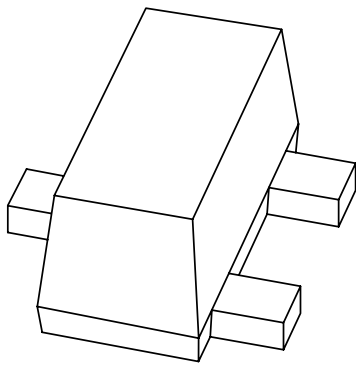


# DATA SHEET



## **BC846F; BC847F; BC848F series** NPN general purpose transistors

Preliminary specification  
Supersedes data of 1998 Nov 10

1999 May 18

**NPN general purpose transistors**

**BC846F; BC847F; BC848F series**

**FEATURES**

- Power dissipation comparable to SOT23
- Low current (max. 100 mA)
- Low voltage (max. 65 V).

**APPLICATIONS**

- General purpose switching and amplification, especially in portable equipment.

**DESCRIPTION**

NPN transistor encapsulated in an ultra small SC-89 (SOT490) plastic SMD package.  
 PNP complements: BC856F, BC857F and BC858F series.

**MARKING**

TYPE NUMBER	MARKING CODE	TYPE NUMBER	MARKING CODE
BC846AF	1A	BC847CF	1G
BC846BF	1B	BC848AF	1J
BC847AF	1E	BC848BF	1K
BC847BF	1F	BC848CF	1L

**PINNING**

PIN	DESCRIPTION
1	base
2	emitter
3	collector

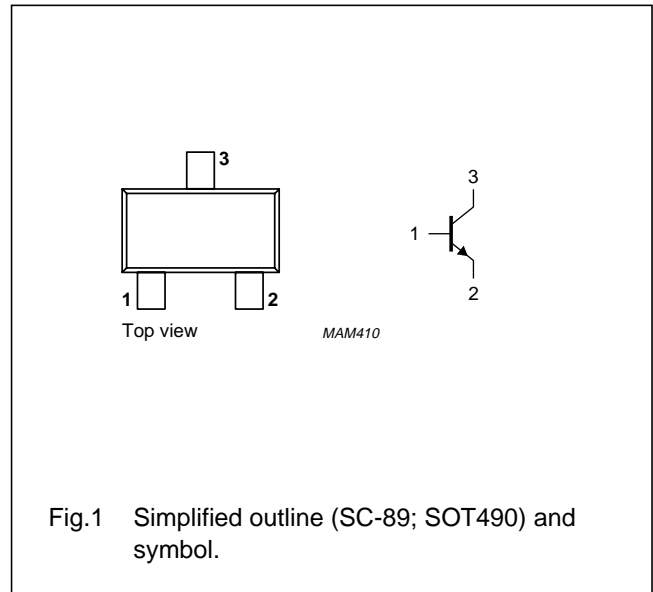


Fig.1 Simplified outline (SC-89; SOT490) and symbol.

## NPN general purpose transistors

## BC846F; BC847F; BC848F series

**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			
	BC846AF; BC846BF		–	80	V
	BC847AF; BC847BF; BC847CF		–	50	V
	BC848AF; BC848BF; BC848CF		–	30	V
$V_{CEO}$	collector-emitter voltage	open base			
	BC846AF; BC846BF		–	65	V
	BC847AF; BC847BF; BC847CF		–	45	V
	BC848AF; BC848BF; BC848CF		–	30	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	100	mA
$I_{CM}$	peak collector current		–	200	mA
$I_{BM}$	peak base current		–	100	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.

## NPN general purpose transistors

## BC846F; BC847F; BC848F series

## 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.

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	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 BC846AF; BC847AF; BC848AF BC846BF; BC847BF; BC848BF BC847CF; BC848CF	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	110 200 420	220 450 800	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	200	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA};$ note 1	–	400	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	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	1.5	pF
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	MHz
F	noise figure	$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	–	10	dB

## Note

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

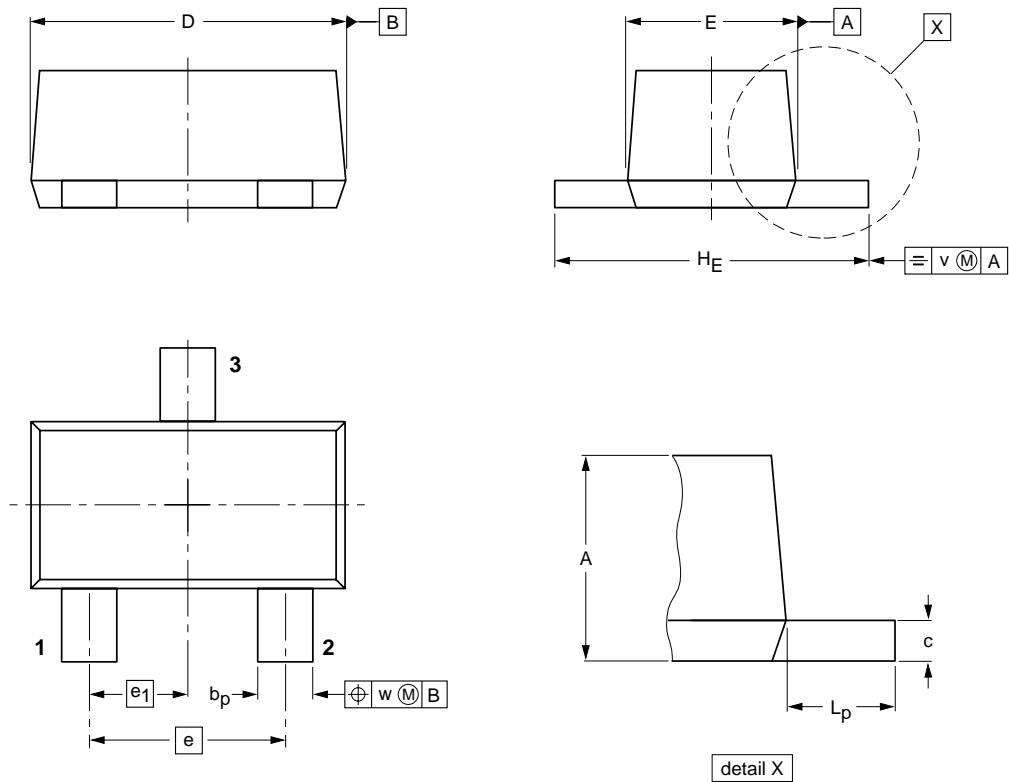
NPN general purpose transistors

BC846F; BC847F; BC848F series

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT490



DIMENSIONS (mm are the original dimensions)

UNIT	A	$b_p$	c	D	E	e	$e_1$	$H_E$	$L_p$	v	w
mm	0.8 0.6	0.33 0.23	0.2 0.1	1.7 1.5	0.95 0.75	1.0	0.5	1.7 1.5	0.5 0.3	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT490			SC-89			98-10-23

## NPN general purpose transistors

## BC846F; BC847F; BC848F series

**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

BC846F; BC847F; BC848F series

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