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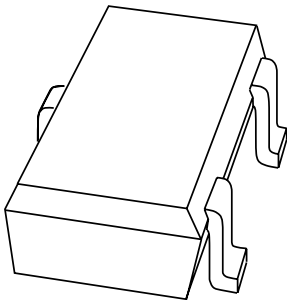
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Kind regards,

Team Nexperia

# DATA SHEET



## **BC856W; BC857W; BC858W** PNP general purpose transistors

Product data sheet  
Supersedes data of 1999 Apr 12

2002 Feb 04

# PNP general purpose transistors

**BC856W; BC857W;  
BC858W**

## FEATURES

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

## APPLICATIONS

- General purpose switching and amplification.

## DESCRIPTION

PNP transistor in a SOT323 plastic package.  
NPN complements: BC846W, BC847W and BC848W.

## MARKING

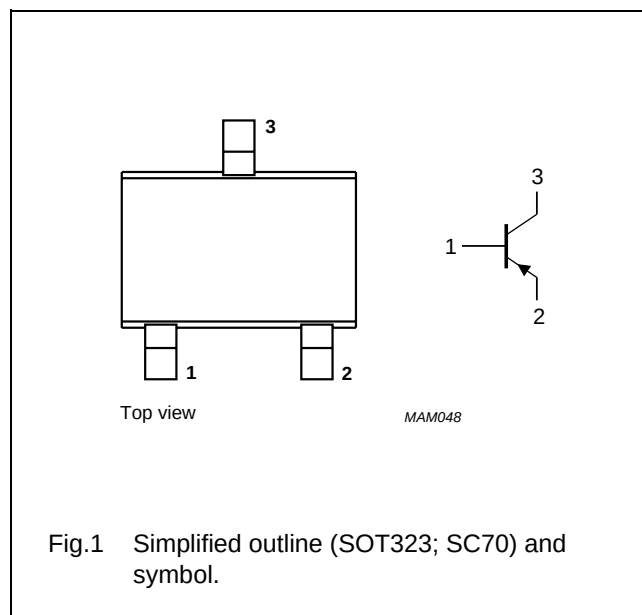
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| BC856W      | 3D*                         |
| BC856AW     | 3A*                         |
| BC856BW     | 3B*                         |
| BC857W      | 3H*                         |
| BC857AW     | 3E*                         |
| BC857BW     | 3F*                         |
| BC857CW     | 3G*                         |
| BC858W      | 3M*                         |

## Note

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

## PINNING

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



## PNP general purpose transistors

## BC856W; BC857W; BC858W

**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                     |      |      |      |
|                  | BC856W                        |                                  | –    | –80  | V    |
|                  | BC857W                        |                                  | –    | –50  | V    |
|                  | BC858W                        |                                  | –    | –30  | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                        |      |      |      |
|                  | BC856W                        |                                  | –    | –65  | V    |
|                  | BC857W                        |                                  | –    | –45  | V    |
|                  | BC858W                        |                                  | –    | –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. Refer to SOT323 standard mounting conditions.

**THERMAL CHARACTERISTICS**

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

**Note**

1. Refer to SOT323 standard mounting conditions.

## PNP general purpose transistors

## BC856W; BC857W; BC858W

## CHARACTERISTICS

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

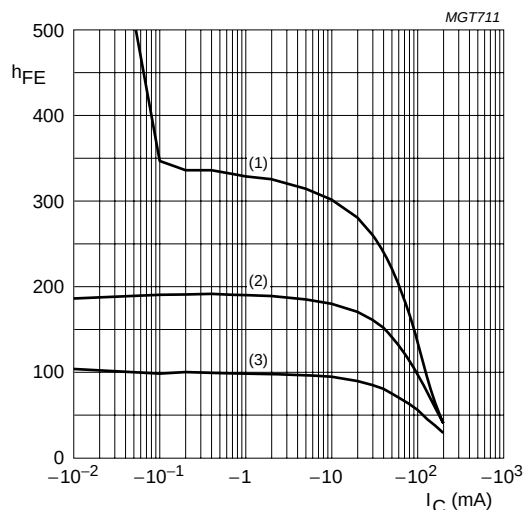
| SYMBOL      | PARAMETER                            | CONDITIONS                                                                                                                     | MIN. | TYP. | MAX. | UNIT          |
|-------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $I_{CBO}$   | collector-base cut-off current       | $V_{CB} = -30\text{ V}; I_E = 0$                                                                                               | –    | –1   | –15  | nA            |
|             |                                      | $V_{CB} = -30\text{ V}; I_E = 0$ ;<br>$T_j = 150\text{ }^{\circ}\text{C}$                                                      | –    | –    | –4   | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = -5\text{ V}; I_C = 0$                                                                                                | –    | –    | –100 | nA            |
| $h_{FE}$    | DC current gain                      | $I_C = -2\text{ mA}; V_{CE} = -5\text{ V}$                                                                                     |      |      |      |               |
|             | BC856W                               |                                                                                                                                | 125  | –    | 475  |               |
|             | BC857W; BC858W                       |                                                                                                                                | 125  | –    | 800  |               |
|             | BC856AW; BC857AW                     |                                                                                                                                | 125  | –    | 250  |               |
|             | BC856BW; BC857BW                     |                                                                                                                                | 220  | –    | 475  |               |
|             | BC857CW                              |                                                                                                                                | 420  | –    | 800  |               |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$                                                                                    | –    | –75  | –300 | mV            |
|             |                                      | $I_C = -100\text{ mA}; I_B = -5\text{ mA}$ ;<br>note 1                                                                         | –    | –250 | –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                                                                         | –    | –850 | –    | mV            |
| $V_{BE}$    | base-emitter voltage                 | $I_C = -2\text{ mA}; V_{CE} = -5\text{ V}$                                                                                     | –600 | –650 | –750 | mV            |
|             |                                      | $I_C = -10\text{ mA}; V_{CE} = -5\text{ V}$                                                                                    | –    | –    | –820 | mV            |
| $C_c$       | collector capacitance                | $V_{CB} = -10\text{ V}; I_E = I_c = 0$ ;<br>$f = 1\text{ MHz}$                                                                 | –    | –    | 3    | pF            |
| $C_e$       | emitter capacitance                  | $V_{EB} = -0.5\text{ V}; I_C = I_c = 0$ ;<br>$f = 1\text{ MHz}$                                                                | –    | –    | 12   | 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:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

## PNP general purpose transistors

## BC856W; BC857W; BC858W



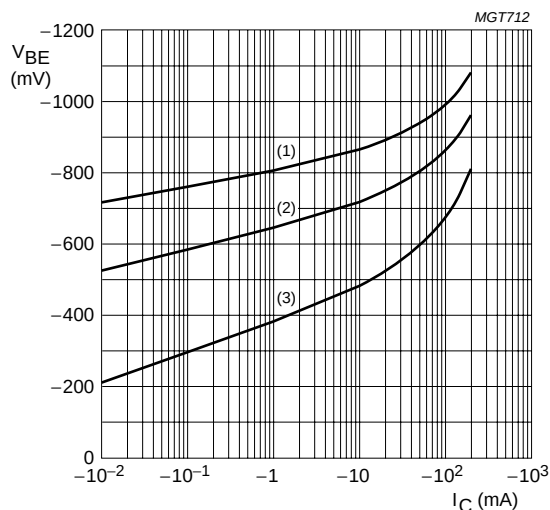
**BC857AW;**  $V_{CE} = -5$  V.

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.2 DC current gain as a function of collector current; typical values.



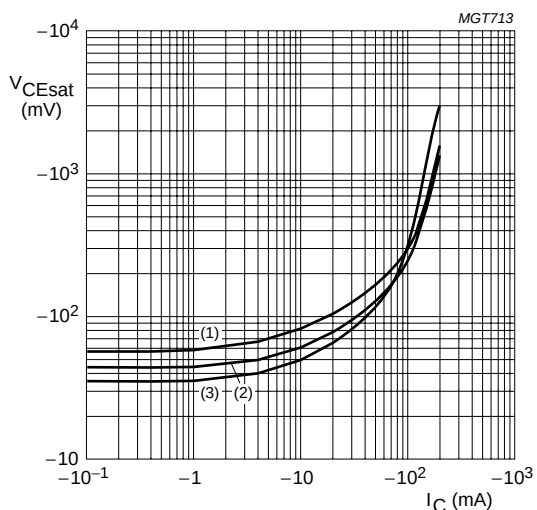
**BC857AW;**  $V_{CE} = -5$  V.

(1)  $T_{amb} = -55$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.3 Base-emitter voltage as a function of collector current; typical values.



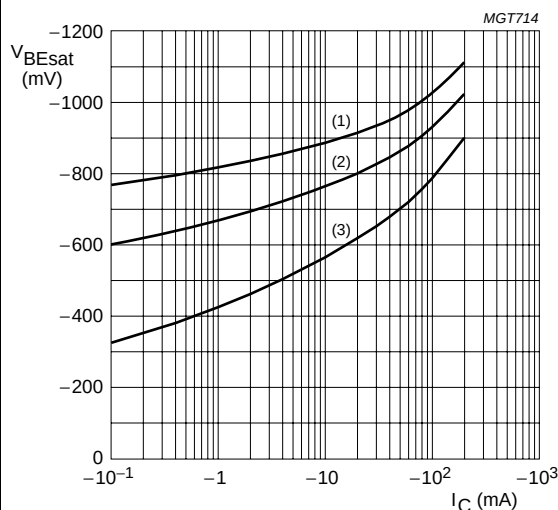
**BC857AW;**  $I_C/I_B = 20$ .

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



**BC857AW;**  $I_C/I_B = 20$ .

(1)  $T_{amb} = -55$  °C.

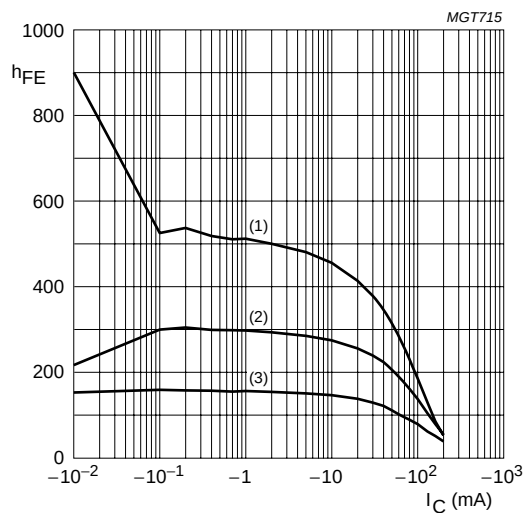
(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.5 Base-emitter saturation voltage as a function of collector current; typical values.

## PNP general purpose transistors

## BC856W; BC857W; BC858W



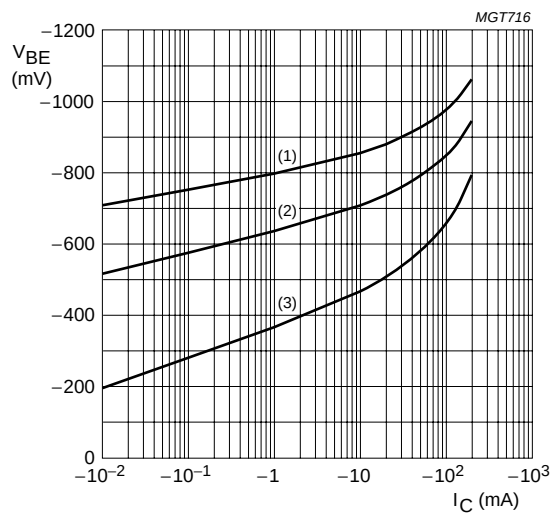
BC857BW;  $V_{CE} = -5$  V.

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.6 DC current gain as a function of collector current; typical values.



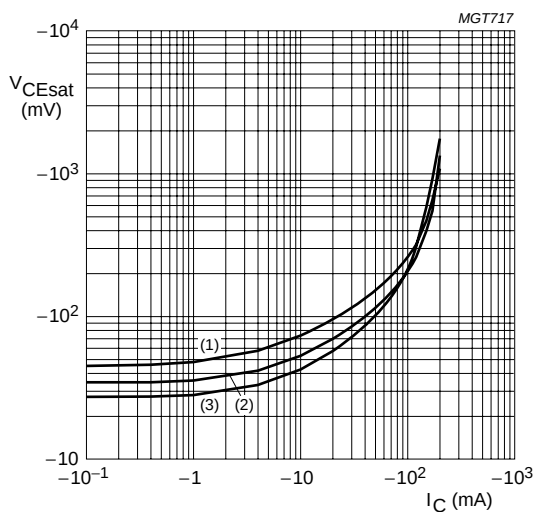
BC857BW;  $V_{CE} = -5$  V.

(1)  $T_{amb} = -55$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.7 Base-emitter voltage as a function of collector current; typical values.



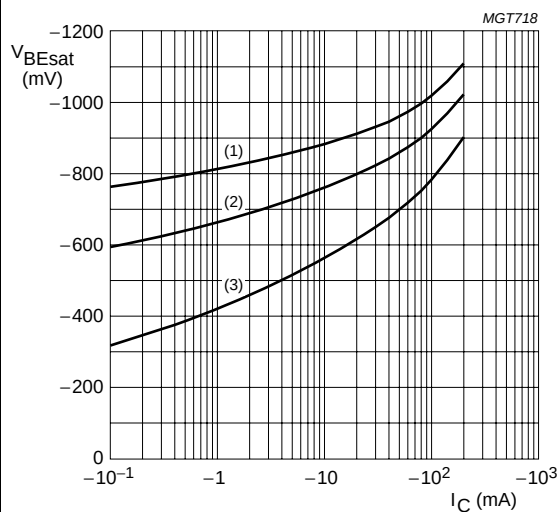
BC857BW;  $I_C/I_B = 20$ .

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.8 Collector-emitter saturation voltage as a function of collector current; typical values.



BC857BW;  $I_C/I_B = 20$ .

(1)  $T_{amb} = -55$  °C.

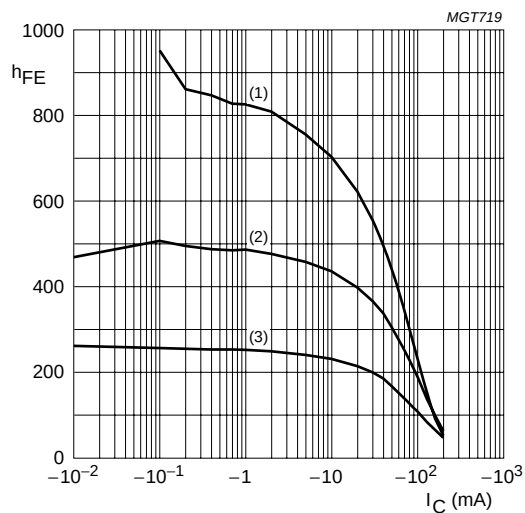
(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.9 Base-emitter saturation voltage as a function of collector current; typical values.

## PNP general purpose transistors

## BC856W; BC857W; BC858W



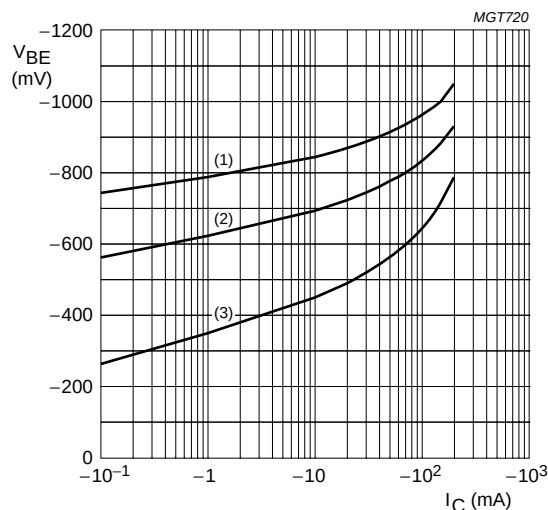
**BC857CW**;  $V_{CE} = -5$  V.

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.10 DC current gain as a function of collector current; typical values.



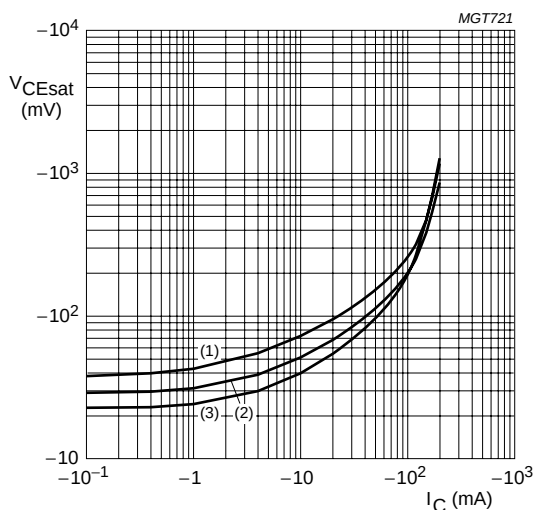
**BC857CW**;  $V_{CE} = -5$  V.

(1)  $T_{amb} = -55$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.11 Base-emitter voltage as a function of collector current; typical values.



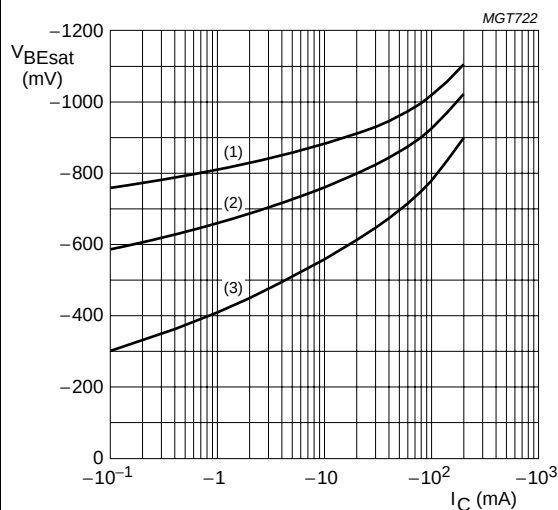
**BC857CW**;  $I_C/I_B = 20$ .

(1)  $T_{amb} = 150$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = -55$  °C.

Fig.12 Collector-emitter saturation voltage as a function of collector current; typical values.



**BC857CW**;  $I_C/I_B = 20$ .

(1)  $T_{amb} = -55$  °C.

(2)  $T_{amb} = 25$  °C.

(3)  $T_{amb} = 150$  °C.

Fig.13 Base-emitter saturation voltage as a function of collector current; typical values.



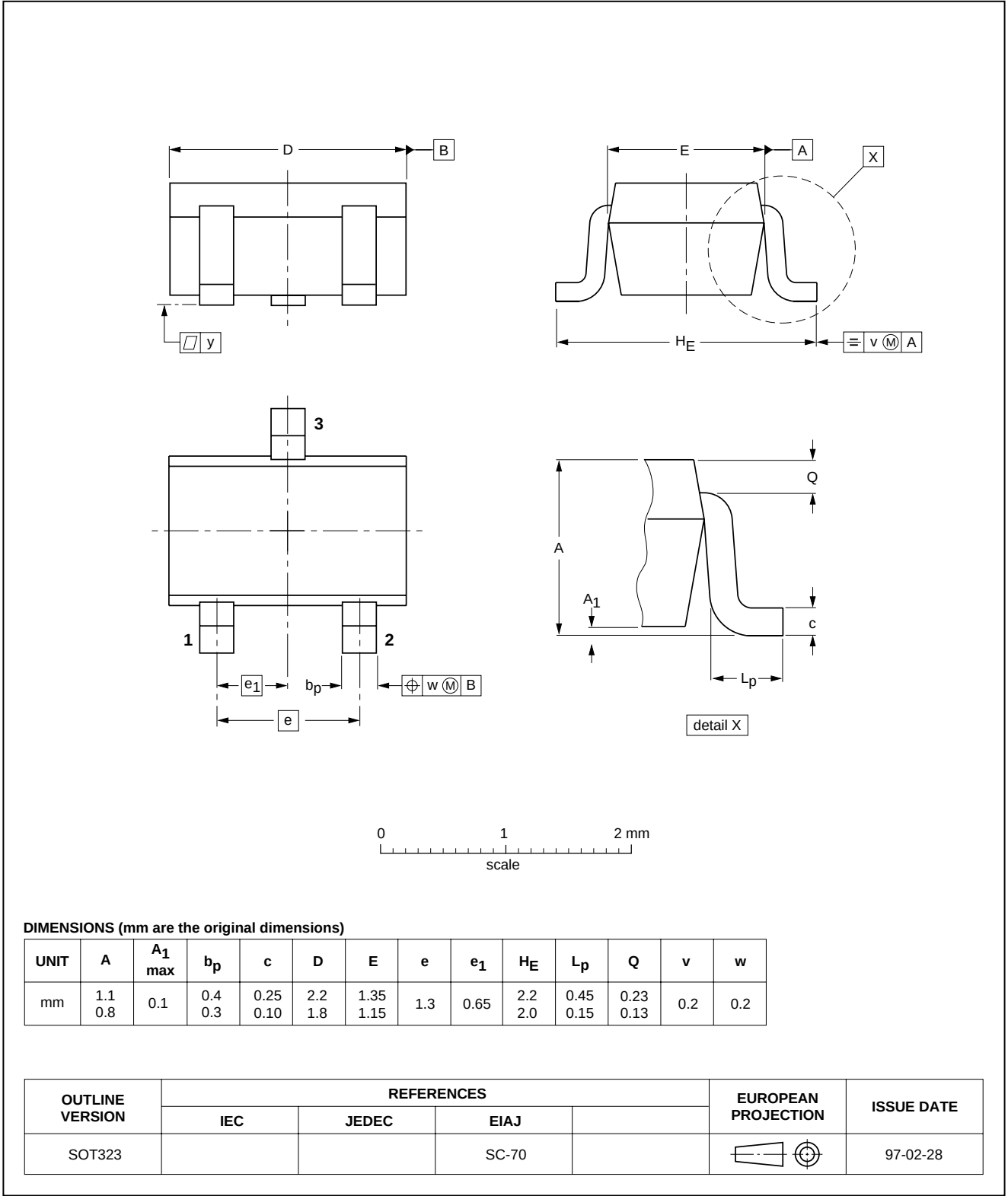
PNP general purpose transistors

BC856W; BC857W; BC858W

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT323



## PNP general purpose transistors

BC856W; BC857W; BC858W

## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
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Printed in The Netherlands

613514/04/pp10

Date of release: 2002 Feb 04

Document order number: 9397 750 09168

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