

DATA SHEET

BSP205

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**

BSP205

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.

QUICK REFERENCE DATA

Drain-source voltage	$-V_{DS}$	max.	60 V
Drain current (DC)	$-I_D$	max.	275 mA
Drain-source ON-resistance	$-I_D = 200 \text{ mA}; -V_{GS} = 10 \text{ V}$	$R_{DS(on)}$	max. 10 Ω
Gate threshold voltage		$-V_{GS(th)}$	max. 3.5 V

FEATURES

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

PINNING - SOT223

- 1 = gate
- 2 = drain
- 3 = source
- 4 = drain

PIN CONFIGURATION

Marking code

BSP205

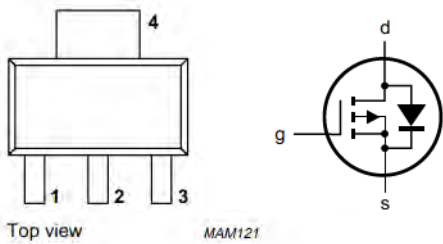


Fig.1 Simplified outline and symbol.

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BSP205**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$-V_{DS}$	max.	60 V
Gate-source voltage (open drain)	$\pm V_{GSO}$	max.	20 V
Drain current (DC)	$-I_D$	max.	275 mA
Drain current (peak)	$-I_{DM}$	max.	550 mA
Total power dissipation up to $T_{amb} = 25\text{ }^{\circ}\text{C}$ (note 1)	P_{tot}	max.	1.5 W
Storage temperature range	T_{stg}		-65 to $150\text{ }^{\circ}\text{C}$
Junction temperature	T_j	max.	$150\text{ }^{\circ}\text{C}$

THERMAL RESISTANCE

From junction to ambient (note 1)	$R_{th\ j-a}$	=	83.3 K/W
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Note

1. Device mounted on an epoxy printed-circuit board $40\text{ mm} \times 40\text{ mm} \times 1.5\text{ mm}$; mounting pad for the drain lead min. 6 cm^2 .

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CHARACTERISTICS

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

Drain-source breakdown voltage

$-I_D = 10\text{ }\mu\text{A}$; $V_{GS} = 0$

$-V_{(BR)DSS}$ min. 60 V

Drain-source leakage current

$-V_{DS} = 48\text{ V}$; $V_{GS} = 0$

$-I_{DSS}$ max. 1.0 μA

Gate-source leakage current

$\pm V_{GS} = 20\text{ V}$; $V_{DS} = 0$

$\pm I_{GSS}$ max. 100 nA

Gate threshold voltage

$-I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$

$-V_{GS(th)}$ min. 1.5 V
max. 3.5 V

Drain-source ON-resistance

$-I_D = 200\text{ mA}$; $-V_{GS} = 10\text{ V}$

$R_{DS(on)}$ typ. 7.5 Ω
max. 10 Ω

Transfer admittance

$-I_D = 200\text{ mA}$; $-V_{DS} = 15\text{ V}$

$|Y_{fs}|$ min. 60 mS
typ. 125 mS

Input capacitance at $f = 1\text{ MHz}$;

$-V_{DS} = 10\text{ V}$; $V_{GS} = 0$

C_{iss} typ. 30 pF
max. 45 pF

Output capacitance at $f = 1\text{ MHz}$;

$-V_{DS} = 10\text{ V}$; $V_{GS} = 0$

C_{oss} typ. 20 pF
max. 30 pF

Feedback capacitance at $f = 1\text{ MHz}$;

$-V_{DS} = 10\text{ V}$; $V_{GS} = 0$

C_{rss} typ. 5 pF
max. 10 pF

Switching times (see Figs 2 and 3)

$-I_D = 200\text{ mA}$; $-V_{DD} = 50\text{ V}$;

$-V_{GS} = 0\text{ to }10\text{ V}$

t_{on} typ. 3 ns
max. 6 ns

t_{off} typ. 10 ns
max. 15 ns

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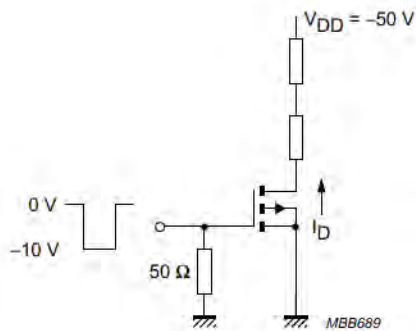


Fig.2 Switching time test circuit.

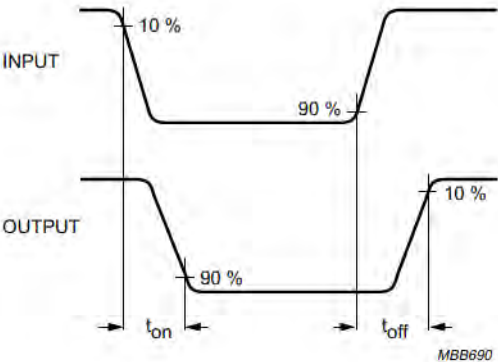


Fig.3 Input and output waveforms.

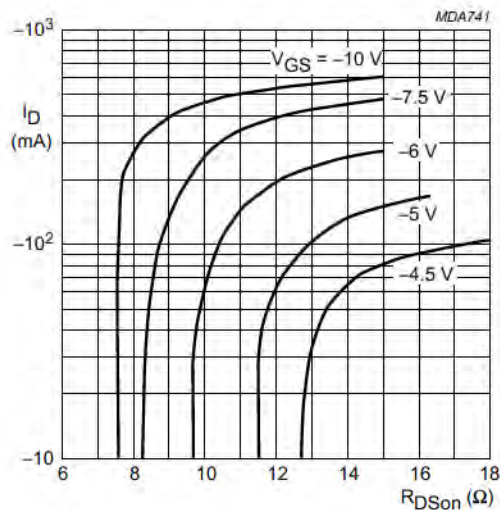


Fig.4 ON-resistance as a function of drain current; $T_j = 25\text{ }^{\circ}\text{C}$; typical values.

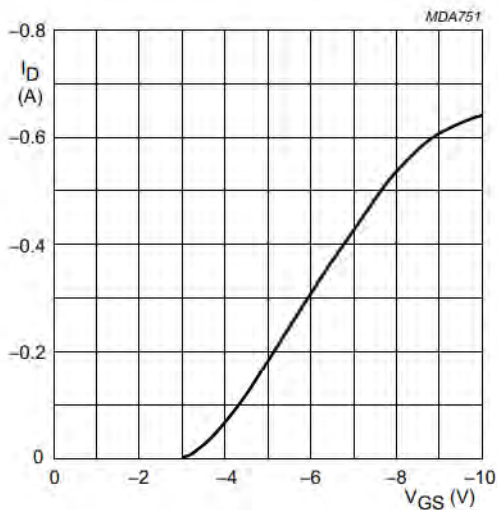


Fig.5 Transfer characteristics; $-V_{DS} = 10\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; typical values.

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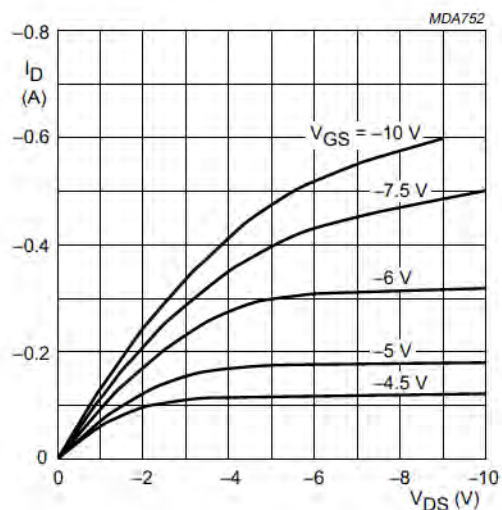


Fig.6 Output characteristics; $T_j = 25\text{ }^{\circ}\text{C}$; typical values.

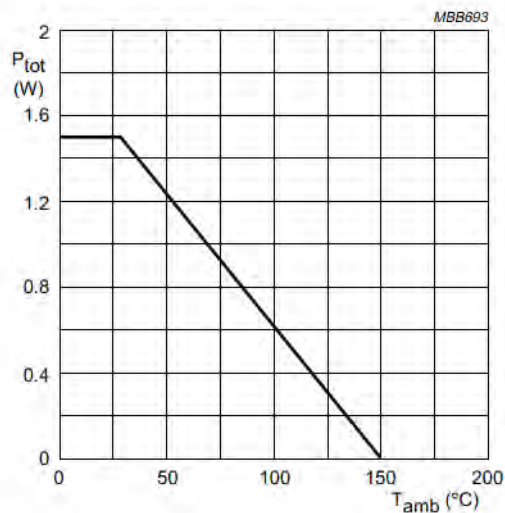


Fig.7 Power derating curve.

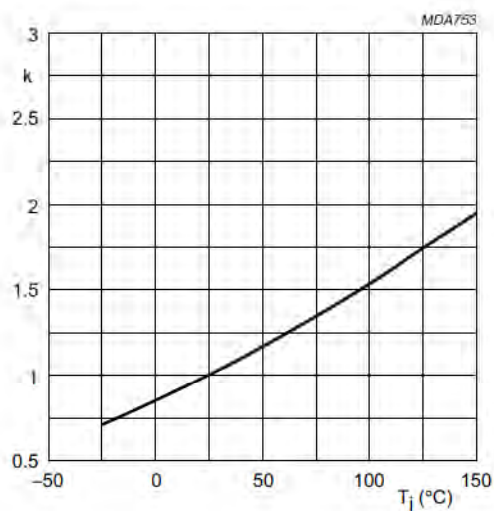


Fig.8

$$k = \frac{R_{DS(on)} \text{ at } T_j}{R_{DS(on)} \text{ at } 25\text{ }^{\circ}\text{C}};$$

at $-200\text{ mA}/-10\text{ V}$; typical values.

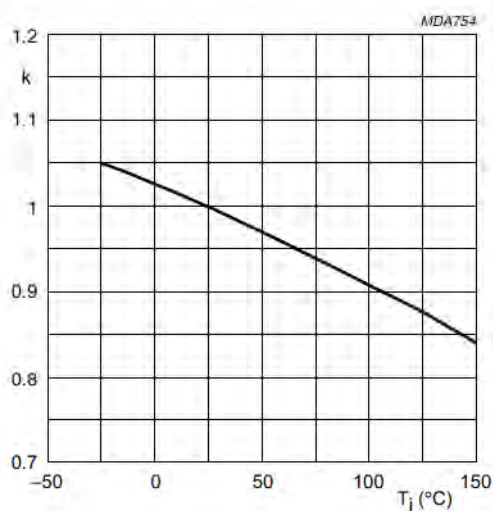


Fig.9

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

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

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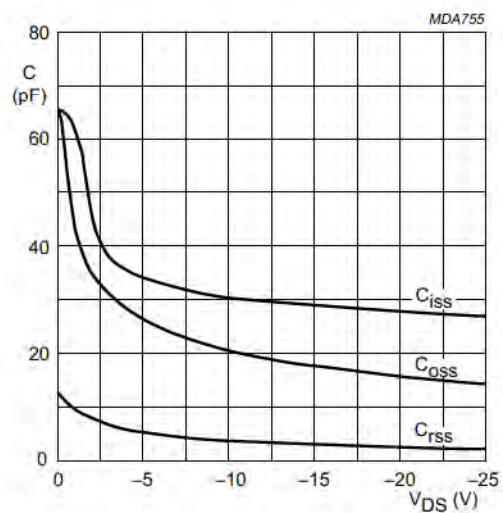
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Fig.10 $T_j = 25\text{ }^{\circ}\text{C}$; $V_{GS} = 0$; $f = 1\text{ MHz}$; typical values.

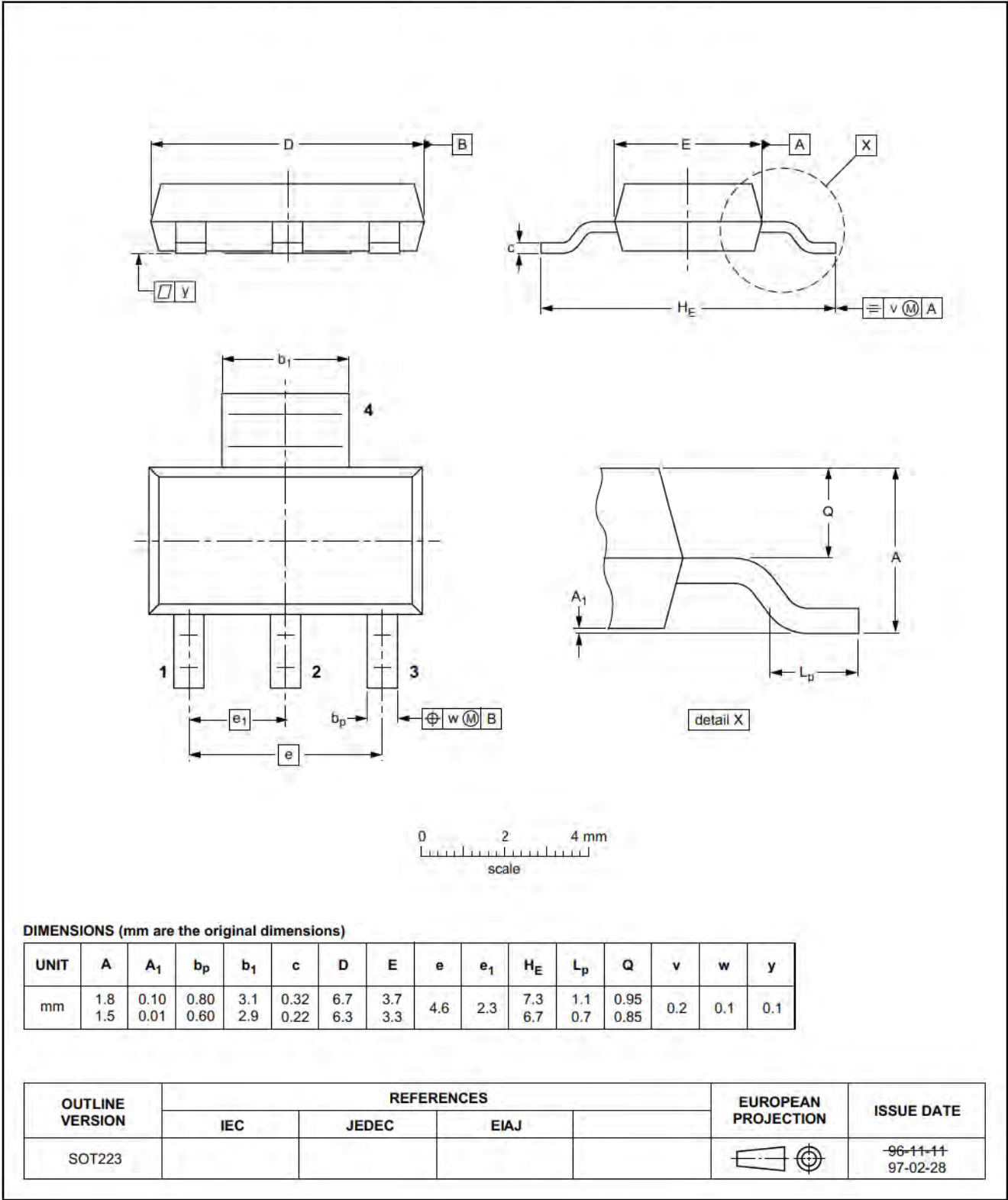
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PACKAGE OUTLINE

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

SOT223



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BSP205**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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