DATA SHEET

BSN254
BSN254A
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

BSN254 BSN254A

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistors in TO-92 variant envelope and designed for use as line current interrupters 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 second breakdown
- Low $R_{DS\ (on)}$

QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	250	V
Drain current (DC)	I_D	max.	300	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	1	W
Drain-source on-resistance				
I_D = 300 mA; V_{GS} = 10 V	$R_{DS(on)}$	typ.	5.0	Ω
		max.	7.0	Ω
Gate-source threshold voltage	$V_{GS(th)}$	max.	2	V

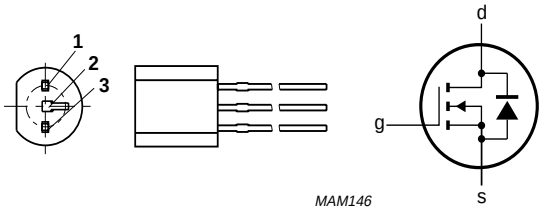
PINNING (BSN254)

1 = gate
2 = drain
3 = source

PINNING (BSN254A)

1 = source
2 = gate
3 = drain

PIN CONFIGURATION - TO-92 VARIANT



Note: Various pinnings are available on request.

Fig.1 Simplified outline and symbol.

N-channel enhancement mode vertical D-MOS transistors

BSN254
BSN254A

RATINGS

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

Drain-source voltage	V_{DS}	max.	250	V
Gate-source voltage (open drain)	$\pm V_{GSO}$	max.	20	V
Drain current (DC)	I_D	max.	300	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	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)	$R_{th\ j\text{-}a}$	=	125	K/W

Note

1. Device mounted on printed-circuit board, max. lead length 4 mm, mounting pad for drain lead min. 10 mm × 10 mm.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Drain-source breakdown voltage				
I_D = 10 μA; V_{GS} = 0	$V_{(BR)\ DSS}$	min.	250	V
Drain-source leakage current				
V_{DS} = 200 V; V_{GS} = 0	I_{DSS}	max.	1	μA
Gate-source leakage current				
$\pm V_{GS}$ = 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. max.	0.8 2.0	V V
Drain-source on-resistance				
I_D = 300 mA; V_{GS} = 10 V	$R_{DS\ (on)}$	typ. max.	5.0 7.0	Ω Ω
I_D = 20 mA; V_{GS} = 2.4 V	$R_{DS(on)}$	max.	10	Ω
Transfer admittance				
I_D = 300 mA; V_{DS} = 25 V	$\lvert Y_{fs} \rvert$	min. typ.	200 400	mS mS
Input capacitance at f = 1 MHz				
V_{DS} = 25 V; V_{GS} = 0	C_{iss}	typ. max.	65 90	pF pF

Output capacitance at f = 1 MHz			
V_{DS} = 25 V; V_{GS} = 0	C_{oss}	typ.	20 pF
		max.	30 pF
Feedback capacitance at f = 1 MHz			
V_{DS} = 25 V; V_{GS} = 0	C_{rss}	typ.	5 pF
		max.	15 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 ns
		max.	10 ns
	t_{off}	typ.	20 ns
		max.	30 ns

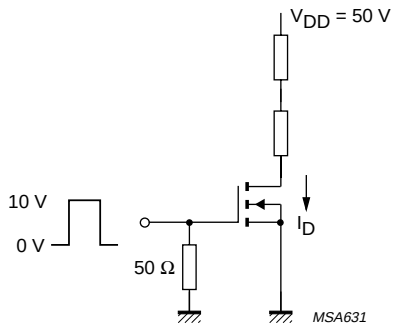


Fig.2 Switching times test circuit.

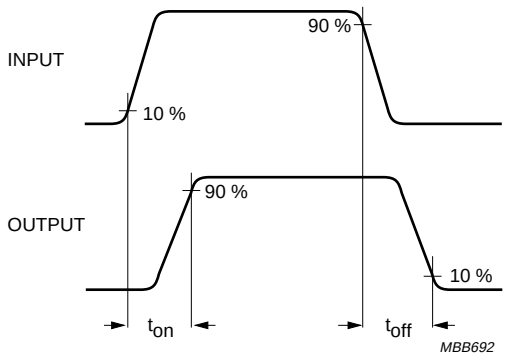


Fig.3 Input and output waveforms.

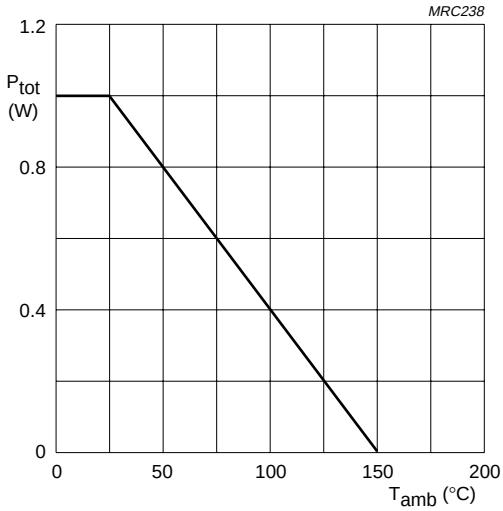


Fig.4 Power derating curve.

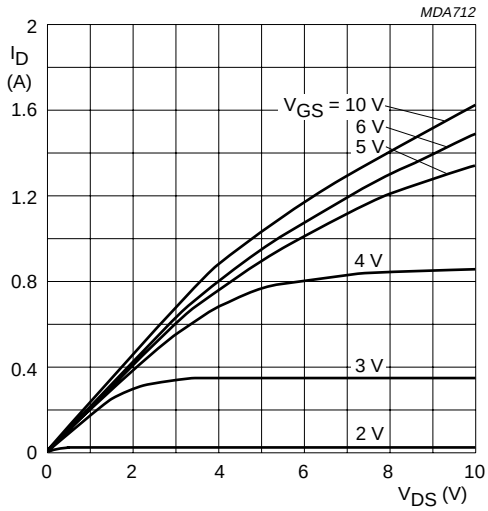


Fig.5 Output characteristics; T_j = 25 °C; typical values.

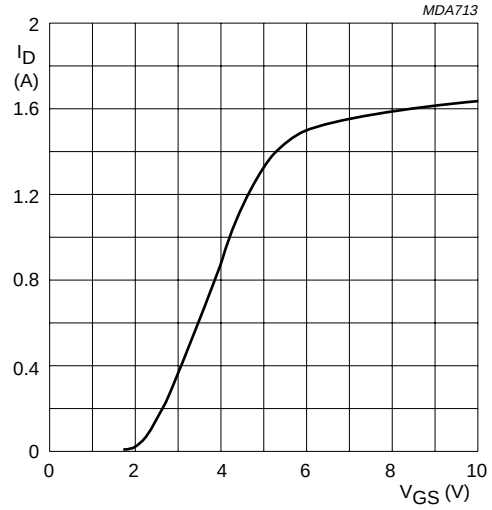


Fig.6 Transfer characteristic; V_{DS} = 10 V; T_j = 25 °C; typical value.

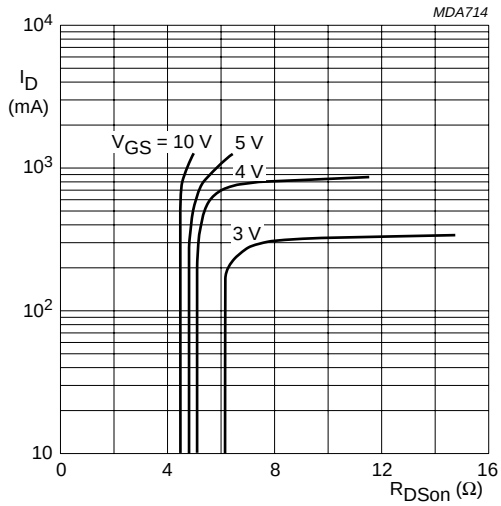


Fig.7 On-resistance as a function of drain current; T_j = 25 °C; typical values.

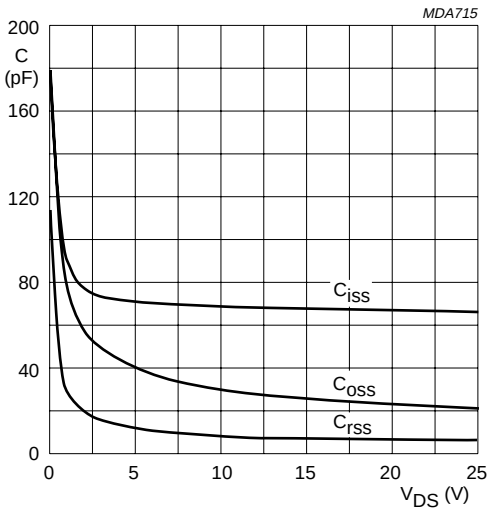


Fig.8 Capacitances as a function of drain-source voltage; V_{GS} = 0; f = 1 MHz; T_j = 25 °C; typical values.

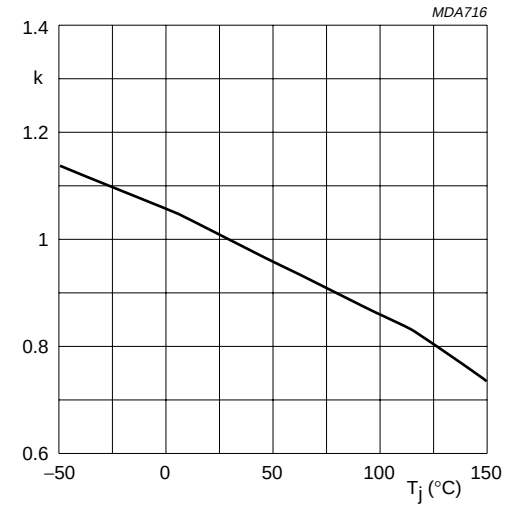


Fig.9

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

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

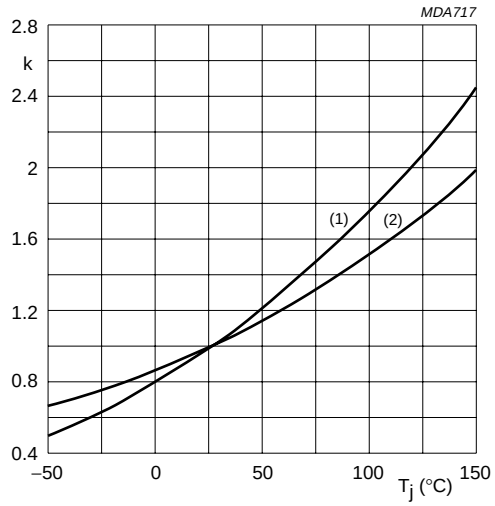


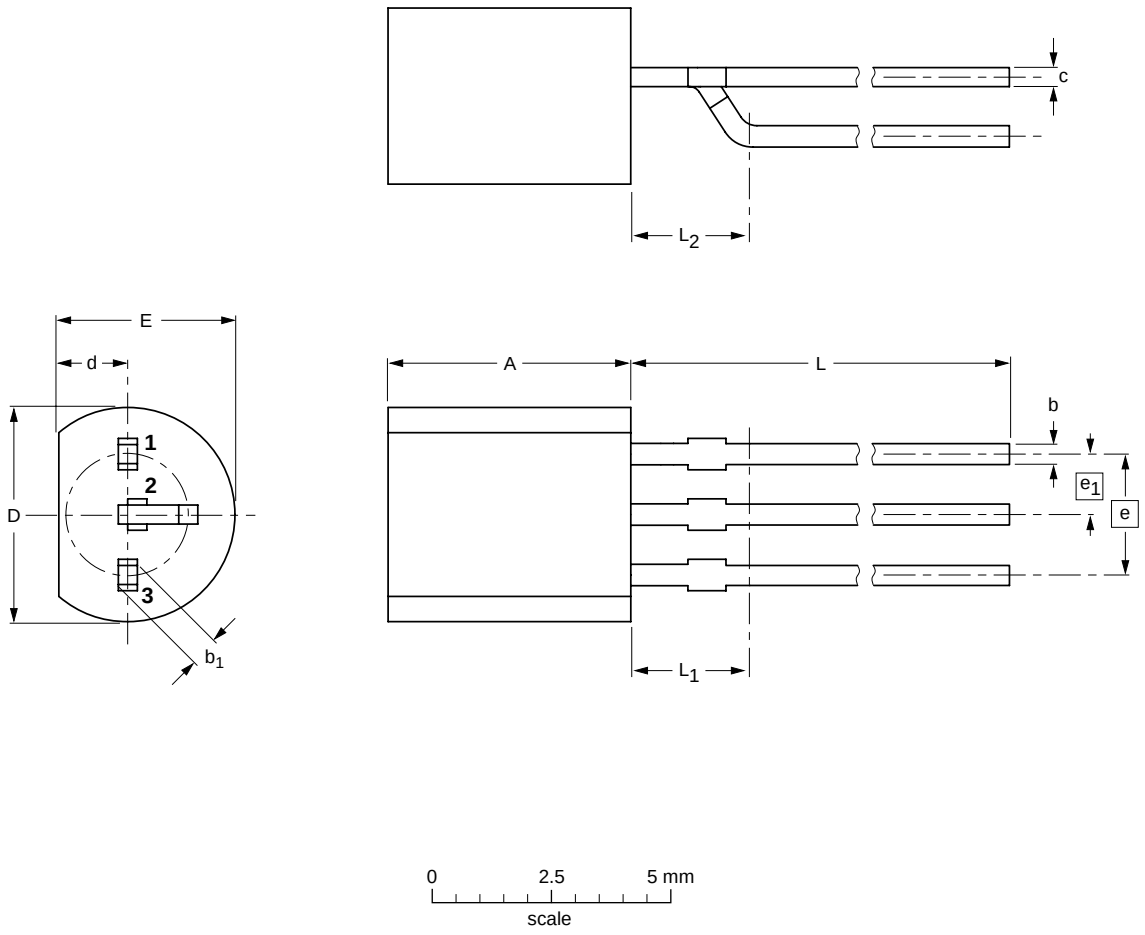
Fig.10

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

typical values.

PACKAGE OUTLINES

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



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1 (1) max	L_2 max
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	2.5

Notes

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 variant		TO-92	SC-43			97-04-14

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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