DATA SHEET

BSN10; BSN10A
N-channel enhancement mode vertical D-MOS transistors

Product specification
File under Discrete Semiconductors, SC13b

April 1995

Philips Semiconductors

PHILIPS

N-channel enhancement mode vertical D-MOS transistors

BSN10; BSN10A

FEATURES

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

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a TO-92 envelope, intended for use in general purpose fast switching applications.

PINNING - TO-92

PIN	DESCRIPTION
BSN10	
1	gate
2	drain
3	source
BSN10A	
1	source
2	gate
3	drain

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{DS}	drain-source voltage	50	V
I_D	DC drain current	175	mA
$R_{DS(on)}$	drain-source on-resistance	15	Ω
$V_{GS(th)}$	gate-source threshold voltage	1.8	V

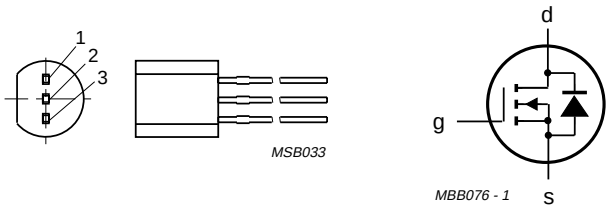


Fig.1 Simplified outline (TO-92) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	50	V
$\pm V_{GSO}$	gate-source voltage	open drain	–	20	V
I_D	DC drain current		–	175	mA
I_{DM}	peak drain current		–	300	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C (note 1)	–	830	mW
T_{stg}	storage temperature range		–65	150	°C
T_j	junction temperature		–	150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j\text{-}a}$	from junction to ambient (note 1)	150 K/W

Note

1. Device mounted on a printed circuit board, maximum lead length 4 mm.

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	50	–	–	V
I_{DSS}	drain-source leakage current	V_{DS} = 40 V; V_{GS} = 0	–	–	1	μA
$\pm I_{GSS}$	gate-source leakage current	$\pm V_{GS}$ = 20 V; V_{DS} = 0	–	–	100	nA
$V_{GS(th)}$	gate-source threshold voltage	I_D = 1 mA; V_{GS} = V_{DS}	0.4	–	1.8	V
$R_{DS(on)}$	drain-source on-resistance	I_D = 100 mA; V_{GS} = 10 V	–	8	15	Ω
		I_D = 100 mA; V_{GS} = 5 V	–	12	20	Ω
		I_D = 10 mA; V_{GS} = 2.5 V	–	18	30	Ω
$\lvert Y_{fs} \rvert$	transfer admittance	I_D = 100 mA; V_{DS} = 10 V	40	80	–	mS
C_{iss}	input capacitance	V_{DS} = 10 V; V_{GS} = 0; f = 1 MHz	–	8	15	pF
C_{oss}	output capacitance	V_{DS} = 10 V; V_{GS} = 0; f = 1 MHz	–	7	15	pF
C_{rss}	feedback capacitance	V_{DS} = 10 V; V_{GS} = 0; f = 1 MHz	–	2	5	pF
Switching times						
t_{on}	turn-on time	I_D = 100 mA; V_{DD} = 20 V; V_{GS} = 0 to 10 V	–	2	5	ns
t_{off}	turn-off time	I_D = 100 mA; V_{DD} = 50 V; V_{GS} = 0 to 10 V	–	5	10	ns

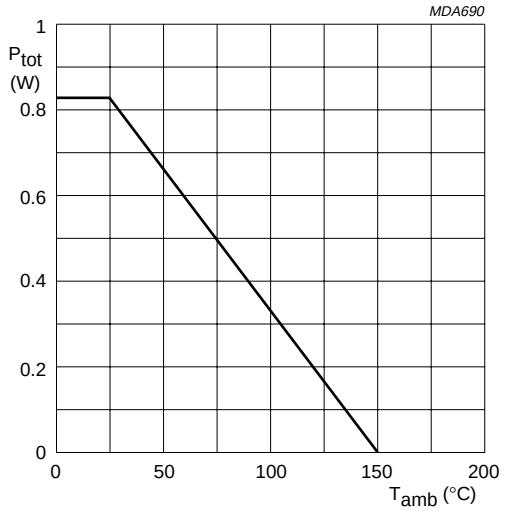
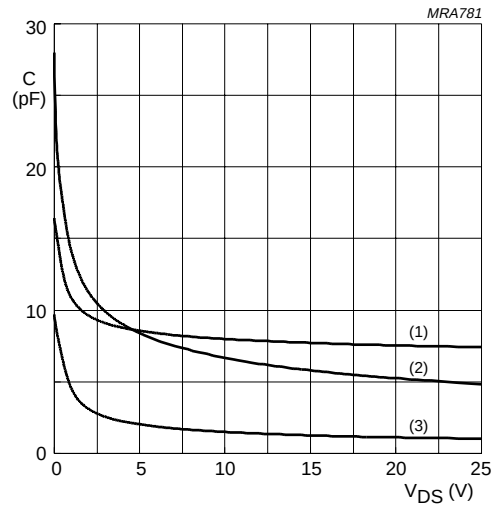
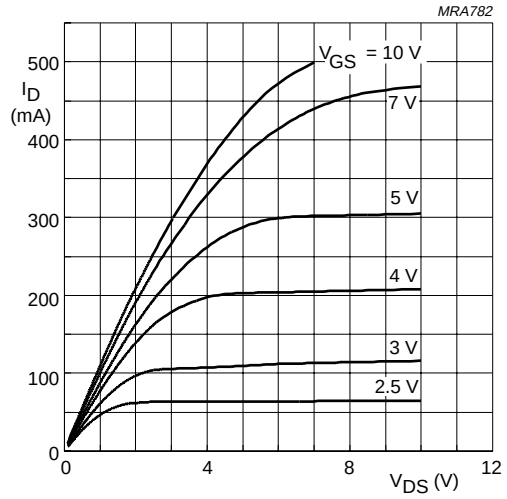


Fig.2 Power derating curve.



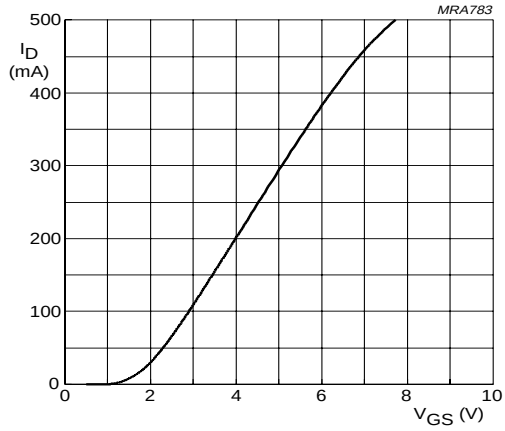
V_{GS} = 0; f = 1 MHz; T_j = 25 °C.

Fig.3 Capacitance as a function of drain-source voltage, typical values.



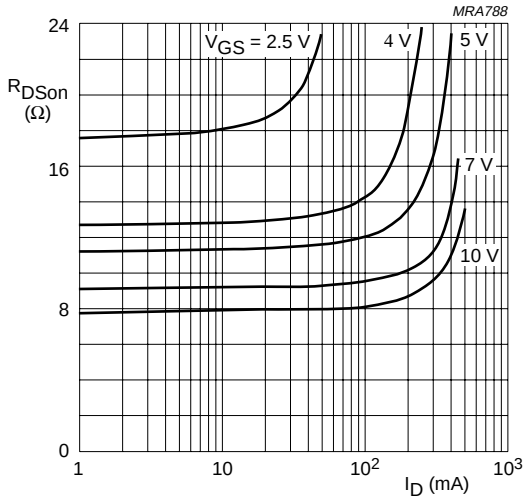
T_j = 25 °C.

Fig.4 Typical output characteristics.



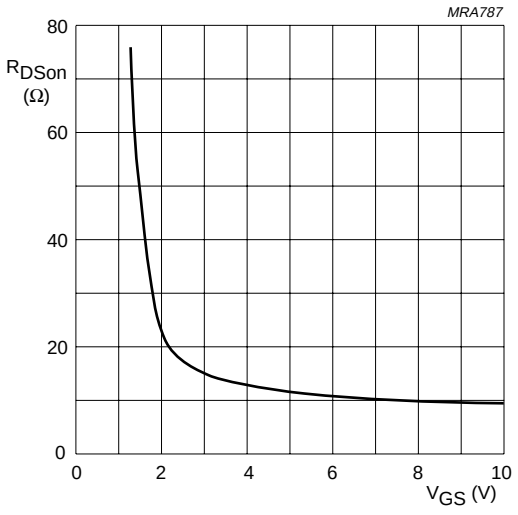
V_{DS} = 10 V; T_j = 25 °C.

Fig.5 Typical transfer characteristics.



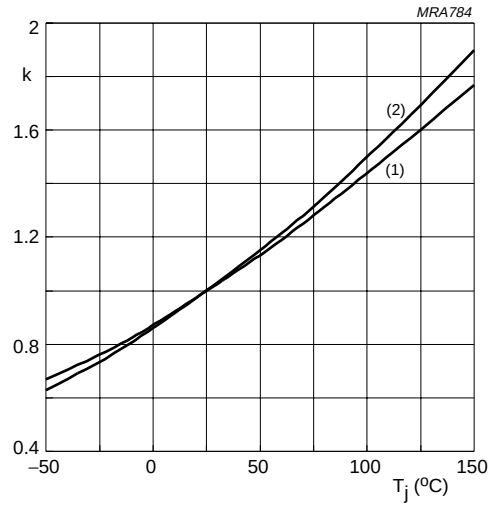
T_j = 25 °C.

Fig.6 Drain-source on-resistance as a function of drain current, typical values.



V_{DS} = 0.1 V; T_j = 25 °C.

Fig.7 Drain-source on-resistance as a function of gate-source voltage, typical values.



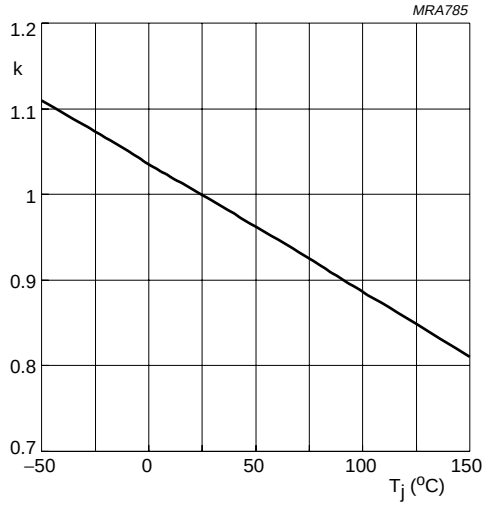
$$k = \frac{R_{DS(on)} \text{ at } T_j}{R_{DS(on)} \text{ at } 25\ °C}.$$

Typical $R_{DS(on)}$ at 100 mA/10 V.

(1) I_D = 10 mA; V_{GS} = 2.5 V.

(2) I_D = 100 mA; V_{GS} = 10 V.

Fig.8 Temperature coefficient of drain-source on-resistance.



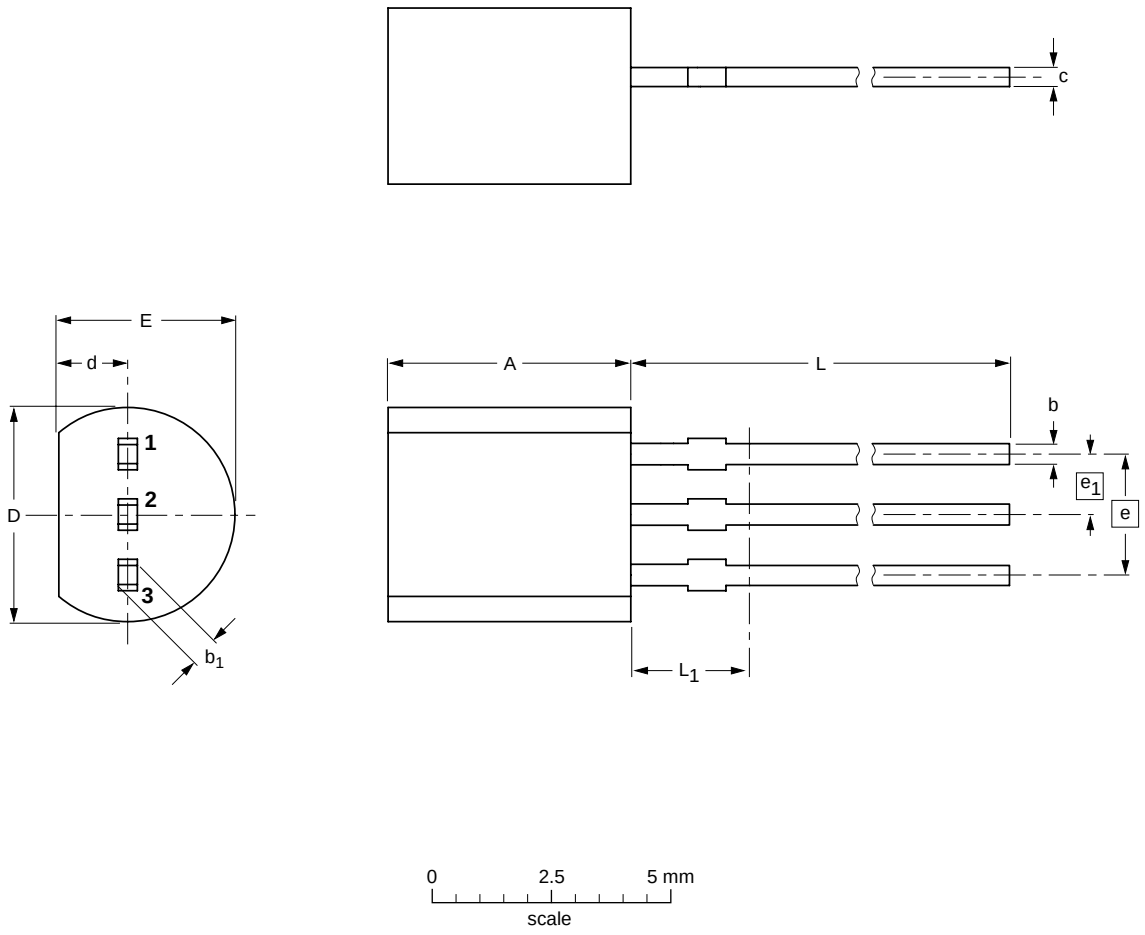
$$k = \frac{V_{GS(th)} \text{ at } T_j}{V_{GS(th)} \text{ 25 °C}}.$$

Typical $V_{GS(th)}$ at 1 mA.

Fig.9 Temperature coefficient gate-source threshold voltage.

PACKAGE OUTLINES

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1(1)
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

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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SCA54

Printed in The Netherlands 137107/00/01/pp8 Date of release: April 1995 Document order number: 9397 750 02459

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