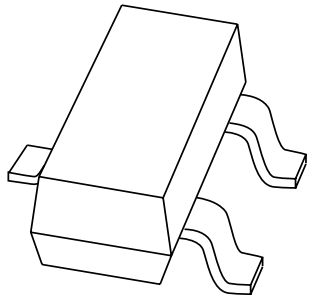


DATA SHEET



BC846; BC847; BC848 NPN general purpose transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Mar 12

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

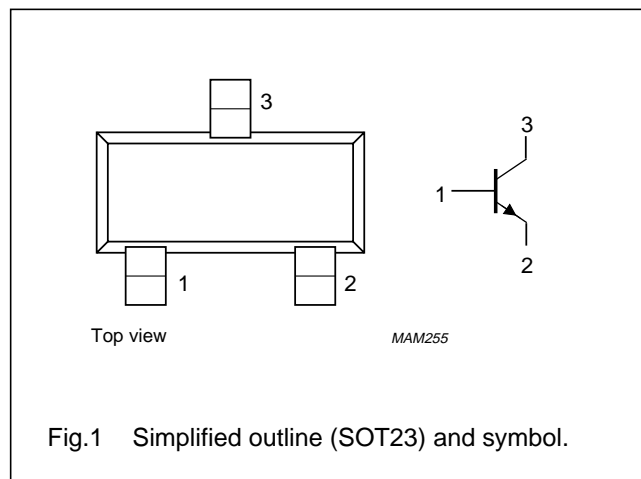
NPN transistor in a SOT23 plastic package.
PNP complements: BC856; BC857; BC858.

MARKING

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BC846	1Dp	BC847C	1Gp
BC846A	1Ap	BC848	1Mp
BC846B	1Bp	BC848A	1Jp
BC847	1Hp	BC848B	1Kp
BC847A	1Ep	BC848C	1Lp
BC847B	1Fp		

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



QUICK REFERENCE DATA

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
I_{CM}	peak collector current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	250	mW
h_{FE}	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$			
	BC846		110	450	
	BC847; BC848		110	800	
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	MHz

NPN general purpose transistors

BC846; BC847; BC848

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

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} ≤ 25 °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.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board.

NPN general purpose transistors

BC846; BC847; BC848

CHARACTERISTICS

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

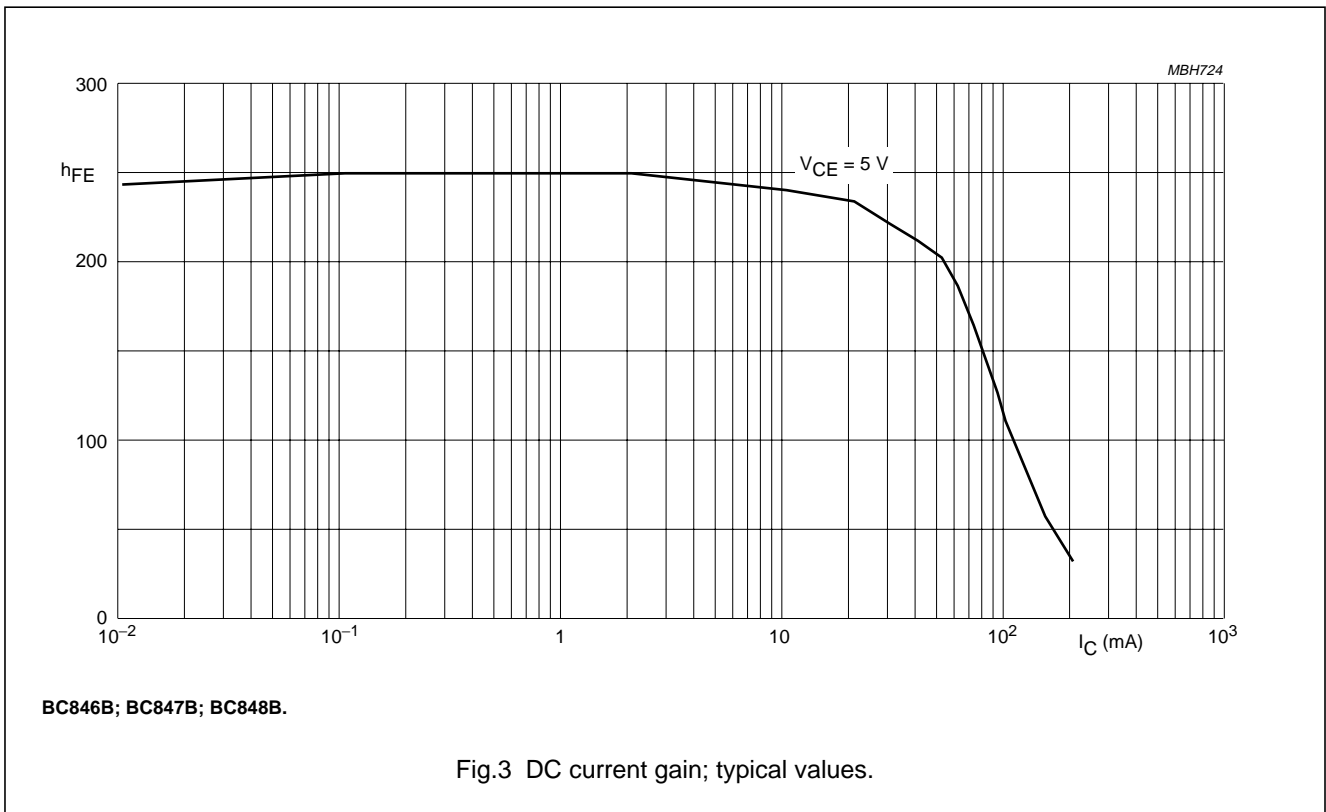
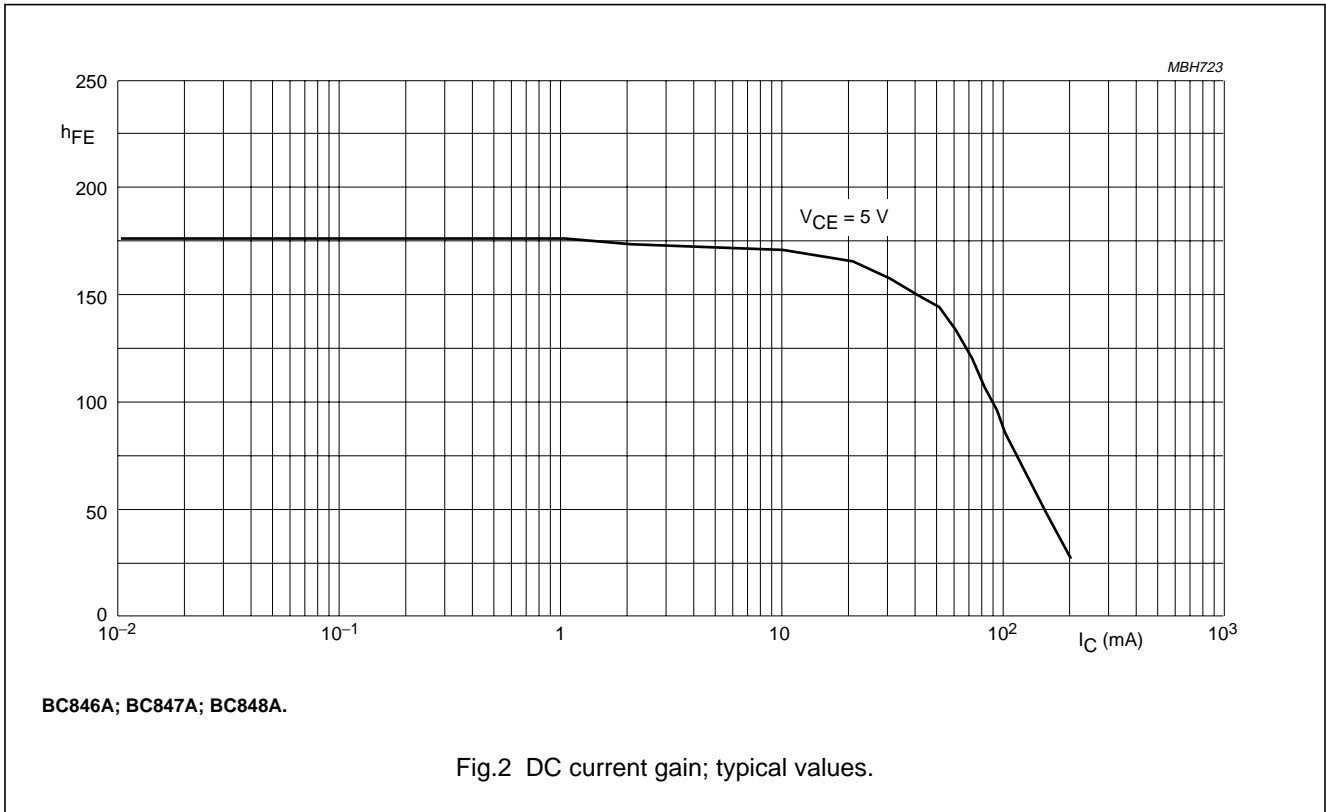
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = 30\text{ V}$	–	–	15	nA
		$I_E = 0; V_{CB} = 30\text{ V}; T_j = 150\text{ °C}$	–	–	5	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	100	nA
h_{FE}	DC current gain BC846A; BC847A; BC848A BC846B; BC847B; BC848B BC847C; BC848C	$I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V};$ see Figs 2, 3 and 4	–	90	–	
			–	150	–	
			–	270	–	
h_{FE}	DC current gain BC846 BC847; BC848 BC846A; BC847A; BC848A BC846B; BC847B; BC848B BC847C; BC848C	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V};$ see Figs 2, 3 and 4	110	–	450	
			110	–	800	
			110	180	220	
			200	290	450	
			420	520	800	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	90	250	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	–	200	600	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA};$ note 1	–	700	–	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA};$ note 1	–	900	–	mV
V_{BE}	base-emitter voltage	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V};$ note 2	580	660	700	mV
		$I_C = 10\text{ mA}; V_{CE} = 5\text{ V};$ note 2	–	–	770	mV
C_C	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz};$	–	2.5	–	pF
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz};$	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

Notes

- V_{BEsat} decreases by about 1.7 mV/K with increasing temperature.
- V_{BE} decreases by about 2 mV/K with increasing temperature.

NPN general purpose transistors

BC846; BC847; BC848



NPN general purpose transistors

BC846; BC847; BC848

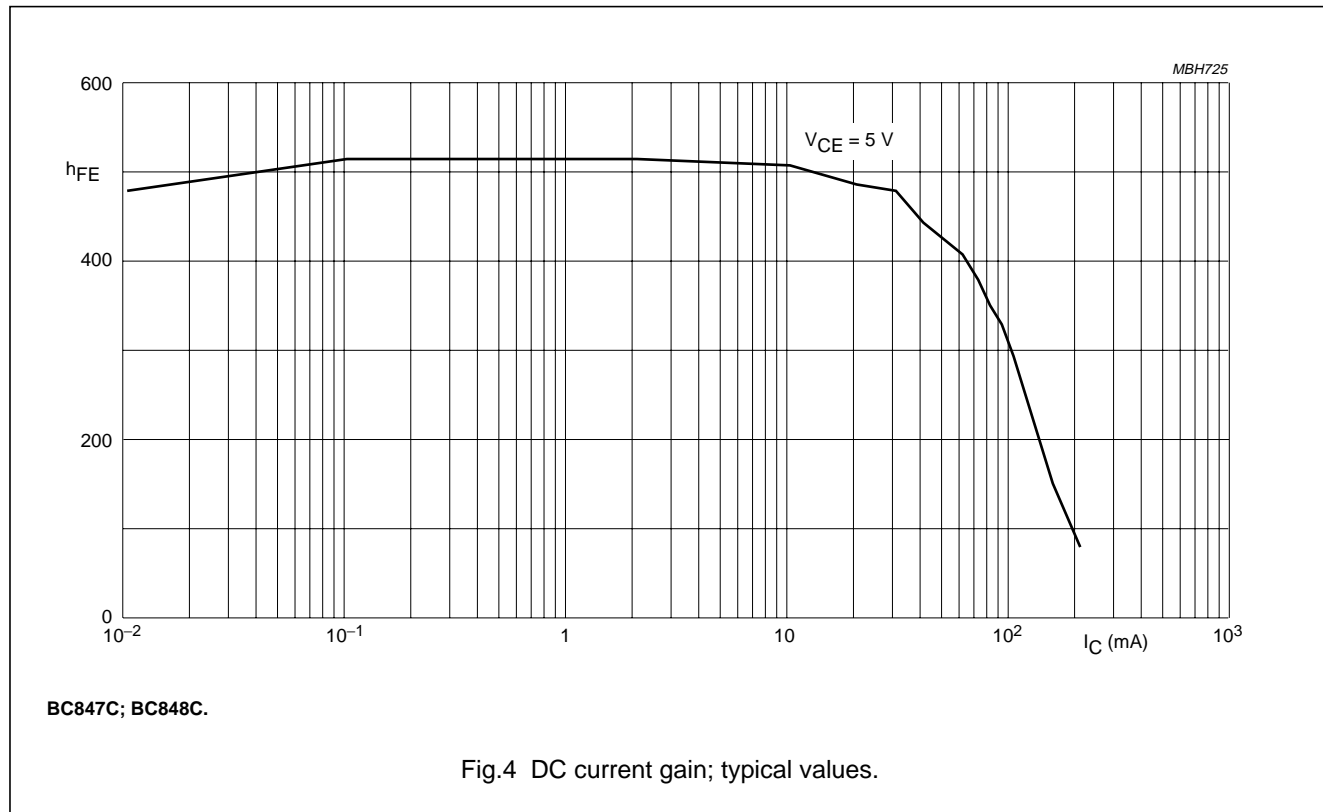


Fig.4 DC current gain; typical values.

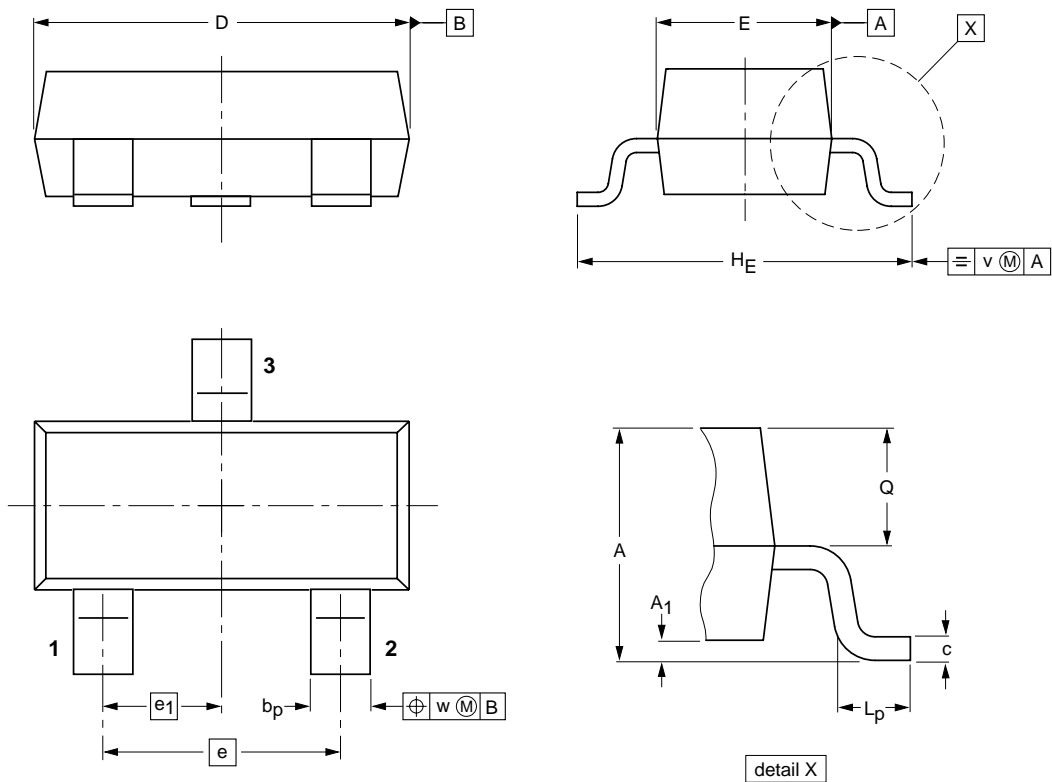
NPN general purpose transistors

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						97-02-28

NPN general purpose transistors

BC846; BC847; BC848

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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NPN general purpose transistors

BC846; BC847; BC848

NOTES

NPN general purpose transistors

BC846; BC847; BC848

NOTES

NPN general purpose transistors

BC846; BC847; BC848

NOTES

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