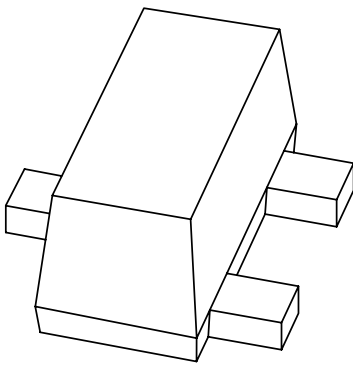


# DATA SHEET



## **BC847F series** NPN general purpose transistors

Product specification  
Supersedes data of 2000 Oct 23

2000 Dec 04

NPN general purpose transistors

BC847F series

FEATURES

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

APPLICATIONS

- General purpose switching and amplification especially in portable equipment.

DESCRIPTION

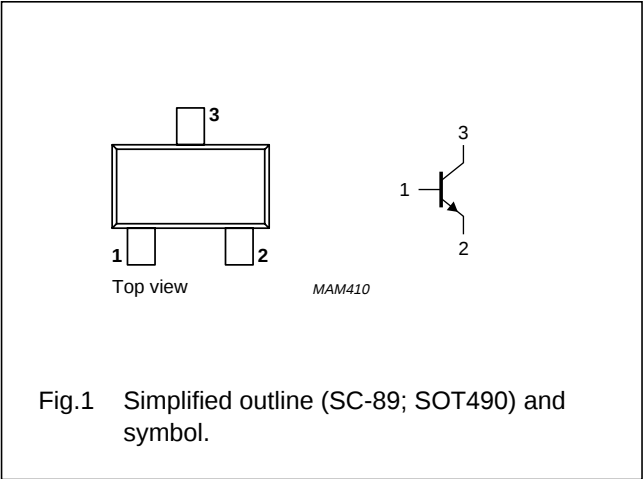
NPN general purpose transistor in an SC-89 (SOT490) plastic package.  
PNP complement: BC857F series.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| BC847AF     | 1E           |
| BC847BF     | 1F           |
| BC847CF     | 1G           |

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | base        |
| 2   | emitter     |
| 3   | collector   |



LIMITING VALUES

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

| SYMBOL           | PARAMETER                     | CONDITIONS                       | MIN. | MAX. | UNIT |
|------------------|-------------------------------|----------------------------------|------|------|------|
| V <sub>CBO</sub> | collector-base voltage        | open emitter                     | –    | 50   | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                        | –    | 45   | 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             |                                  | –    | 100  | mA   |
| P <sub>tot</sub> | total power dissipation       | T <sub>amb</sub> ≤ 25 °C; note 1 | –    | 250  | 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.

## NPN general purpose transistors

## BC847F 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-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    | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current                     | $V_{EB} = 5\text{ V}; I_C = 0$                                                                                             | –    | 100  | nA            |
| $h_{FE}$    | DC current gain<br>BC847AF<br>BC847BF<br>BC847CF | $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$                                                                                   |      |      |               |
|             |                                                  |                                                                                                                            | 110  | 220  |               |
|             |                                                  |                                                                                                                            | 200  | 450  |               |
|             |                                                  |                                                                                                                            | 420  | 800  |               |
| $V_{BE}$    | 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            |
| $V_{CEsat}$ | collector-emitter saturation voltage             | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$                                                                                  | –    | 200  | mV            |
|             |                                                  | $I_C = 100\text{ mA}; I_B = 5\text{ mA}; \text{note 1}$                                                                    | –    | 400  | mV            |
| $C_c$       | collector capacitance                            | $V_{CB} = 10\text{ V}; I_E = I_e = 0;$<br>$f = 1\text{ MHz}$                                                               | –    | 1.5  | pF            |
| $f_T$       | transition frequency                             | $V_{CE} = 5\text{ V}; I_C = 10\text{ mA};$<br>$f = 100\text{ MHz}$                                                         | 100  | –    | MHz           |
| F           | noise figure                                     | $I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V};$<br>$R_S = 2\text{ k}\Omega; f = 1\text{ kHz};$<br>$B = 200\text{ Hz}$ | –    | 10   | dB            |

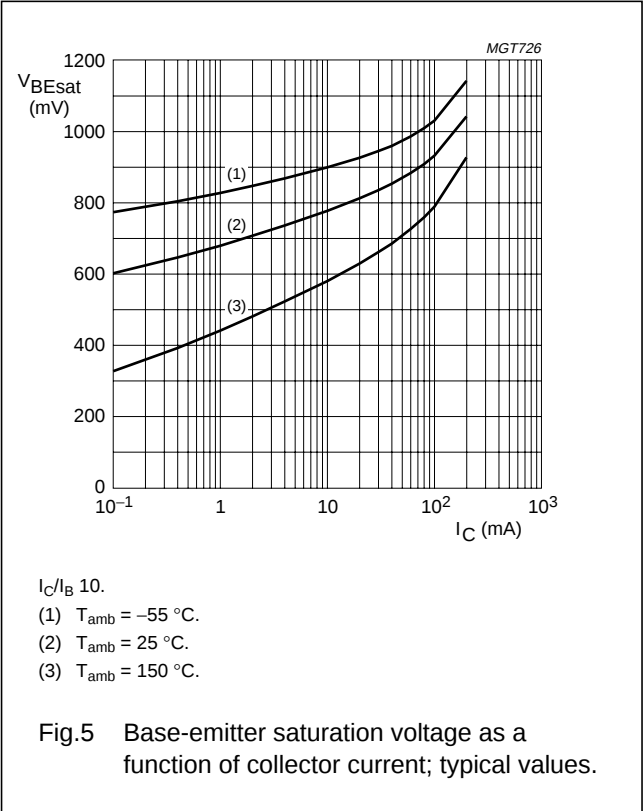
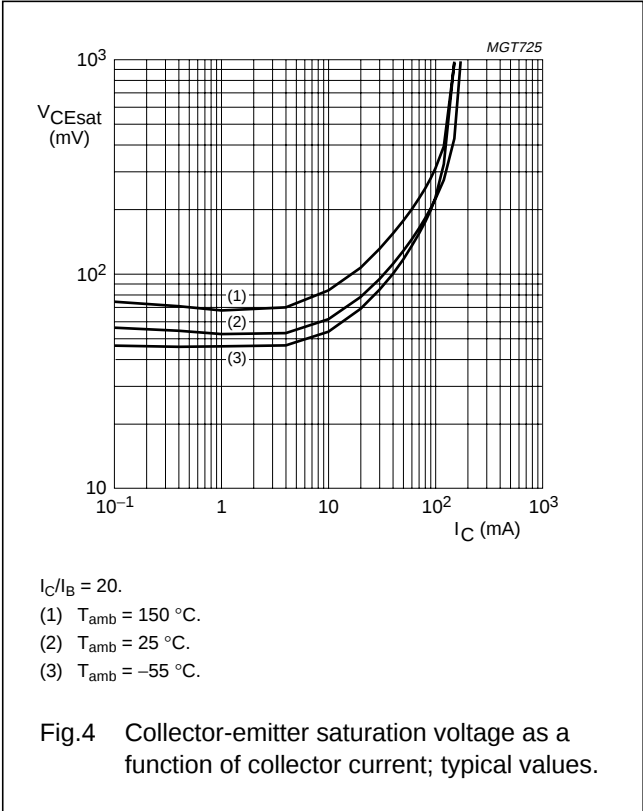
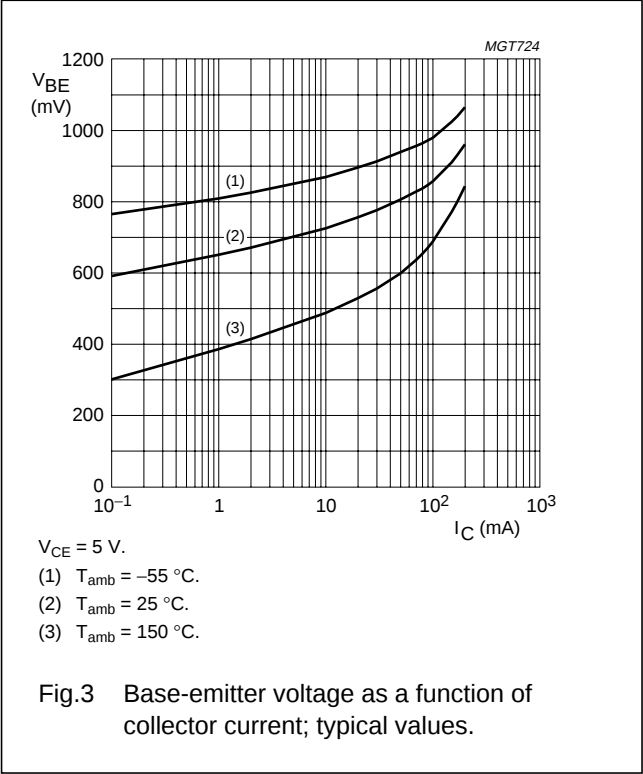
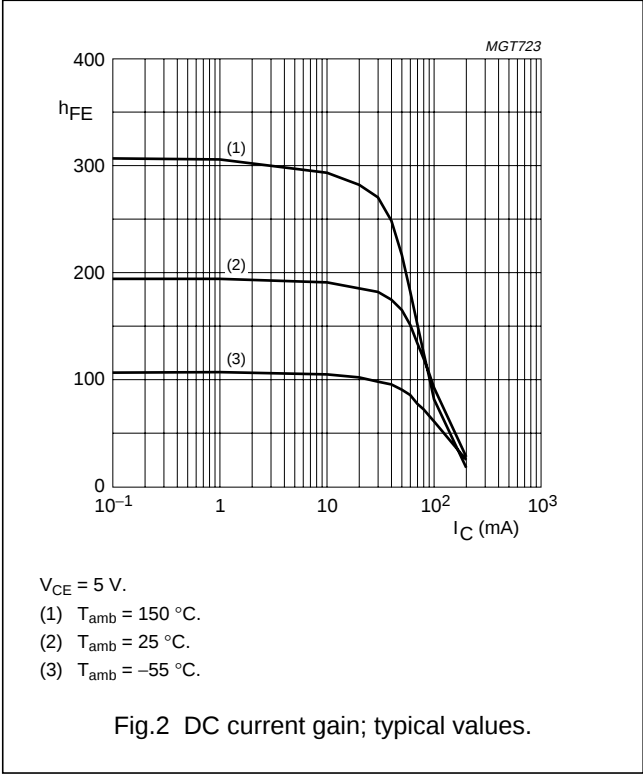
## Note

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

NPN general purpose transistors

BC847F series

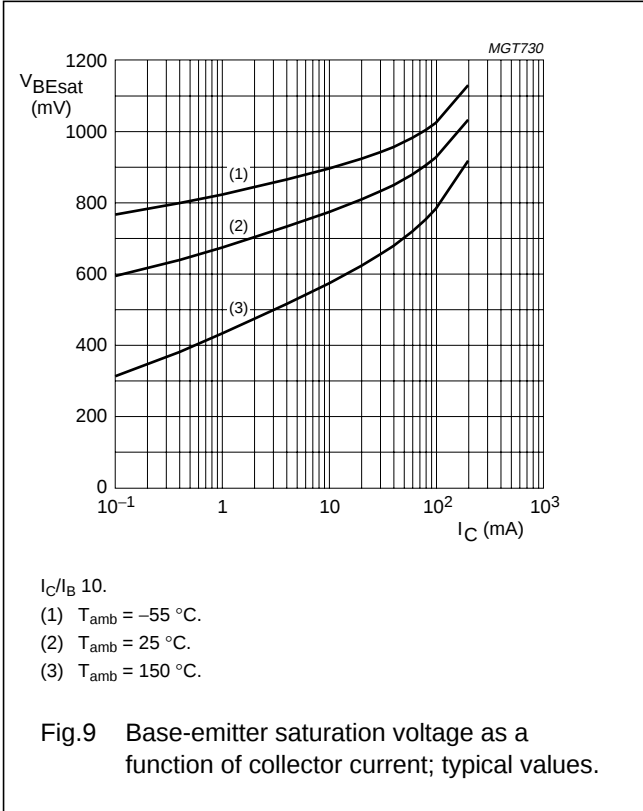
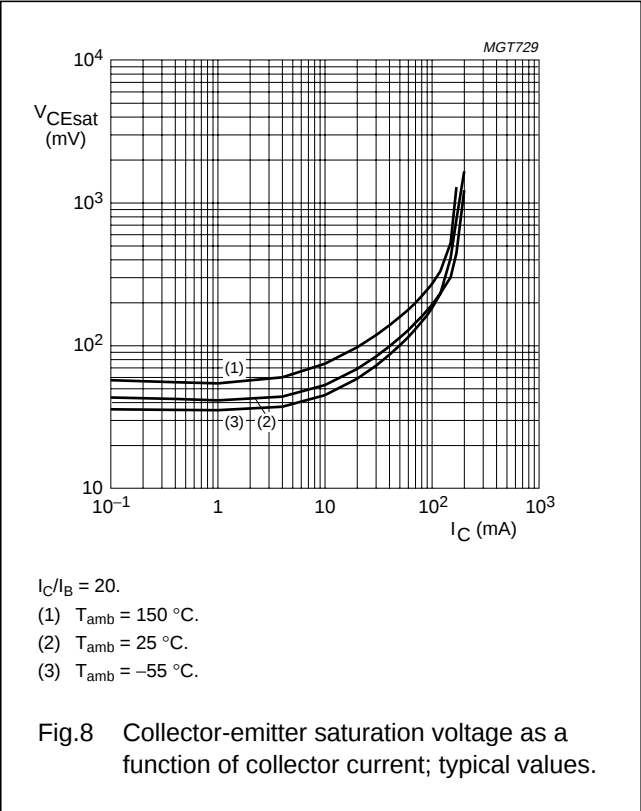
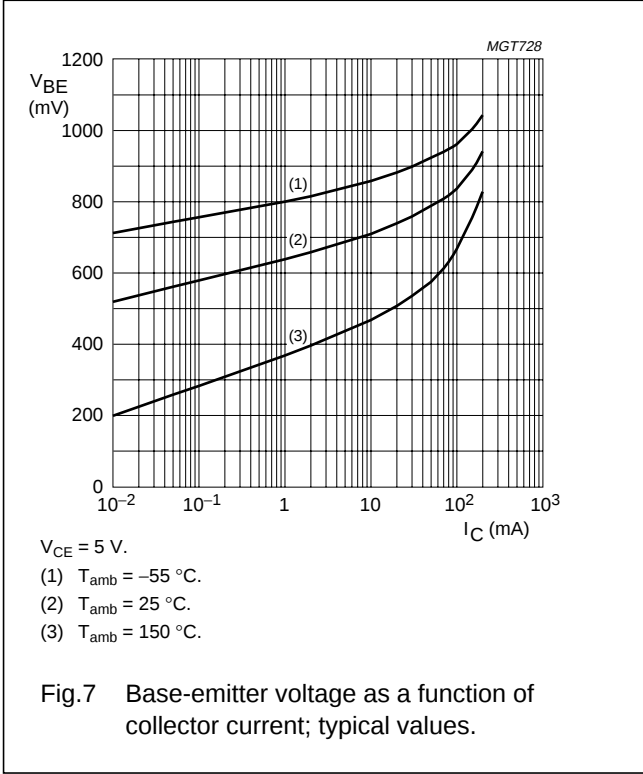
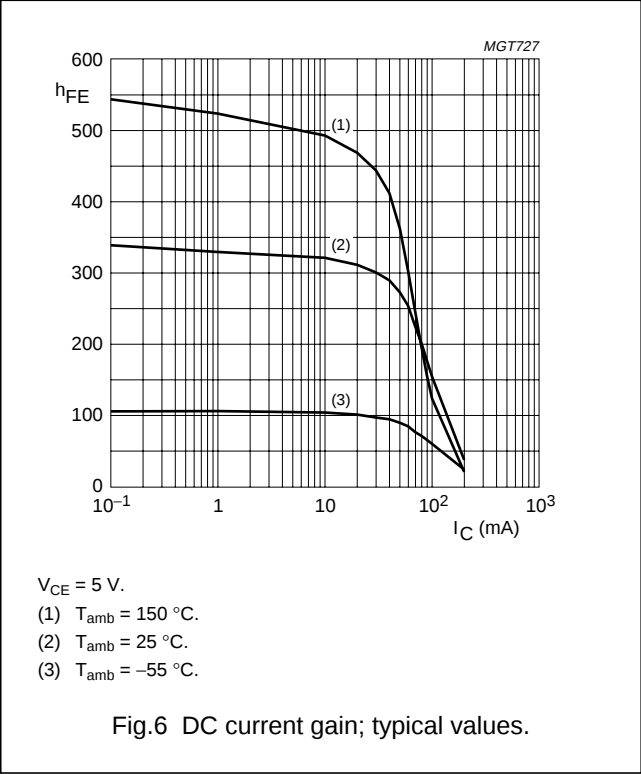
GRAPHICAL INFORMATION BC847AF



NPN general purpose transistors

BC847F series

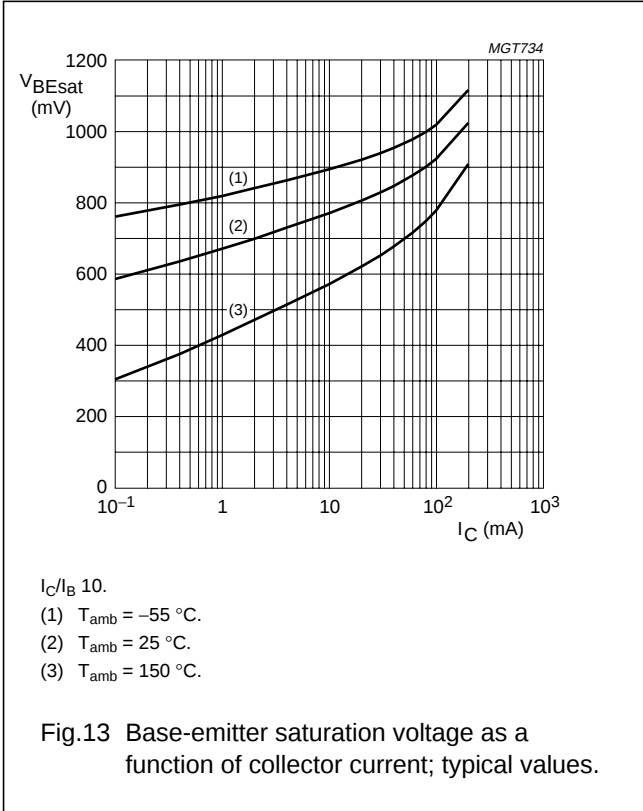
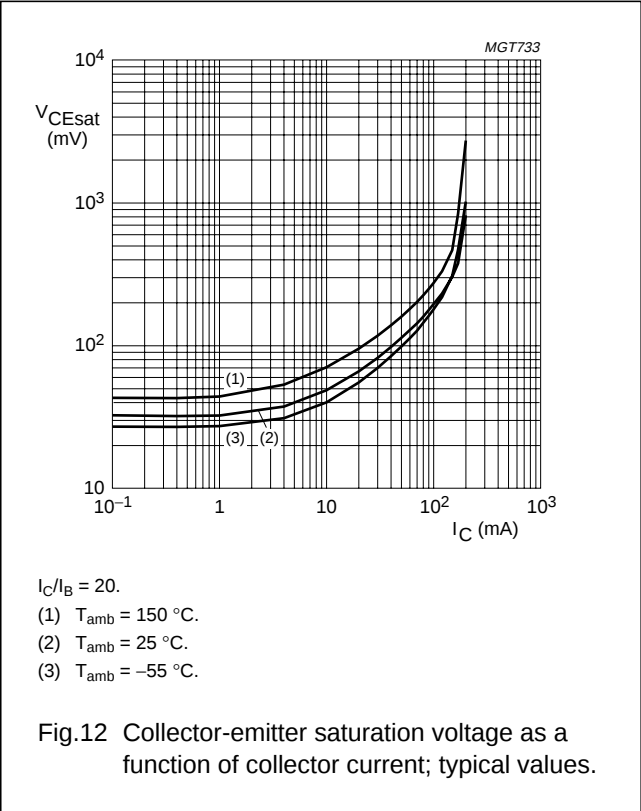
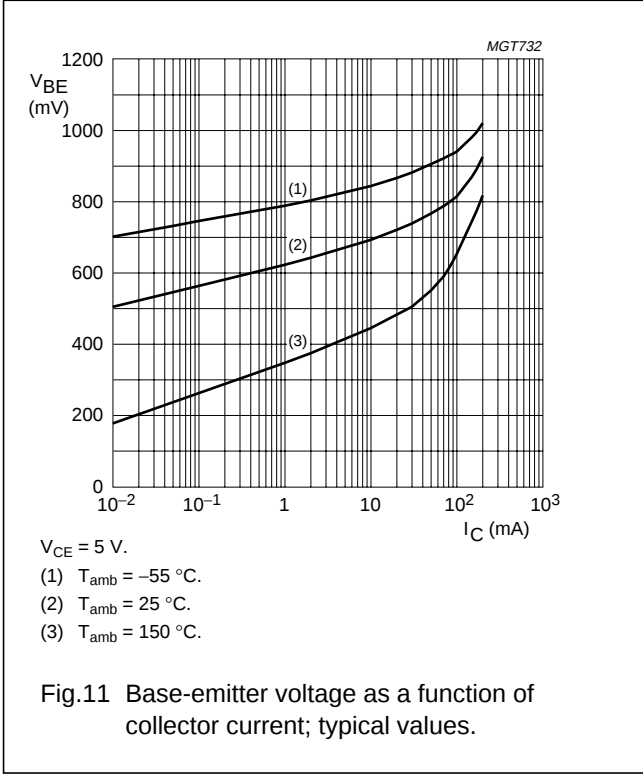
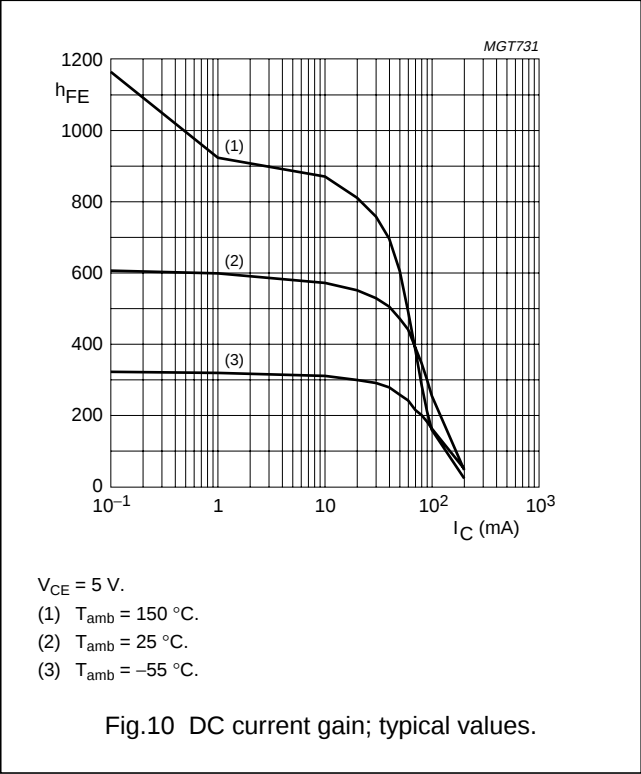
GRAPHICAL INFORMATION BC847BF



NPN general purpose transistors

BC847F series

GRAPHICAL INFORMATION BC847CF



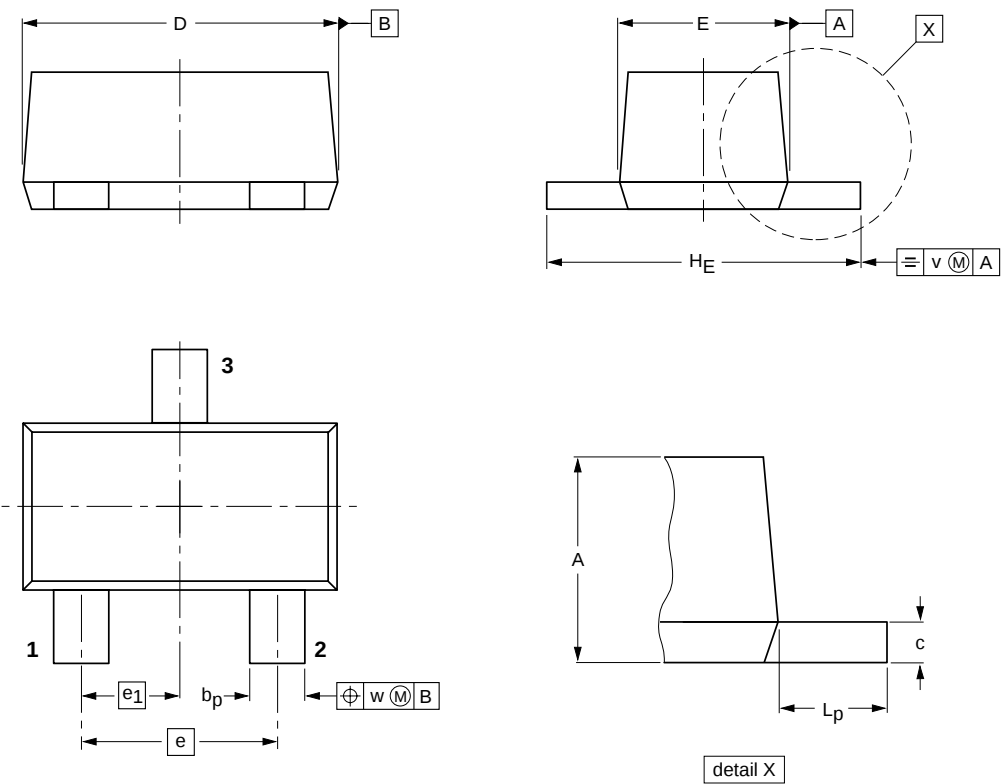
NPN general purpose transistors

BC847F series

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT490



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b <sub>p</sub> | c          | D          | E            | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | v   | w   |
|------|------------|----------------|------------|------------|--------------|-----|----------------|----------------|----------------|-----|-----|
| mm   | 0.8<br>0.6 | 0.33<br>0.23   | 0.2<br>0.1 | 1.7<br>1.5 | 0.95<br>0.75 | 1.0 | 0.5            | 1.7<br>1.5     | 0.5<br>0.3     | 0.1 | 0.1 |

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

## NPN general purpose transistors

## BC847F series

## DATA SHEET STATUS

| DATA SHEET STATUS         | PRODUCT STATUS | DEFINITIONS <sup>(1)</sup>                                                                                                                                                                                                                                 |
|---------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective specification   | Development    | This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.                                                                                                          |
| Preliminary specification | Qualification  | This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |
| Product specification     | Production     | This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.                                                       |

## Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

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**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**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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NPN general purpose transistors

BC847F series

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**NOTES**

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