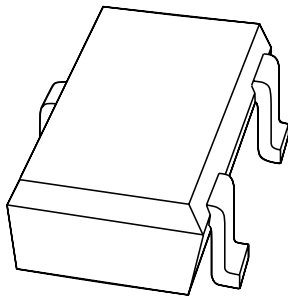


# DATA SHEET



## **BC846W; BC847W; BC848W** NPN general purpose transistors

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

1997 Mar 27

## NPN general purpose transistors

## BC846W; BC847W; BC848W

## FEATURES

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

## APPLICATIONS

- General purpose switching and amplification.

## DESCRIPTION

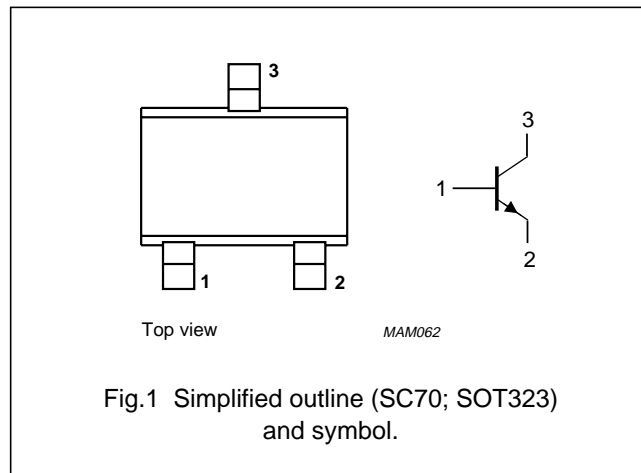
NPN transistor in a SC70; SOT323 plastic package.  
PNP complements: BC856W, BC857W, and BC858W.

## MARKING

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BC846W	1Dt	BC847CW	1Gt
BC846AW	1At	BC848W	1Mt
BC846BW	1Bt	BC848AW	1Jt
BC847W	1Ht	BC848BW	1Kt
BC847AW	1Et	BC848CW	1Lt
BC847BW	1Ft		

## 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			
	BC846W		–	80	V
	BC847W		–	50	V
	BC848W		–	30	V
$V_{CEO}$	collector-emitter voltage	open base			
	BC846W		–	65	V
	BC847W		–	45	V
	BC848W		–	30	V
$I_{CM}$	peak collector current		–	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	200	mW
$h_{FE}$	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$			
	BC846W		110	450	
	BC847W; BC848W		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

## BC846W; BC847W; BC848W

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BC846W		–	80	V
	BC847W		–	50	V
	BC848W		–	30	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BC846W		–	65	V
	BC847W		–	45	V
	BC848W		–	30	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	5	V
I <sub>C</sub>	collector current (DC)		–	100	mA
I <sub>CM</sub>	peak collector current		–	200	mA
I <sub>BM</sub>	peak base current		–	200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	–	200	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

**Note**

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

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-a</sub>	thermal resistance from junction to ambient	note 1	625	K/W

**Note**

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

## NPN general purpose transistors

## BC846W; BC847W; BC848W

**CHARACTERISTICS**

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

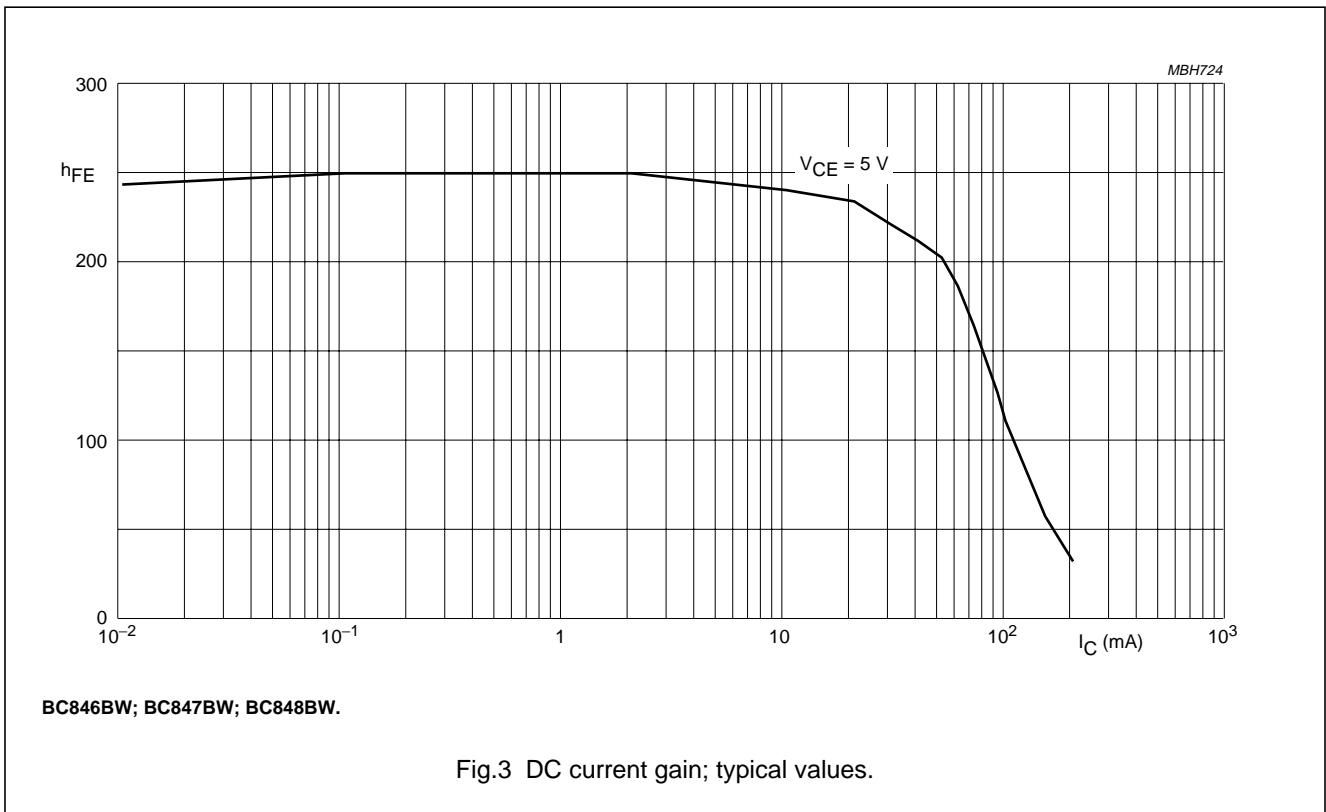
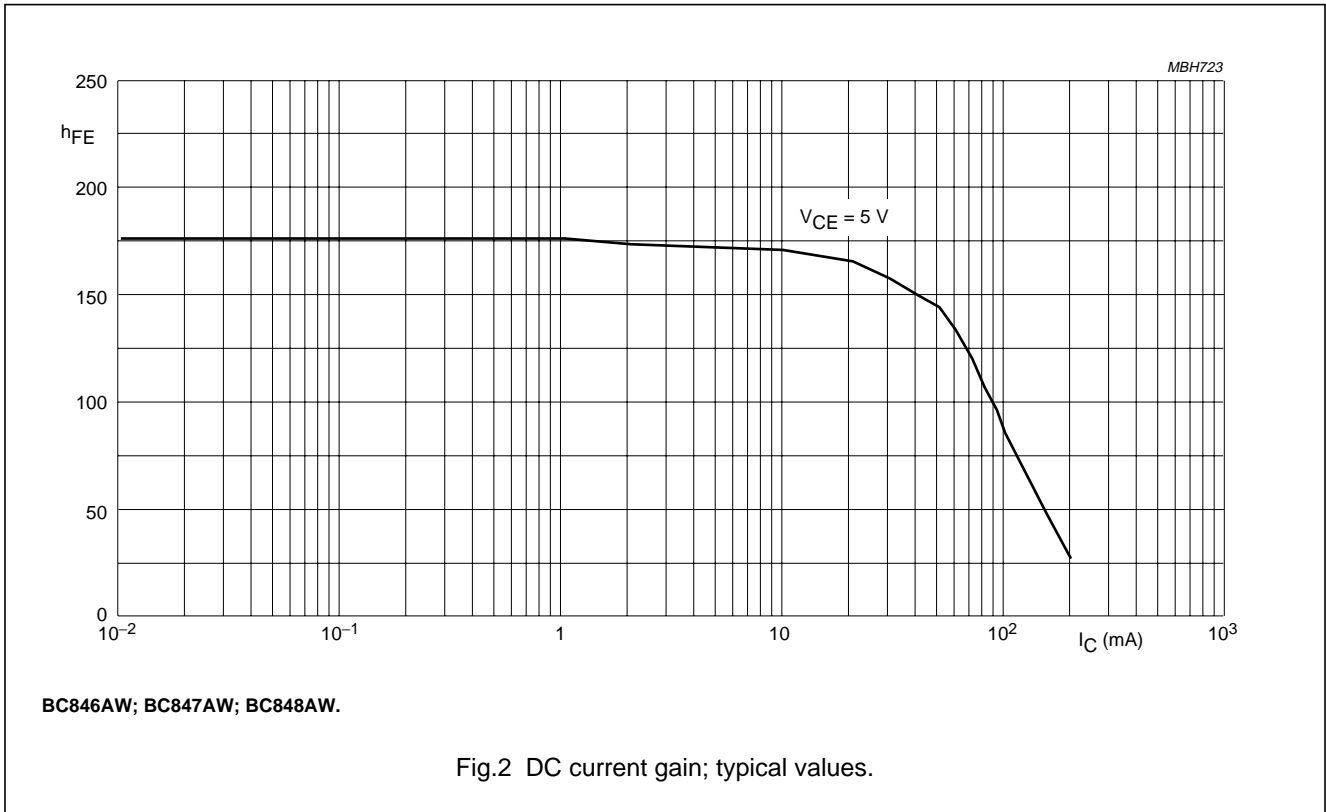
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 30\text{ V}$	–	–	15	nA
		$I_E = 0; V_{CB} = 30\text{ V}; T_j = 150\text{ °C}$	–	–	5	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	100	nA
$h_{FE}$	DC current gain BC846W BC847W; BC848W BC846AW; BC847AW; BC848AW BC846BW; BC847BW; BC848BW BC847CW; BC848CW	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V};$ see Figs 2, 3 and 4	110	–	450	
			110	–	800	
			110	–	220	
			200	–	450	
			420	–	800	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	–	250	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA};$ note 1	–	–	600	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	700	–	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	–	900	–	mV
$V_{BE}$	base-emitter voltage	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	580	–	700	mV
		$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	–	–	770	mV
$C_C$	collector capacitance	$I_E = I_B = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	3	pF
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	–	MHz
F	noise figure	$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	–	–	10	dB

**Note**

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

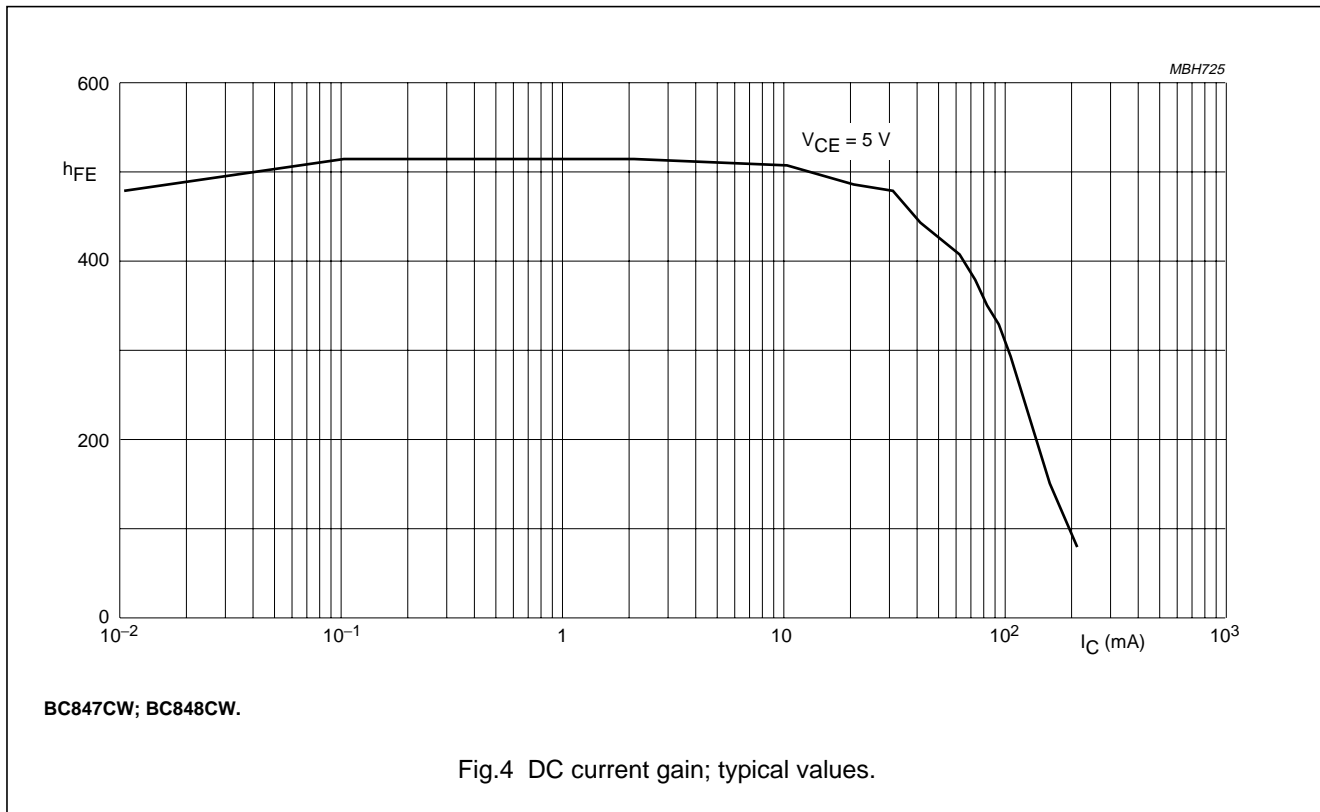
# NPN general purpose transistors

# BC846W; BC847W; BC848W



NPN general purpose transistors

BC846W; BC847W; BC848W



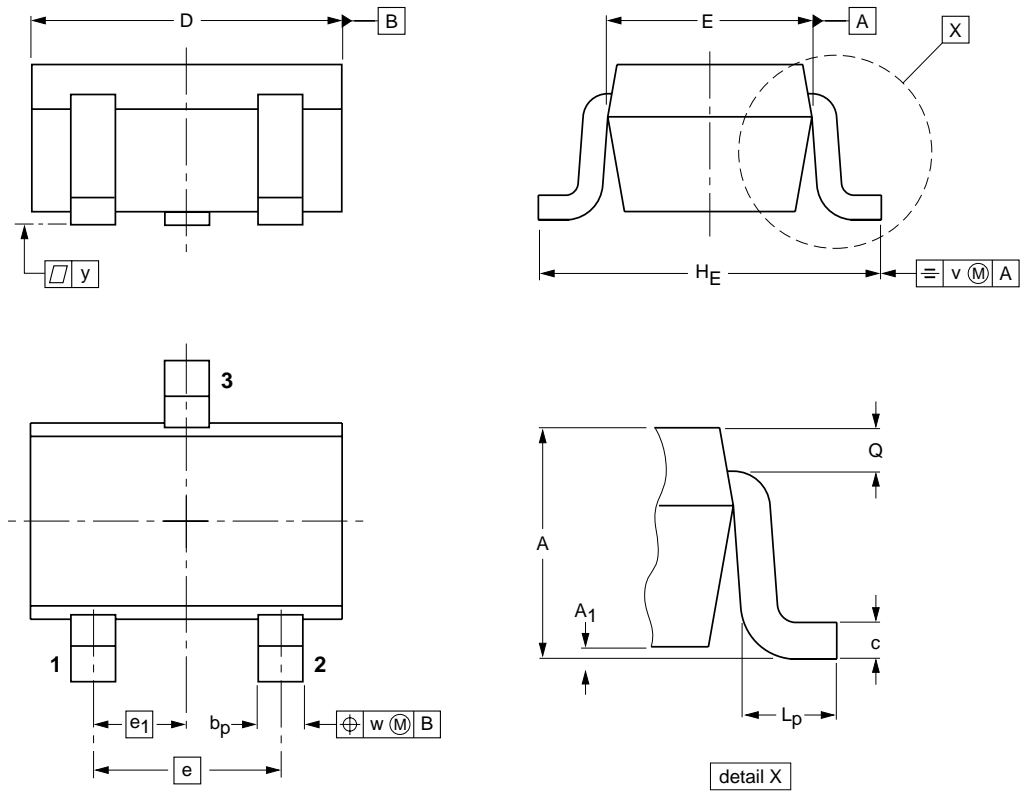
NPN general purpose transistors

BC846W; BC847W; BC848W

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT323			SC-70			97-02-28

## NPN general purpose transistors

BC846W; BC847W; BC848W

**DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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NPN general purpose transistors

BC846W; BC847W; BC848W

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**NOTES**

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NPN general purpose transistors

BC846W; BC847W; BC848W

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**NOTES**

NPN general purpose transistors

BC846W; BC847W; BC848W

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**NOTES**

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