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

Philips Semiconductors

PHILIPS

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 °C	P_{tot}	max.	1.5	W
Drain-source on-resistance I_D = 400 mA; V_{GS} = 10 V	$R_{DS(on)}$	typ. max.	4.5 6.0	Ω Ω
Transfer admittance I_D = 400 mA; V_{DS} = 25 V	$\lvert Y_{fs} \rvert$	min. typ.	200 350	mS mS

PINNING - SOT223

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

Marking code

BSP121

PIN CONFIGURATION

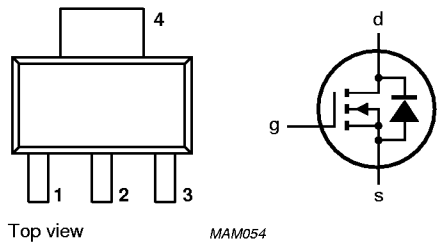

Fig.1 Simplified outline and symbol.

N-channel enhancement mode vertical D-MOS transistor

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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 °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)	$R_{thj\text{-}a}$	=	83.3	K/W

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 cm^2.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Drain-source breakdown voltage			
I_D = 10 μA; V_{GS} = 0	$V_{(BR)DSS}$	min.	200 V
Drain-source leakage current			
V_{DS} = 160 V; V_{GS} = 0	I_{DSS}	max.	1.0 μA
V_{DS} = 60 V; V_{GS} = 0	I_{DSS}	max.	200 nA
Gate-source leakage current			
± V_{GS} = 20 V; V_{DS} = 0	$\pm I_{GSS}$	max.	100 nA
Gate threshold voltage			
I_D = 1 mA; V_{DS} = V_{GS}	$V_{GS(th)}$	min.	0.8 V
		max.	2.8 V
Drain-source on-resistance			
I_D = 400 mA; V_{GS} = 10 V	$R_{DS(on)}$	typ.	4.5 Ω
		max.	6.0 Ω
Transfer admittance			
I_D = 400 mA; V_{DS} = 25 V	$\lvert Y_{fs} \rvert$	min.	200 mS
		typ.	350 mS
Input capacitance at f = 1 MHz			
V_{DS} = 25 V; V_{GS} = 0	C_{iss}	typ.	45 pF
		max.	60 pF
Output capacitance at f = 1 MHz			
V_{DS} = 25 V; V_{GS} = 0	C_{oss}	typ.	15 pF
		max.	25 pF
Feedback capacitance at f = 1 MHz			
V_{DS} = 25 V; V_{GS} = 0	C_{rss}	typ.	3.5 pF
		max.	10 pF
Switching times (see Figs 2 and 3)			
I_D = 250 mA; V_{DD} = 50 V; V_{GS} = 0 to 10 V	t_{on}	typ.	5 pF
		max.	10 pF
	t_{off}	typ.	15 ns
		max.	20 ns

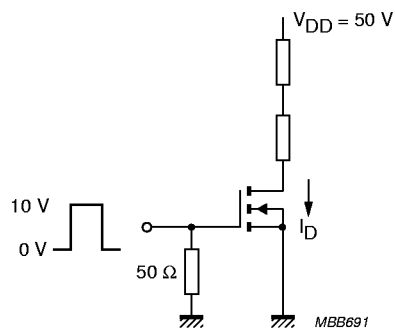

Fig.2 Switching time test circuit

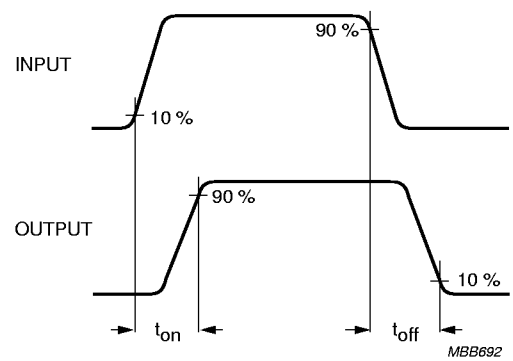

Fig.3 Input and output waveforms.

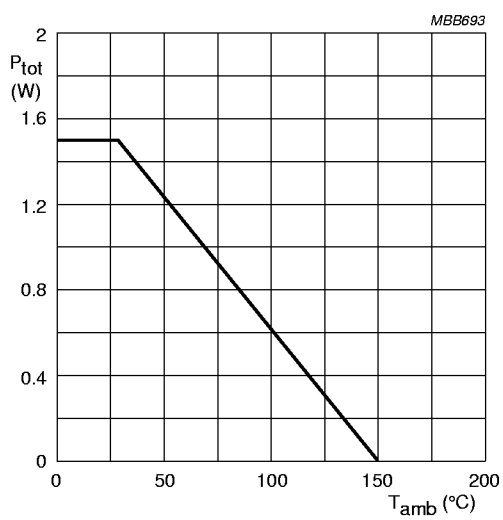

Fig.4 Power derating curve.

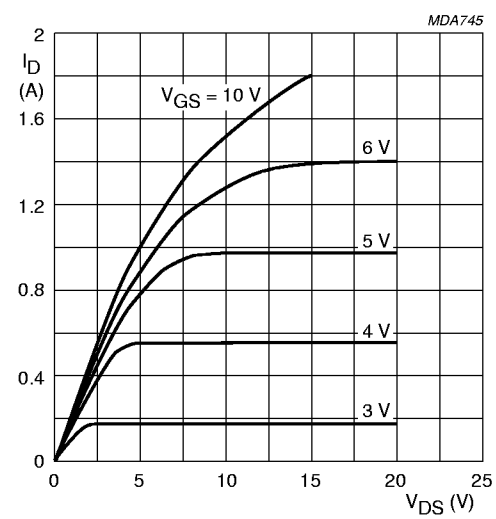

Fig.5 Output characteristic; T_j = 25 °C; typical value.

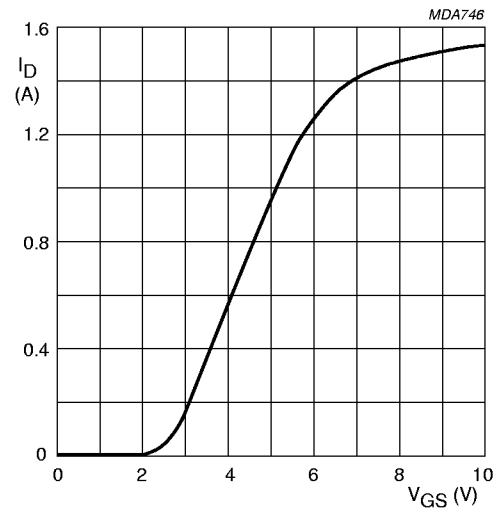

Fig.6 Transfer characteristic; V_{DS} = 10 V; T_j = 25 °C; typical values.

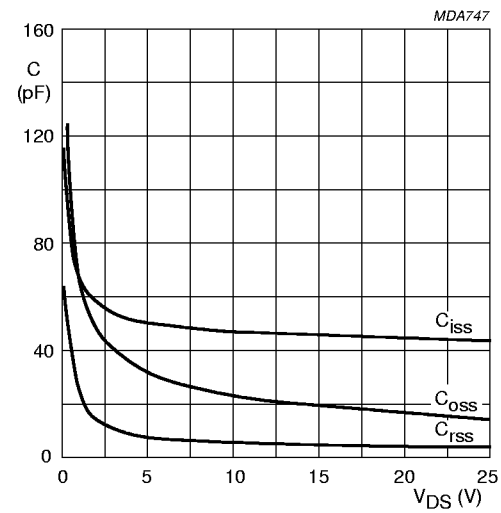

Fig.7 Capacitance as a function of drain-source voltage; V_{GS} = 0; f = 1 MHz; T_j = 25 °C; typical values.

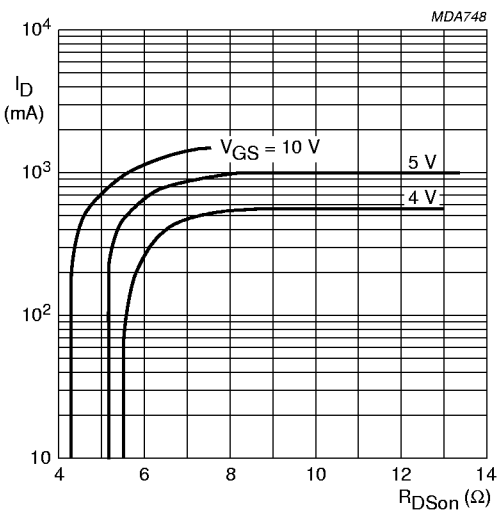

Fig.8 T_j = 25 °C; typical values.

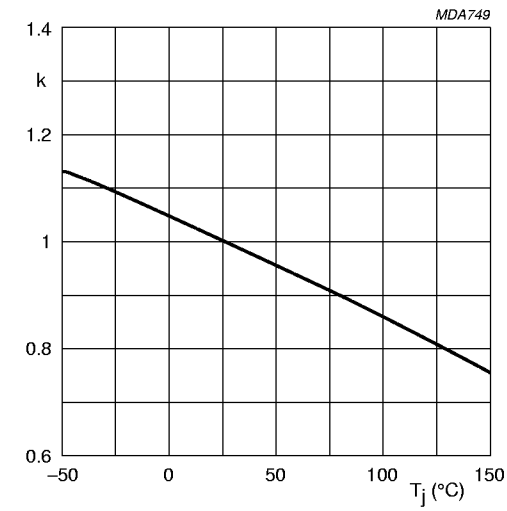

Fig.9

$$k = \frac{V_{GS\,(th)} \text{ at } T_j}{V_{GS\,(th)} \text{ at } 25\ °C};$$

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

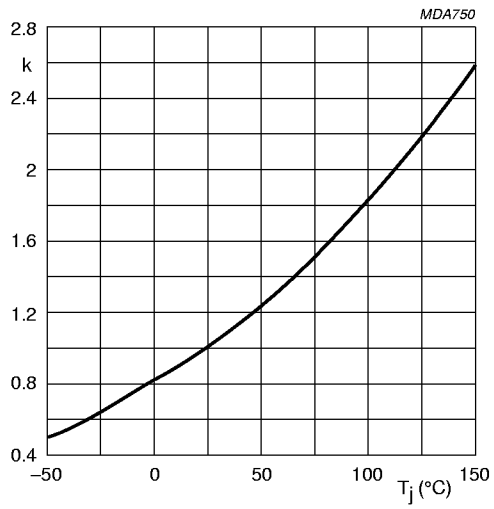

Fig.10

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

at 400 mA/10 V; typical values.

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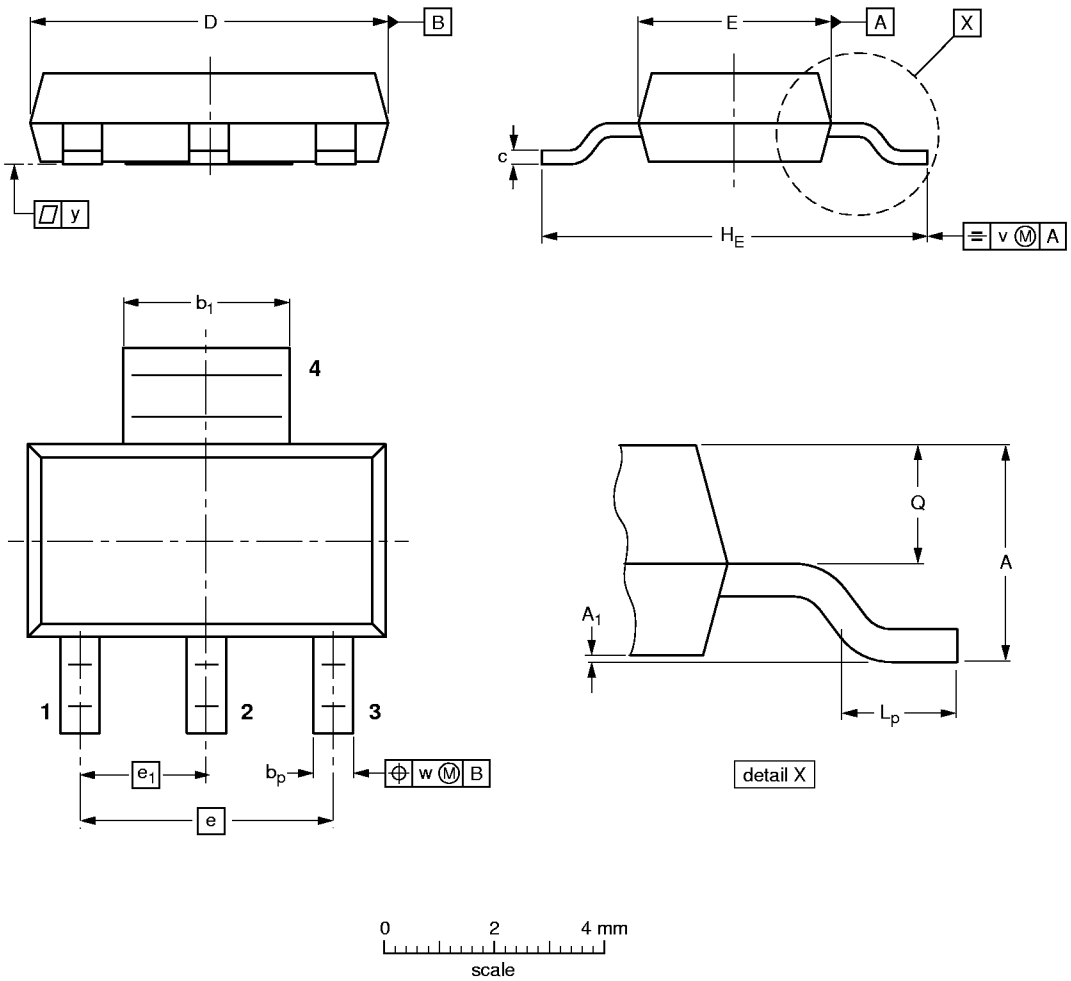
PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_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