

# 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.

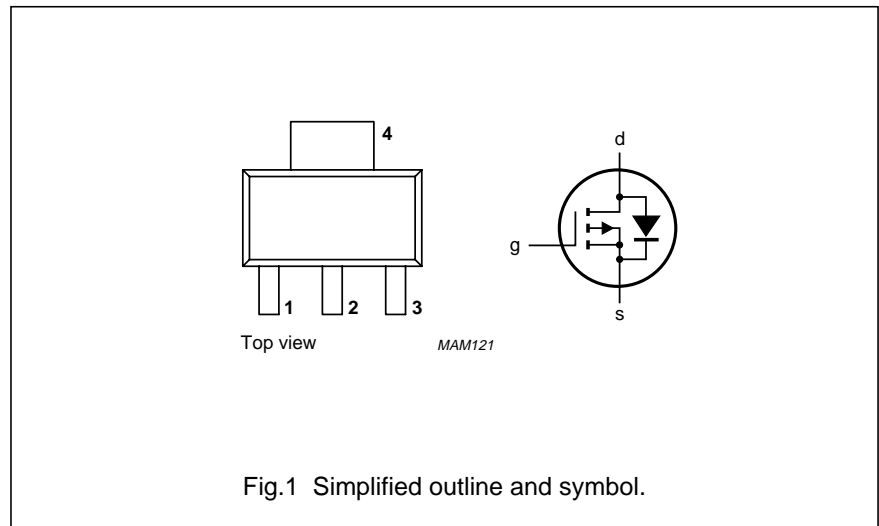
## PINNING - SOT223

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	$\Omega$
$-V_{GS(th)}$	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 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>.

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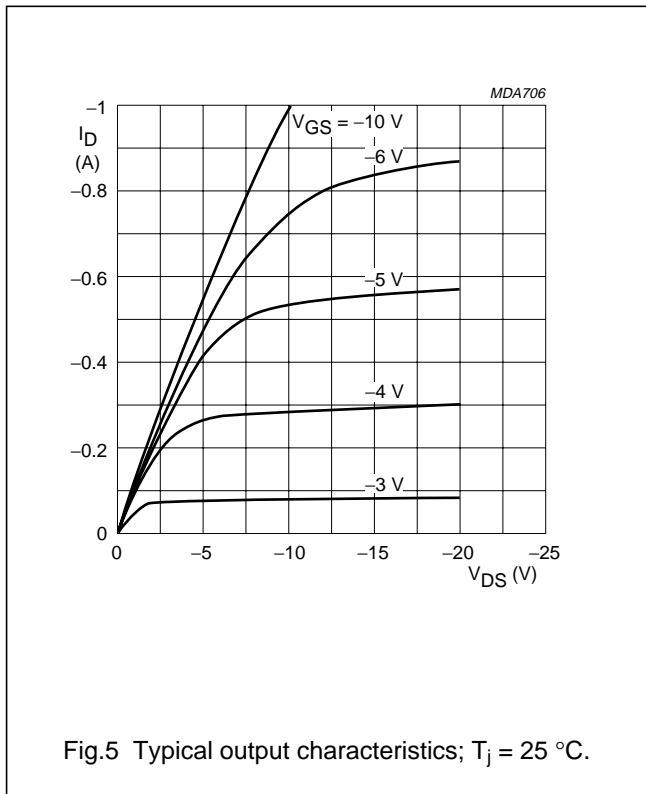
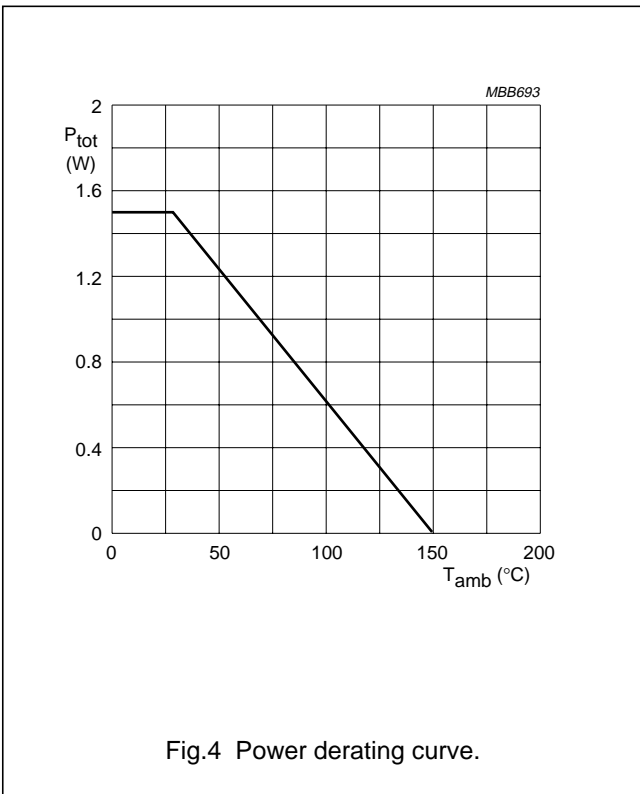
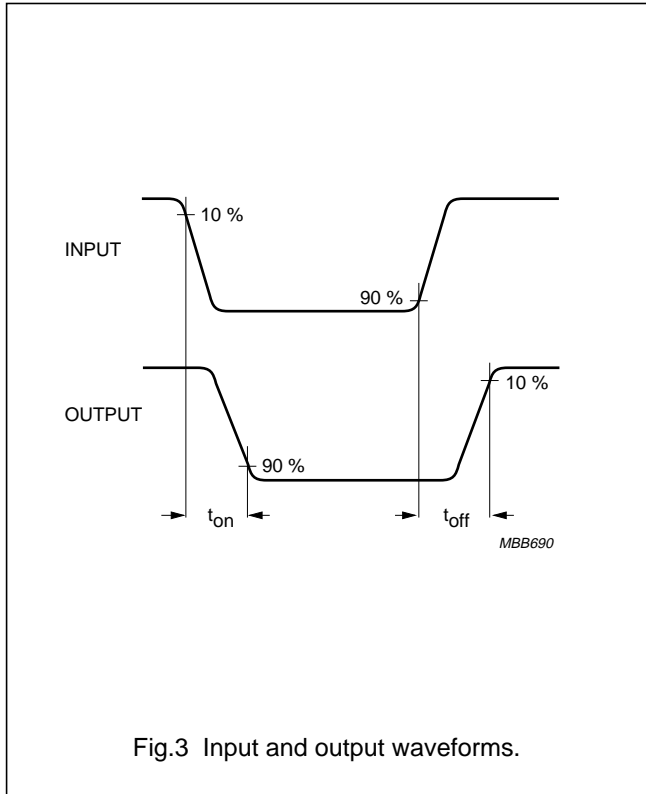
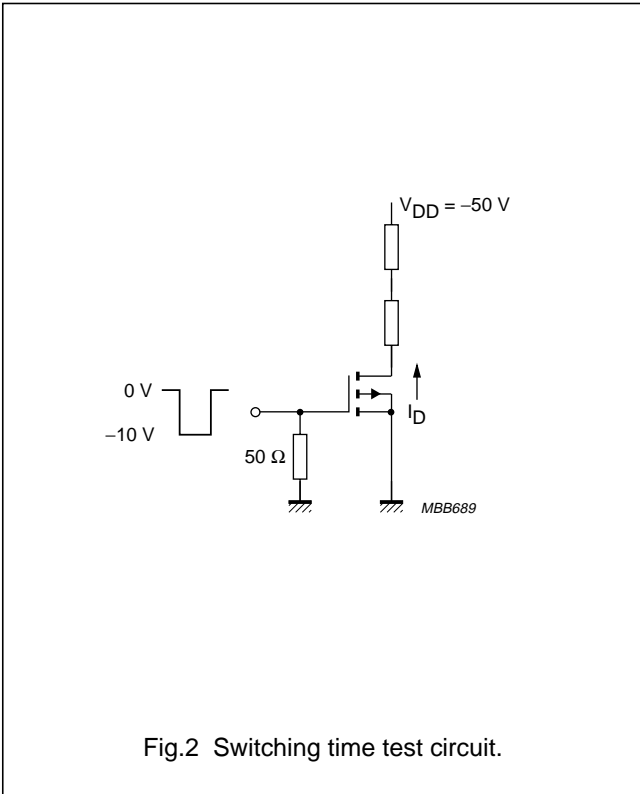
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**CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise specified.

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	$\mu\text{A}$
$\pm I_{GSS}$	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	$\Omega$
$ 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
<b>Switching times (see Figs 2 and 3)</b>						
$t_{on}$	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

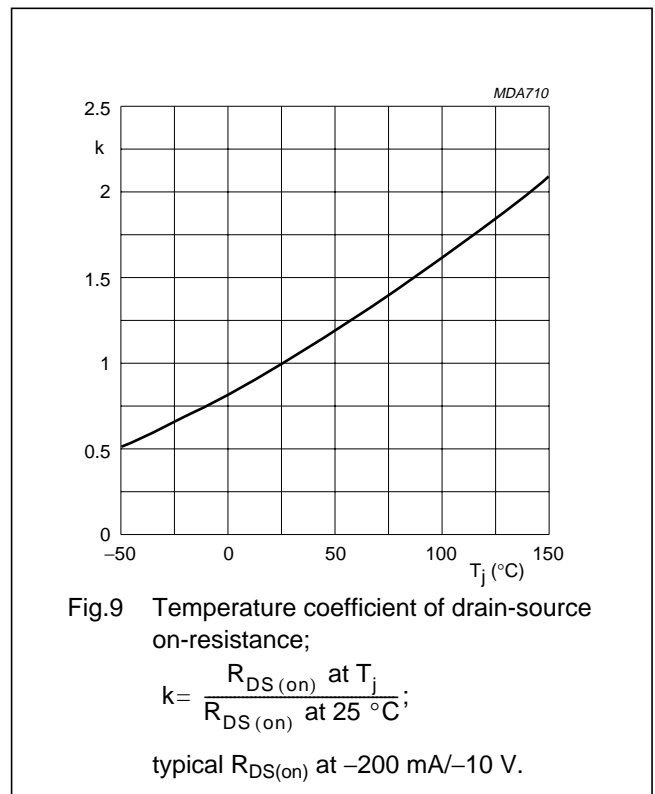
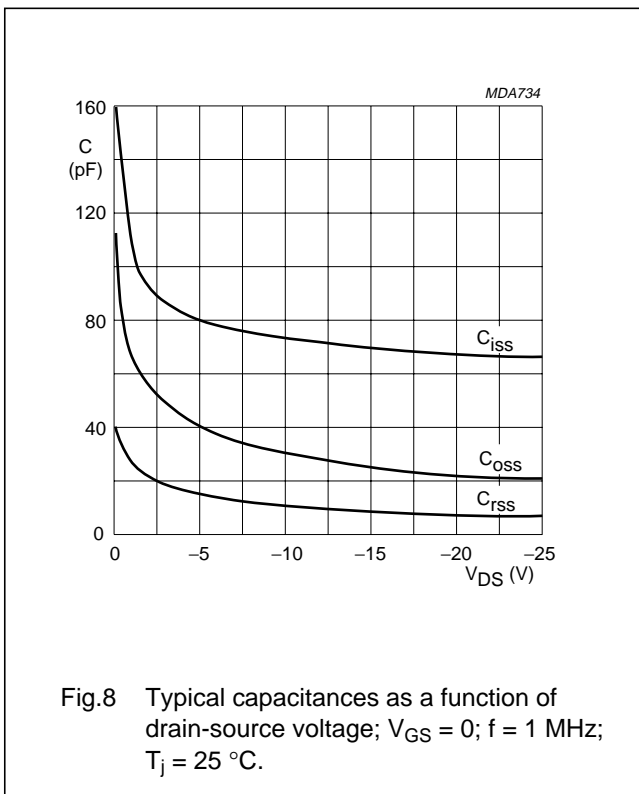
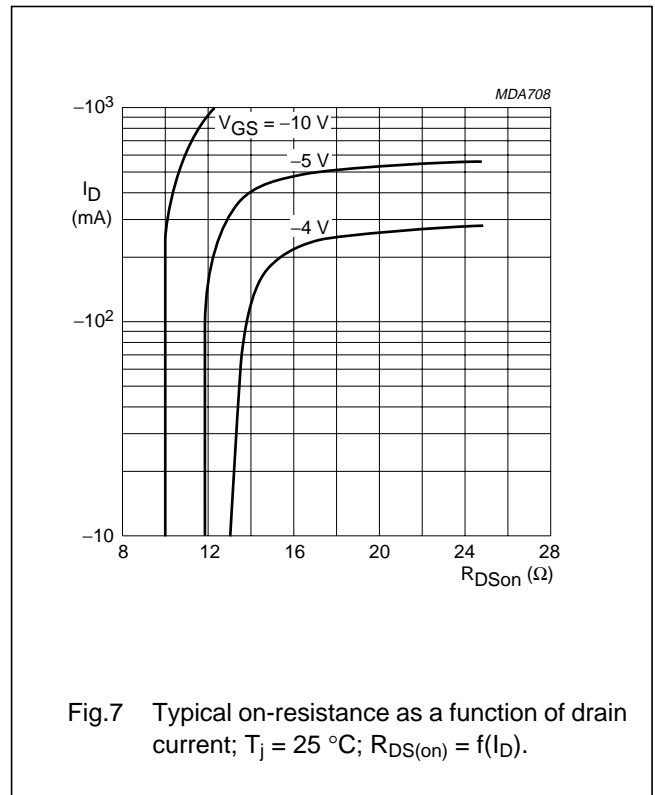
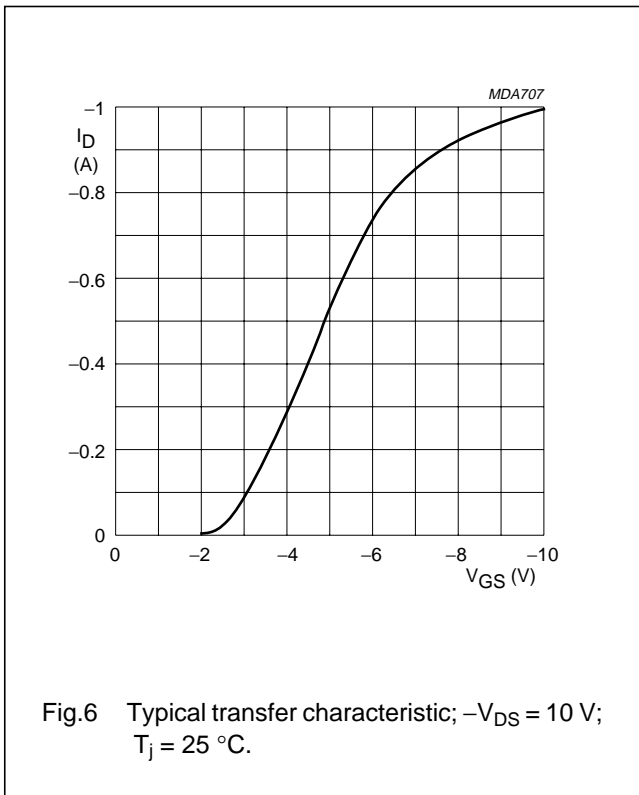
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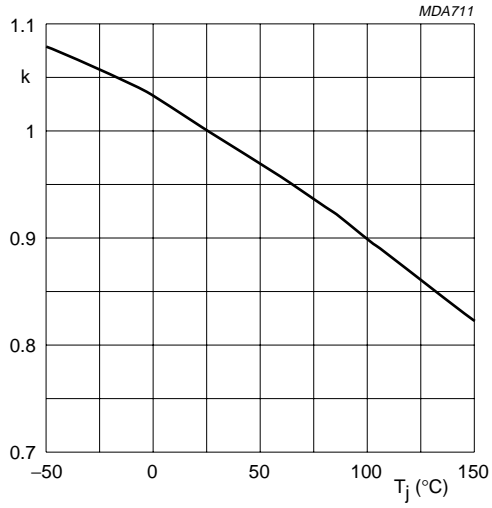


Fig.10 Temperature coefficient of gate-source threshold voltage;

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

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

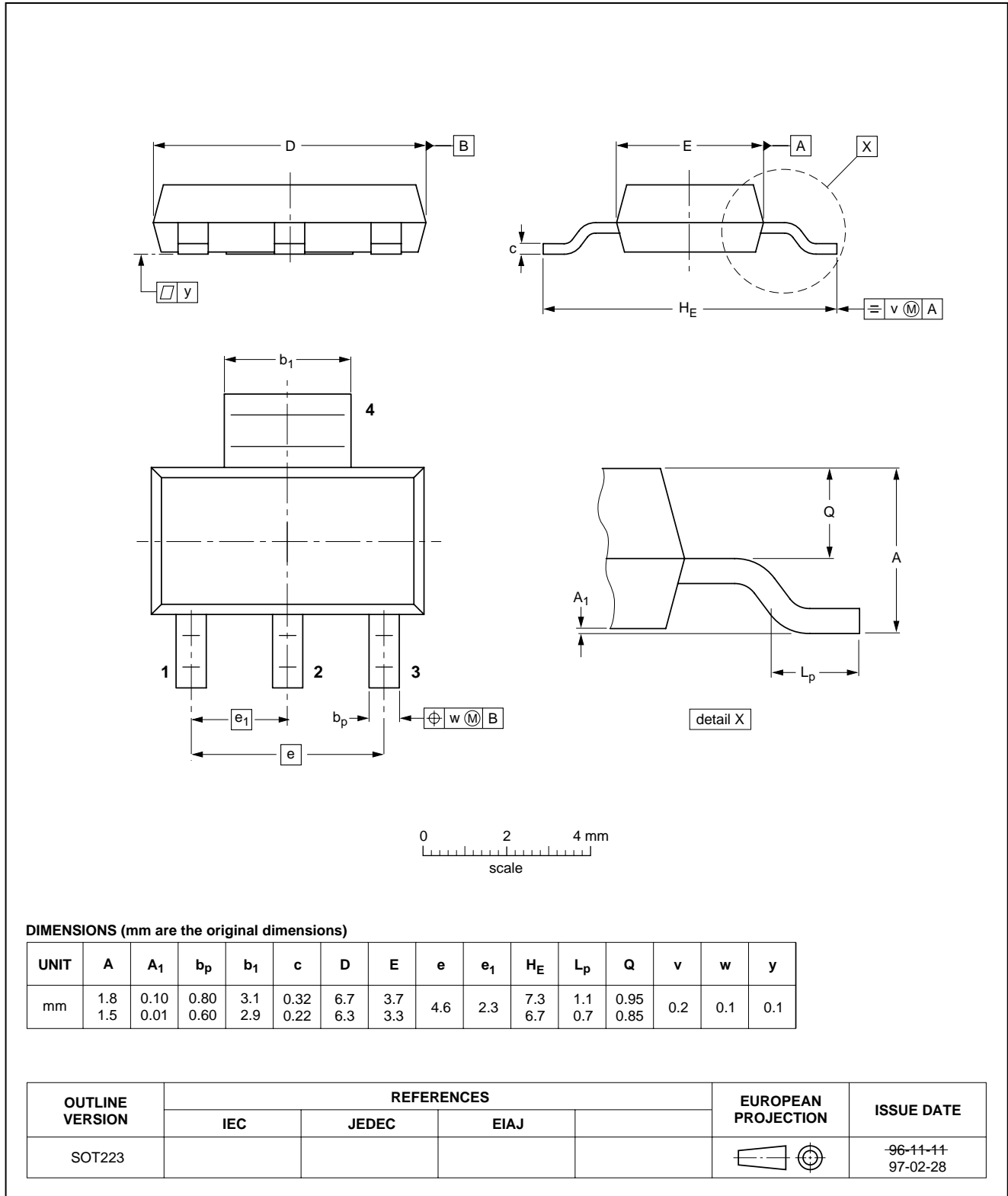
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PACKAGE OUTLINE

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

SOT223



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 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

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



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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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**NOTES**

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