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Team Nexperia

# DATA SHEET

## **BSP220**

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

**BSP220**

## 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 and intended for use in relay, high-speed and line transformer drivers.

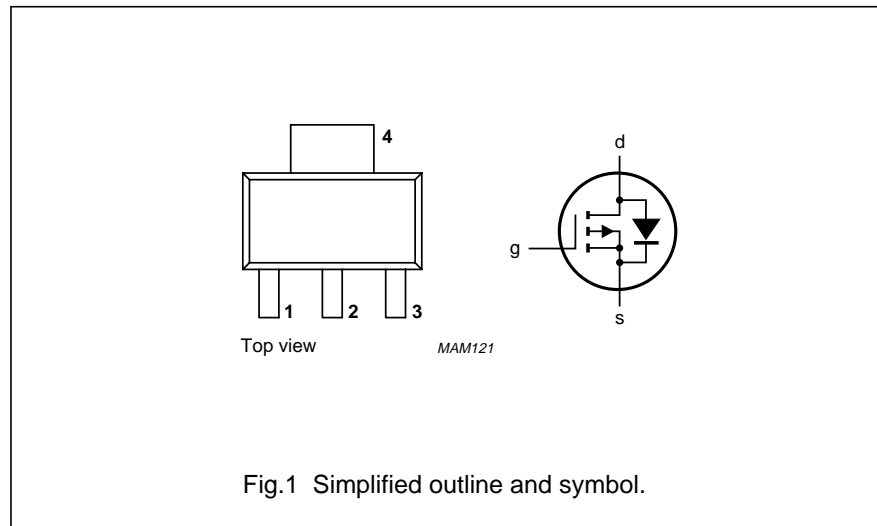
## PINNING - SOT223

PIN	DESCRIPTION
1	gate
2	drain
3	source
4	drain

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$-V_{DS}$	drain-source voltage		200	V
$-I_D$	drain current	DC value	225	mA
$R_{DS(on)}$	drain-source on-resistance	$-I_D = 200 \text{ mA}$ $-V_{GS} = 10 \text{ V}$	12	$\Omega$
$-V_{GS(th)}$	gate-source threshold voltage		2.8	V

## PIN CONFIGURATION



# P-channel enhancement mode vertical D-MOS transistor

BSP220

## LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{DS}$	drain-source voltage		–	200	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

BSP220

**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	$-I_D = 10\ \mu\text{A}$ $V_{GS} = 0$	200	–	–	V
$-I_{DSS}$	drain-source leakage current	$-V_{DS} = 160\ \text{V}$ $V_{GS} = 0$	–	–	1	$\mu\text{A}$
$\pm I_{GSS}$	gate-source leakage current	$\pm V_{GS} = 20\ \text{V}$ $V_{DS} = 0$	–	–	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	12	$\Omega$
$ 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	20	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

P-channel enhancement mode vertical D-MOS transistor

BSP220

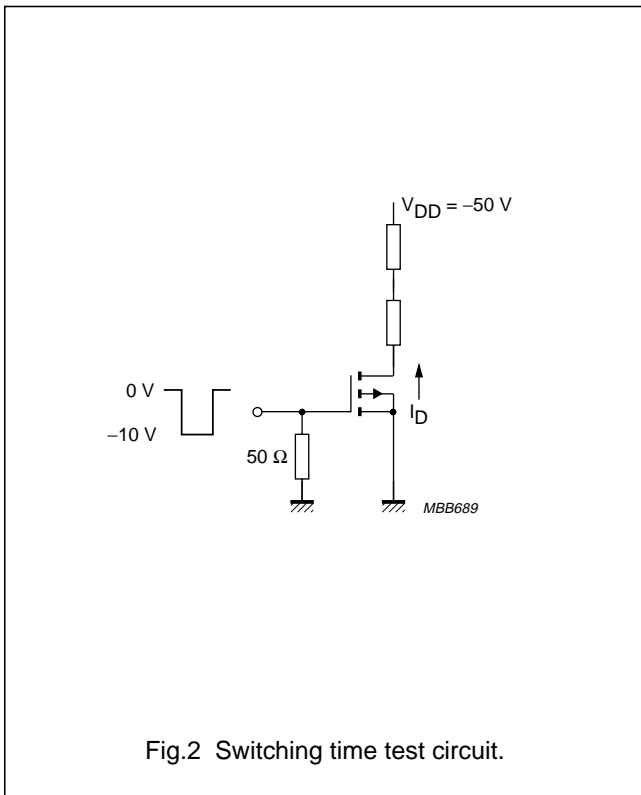


Fig.2 Switching time test circuit.

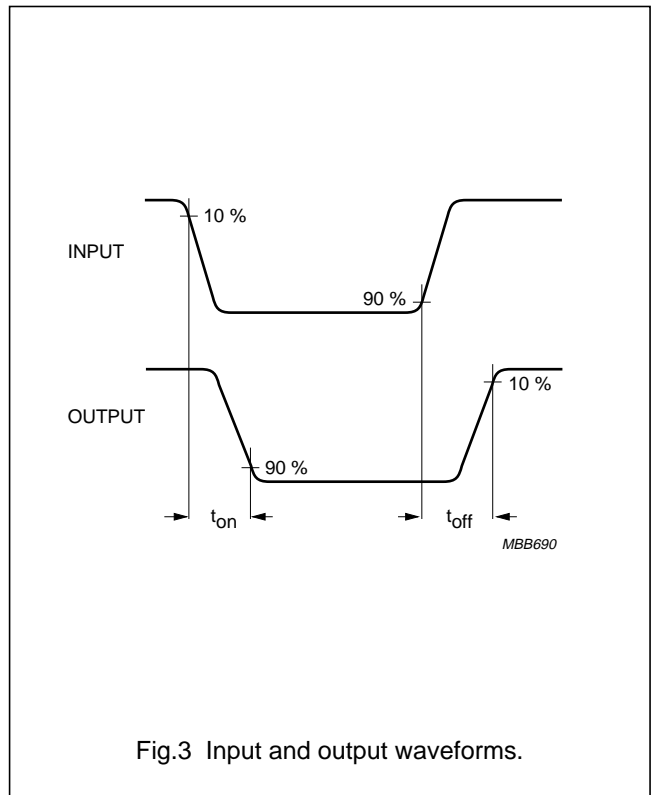


Fig.3 Input and output waveforms.

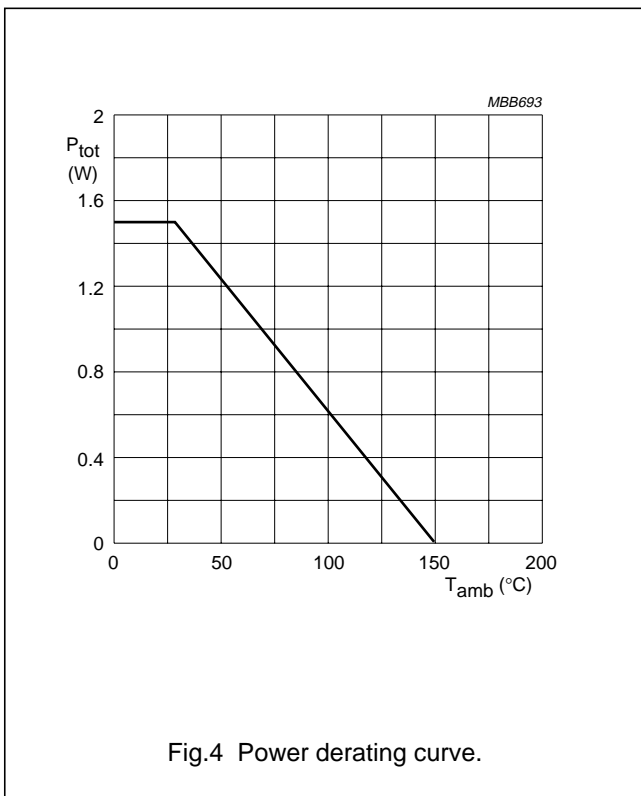


Fig.4 Power derating curve.

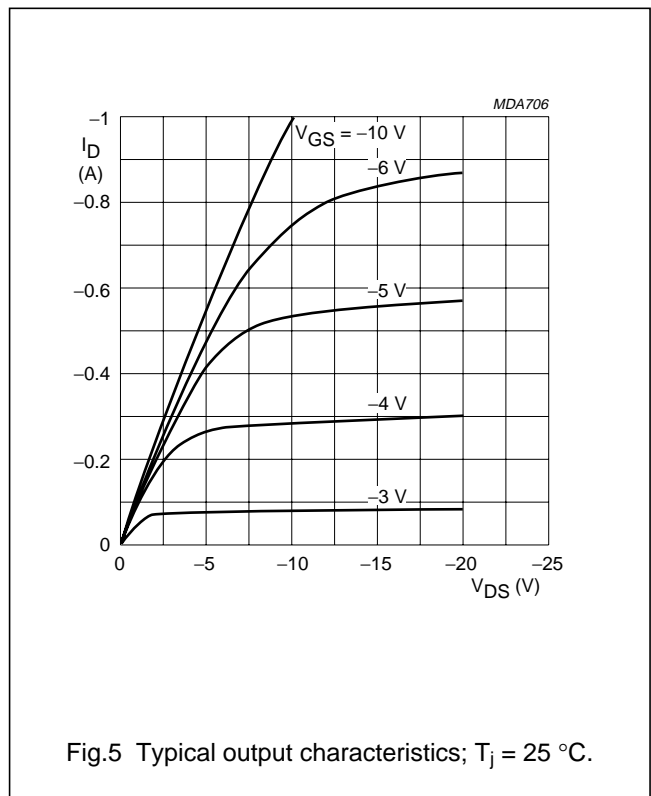
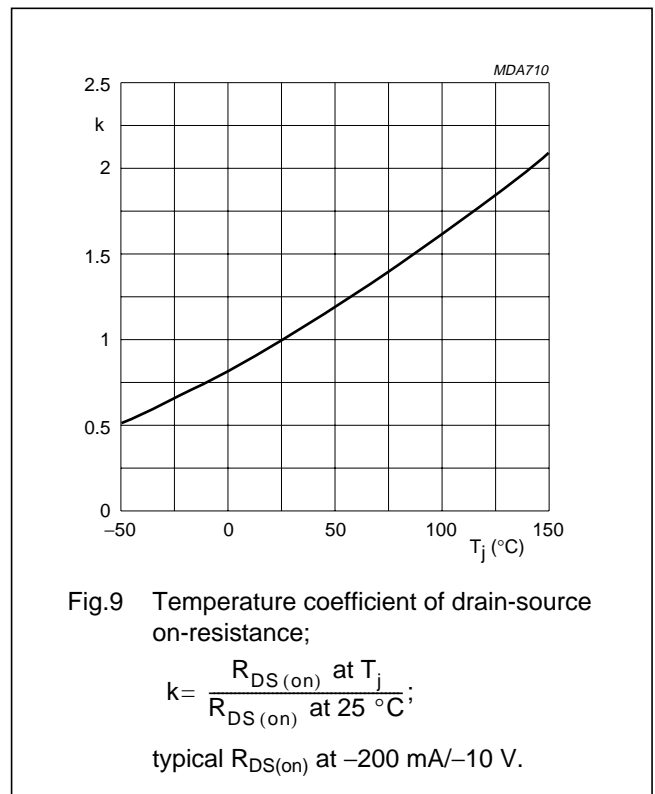
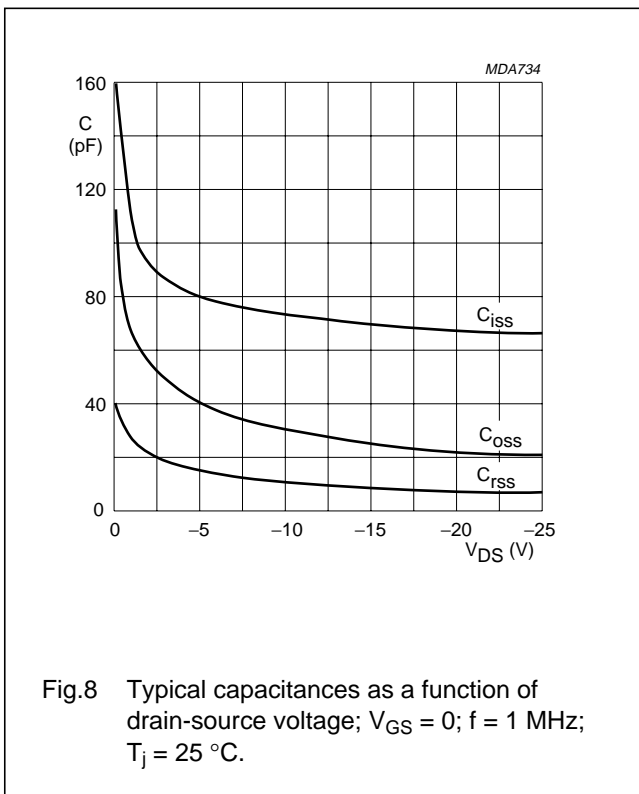
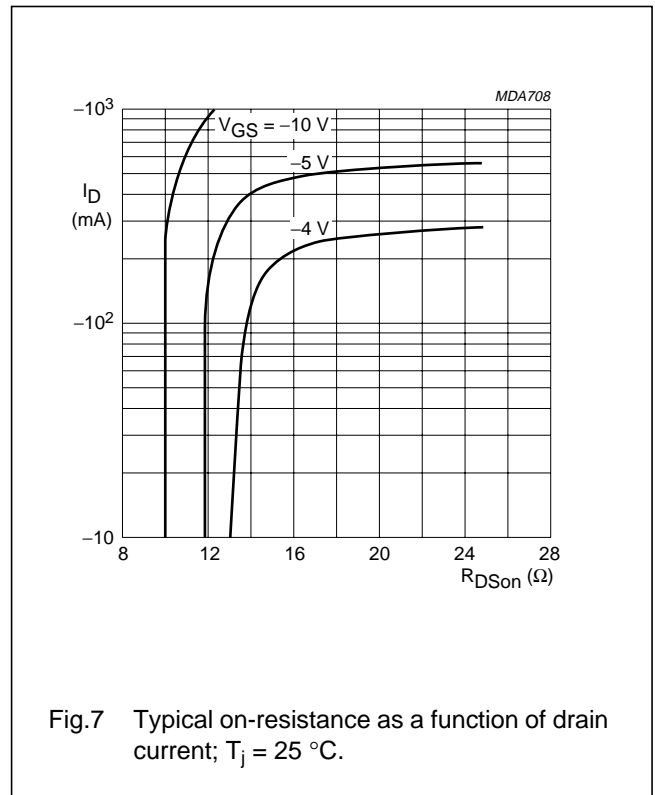
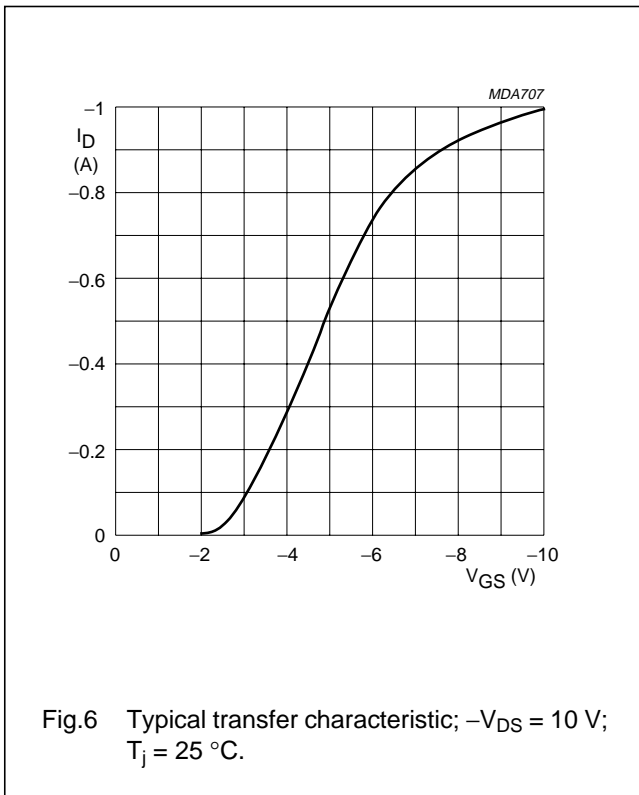


Fig.5 Typical output characteristics; T<sub>j</sub> = 25 °C.

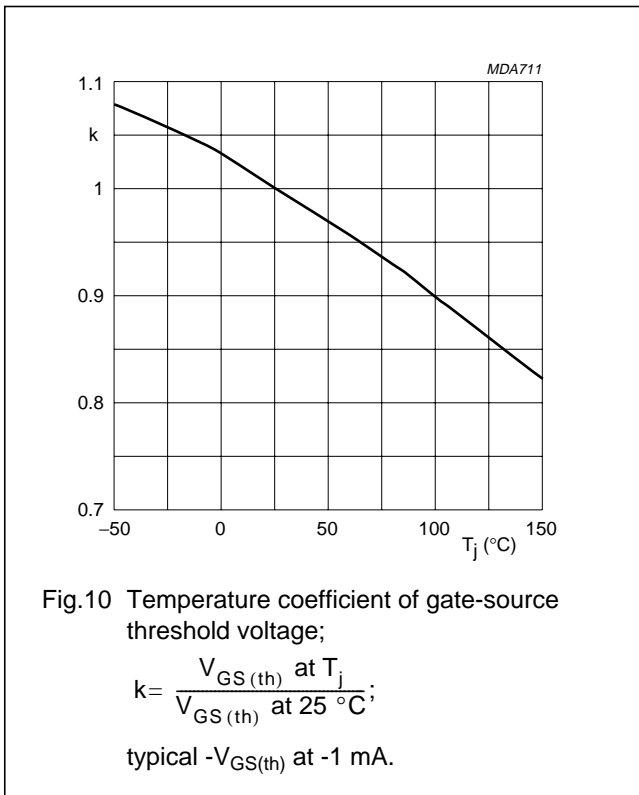
P-channel enhancement mode vertical D-MOS transistor

BSP220



P-channel enhancement mode vertical  
D-MOS transistor

BSP220





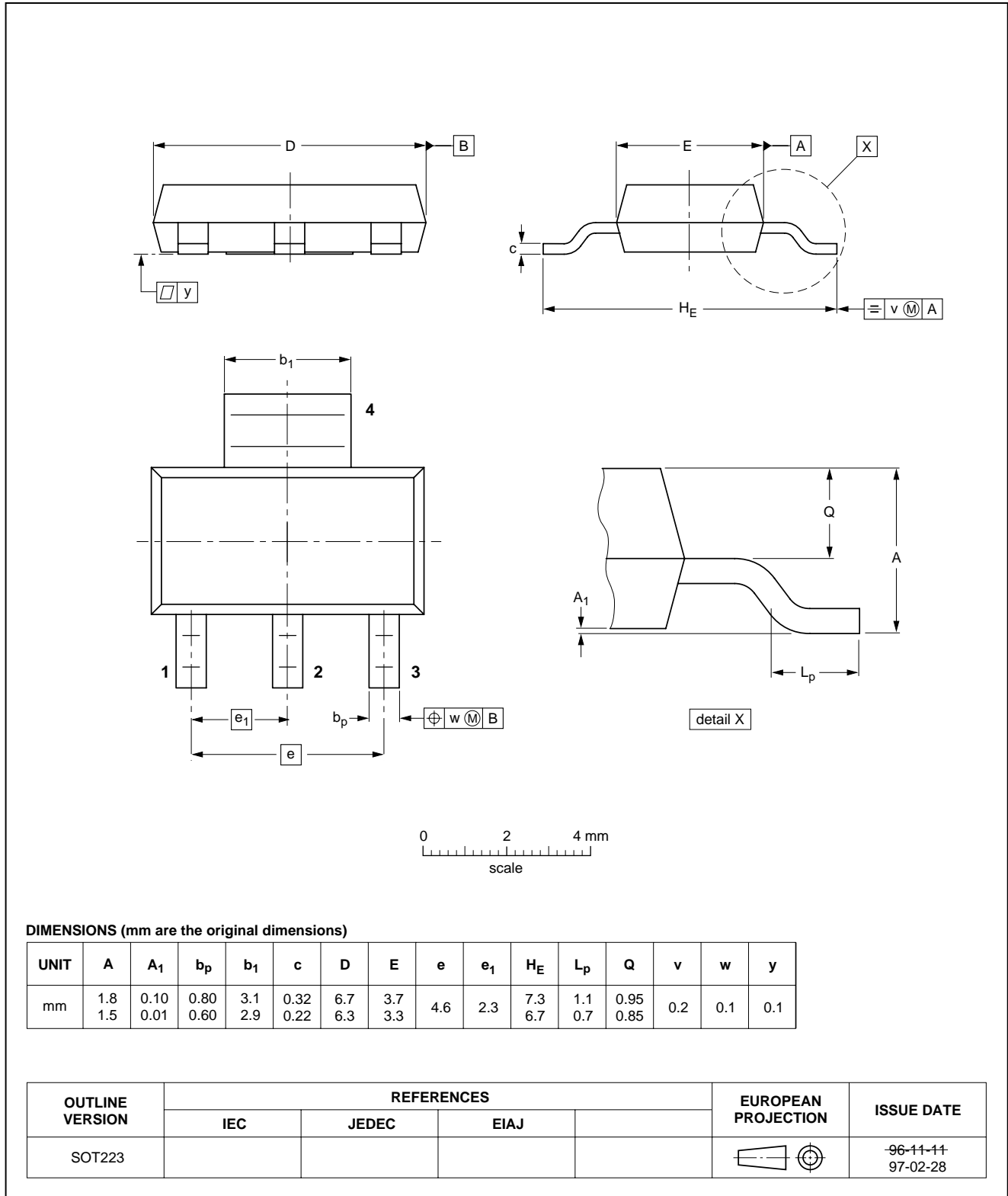
P-channel enhancement mode vertical  
D-MOS transistor

BSP220

PACKAGE OUTLINE

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

SOT223



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**P-channel enhancement mode vertical  
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**BSP220****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  
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**NOTES**

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P-channel enhancement mode vertical  
D-MOS transistor

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BSP220

**NOTES**

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**Argentina:** see South America

**Australia:** 34 Waterloo Road, NORTH RYDE, NSW 2113,  
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

**Austria:** Computerstr. 6, A-1101 WIEN, P.O. Box 213,  
Tel. +43 1 60 101, Fax. +43 1 60 101 1210

**Belarus:** Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,  
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

**Belgium:** see The Netherlands

**Brazil:** see South America

**Bulgaria:** Philips Bulgaria Ltd., Energoproject, 15th floor,  
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Tel. +359 2 689 211, Fax. +359 2 689 102

**Canada:** PHILIPS SEMICONDUCTORS/COMPONENTS,  
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**China/Hong Kong:** 501 Hong Kong Industrial Technology Centre,  
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**Colombia:** see South America

**Czech Republic:** see Austria

**Denmark:** Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,  
Tel. +45 32 88 2636, Fax. +45 31 57 0044

**Finland:** Sinikalliontie 3, FIN-02630 ESPOO,  
Tel. +358 9 615800, Fax. +358 9 61580920

**France:** 4 Rue du Port-aux-Vins, BP317, 92156 SURESNES Cedex,  
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

**Germany:** Hammerbrookstraße 69, D-20097 HAMBURG,  
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

**Greece:** No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,  
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**Hungary:** see Austria

**India:** Philips INDIA Ltd, Shivsagar Estate, A Block, Dr. Annie Besant Rd.  
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**Indonesia:** see Singapore

**Ireland:** Newstead, Clonskeagh, DUBLIN 14,  
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**Israel:** RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,  
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

**Italy:** PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,  
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

**Japan:** Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108,  
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**Malaysia:** No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,  
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**Mexico:** 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,  
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**New Zealand:** 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,  
Tel. +64 9 849 4160, Fax. +64 9 849 7811

**Norway:** Box 1, Manglerud 0612, OSLO,  
Tel. +47 22 74 8000, Fax. +47 22 74 8341

**Philippines:** Philips Semiconductors Philippines Inc.,  
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,  
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

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**Portugal:** see Spain

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**Singapore:** Lorong 1, Toa Payoh, SINGAPORE 1231,  
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**Slovakia:** see Austria

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**South America:** Rua do Rocio 220, 5th floor, Suite 51,  
04552-903 São Paulo, SÃO PAULO - SP, Brazil,  
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**Spain:** Balmes 22, 08007 BARCELONA,  
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**Taiwan:** Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,  
TAIPEI, Taiwan Tel. +886 2 2134 2865, Fax. +886 2 2134 2874

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**Turkey:** Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,  
Tel. +90 212 279 2770, Fax. +90 212 282 6707

**Ukraine:** PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,  
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

**United Kingdom:** Philips Semiconductors Ltd., 276 Bath Road, Hayes,  
MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

**United States:** 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,  
Tel. +1 800 234 7381

**Uruguay:** see South America

**Vietnam:** see Singapore

**Yugoslavia:** PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,  
Tel. +381 11 625 344, Fax. +381 11 635 777

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