



# BF992

Silicon N-channel dual gate MOS-FET

Rev. 04 — 21 November 2007

Product data sheet

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NXP Semiconductors

# Silicon N-channel dual gate MOS-FET

**BF992**

## APPLICATIONS

- VHF applications such as VHF television tuners and FM tuners with 12 V supply voltage. The device is also suitable for use in professional communications equipment.

## DESCRIPTION

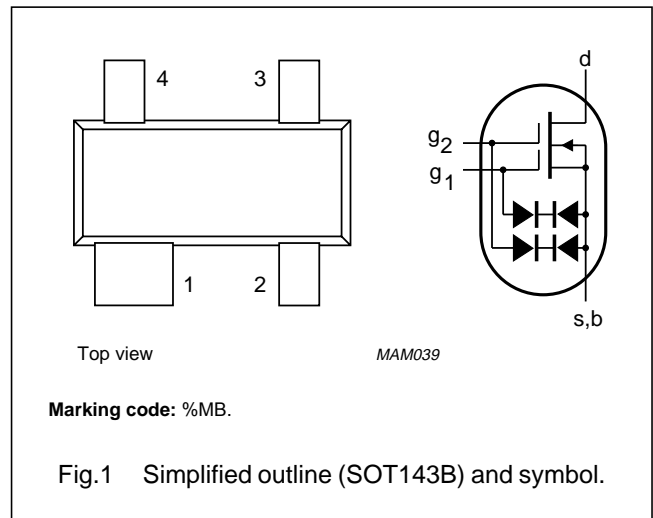
Depletion type field-effect transistor in a plastic micro-miniature SOT143B package with source and substrate interconnected.

The transistor is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

| <b>CAUTION</b>   |
|--|
| The device is supplied in an antistatic package.<br>The gate-source input must be protected against static discharge during transport or handling. |

## PINNING

| PIN | SYMBOL         | DESCRIPTION |
|-----|----------------|-------------|
| 1   | s, b           | source      |
| 2   | d              | drain       |
| 3   | g <sub>2</sub> | gate 2      |
| 4   | g <sub>1</sub> | gate 1      |



## QUICK REFERENCE DATA

| SYMBOL             | PARAMETER                      | CONDITIONS  | TYP. | MAX. | UNIT |
|--------------------|--------------------------------|---|------|------|------|
| V <sub>DS</sub>    | drain-source voltage (DC)      |   | –    | 20   | V    |
| I <sub>D</sub>     | drain current (DC)             |   | –    | 40   | mA   |
| P <sub>tot</sub>   | total power dissipation        | T <sub>amb</sub> = 60 °C  | –    | 200  | mW   |
| Y <sub>fs</sub>    | forward transfer admittance    | f = 1 kHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V                          | 25   | –    | mS   |
| C <sub>ig1-s</sub> | input capacitance at gate 1    | f = 1 MHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V                          | 4    | –    | pF   |
| C <sub>rs</sub>    | reverse transfer capacitance   | f = 1 MHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V                          | 30   | –    | fF   |
| F                  | noise figure                   | G <sub>S</sub> = 2 mS; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V; f = 200 MHz | 1.2  | –    | dB   |
| T <sub>j</sub>     | operating junction temperature |   | –    | 150  | °C   |

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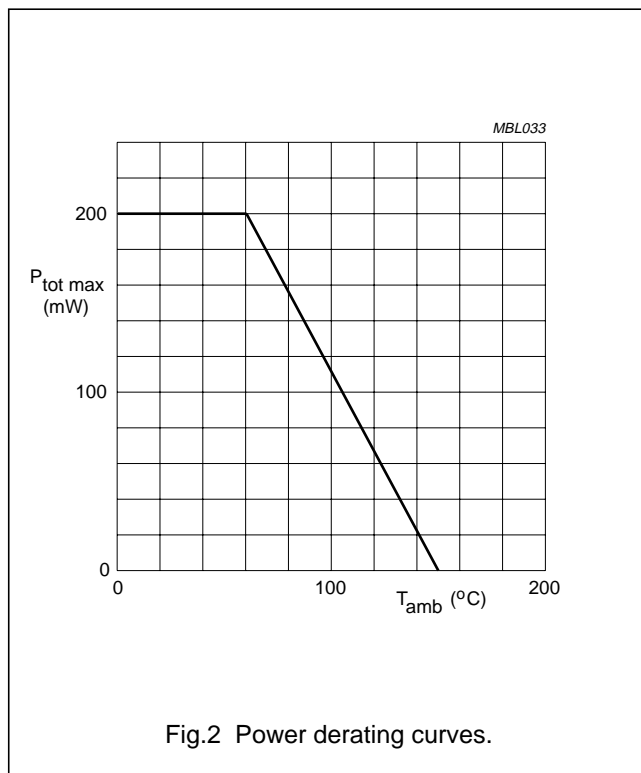
## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL    | PARAMETER                      | CONDITIONS                                      | MIN. | MAX. | UNIT |
|-----------|--------------------------------|---|------|------|------|
| $V_{DS}$  | drain-source voltage           |   | –    | 20   | V    |
| $I_D$     | drain current                  |   | –    | 40   | mA   |
| $I_{G1}$  | gate 1 current                 |   | –    | ±10  | mA   |
| $I_{G2}$  | gate 2 current                 |   | –    | ±10  | mA   |
| $P_{tot}$ | total power dissipation        | $T_{amb} \leq 60\text{ °C}$ ; see Fig.2; note 1 | –    | 200  | mW   |
| $T_{stg}$ | storage temperature            |   | –65  | +150 | °C   |
| $T_j$     | operating junction temperature |   | –    | 150  | °C   |

### Note

1. Device mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.



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## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient in free air | note 1     | 460   | K/W  |

## Note

1. Device mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.

## STATIC CHARACTERISTICS

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

| SYMBOL              | PARAMETER                       | CONDITIONS   | MIN. | MAX. | UNIT |
|---------------------|---------------------------------|--|------|------|------|
| $\pm V_{(BR)G1-SS}$ | gate 1-source breakdown voltage | $V_{G2-S} = V_{DS} = 0$ ; $I_{G1-SS} = \pm 10\text{ mA}$                         | 8    | 20   | V    |
| $\pm V_{(BR)G2-SS}$ | gate 2-source breakdown voltage | $V_{G1-S} = V_{DS} = 0$ ; $I_{G2-SS} = \pm 10\text{ mA}$                         | 8    | 20   | V    |
| $-V_{(P)G1-S}$      | gate 1-source cut-off voltage   | $V_{G2-S} = 4\text{ V}$ ; $V_{DS} = 10\text{ V}$ ; $I_D = 20\text{ }\mu\text{A}$ | 0.2  | 1.3  | V    |
| $-V_{(P)G2-S}$      | gate 2-source cut-off voltage   | $V_{G1-S} = 0$ ; $V_{DS} = 10\text{ V}$ ; $I_D = 20\text{ }\mu\text{A}$          | 0.2  | 1.1  | V    |
| $\pm I_{G1-SS}$     | gate 1 cut-off current          | $V_{G2-S} = V_{DS} = 0$ ; $V_{G1-S} = \pm 7\text{ V}$                            | –    | 25   | nA   |
| $\pm I_{G2-SS}$     | gate 2 cut-off current          | $V_{G1-S} = V_{DS} = 0$ ; $V_{G2-S} = \pm 7\text{ V}$                            | –    | 25   | nA   |

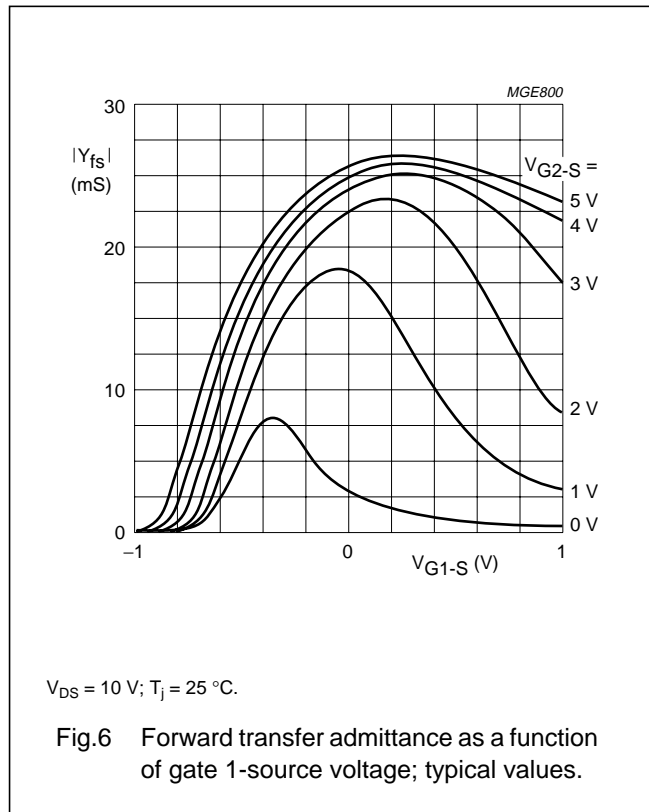
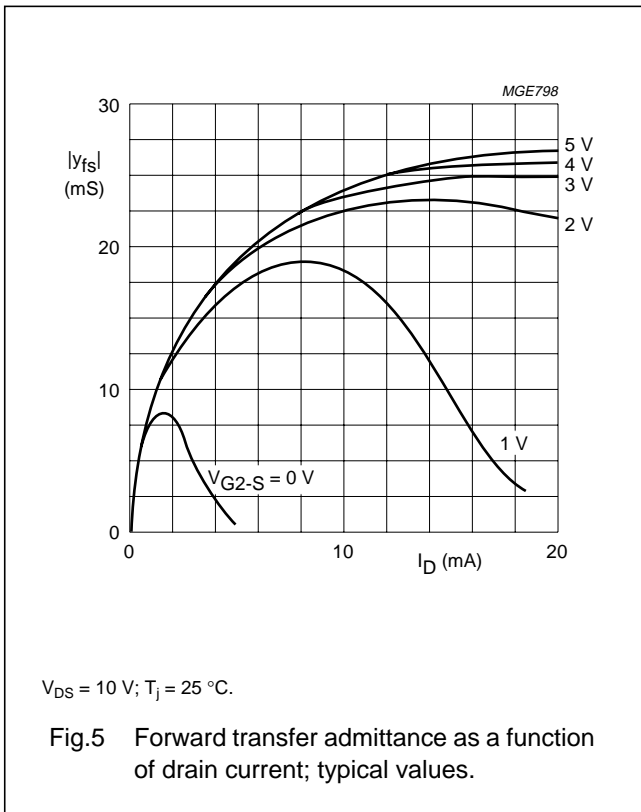
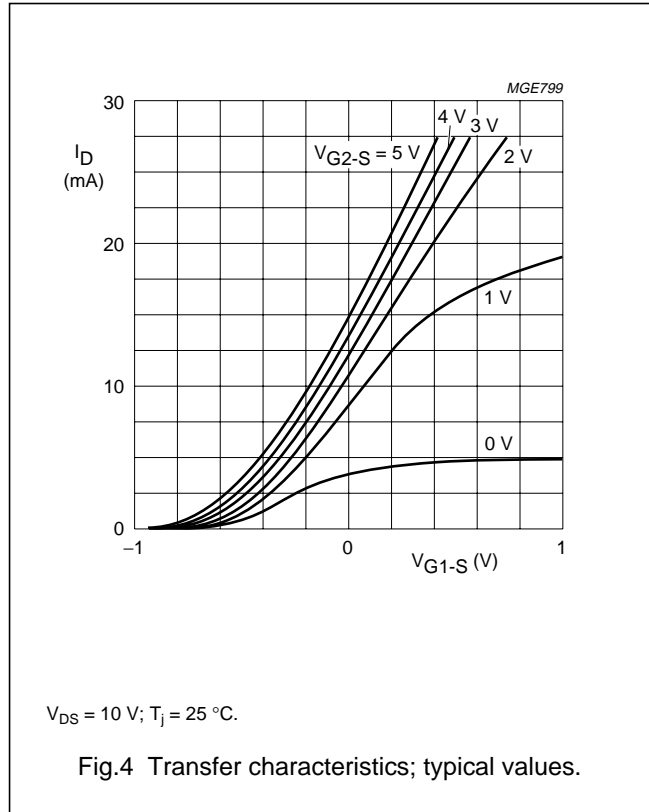
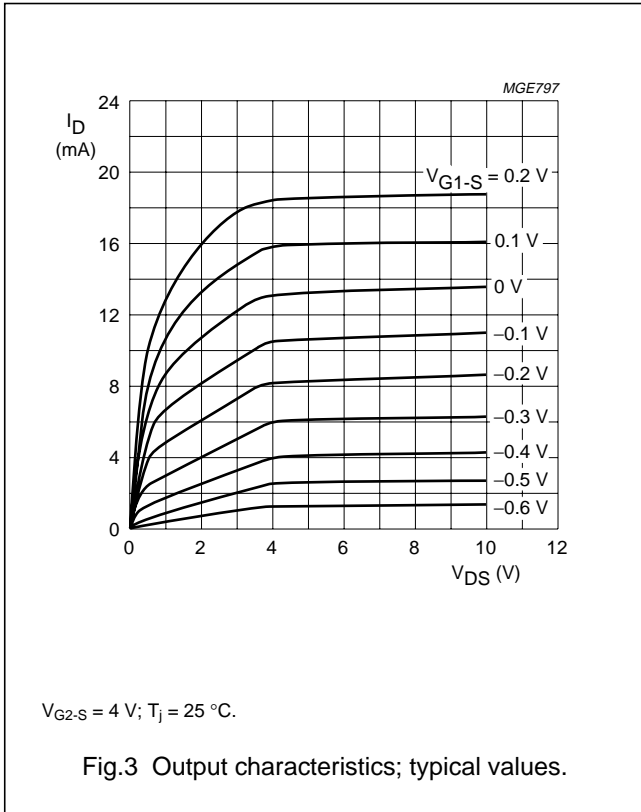
## DYNAMIC CHARACTERISTICS

Common source;  $T_{amb} = 25\text{ °C}$ ;  $V_{DS} = 10\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ; unless otherwise specified.

| SYMBOL      | PARAMETER                    | CONDITIONS                                 | MIN. | TYP. | MAX. | UNIT |
|-------------|------------------------------|--|------|------|------|------|
| $ y_{fs} $  | forward transfer admittance  |  | 20   | 25   | –    | mS   |
| $C_{ig1-s}$ | input capacitance at gate 1  | $f = 1\text{ MHz}$                         | –    | 4    | –    | pF   |
| $C_{ig2-s}$ | input capacitance at gate 2  | $f = 1\text{ MHz}$                         | –    | 1.7  | –    | pF   |
| $C_{os}$    | output capacitance           | $f = 1\text{ MHz}$                         | –    | 2    | –    | pF   |
| $C_{rs}$    | reverse transfer capacitance | $f = 1\text{ MHz}$                         | –    | 30   | 40   | fF   |
| F           | noise figure                 | $f = 200\text{ MHz}$ ; $G_S = 2\text{ mS}$ | –    | 1.2  | –    | dB   |

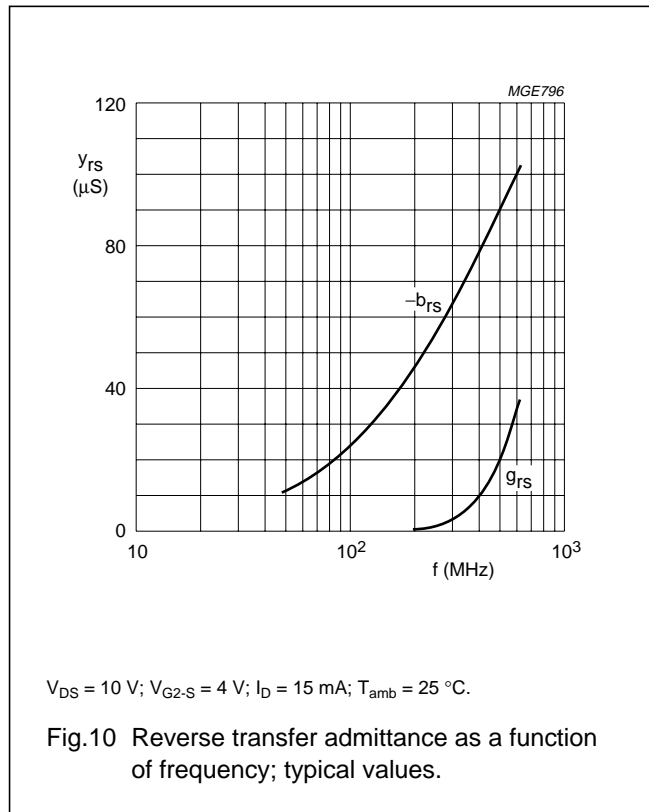
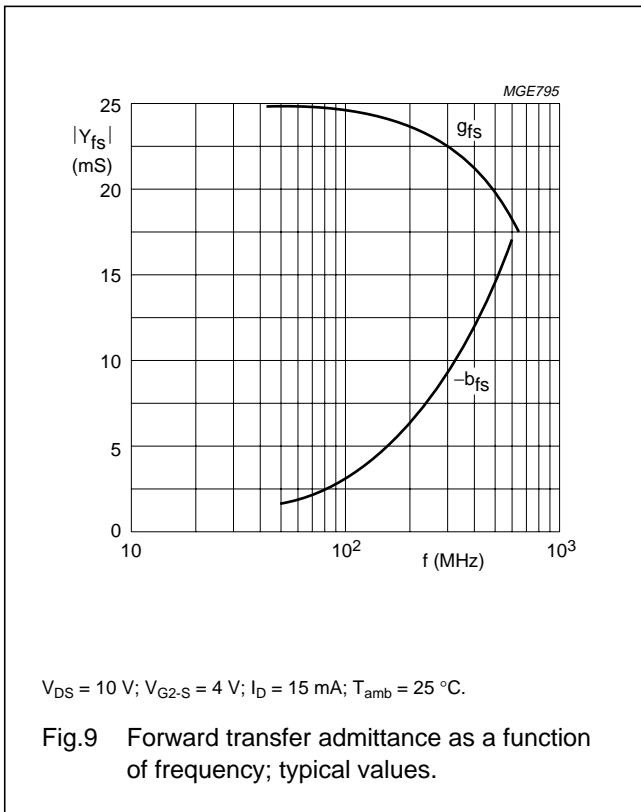
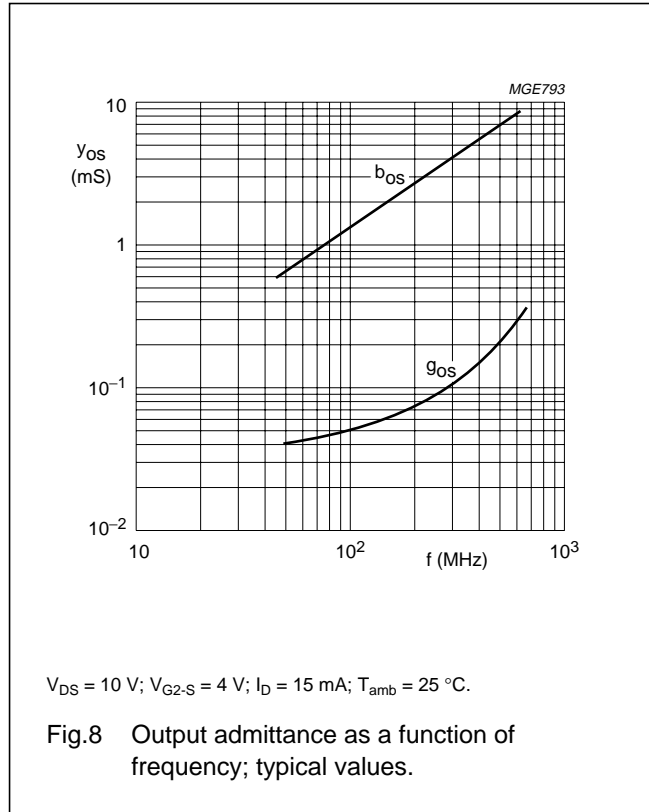
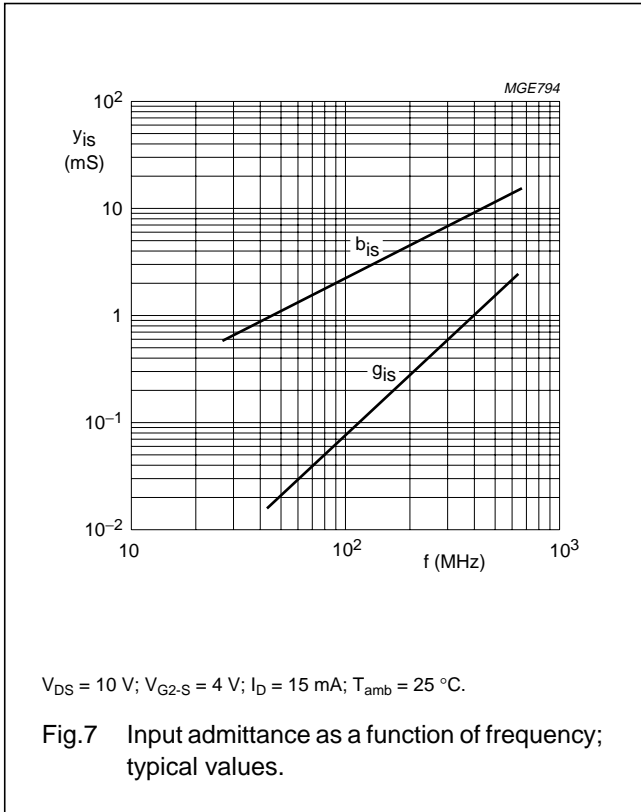
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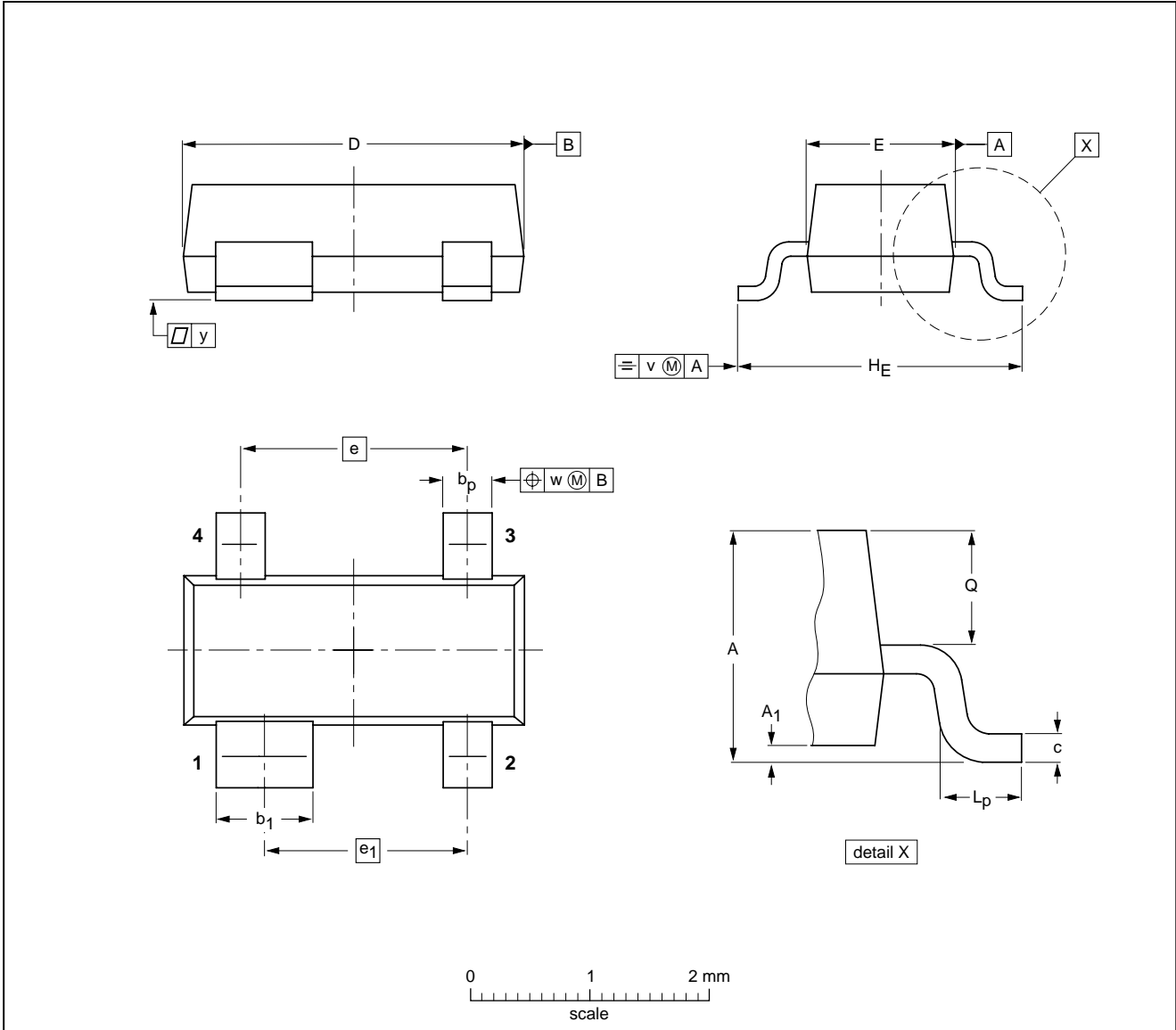
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## PACKAGE OUTLINE

Plastic surface mounted package; 4 leads

SOT143B



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max | b <sub>p</sub> | b <sub>1</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|-----------------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                   | 0.48<br>0.38   | 0.88<br>0.78   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 1.7            | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |            |
| SOT143B         |            |       |      |  |                     | 97-02-28   |

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### Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | Definition  |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet      | Development                   | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet    | Qualification                 | This document contains data from the preliminary specification.                       |
| Product [short] data sheet        | Production                    | This document contains the product specification.                                     |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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## Revision history

### Revision history

| Document ID                 | Release date                            | Data sheet status     | Change notice | Supersedes |
|-----------------------------|---|-----------------------|---------------|------------|
| BF992_N_4                   | 20071121                                | Product data sheet    | -             | BF992_3    |
| Modifications:              | • Fig. 1 on page 2; Figure note changed |                       |               |            |
| BF992_3<br>(9397 750 06013) | 19990811                                | Product specification | -             | BF992_2    |
| BF992_2                     | 19960730                                | Product specification | -             | BF992_SF_1 |
| BF992_SF_1                  | -                                       | -                     | -             | -          |

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