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Kind regards,

Team Nexperia

# 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.

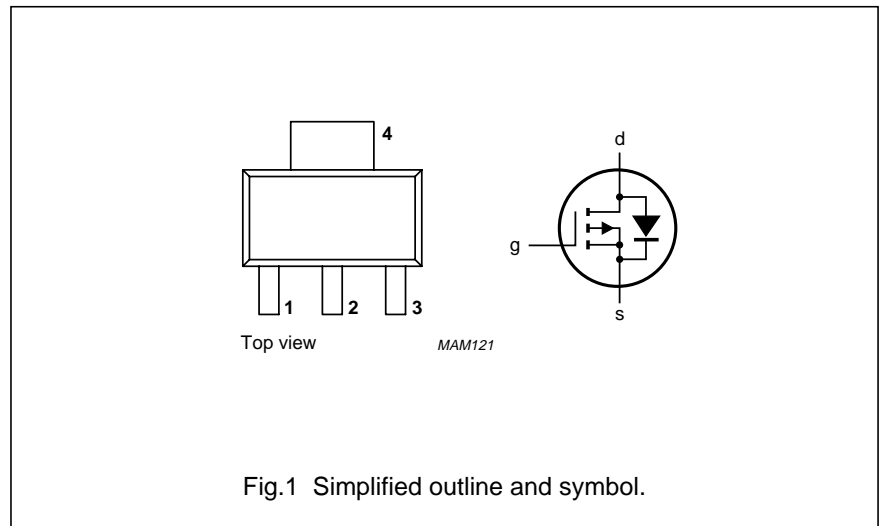
## PINNING - SOT223

| 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    | $-I_D = 200 \text{ mA}$<br>$-V_{GS} = 10 \text{ V}$ | 15   | $\Omega$ |
| $-V_{GS(th)}$ | gate-source threshold voltage | $-I_D = 1 \text{ mA}$<br>$V_{GS} = V_{DS}$          | 2.8  | V        |

## PIN CONFIGURATION



# P-channel enhancement mode vertical D-MOS transistor

BSP225

## 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 cm<sup>2</sup>.

## 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 cm<sup>2</sup>.

# P-channel enhancement mode vertical D-MOS transistor

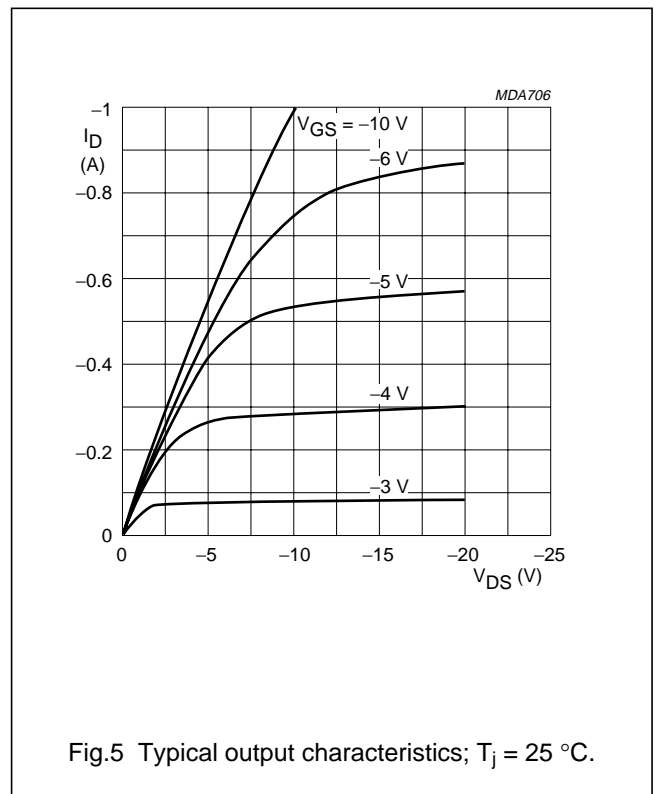
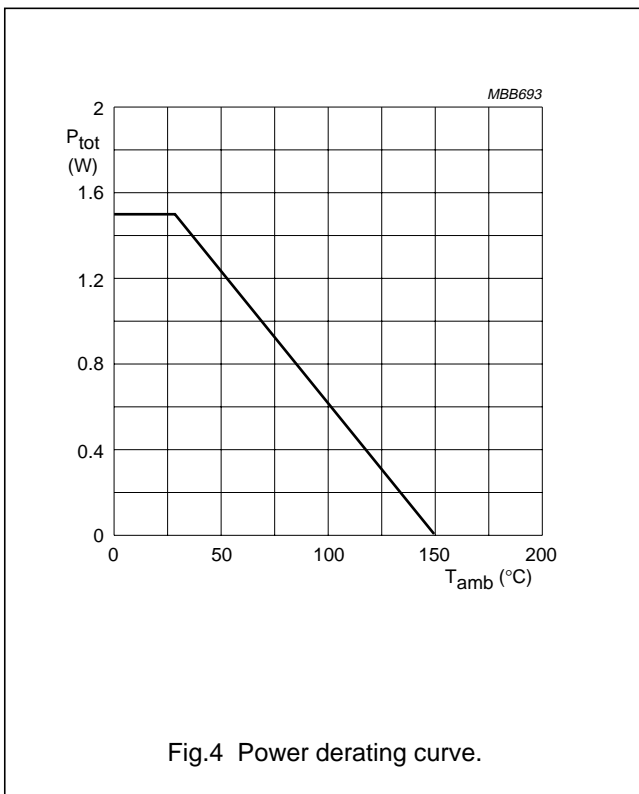
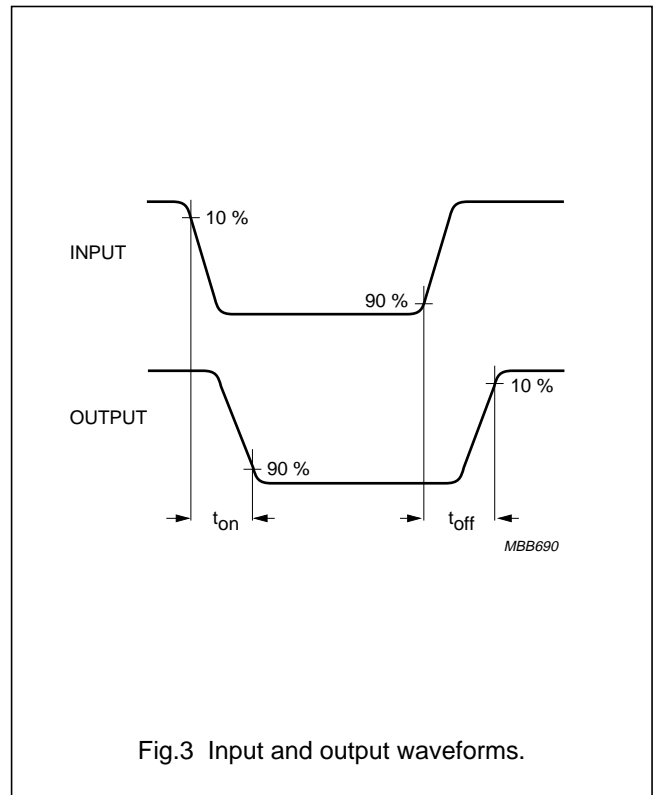
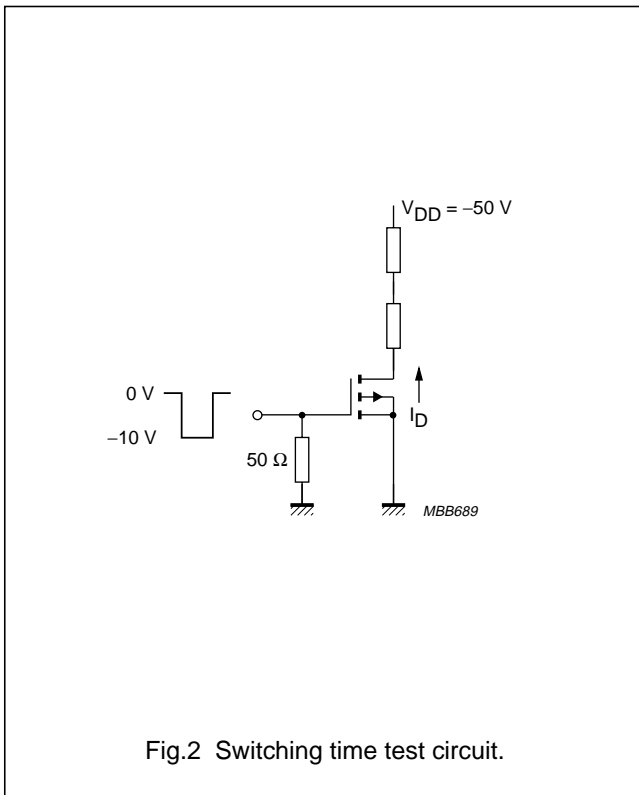
BSP225

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

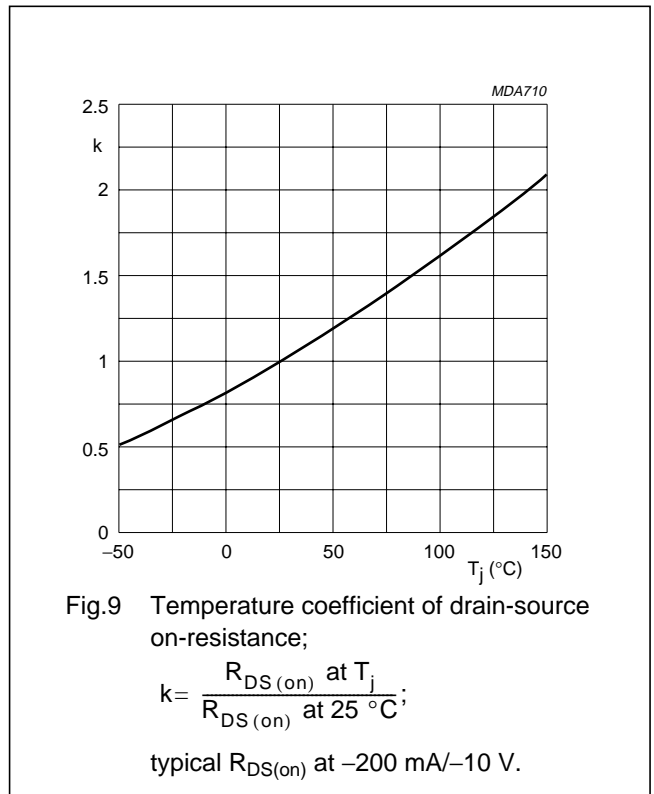
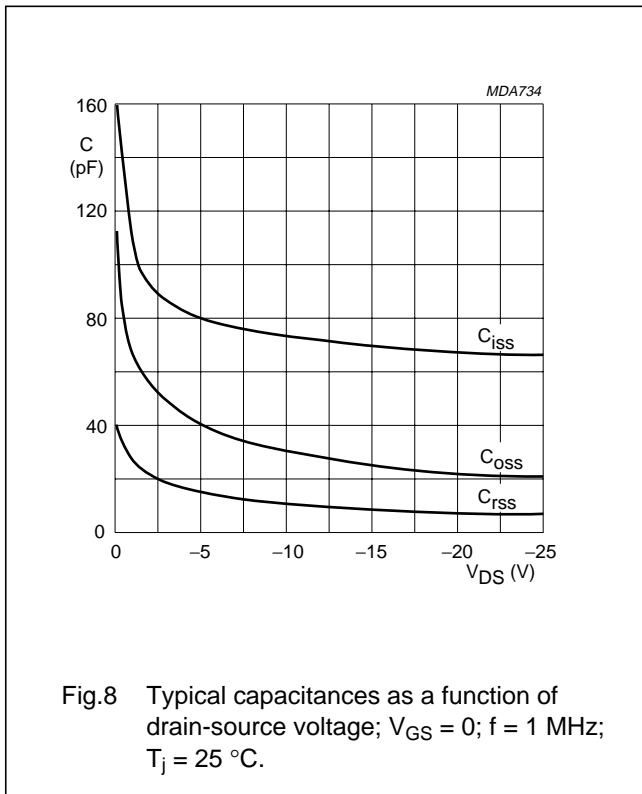
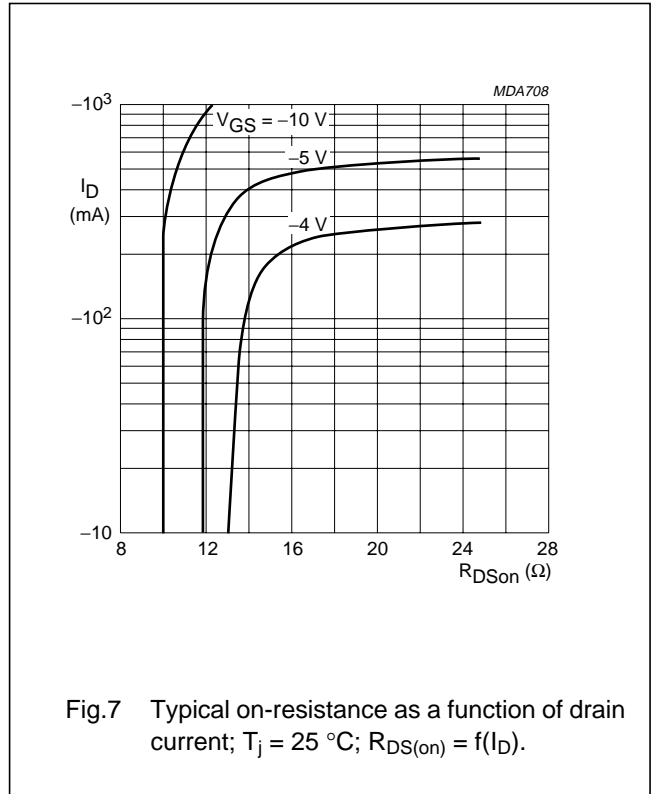
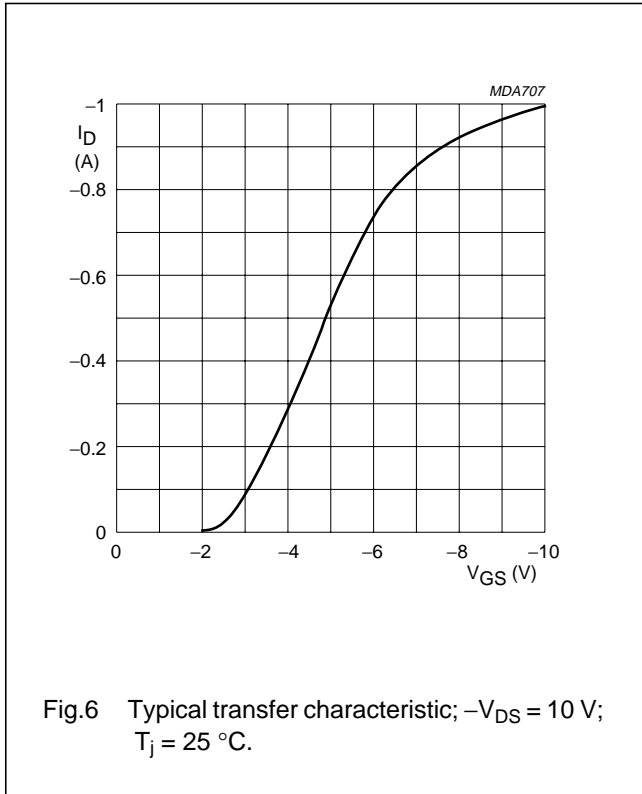
P-channel enhancement mode vertical  
D-MOS transistor

BSP225



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P-channel enhancement mode vertical  
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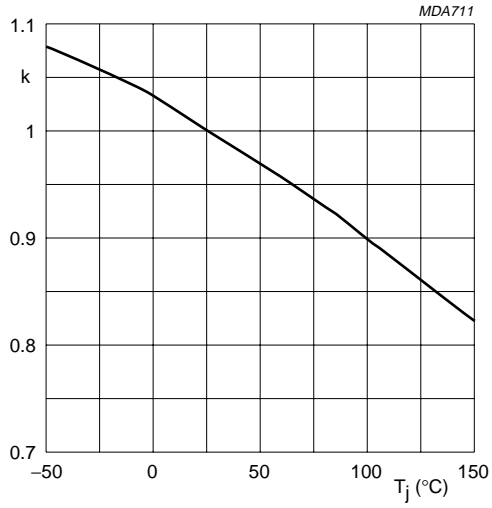


Fig.10 Temperature coefficient of gate-source threshold voltage;

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

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



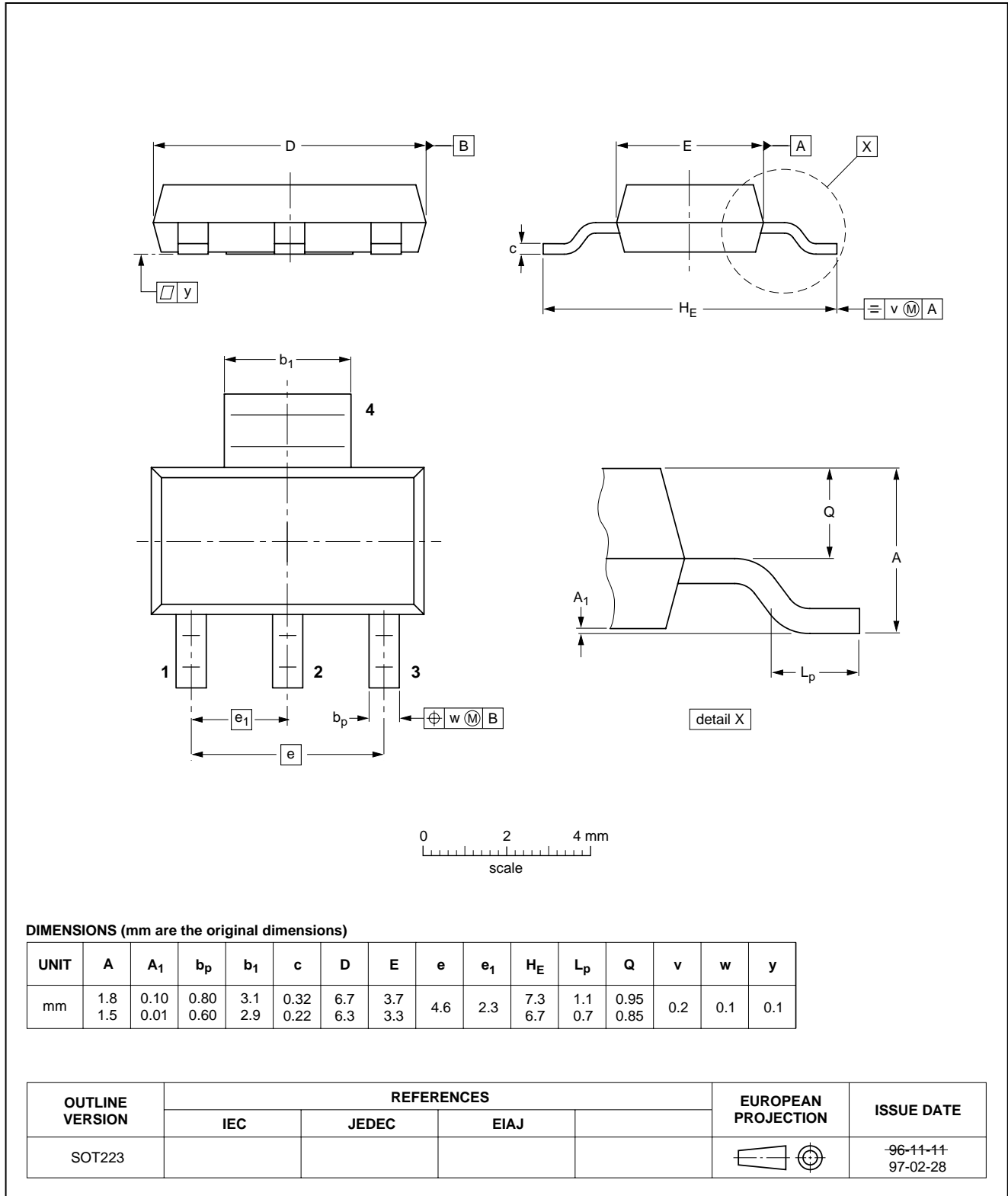
P-channel enhancement mode vertical  
D-MOS transistor

BSP225

PACKAGE OUTLINE

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

SOT223



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub> | 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   | 1.8<br>1.5 | 0.10<br>0.01   | 0.80<br>0.60   | 3.1<br>2.9     | 0.32<br>0.22 | 6.7<br>6.3 | 3.7<br>3.3 | 4.6 | 2.3            | 7.3<br>6.7     | 1.1<br>0.7     | 0.95<br>0.85 | 0.2 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|-------|------|--|---------------------|----------------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |                      |
| SOT223          |            |       |      |  |                     | 96-11-11<br>97-02-28 |

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**P-channel enhancement mode vertical  
D-MOS transistor**

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**BSP225****DEFINITIONS**

| <b>Data sheet status</b>  |   |
|---|---|
| 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.                                |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification. |   |

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P-channel enhancement mode vertical  
D-MOS transistor

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**NOTES**

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P-channel enhancement mode vertical  
D-MOS transistor

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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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