

DATA SHEET

BSP225

P-channel enhancement mode
vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC13b

April 1995

P-channel enhancement mode vertical D-MOS transistor

BSP225

FEATURES

- Low $R_{DS(on)}$
- Direct interface to C-MOS, TTL, etc.
- High-speed switching
- No secondary breakdown.

DESCRIPTION

P-channel enhancement mode vertical D-MOS transistor in a miniature SOT223 envelope, intended for use in relay, high-speed and line transformer drivers.

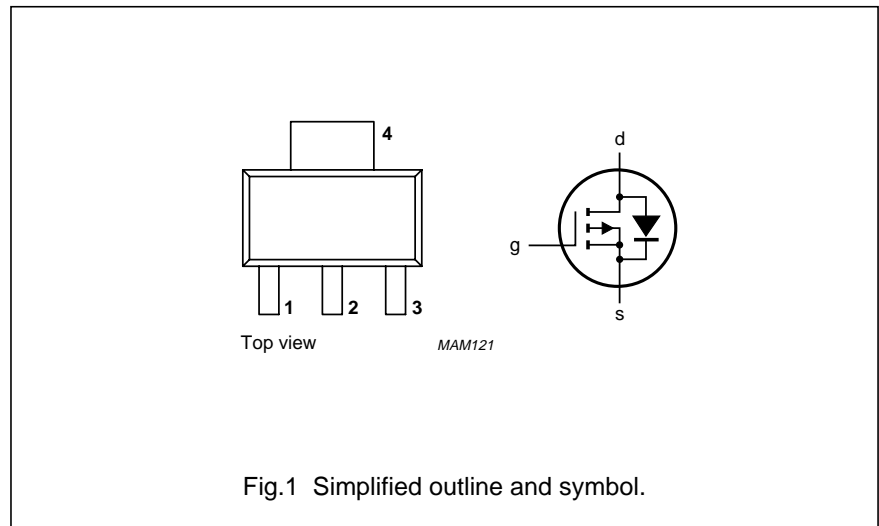
PINNING - SOT223

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | gate |
| 2 | drain |
| 3 | source |
| 4 | drain |

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---------------|-------------------------------|---|------|----------|
| $-V_{DS}$ | drain-source voltage | | 250 | V |
| $-I_D$ | drain current | DC value | 225 | mA |
| $R_{DS(on)}$ | drain-source on-resistance | $-I_D = 200 \text{ mA}$ $-V_{GS} = 10 \text{ V}$ | 15 | Ω |
| $-V_{GS(th)}$ | gate-source threshold voltage | $-I_D = 1 \text{ mA}$ $V_{GS} = V_{DS}$ | 2.8 | V |

PIN CONFIGURATION



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LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---------------|---------------------------|---|------|------|------|
| $-V_{DS}$ | drain-source voltage | | – | 250 | V |
| $\pm V_{GSO}$ | gate-source voltage | open drain | – | 20 | V |
| $-I_D$ | drain current | DC value | – | 225 | mA |
| $-I_{DM}$ | drain current | peak value | – | 600 | mA |
| P_{tot} | total power dissipation | up to $T_{amb} = 25\text{ °C}$ (note 1) | – | 1.5 | W |
| T_{stg} | storage temperature range | | –65 | 150 | °C |
| T_j | junction temperature | | – | 150 | °C |

Note

1. Device mounted on an epoxy printed-circuit board, 40 x 40 x 1.5 mm, mounting pad for the drain lead minimum 6 cm².

THERMAL RESISTANCE

| SYMBOL | PARAMETER | VALUE | UNIT |
|---------------|-----------------------------------|-------|------|
| $R_{th\ j-a}$ | from junction to ambient (note 1) | 83.3 | K/W |

Note

1. Device mounted on an epoxy printed-circuit board, 40 x 40 x 1.5 mm, mounting pad for the drain lead minimum 6 cm².

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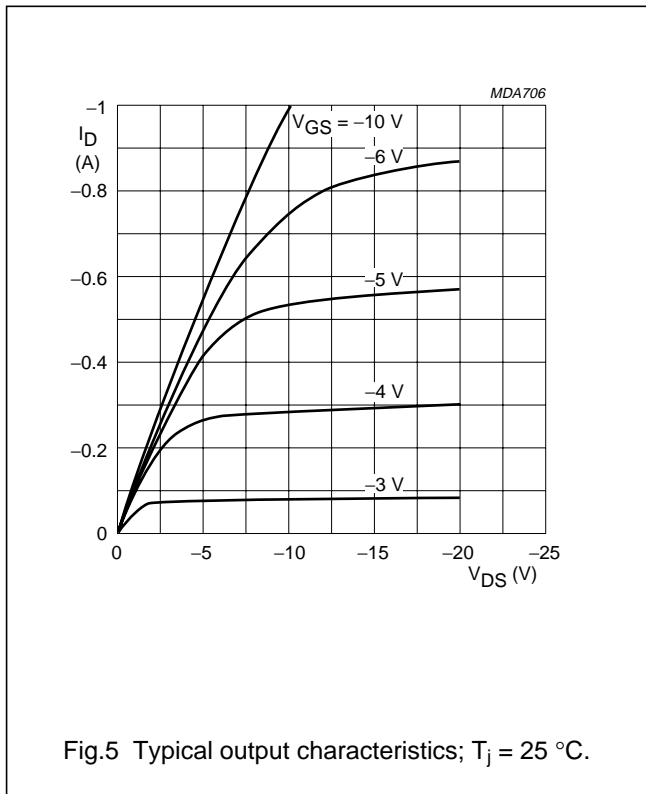
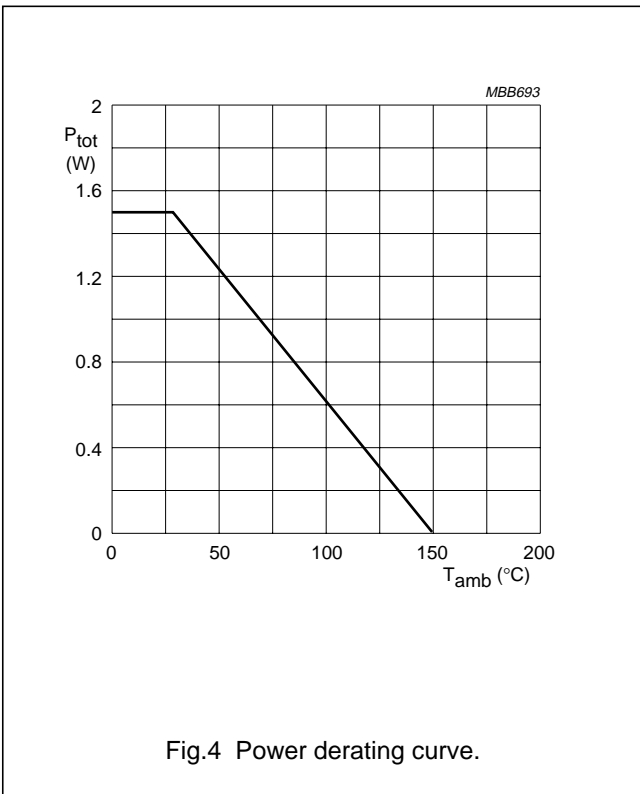
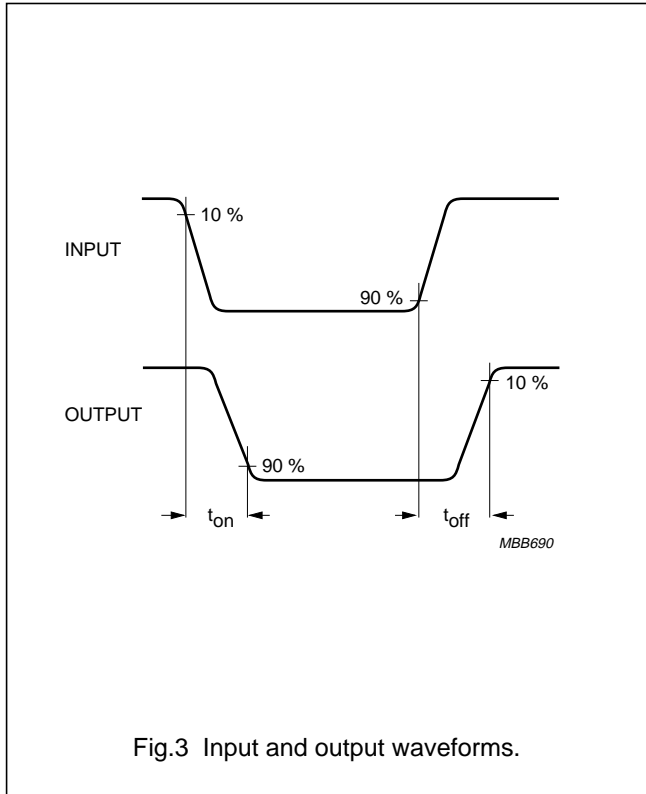
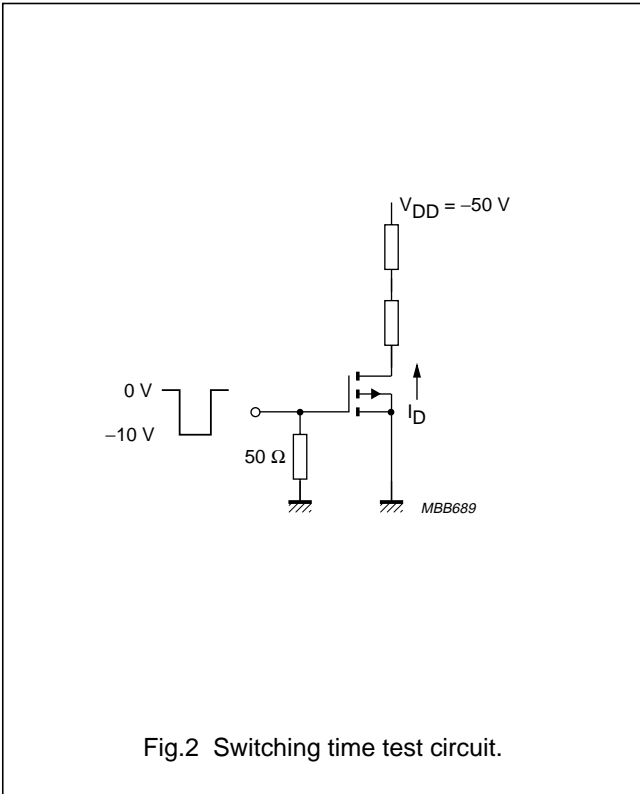
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CHARACTERISTICS $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|--------------------------------|---|------|------|------|---------------|
| $-V_{(BR)DSS}$ | drain-source breakdown voltage | $-I_D = 10\ \mu\text{A}$ $V_{GS} = 0$ | 250 | – | – | V |
| $-I_{DSS}$ | drain-source leakage current | $-V_{DS} = 200\ \text{V}$ $V_{GS} = 0$ | – | – | 1 | μA |
| $\pm I_{GSS}$ | gate-source leakage current | $V_{DS} = 0$ $\pm V_{GS} = 20\ \text{V}$ | – | – | 100 | nA |
| $-V_{GS(th)}$ | gate-source threshold voltage | $-I_D = 1\ \text{mA}$ $V_{GS} = V_{DS}$ | 0.8 | – | 2.8 | V |
| $R_{DS(on)}$ | drain-source on-resistance | $-I_D = 200\ \text{mA}$ $-V_{GS} = 10\ \text{V}$ | – | 10 | 15 | Ω |
| $ Y_{fs} $ | transfer admittance | $-I_D = 200\ \text{mA}$ $-V_{DS} = 25\ \text{V}$ | 100 | 200 | – | mS |
| C_{iss} | input capacitance | $-V_{DS} = 25\ \text{V}$ $-V_{GS} = 0$ $f = 1\ \text{MHz}$ | – | 65 | 90 | pF |
| C_{oss} | output capacitance | $-V_{DS} = 25\ \text{V}$ $-V_{GS} = 0$ $f = 1\ \text{MHz}$ | – | 20 | 30 | pF |
| C_{rss} | feedback capacitance | $-V_{DS} = 25\ \text{V}$ $-V_{GS} = 0$ $f = 1\ \text{MHz}$ | – | 6 | 15 | pF |
| Switching times (see Figs 2 and 3) | | | | | | |
| t_{on} | turn-on time | $-I_D = 250\ \text{mA}$ $-V_{DD} = 50\ \text{V}$ $-V_{GS} = 0\ \text{to}\ 10\ \text{V}$ | – | 5 | 10 | ns |
| t_{off} | turn-off time | $-I_D = 250\ \text{mA}$ $-V_{DD} = 50\ \text{V}$ $-V_{GS} = 0\ \text{to}\ 10\ \text{V}$ | – | 20 | 30 | ns |

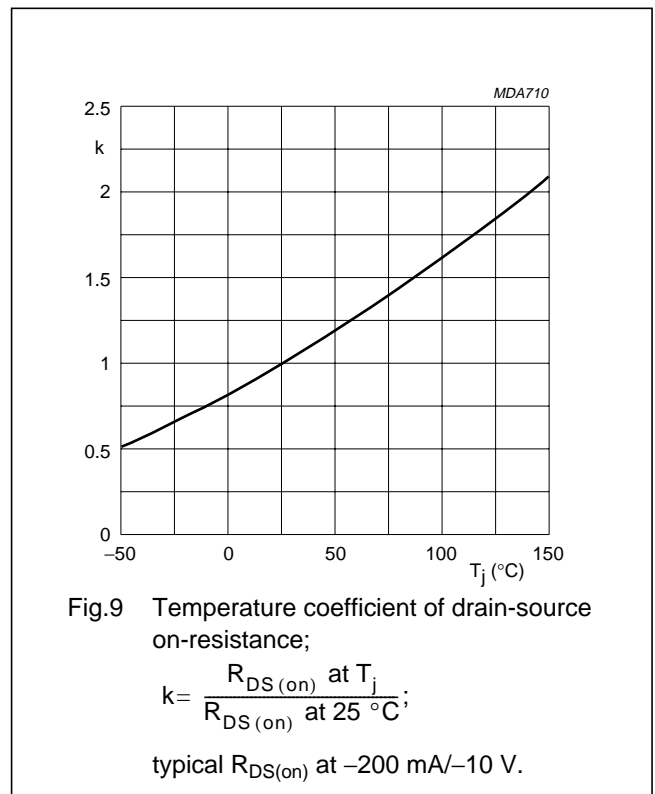
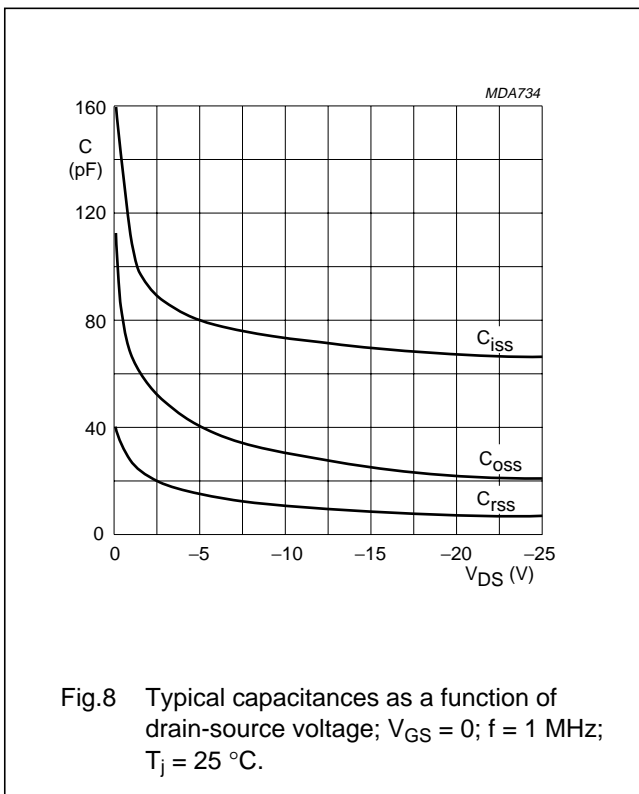
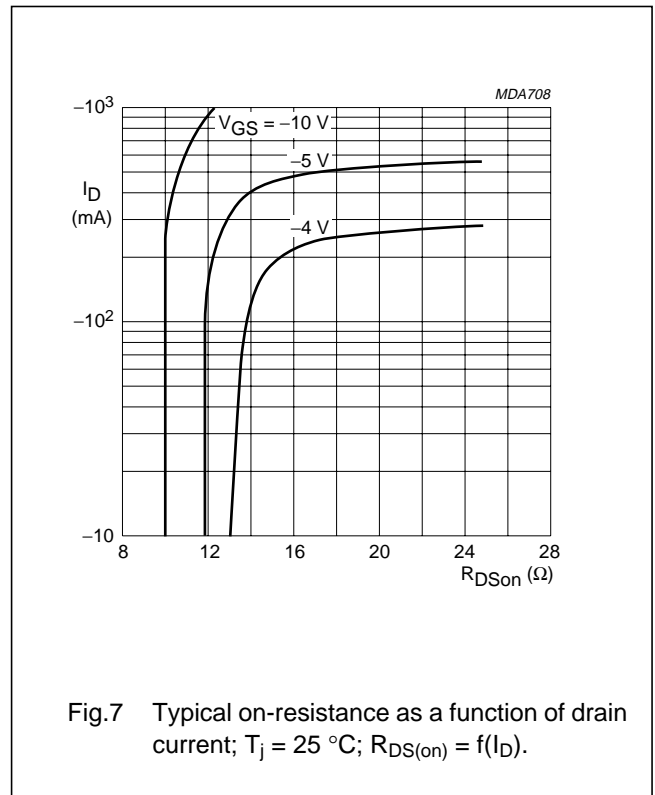
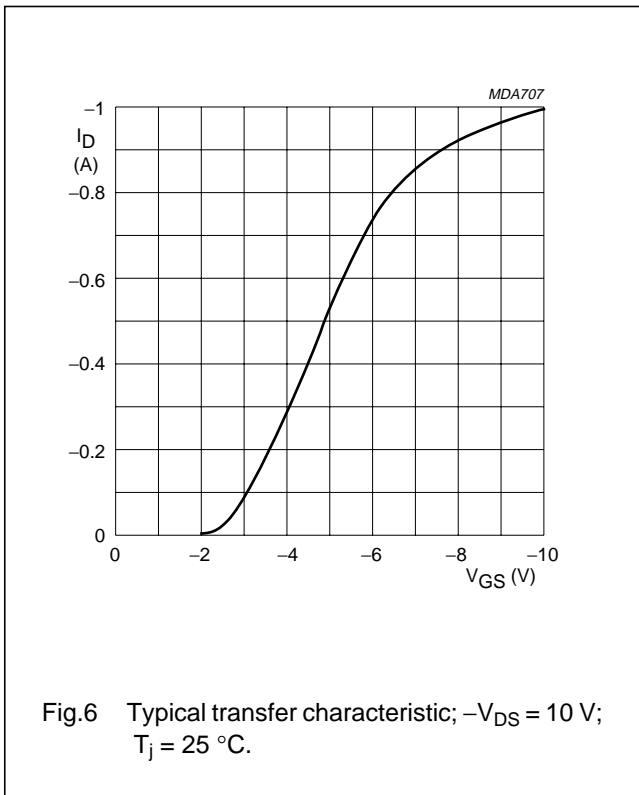
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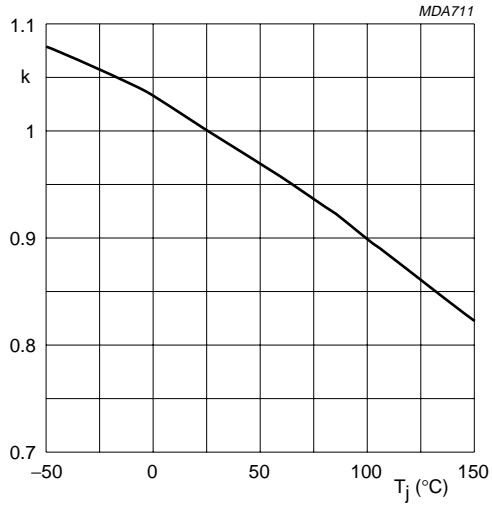


Fig.10 Temperature coefficient of gate-source threshold voltage;

$$k = \frac{-V_{GS(th)} \text{ at } T_j}{-V_{GS(th)} \text{ at } 25^\circ\text{C}}$$

typical $V_{GS(th)}$ at -1 mA.

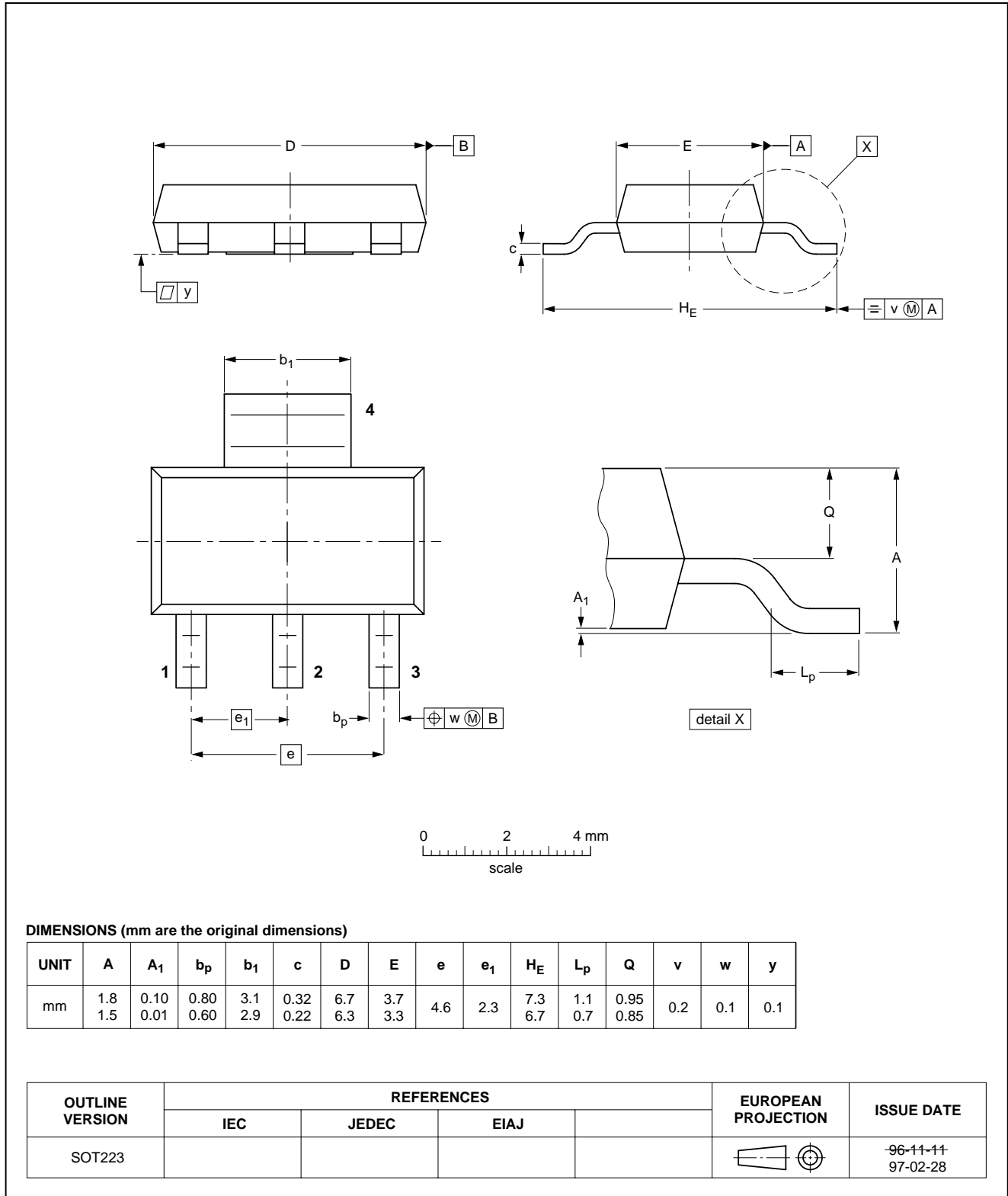
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



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BSP225**DEFINITIONS**

| Data sheet status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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NOTES

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Printed in The Netherlands

137107/00/01/pp12

Date of release: April 1995

Document order number: 9397 750 02483

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