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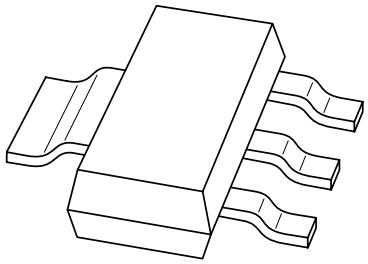
Team Nexperia

DATA SHEET



BSP130
N-channel enhancement mode vertical D-MOS transistor

Product specification
Supersedes data of 1997 Jun 23

2001 Dec 11

Philips
Semiconductors

PHILIPS

N-channel enhancement mode vertical D-MOS transistor

BSP130

FEATURES

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

APPLICATIONS

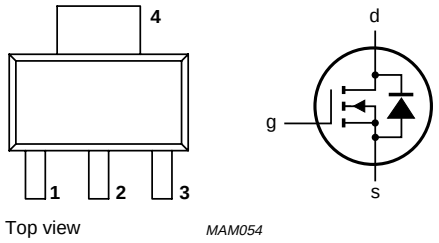
- Line current interruptor in telephone sets
- Relay, high-speed and line transformer drivers.

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a SOT223 package.

PINNING - SOT223

PIN	DESCRIPTION
1	gate
2	drain
3	source
4	drain



Marking code BSP130.

Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	300	V
I_D	drain current (DC)		–	350	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	1.5	W
V_{GSO}	gate-source voltage	open drain	–	±20	V
R_{DSon}	drain-source on-state resistance	I_D = 250 mA; V_{GS} = 10 V	–	6	Ω
V_{GSoff}	gate-source cut-off voltage	I_D = 1 mA; V_{DS} = V_{GS}	0.8	2	V

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	300	V
V_{GSO}	gate-source voltage (DC)	open drain	–	±20	V
I_D	drain current (DC)		–	350	mA
I_{DM}	peak drain current		–	1.4	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C; note 1	–	1.5	W
T_{stg}	storage temperature		–55	+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 tab minimum 6 cm^2.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance 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 tab minimum 6 cm^2.

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = 10 μA; V_{GS} = 0	300	–	–	V
I_{GSS}	gate-source leakage current	V_{GS} = ±20 V; V_{DS} = 0	–	–	±100	nA
V_{GSth}	gate-source threshold voltage	I_D = 1 mA; V_{DS} = V_{GS}	0.8	–	2	V
R_{DSon}	drain-source on-state resistance	I_D = 20 mA; V_{GS} = 2.4 V	–	4.8	10	Ω
		I_D = 250 mA; V_{GS} = 10 V	–	3.7	6	Ω
I_{DSS}	drain-source leakage current	V_{DS} = 240 V; V_{GS} = 0	–	–	100	nA
$\lvert Y_{fs} \rvert$	transfer admittance	I_D = 250 mA; V_{DS} = 25 V	200	690	–	mS
C_{iss}	input capacitance	V_{DS} = 25 V; V_{GS} = 0; f = 1 MHz	–	100	120	pF
C_{oss}	output capacitance	V_{DS} = 25 V; V_{GS} = 0; f = 1 MHz	–	21	30	pF
C_{rss}	feedback capacitance	V_{DS} = 25 V; V_{GS} = 0; f = 1 MHz	–	10	15	pF
Switching times (see Figs 2 and 3)						
t_{on}	turn-on time	I_D = 250 mA; V_{DD} = 50 V; V_{GS} = 0 to 10 V	–	6	10	ns
t_{off}	turn-off time	I_D = 250 mA; V_{DD} = 50 V; V_{GS} = 10 to 0 V	–	46	60	ns

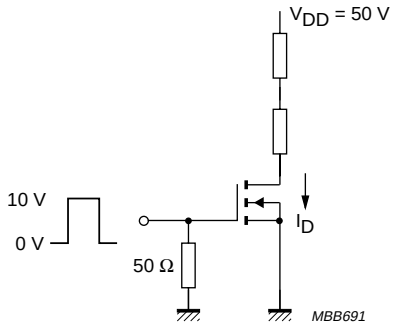


Fig.2 Switching times test circuit.

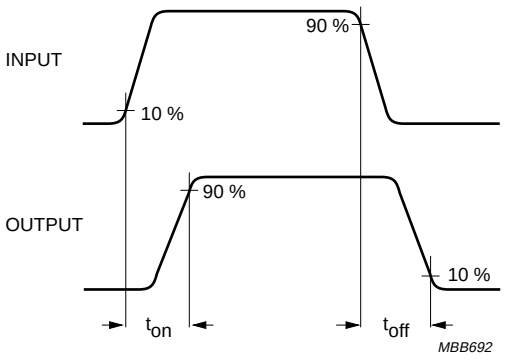


Fig.3 Input and output waveforms.

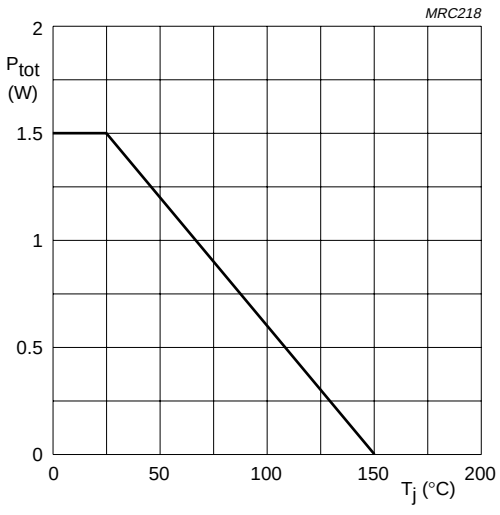
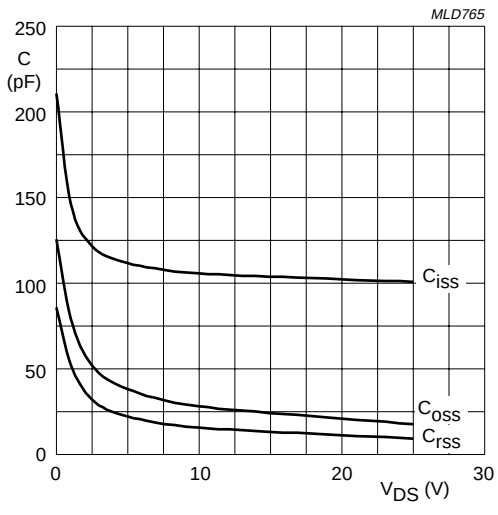
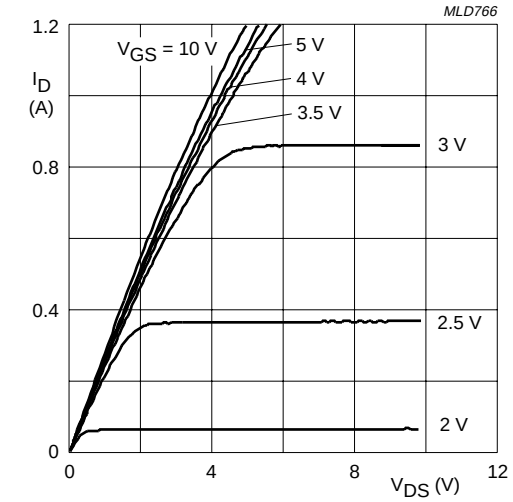


Fig.4 Power derating curve.



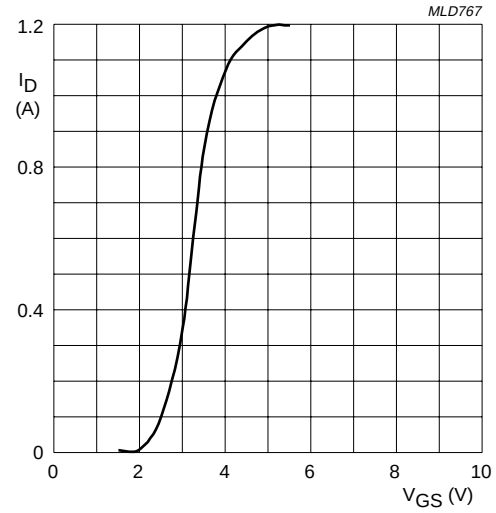
V_{GS} = 0; f = 1 MHz; T_j = 25 °C.

Fig.5 Capacitance as a function of drain-source voltage; typical values.



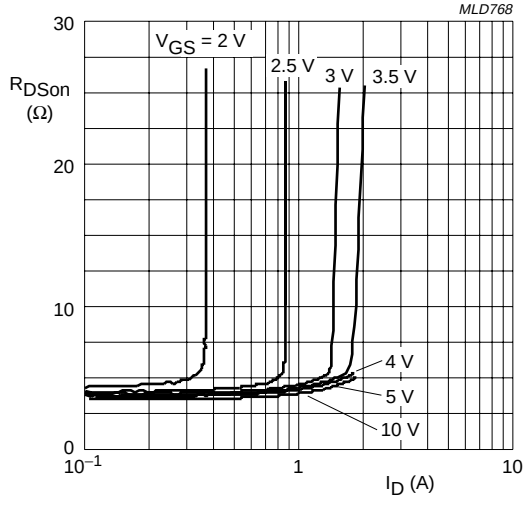
T_j = 25 °C.

Fig.6 Typical output characteristics.



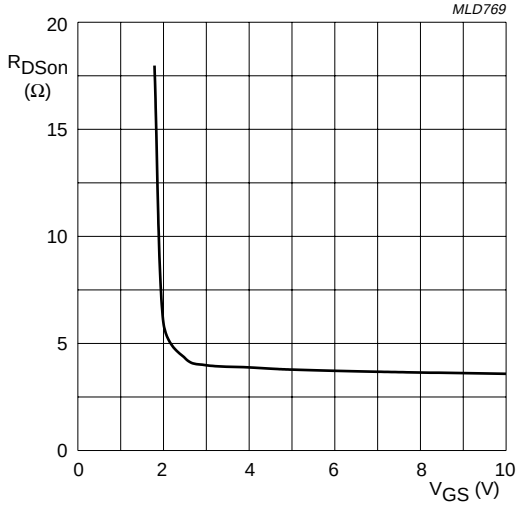
V_{DS} = 10 V; T_j = 25 °C.

Fig.7 Typical transfer characteristics.



T_j = 25 °C.

Fig.8 Drain-source on-state resistance as a function of drain current; typical values.



V_{DS} = 100 mV; T_j = 25 °C.

Fig.9 Drain-source on-state resistance as a function of gate-source voltage; typical values.

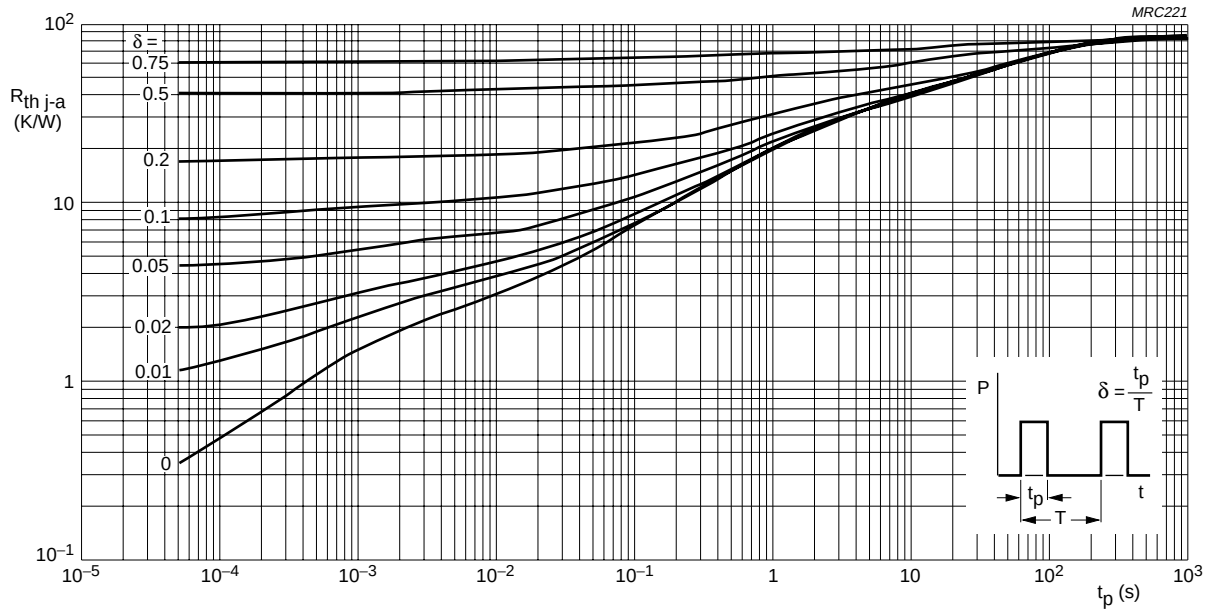
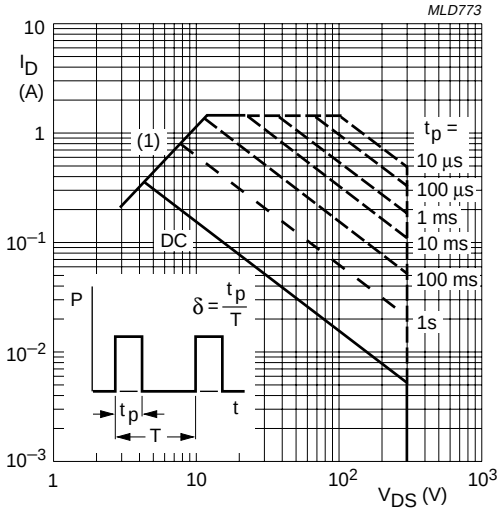


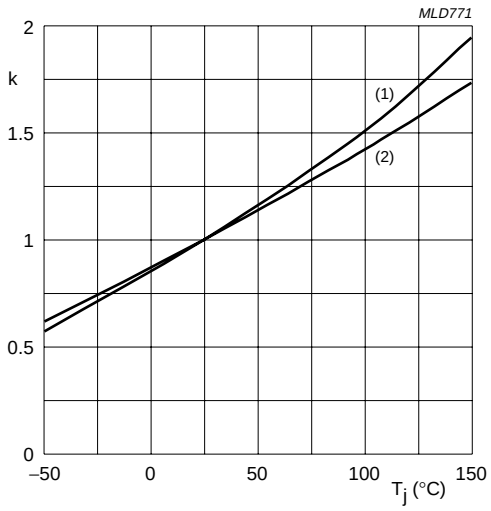
Fig.10 Transient thermal resistance from junction to ambient as a function of pulse time.



δ = 0.01; T_{amb} = 25 °C.

(1) R_{DSon} limitation.

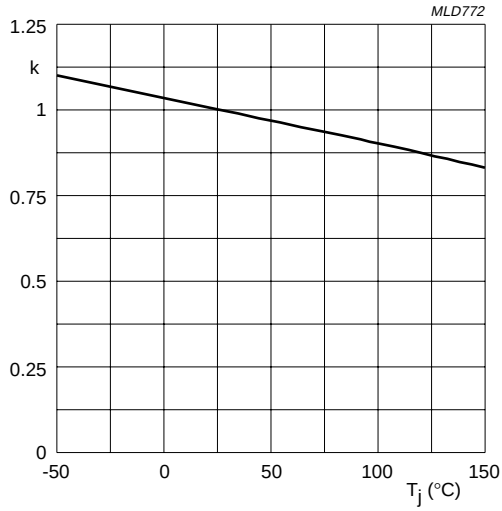
Fig.11 SOAR curve.



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

Typical R_{DSon};
(1) I_D = 250 mA; V_{GS} = 10 V.
(2) I_D = 20 mA; V_{GS} = 2.4 V.

Fig.12 Temperature coefficient of drain-source on-state resistance; typical values.



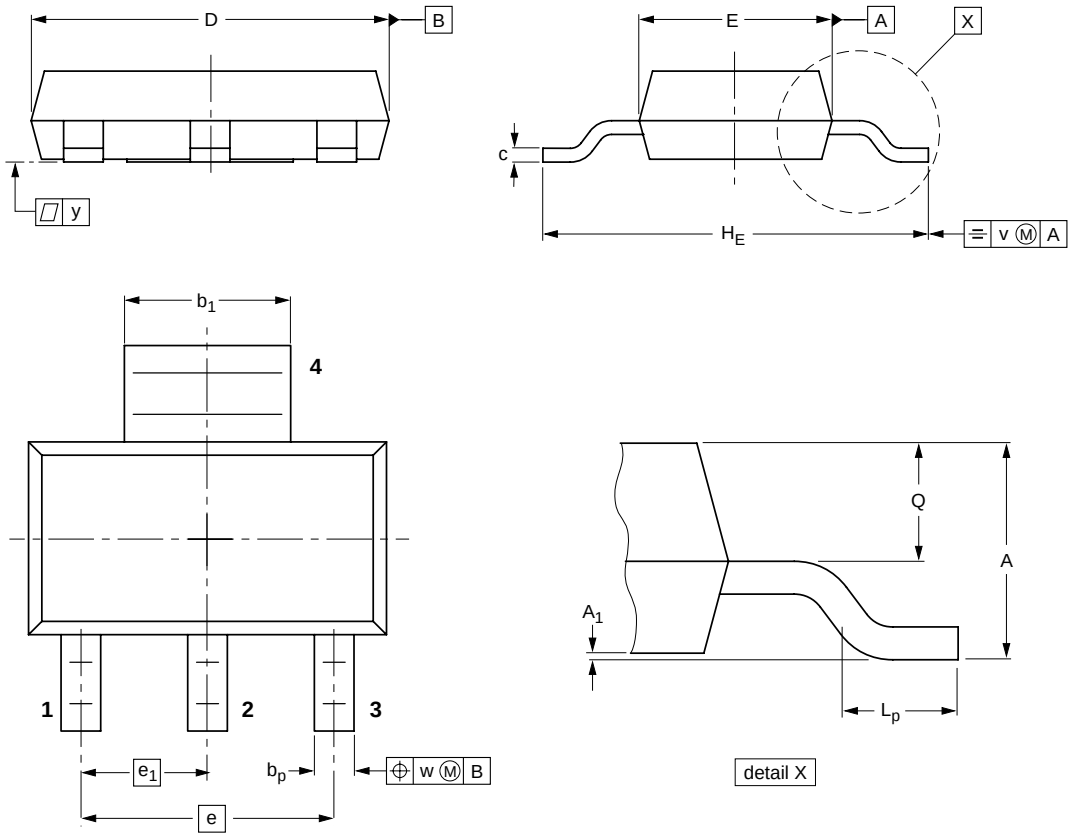
$$k = \frac{V_{GS(th)} \text{ at } T_j}{V_{GS(th)} \text{ at } 25\ °C}.$$

Typical V_{GSth} at 1 mA.

Fig.13 Temperature coefficient of gate-source threshold voltage; typical values.

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			SC-73			~~97-02-28~~ 99-09-13

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