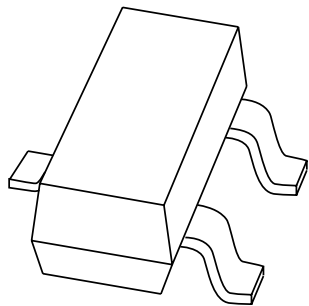


# DATA SHEET



## **BC846; BC847; BC848** NPN general purpose transistors

Product specification  
Supersedes data of 1999 Apr 23

2002 Feb 04

## 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

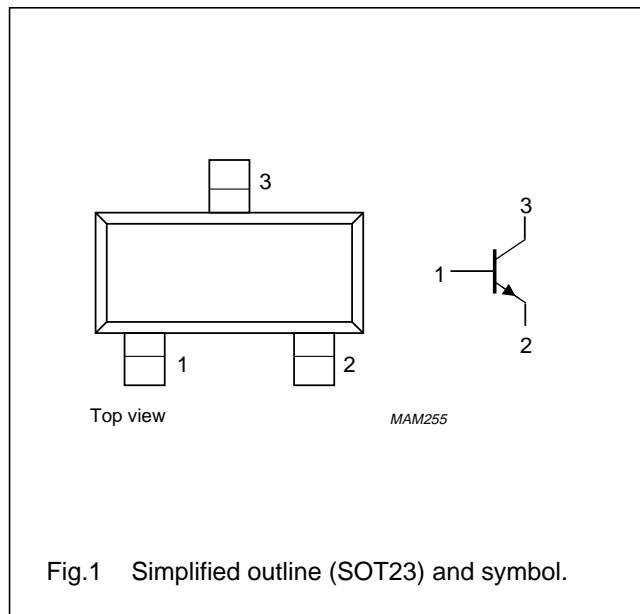
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| BC846       | 1D*                         |
| BC846A      | 1A*                         |
| BC846B      | 1B*                         |
| BC847       | 1H*                         |
| BC847A      | 1E*     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

### Note

- \* = p: made in Hong Kong.  
 \* = t: made in Malaysia.

### PINNING

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



## NPN general purpose transistors

## BC846; BC847; BC848

**LIMITING VALUES**

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

| SYMBOL           | PARAMETER                     | CONDITIONS                       | MIN. | MAX. | UNIT |
|------------------|-------------------------------|----------------------------------|------|------|------|
| V <sub>CBO</sub> | collector-base voltage        | open emitter                     |      |      |      |
|                  | BC846                         |                                  | –    | 80   | V    |
|                  | BC847                         |                                  | –    | 50   | V    |
|                  | BC848                         | –                                | 30   | V    |      |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                        |      |      |      |
|                  | BC846                         |                                  | –    | 65   | V    |
|                  | BC847                         |                                  | –    | 45   | V    |
|                  | BC848                         | –                                | 30   | V    |      |
| V <sub>EBO</sub> | emitter-base voltage          | open collector                   |      |      |      |
|                  | BC846; BC847                  |                                  | –    | 6    | V    |
|                  | BC848                         | –                                | 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 | –    | 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, standard footprint.

**THERMAL CHARACTERISTICS**

| SYMBOL              | PARAMETER                                   | CONDITIONS          | VALUE | UNIT |
|---------------------|---|---------------------|-------|------|
| R <sub>th j-a</sub> | 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

## BC846; BC847; BC848

## CHARACTERISTICS

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

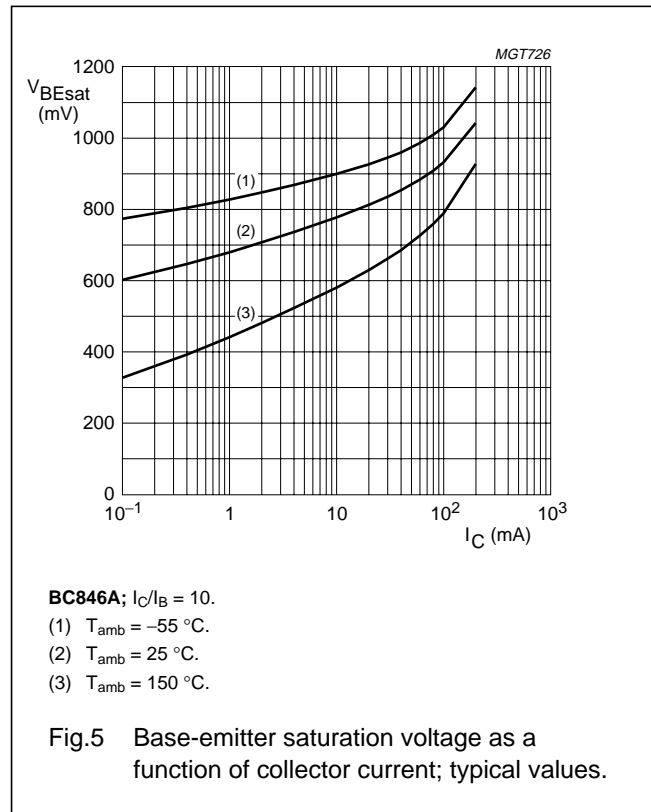
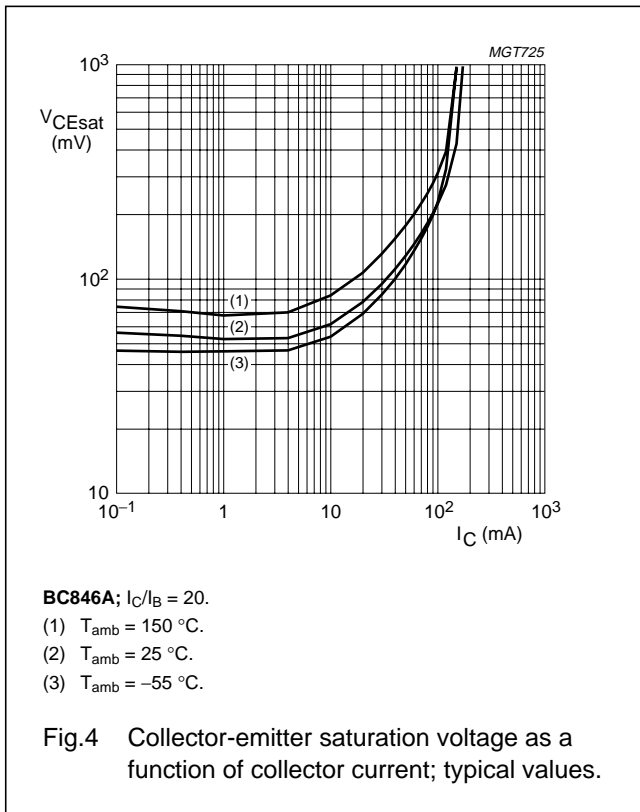
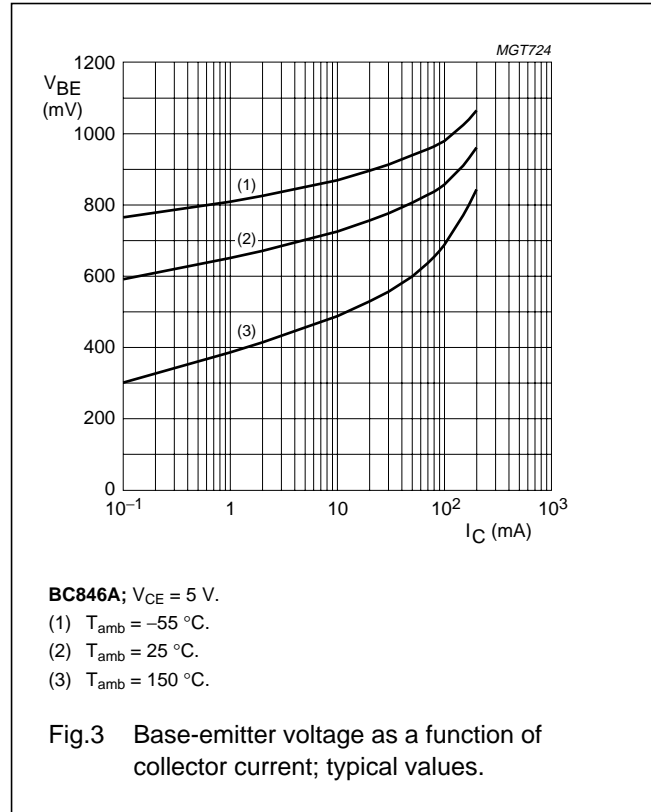
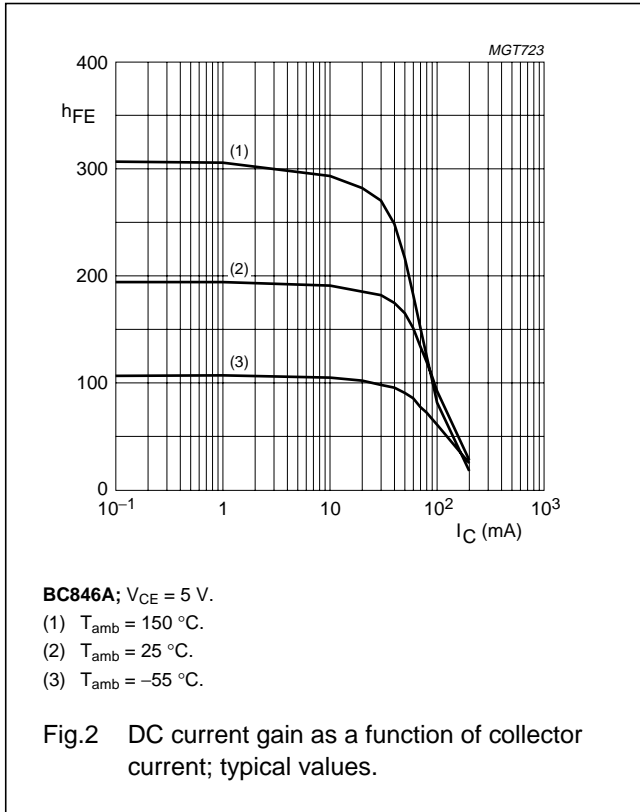
| SYMBOL      | PARAMETER                            | CONDITIONS   | MIN. | TYP. | MAX. | UNIT          |
|-------------|--------------------------------------|--|------|------|------|---------------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = 30\text{ V}; I_E = 0$  | –    | –    | 15   | nA            |
|             |                                      | $V_{CB} = 30\text{ V}; I_E = 0;$<br>$T_J = 150\text{ °C}$  | –    | –    | 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                      | $I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$   | –    | 90   | –    |               |
|             | BC846A; BC847A                       |  |      |      |      |               |
|             | BC846B; BC847B; BC848B               |  | –    | 150  | –    |               |
|             | BC847C                               |  |      |      |      |               |
|             | DC current gain                      | $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$   | 110  | –    | 450  |               |
|             | BC846                                |  |      |      |      |               |
|             | BC847                                |  |      |      |      |               |
|             | BC846A; BC847A                       |  |      |      |      |               |
|             | BC846B; BC847B; BC848B               |  |      |      |      |               |
|             | BC847C                               |  |      |      |      |               |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$  | –    | 90   | 250  | mV            |
|             |                                      | $I_C = 100\text{ mA}; I_B = 5\text{ mA};$<br>note 1  | –    | 200  | 600  | mV            |
| $V_{BEsat}$ | base-emitter saturation voltage      | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$  | –    | 700  | –    | mV            |
|             |                                      | $I_C = 100\text{ mA}; I_B = 5\text{ mA};$<br>note 1  | –    | 900  | –    | mV            |
| $V_{BE}$    | base-emitter voltage                 | $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$   | 580  | 660  | 700  | mV            |
|             |                                      | $I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$  | –    | –    | 770  | mV            |
| $C_c$       | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = I_e = 0;$<br>$f = 1\text{ MHz}$   | –    | 2.5  | –    | 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>$B = 200\text{ Hz}$ | –    | 2    | 10   | dB            |

## Note

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

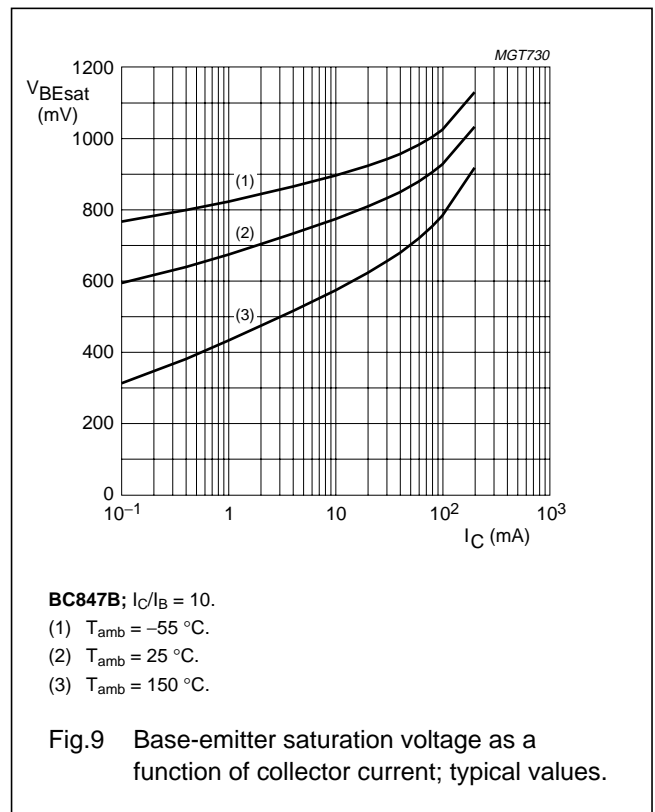
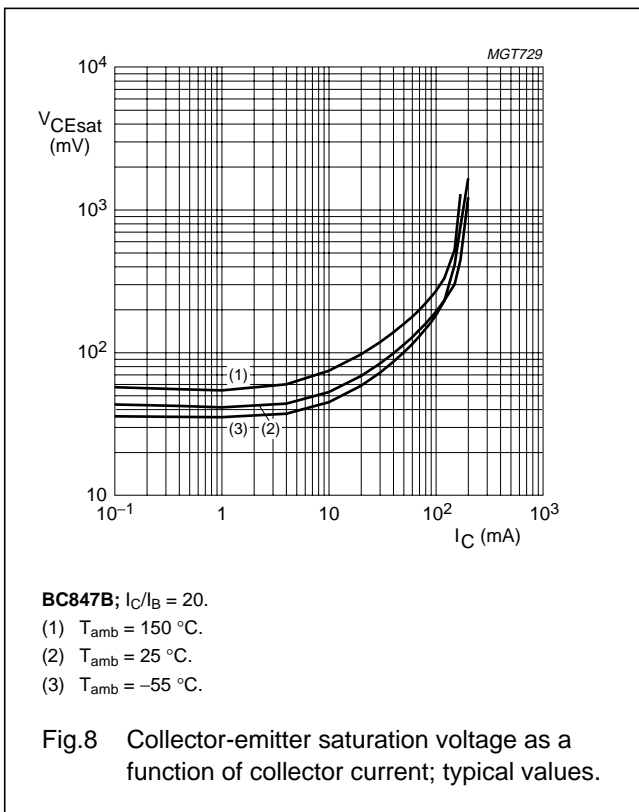
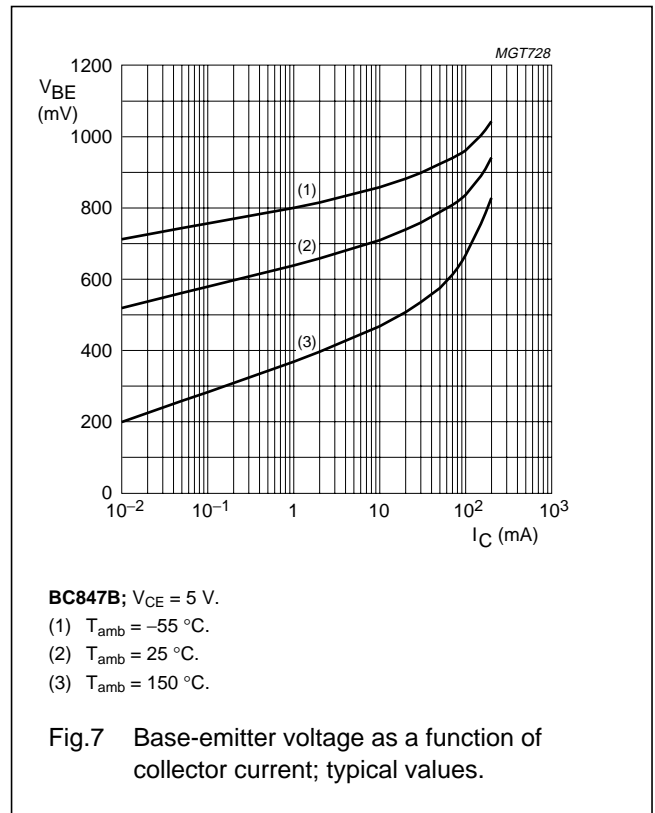
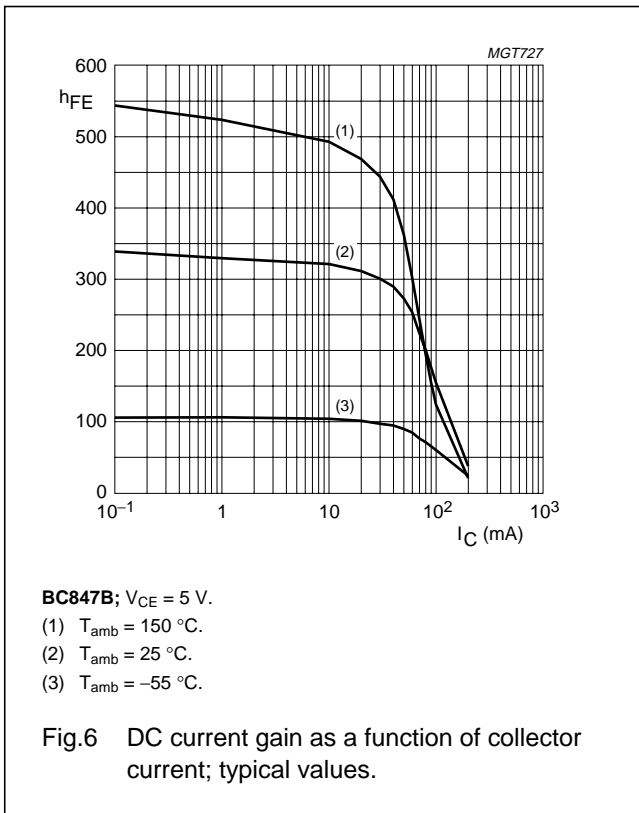
NPN general purpose transistors

BC846; BC847; BC848



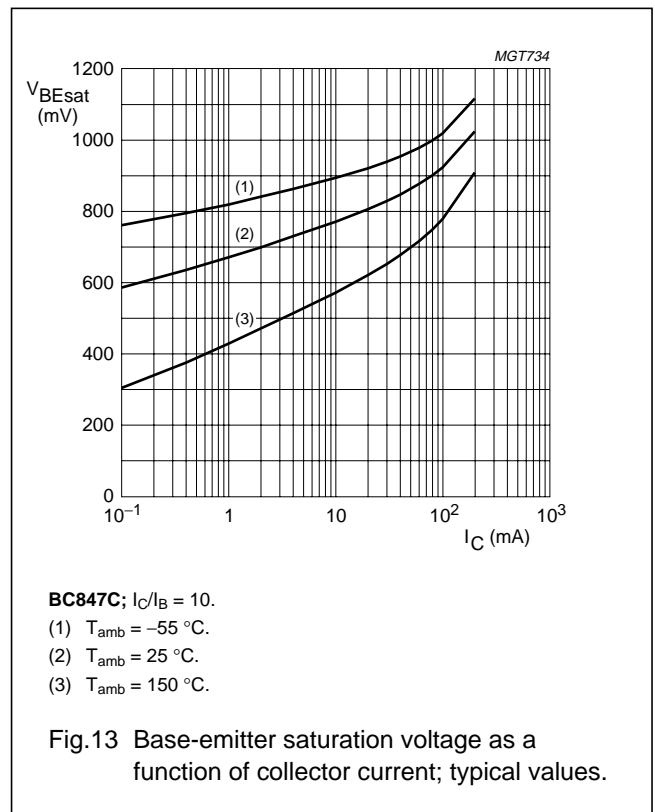
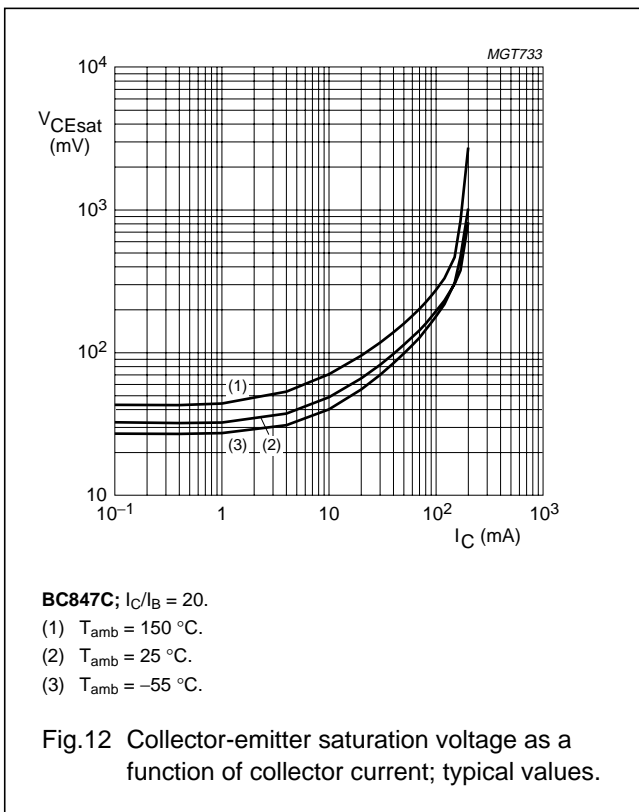
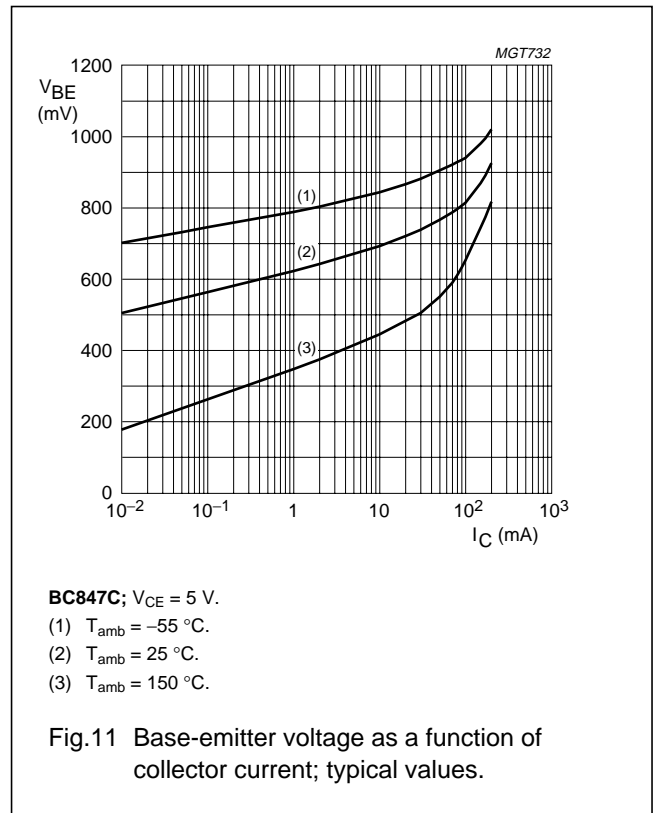
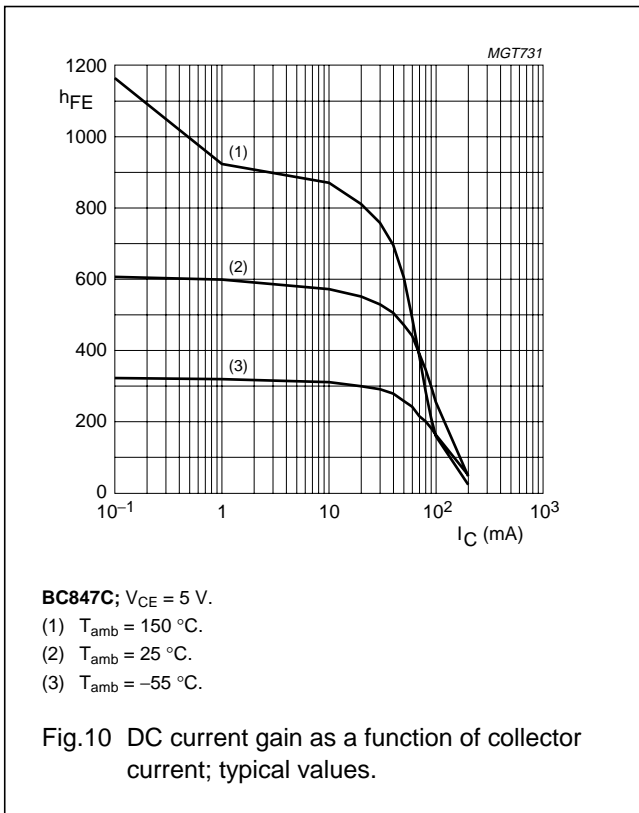
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NPN general purpose transistors

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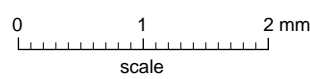
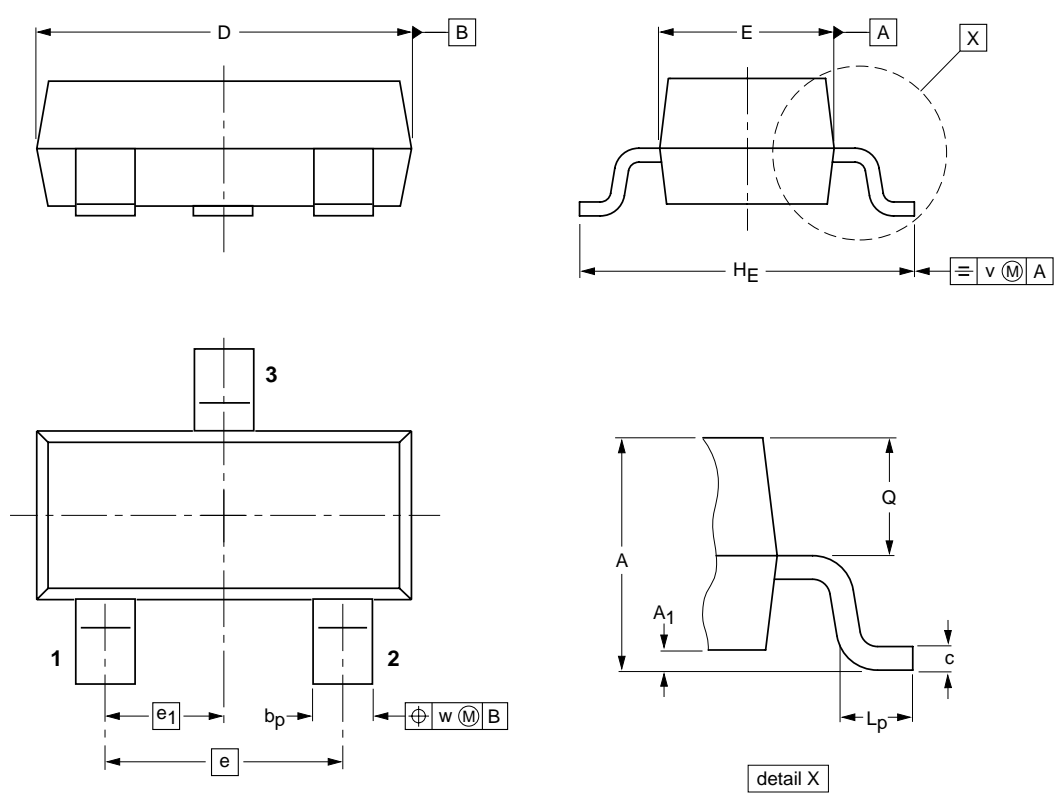
NPN general purpose transistors

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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>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<br>0.9 | 0.1                    | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES |          |      |  | EUROPEAN PROJECTION | ISSUE DATE            |
|-----------------|------------|----------|------|--|---------------------|-----------------------|
|                 | IEC        | JEDEC    | EIAJ |  |                     |                       |
| SOT23           |            | TO-236AB |      |  |                     | 97-02-28-<br>99-09-13 |



## NPN general purpose transistors

BC846; BC847; BC848

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|----------------------------------|-------------------------------|--|
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NPN general purpose transistors

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**NOTES**

NPN general purpose transistors

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**NOTES**

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