

DATA SHEET

BSP121

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

Product specification
Supersedes data of April 1995
File under Discrete Semiconductors, SC13b

1998 Apr 01

N-channel enhancement mode vertical D-MOS transistor

BSP121

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a miniature SOT223 envelope and designed for use as a line current interrupter in telephone sets and for application in relay, high-speed and line-transformer drivers.

FEATURES

- Direct interface to C-MOS, TTL, etc.
- High-speed switching
- No secondary breakdown

QUICK REFERENCE DATA

Drain source voltage	V_{DS}	max.	200 V
Gate-source voltage (open drain)	$\pm V_{GSO}$	max.	20 V
Drain current (DC)	I_D	max.	350 mA
Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$	P_{tot}	max.	1.5 W
Drain-source on-resistance $I_D = 400\text{ mA}; V_{GS} = 10\text{ V}$	$R_{DS(on)}$	typ.	4.5 Ω
		max.	6.0 Ω
Transfer admittance $I_D = 400\text{ mA}; V_{DS} = 25\text{ V}$	$ Y_{fs} $	min.	200 mS
		typ.	350 mS

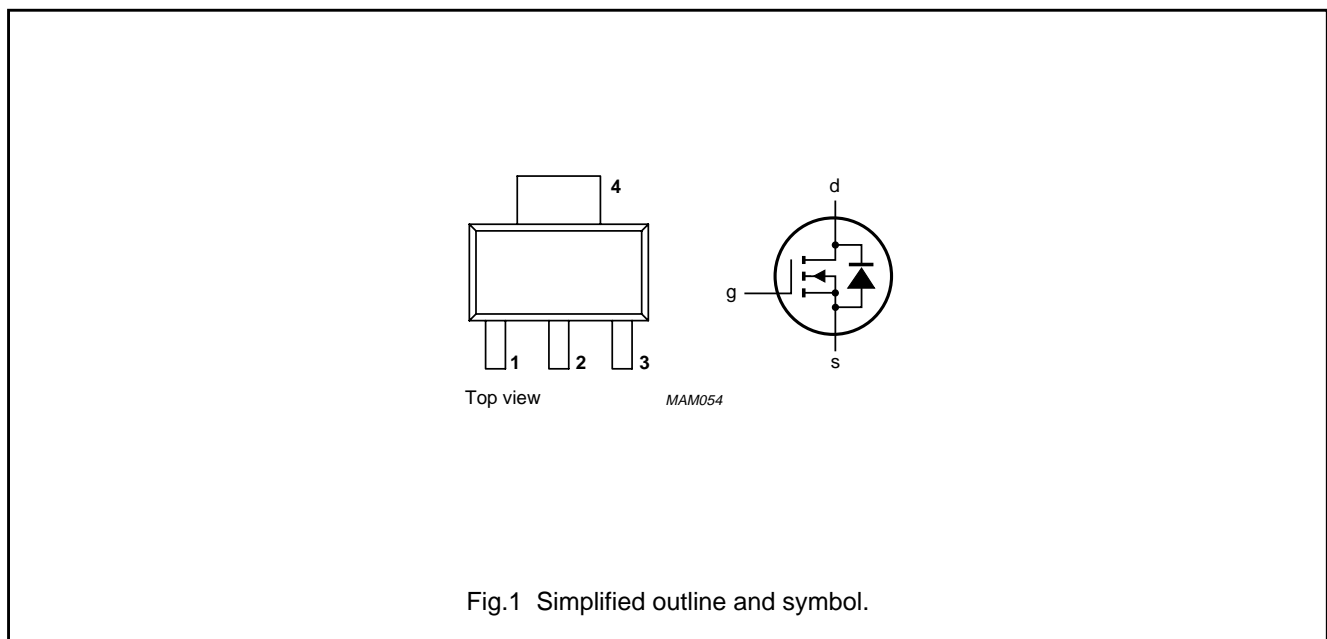
PINNING - SOT223

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

Marking code

BSP121

PIN CONFIGURATION



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BSP121

RATINGS

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

Drain-source voltage	V_{DS}	max.	200 V
Gate-source voltage (open drain)	$\pm V_{GSO}$	max.	20 V
Drain current (DC)	I_D	max.	350 mA
Drain current (peak)	I_{DM}	max.	1.2 A
Total power dissipation up to $T_{amb} = 25\text{ °C}$ (note 1)	P_{tot}	max.	1.5 W
Storage temperature range	T_{stg}		-65 to + 150 °C
Junction temperature	T_j	max.	150 °C

THERMAL RESISTANCE

From junction to ambient (note 1)	R_{thj-a}	=	83.3 K/W
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Note

1. Device mounted on an epoxy printed-circuit board 40 mm × 40 mm × 1.5 mm; mounting pad for the drain lead min. 6 cm².

N-channel enhancement mode vertical D-MOS transistor

BSP121

CHARACTERISTICS

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

Drain-source breakdown voltage

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

$V_{(BR)DSS}$ min. 200 V

Drain-source leakage current

$V_{DS} = 160\text{ V}; V_{GS} = 0$

I_{DSS} max. 1.0 μA

$V_{DS} = 60\text{ V}; V_{GS} = 0$

I_{DSS} max. 200 nA

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. 0.8 V
max. 2.8 V

Drain-source on-resistance

$I_D = 400\text{ mA}; V_{GS} = 10\text{ V}$

$R_{DS(on)}$ typ. 4.5 Ω
max. 6.0 Ω

Transfer admittance

$I_D = 400\text{ mA}; V_{DS} = 25\text{ V}$

$|Y_{fs}|$ min. 200 mS
typ. 350 mS

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

$V_{DS} = 25\text{ V}; V_{GS} = 0$

C_{iss} typ. 45 pF
max. 60 pF

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

$V_{DS} = 25\text{ V}; V_{GS} = 0$

C_{oss} typ. 15 pF
max. 25 pF

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

$V_{DS} = 25\text{ V}; V_{GS} = 0$

C_{rss} typ. 3.5 pF
max. 10 pF

Switching times (see Figs 2 and 3)

$I_D = 250\text{ mA}; V_{DD} = 50\text{ V}; V_{GS} = 0\text{ to }10\text{ V}$

t_{on} typ. 5 pF
max. 10 pF

t_{off} typ. 15 ns
max. 20 ns

N-channel enhancement mode vertical D-MOS transistor

BSP121

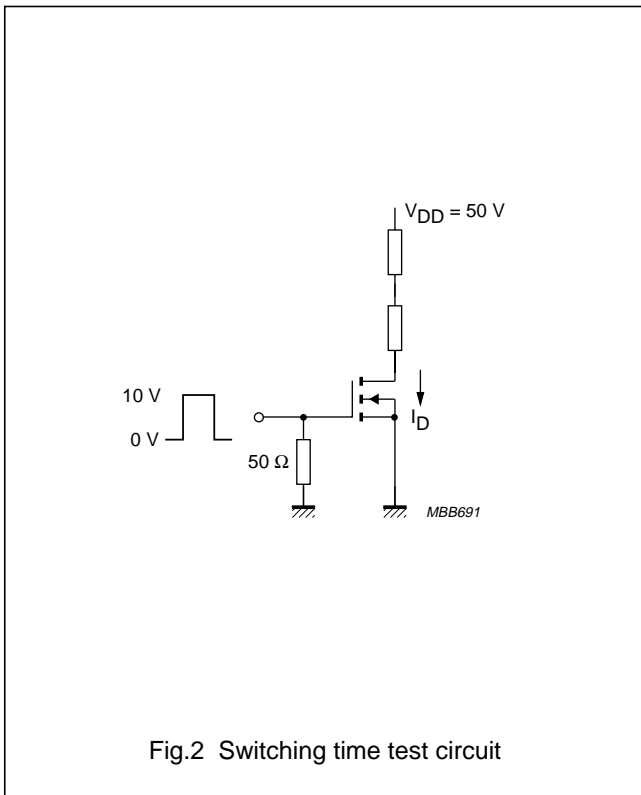


Fig.2 Switching time test circuit

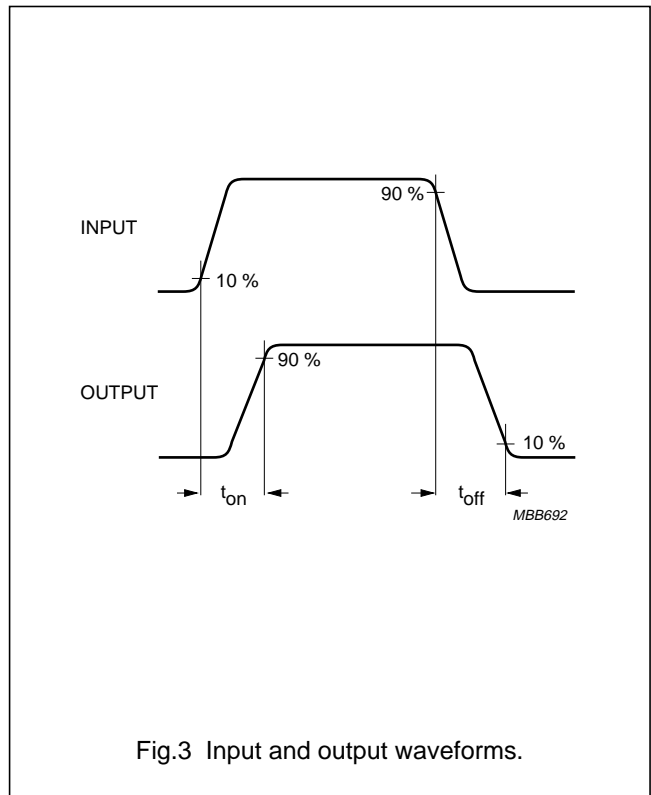


Fig.3 Input and output waveforms.

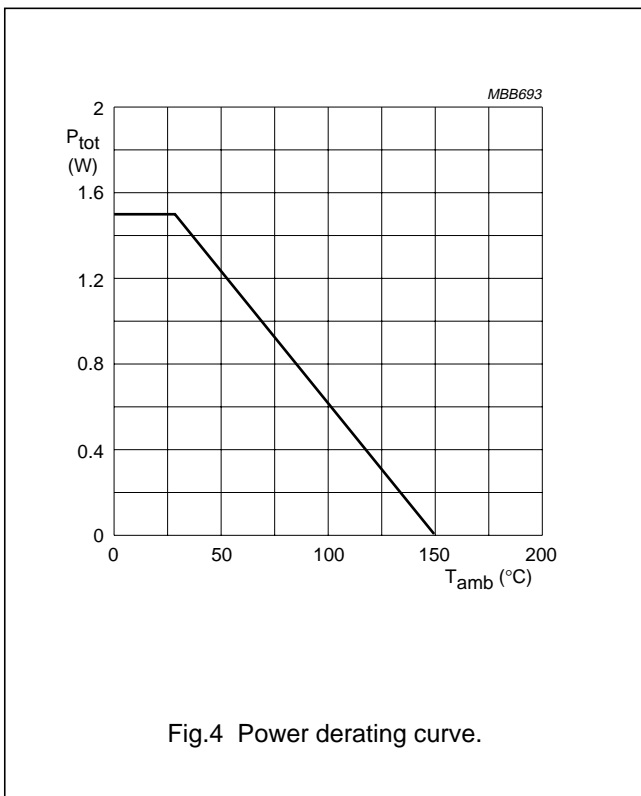


Fig.4 Power derating curve.

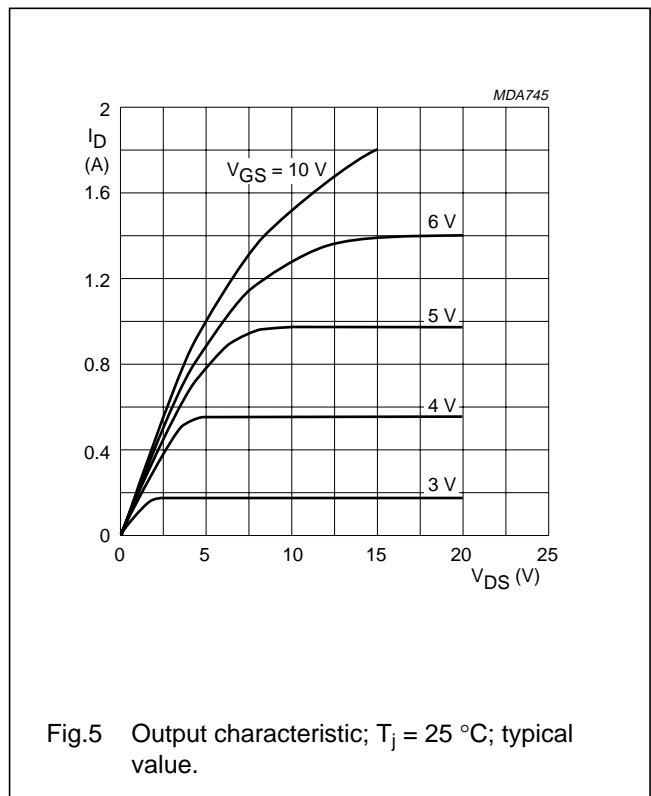
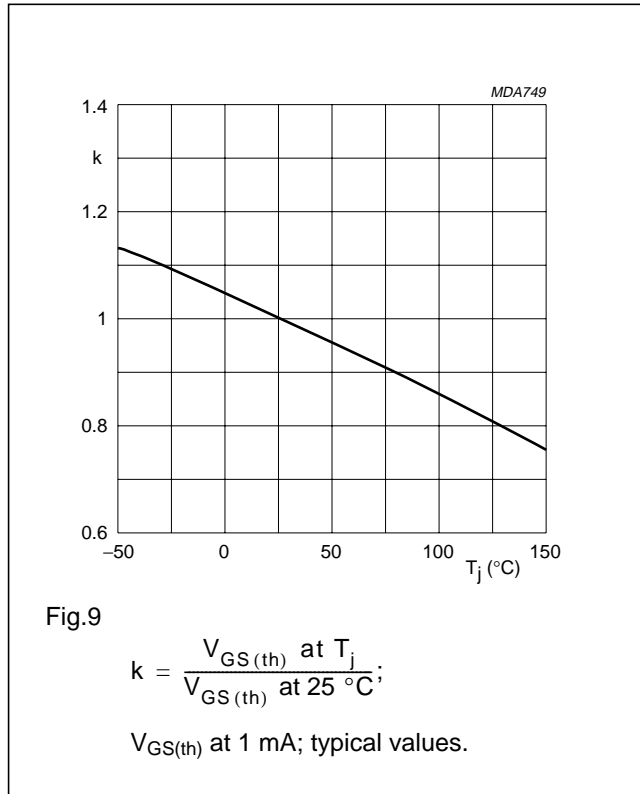
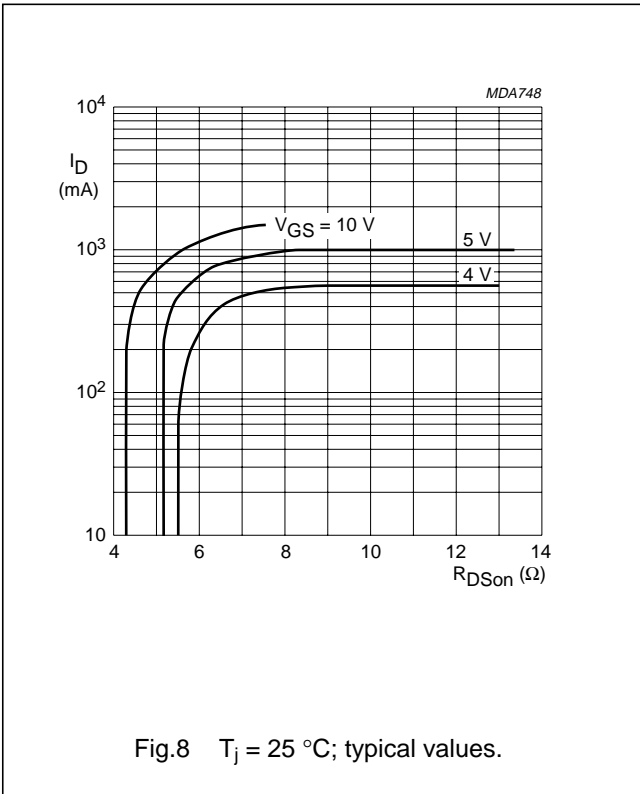
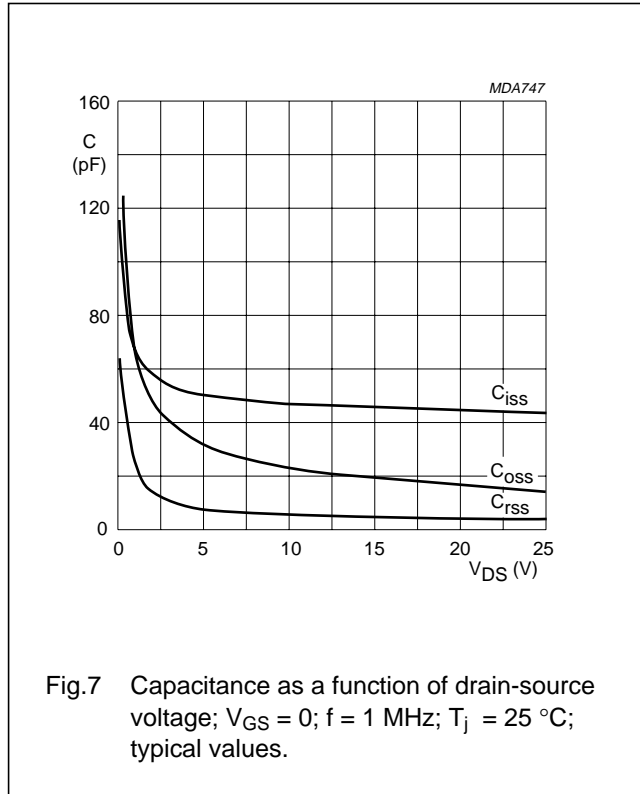
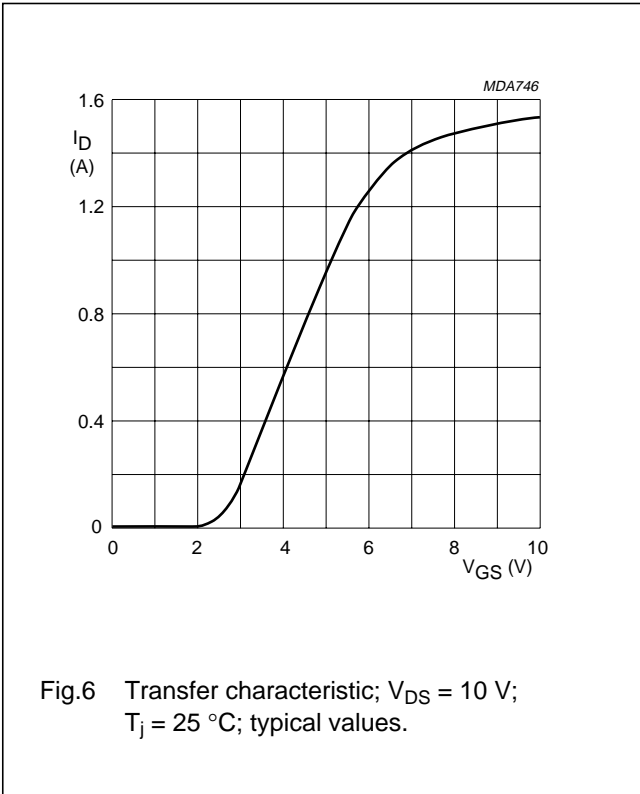


Fig.5 Output characteristic; Tj = 25 °C; typical value.

N-channel enhancement mode vertical D-MOS transistor

BSP121



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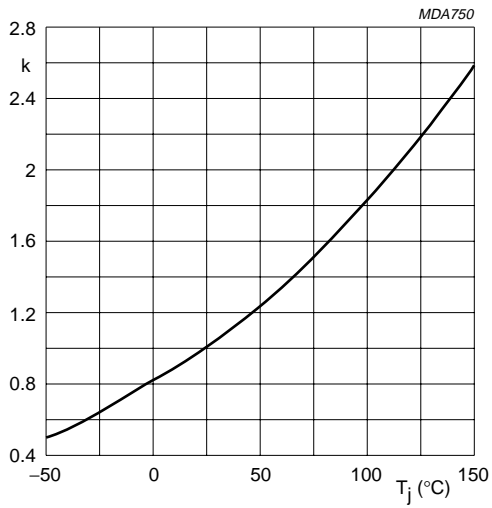


Fig.10

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

at 400 mA/10 V; typical values.

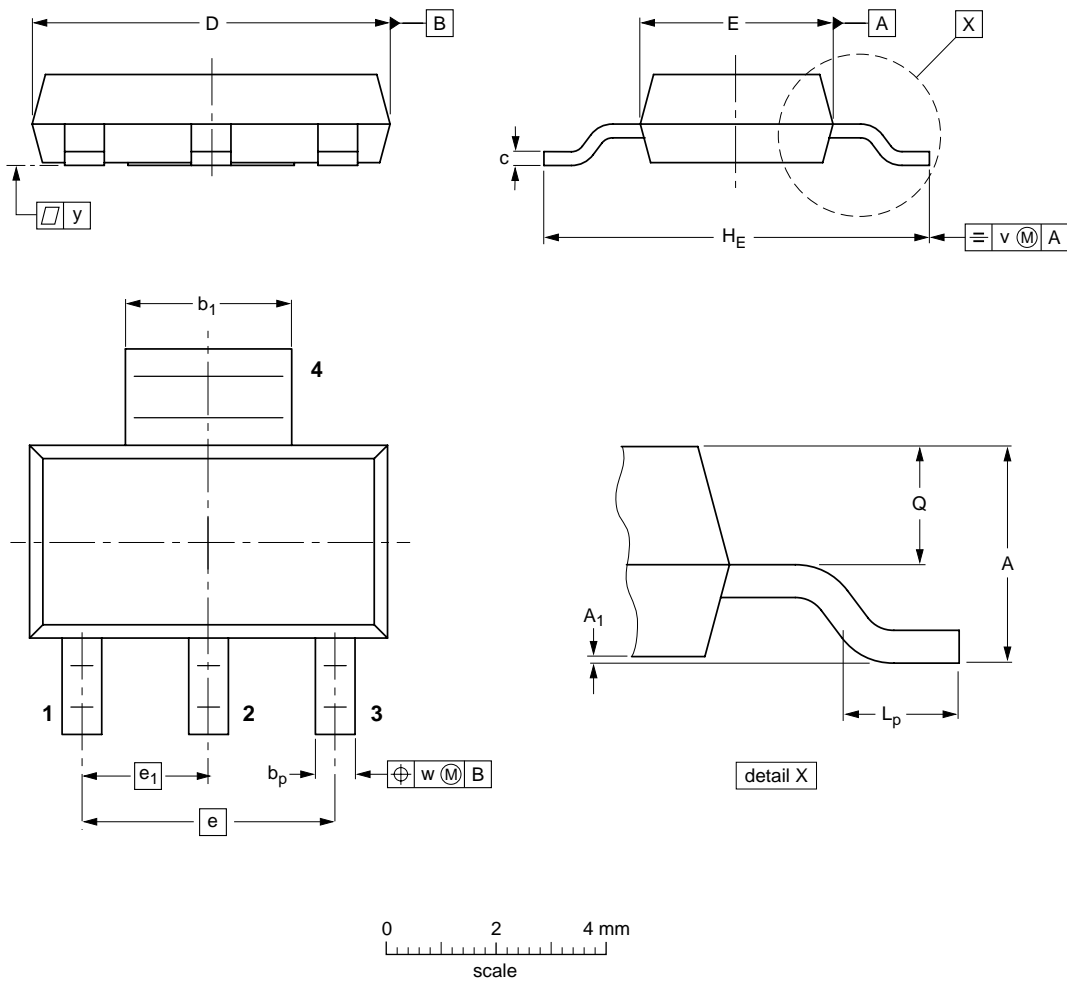
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BSP121

PACKAGE OUTLINE

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

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b _p	b ₁	c	D	E	e	e ₁	H _E	L _p	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

**N-channel enhancement mode vertical
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BSP121**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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