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Kind regards,

Team Nexperia

# DATA SHEET



## **BC859; BC860** PNP general purpose transistors

Product data sheet  
Supersedes data of 1999 May 28

2004 Jan 16

## PNP general purpose transistors

## BC859; BC860

## FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 45 V).

## APPLICATIONS

- Low noise input stages of audio frequency equipment.

## DESCRIPTION

PNP transistor in a SOT23 plastic package.  
NPN complements: BC849 and BC850.

## MARKING

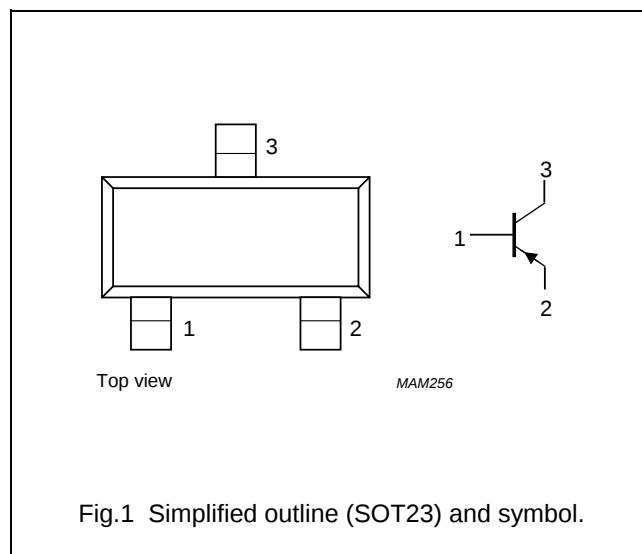
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> | TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|-------------|-----------------------------|
| BC859B      | 4B*                         | BC860B      | 4F*                         |
| BC859C      | 4C*                         | BC860C      | 4G*                         |

## Note

1. \* = p : Made in Hong Kong.  
\* = t : Made in Malaysia.  
\* = W : Made in China.

## PINNING

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



## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | NAME    | DESCRIPTION                              | VERSION |
| BC859B      | —       | plastic surface mounted package; 3 leads | SOT23   |
| BC859C      |         |                                          |         |
| BC860B      |         |                                          |         |
| BC860C      |         |                                          |         |

## PNP general purpose transistors

## BC859; BC860

**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                     |      |      |      |
|                  | BC859                         |                                  | –    | –30  | V    |
|                  | BC860                         |                                  | –    | –50  | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                        |      |      |      |
|                  | BC859                         |                                  | –    | –30  | V    |
|                  | BC860                         |                                  | –    | –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             |                                  | –    | –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.

**THERMAL CHARACTERISTICS**

| SYMBOL               | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|----------------------|---------------------------------------------|------------|-------|------|
| R <sub>th(j-a)</sub> | thermal resistance from junction to ambient | note 1     | 500   | K/W  |

**Note**

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

## PNP general purpose transistors

## BC859; BC860

**CHARACTERISTICS**

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

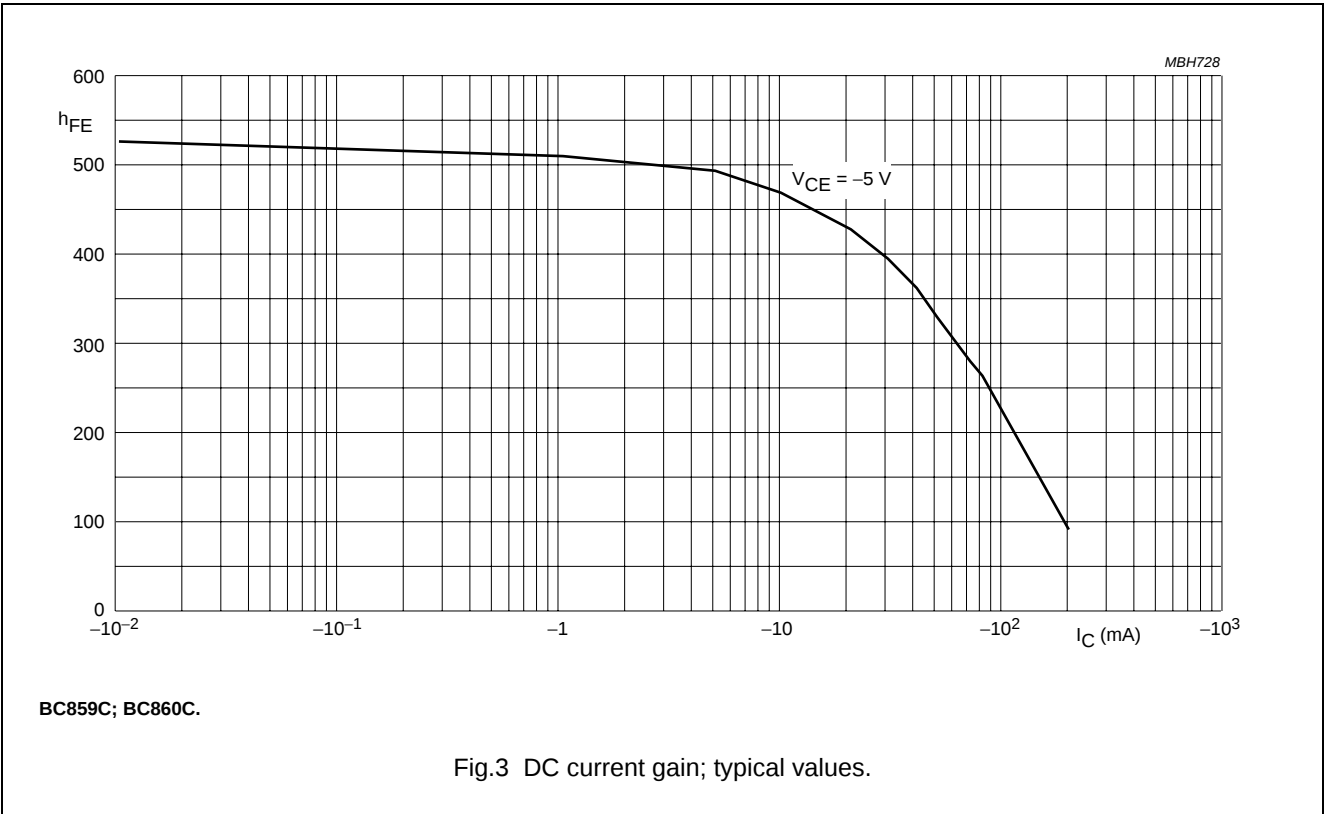
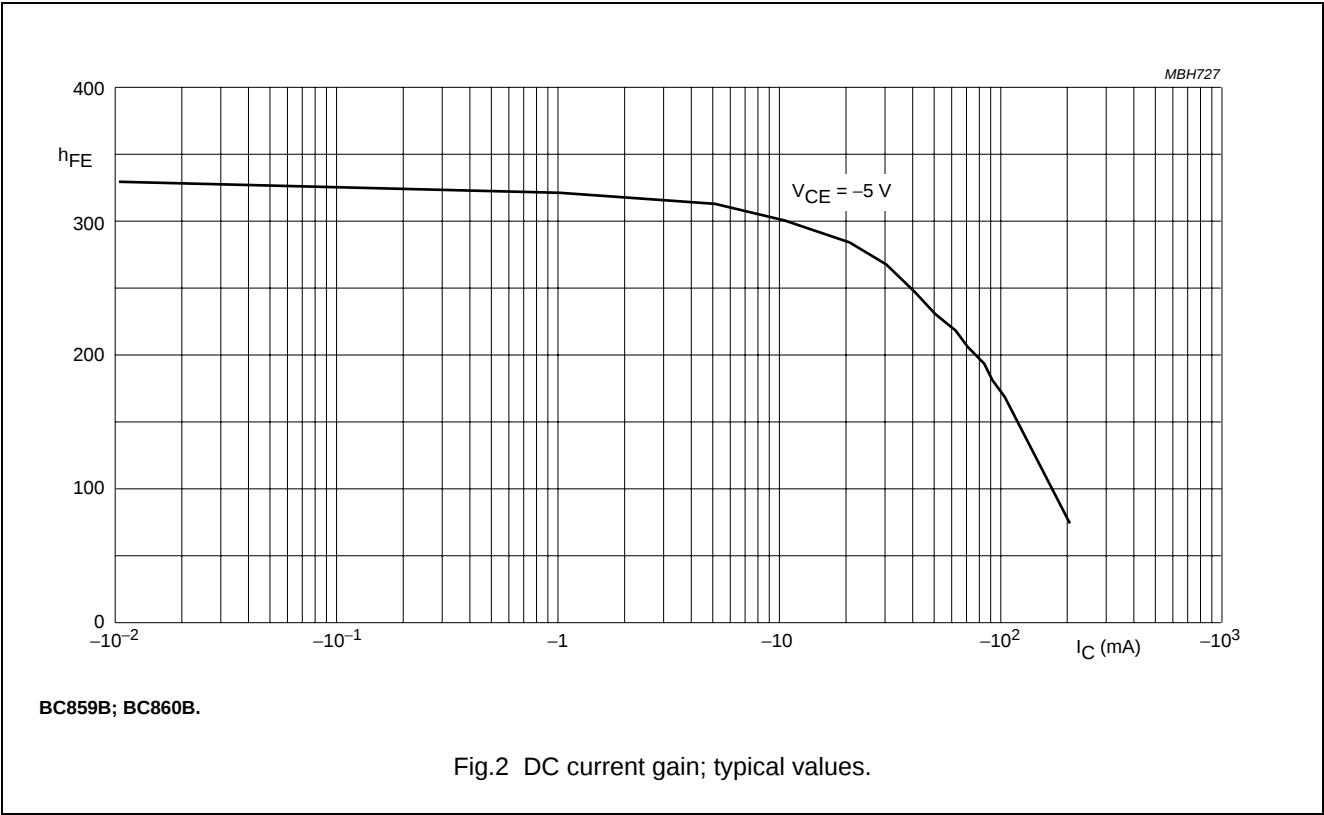
| SYMBOL      | PARAMETER                                         | CONDITIONS                                                                                                              | MIN.       | TYP.   | MAX.       | UNIT          |
|-------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------|--------|------------|---------------|
| $I_{CBO}$   | collector cut-off current                         | $I_E = 0; V_{CB} = -30\text{ V}$                                                                                        | –          | –1     | –15        | nA            |
|             |                                                   | $I_E = 0; V_{CB} = -30\text{ V}; T_j = 150\text{ °C}$                                                                   | –          | –      | –4         | $\mu\text{A}$ |
| $I_{EBO}$   | emitter cut-off current                           | $I_C = 0; V_{EB} = -5\text{ V}$                                                                                         | –          | –      | –100       | nA            |
| $h_{FE}$    | DC current gain                                   | $I_C = -2\text{ mA}; V_{CE} = -5\text{ V};$<br>see Figs 2 and 3                                                         | 220<br>420 | –<br>– | 475<br>800 |               |
|             | BC859B; BC860B<br>BC859C; BC860C                  |                                                                                                                         |            |        |            |               |
| $V_{CEsat}$ | collector-emitter saturation voltage              | $I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$                                                                             | –          | –75    | –300       | mV            |
|             |                                                   | $I_C = -100\text{ mA}; I_B = -5\text{ mA}$                                                                              | –          | –250   | –650       | mV            |
| $V_{BEsat}$ | base-emitter saturation voltage                   | $I_C = -10\text{ mA}; I_B = -0.5\text{ mA};$ note 1                                                                     | –          | –700   | –          | mV            |
|             |                                                   | $I_C = -100\text{ mA}; I_B = -5\text{ mA};$ note 1                                                                      | –          | –850   | –          | mV            |
| $V_{BE}$    | base-emitter voltage                              | $I_C = -2\text{ mA}; V_{CE} = -5\text{ V};$ note 2                                                                      | –600       | –650   | –750       | mV            |
|             |                                                   | $I_C = -10\text{ mA}; V_{CE} = -5\text{ V};$ note 2                                                                     | –          | –      | –820       | mV            |
| $C_c$       | collector capacitance                             | $I_E = I_e = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$                                                                | –          | 4.5    | –          | pF            |
| $C_e$       | emitter capacitance                               | $I_C = I_c = 0; V_{EB} = -500\text{ mV}; f = 1\text{ MHz}$                                                              | –          | 10     | –          | pF            |
| $f_T$       | transition frequency                              | $I_C = -10\text{ mA}; V_{CE} = -5\text{ V}; f = 100\text{ MHz}$                                                         | 100        | –      | –          | MHz           |
| F           | noise figure<br>BC859B; BC860B;<br>BC859C; BC860C | $I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$<br>$f = 30\text{ Hz to }15\text{ kHz}$   | –          | –      | 4          | dB            |
|             | noise figure<br>BC859B; BC860B;<br>BC859C; BC860C | $I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$<br>$f = 1\text{ kHz}; B = 200\text{ Hz}$ | –          | –      | 4          | dB            |

**Notes**

- $V_{BEsat}$  decreases by about  $-1.7\text{ mV/K}$  with increasing temperature.
- $V_{BE}$  decreases by about  $-2\text{ mV/K}$  with increasing temperature.

PNP general purpose transistors

BC859; BC860



PNP general purpose transistors
BC859; BC860

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads
SOT23

The diagrams illustrate the SOT23 package dimensions. The top view shows dimensions D (width), E (lead width), and e (pitch). The side view shows dimensions A (height), A1 (lead height), bp (lead thickness), c (lead thickness), HE (height to base), Lp (lead length), Q (lead thickness), v (lead thickness), and w (lead thickness). A detail view 'X' shows the lead profile. A scale bar indicates 0 to 2 mm.

**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<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    | JEITA |  |                     |                      |
| SOT23           |            | TO-236AB |       |  |                     | 04-11-04<br>06-03-16 |

## PNP general purpose transistors

BC859; BC860

## 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.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

## Notes

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# ***NXP Semiconductors***

## **Customer notification**

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## **Contact information**

For additional information please visit: <http://www.nxp.com>

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