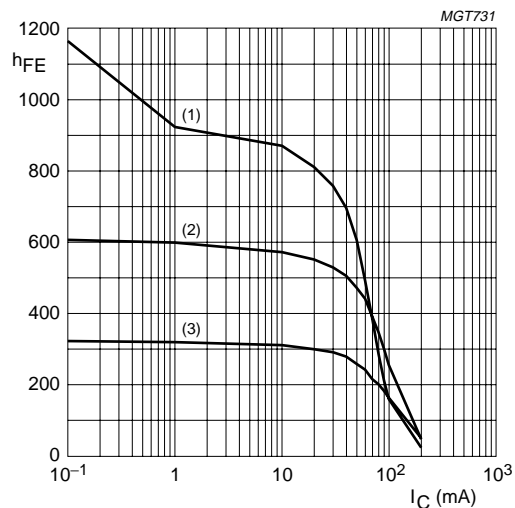
(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.

(3) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

Fig.9 Base-emitter saturation voltage as a function of collector current; typical values.

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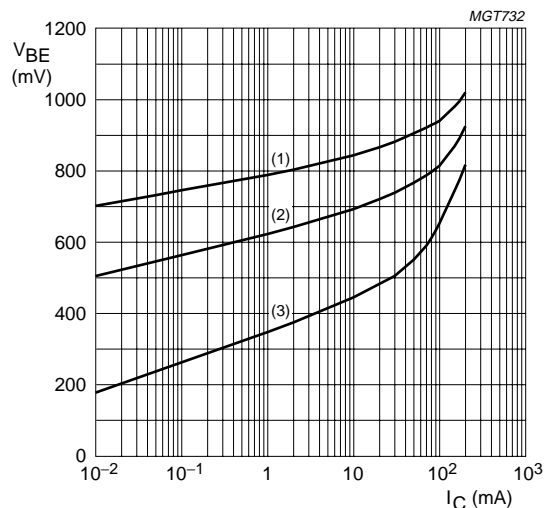
BC847C; $V_{CE} = 5\text{ V}$.

(1) $T_{amb} = 150^\circ\text{C}$.

(2) $T_{amb} = 25^\circ\text{C}$.

(3) $T_{amb} = -55^\circ\text{C}$.

Fig.10 DC current gain as a function of collector current; typical values.



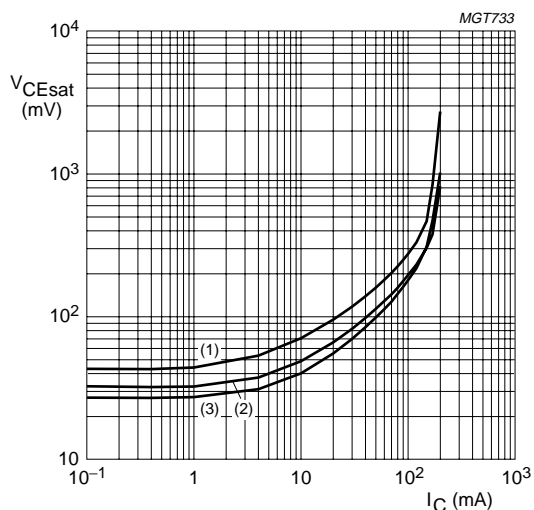
BC847C; $V_{CE} = 5\text{ V}$.

(1) $T_{amb} = -55^\circ\text{C}$.

(2) $T_{amb} = 25^\circ\text{C}$.

(3) $T_{amb} = 150^\circ\text{C}$.

Fig.11 Base-emitter voltage as a function of collector current; typical values.



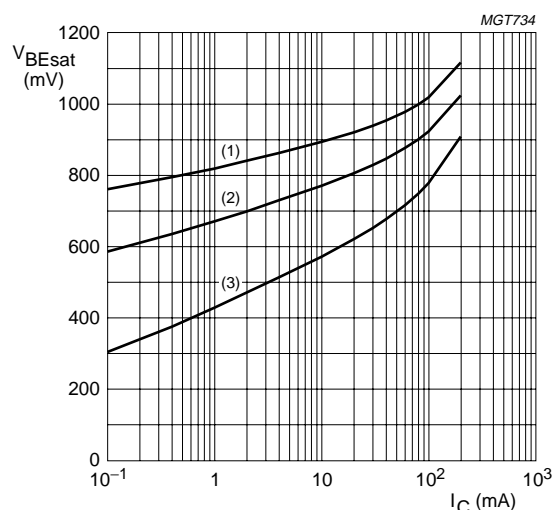
BC847C; $I_C/I_B = 20$.

(1) $T_{amb} = 150^\circ\text{C}$.

(2) $T_{amb} = 25^\circ\text{C}$.

(3) $T_{amb} = -55^\circ\text{C}$.

Fig.12 Collector-emitter saturation voltage as a function of collector current; typical values.



BC847C; $I_C/I_B = 10$.

(1) $T_{amb} = -55^\circ\text{C}$.

(2) $T_{amb} = 25^\circ\text{C}$.

(3) $T_{amb} = 150^\circ\text{C}$.

Fig.13 Base-emitter saturation voltage as a function of collector current; typical values.

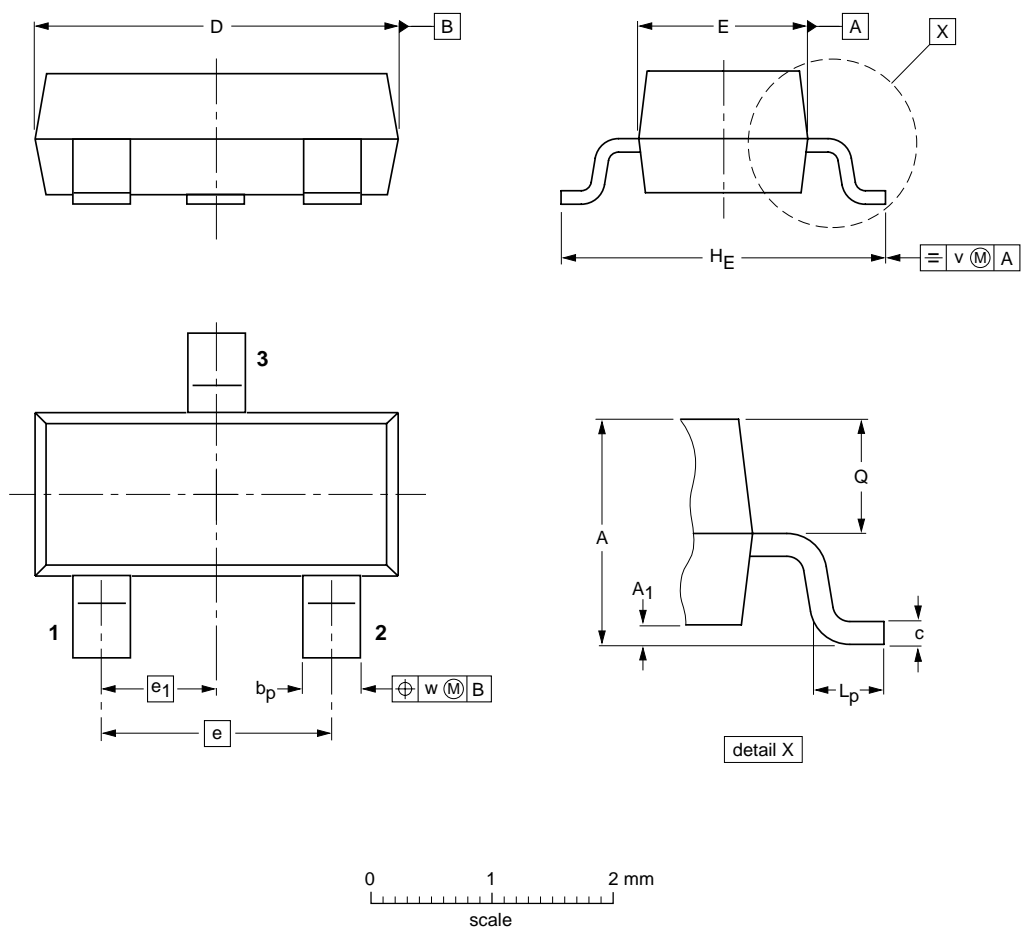
NPN general purpose transistors

BC846; BC847; BC848

PACKAGE OUTLINE

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

NPN general purpose transistors

BC846; BC847; BC848

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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.
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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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