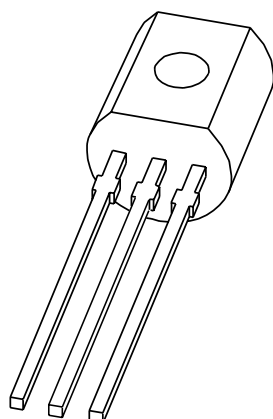


DATA SHEET



BSN254; BSN254A N-channel enhancement mode vertical D-MOS transistor

Product specification
Supersedes data of 1997 Jun 23

2002 Feb 19

N-channel enhancement mode vertical D-MOS transistor

BSN254; BSN254A

FEATURES

- Direct interface to C-MOS, TTL, etc.
- High-speed switching
- No secondary breakdown
- Low $R_{DS(on)}$

APPLICATIONS

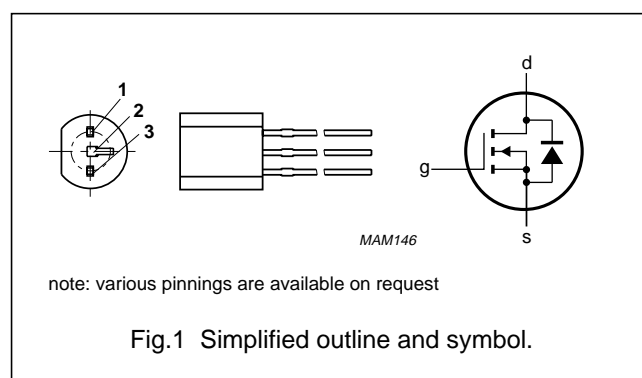
- Line current interruptor in telephone sets
- Relay, high-speed and line transformer drivers.

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a SOT54 (TO-92) variant package.

PINNING - SOT54 variant

PIN	DESCRIPTION	
	BSN254	BSN254A
1	gate	source
2	drain	gate
3	source	drain



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		—	250	V
I_D	drain current (DC)		—	310	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	—	1	W
$R_{DS(on)}$	drain-source on-state resistance	$I_D = 300\text{ mA}$; $V_{GS} = 10\text{ V}$	2.8	5	Ω
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$	—	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)		—	250	V
V_{GSO}	gate-source voltage (DC)	open drain	—	± 20	V
I_D	drain current (DC)		—	310	mA
I_{DM}	peak drain current		—	1.25	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	—	1	W
T_{stg}	storage temperature		−55	+150	°C
T_j	junction temperature		—	150	°C

Note

1. Device mounted on a printed-circuit board; maximum lead length 4 mm; mounting pad for drain lead minimum $10 \times 10\text{ mm}$.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient; note 1	125	K/W

Note

- Device mounted on a printed-circuit board; maximum lead length 4 mm; mounting pad for drain lead minimum 10×10 mm.

CHARACTERISTICS

$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 10\text{ }\mu\text{A}$; $V_{GS} = 0$	250	–	–	V
I_{GSS}	gate-source leakage current	$V_{GS} = \pm 20\text{ V}$; $V_{DS} = 0$	–	–	± 100	nA
V_{GSth}	gate-source threshold voltage	$I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$	0.8	–	2	V
R_{DSon}	drain-source on-state resistance	$I_D = 20\text{ mA}$; $V_{GS} = 2.4\text{ V}$	–	–	7.5	Ω
		$I_D = 300\text{ mA}$; $V_{GS} = 10\text{ V}$	–	2.8	5	Ω
I_{DSS}	drain-source leakage current	$V_{DS} = 200\text{ V}$; $V_{GS} = 0$	–	–	1	μA
$ Y_{fs} $	transfer admittance	$I_D = 300\text{ mA}$; $V_{DS} = 25\text{ V}$	200	600	–	mS
C_{iss}	input capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	100	120	pF
C_{oss}	output capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	21	30	pF
C_{rss}	feedback capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	10	15	pF
Switching times (see Figs 2 and 3)						
t_{on}	turn-on time	$I_D = 250\text{ mA}$; $V_{DD} = 50\text{ V}$; $V_{GS} = 0$ to 10 V	–	6	10	ns
t_{off}	turn-off time	$I_D = 250\text{ mA}$; $V_{DD} = 50\text{ V}$; $V_{GS} = 10$ to 0 V	–	47	60	ns

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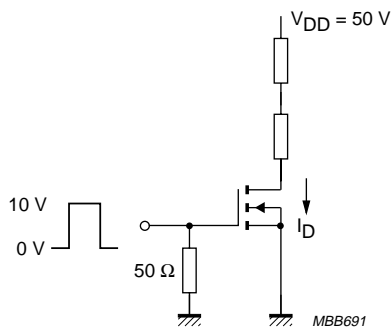


Fig.2 Switching times test circuit.

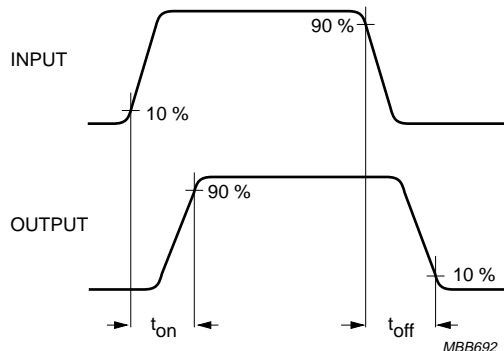


Fig.3 Input and output waveforms.

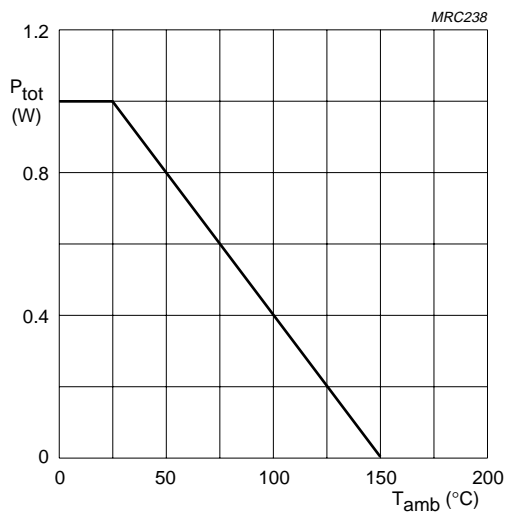
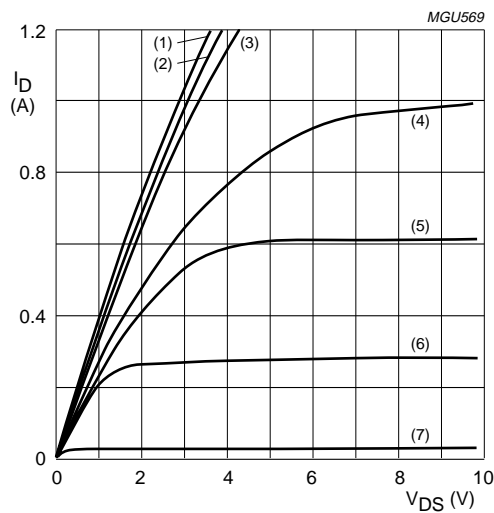


Fig.4 Power derating curve.



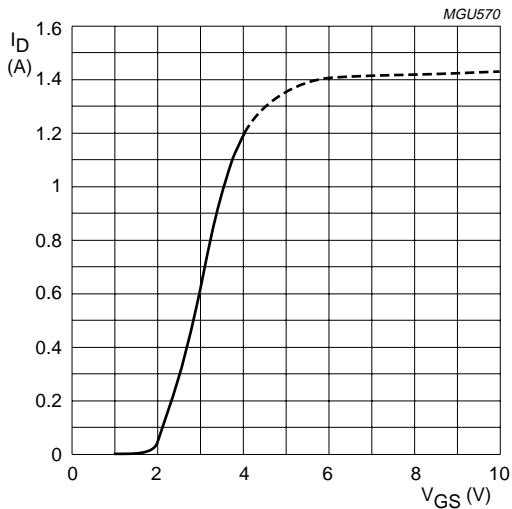
$T_j = 25\text{ }^{\circ}\text{C}$.

(1) $V_{GS} = 10\text{ V}$.	(4) $V_{GS} = 3.5\text{ V}$.	(7) $V_{GS} = 2\text{ V}$.
(2) $V_{GS} = 5\text{ V}$.	(5) $V_{GS} = 3\text{ V}$.	
(3) $V_{GS} = 4\text{ V}$.	(6) $V_{GS} = 2.5\text{ V}$.	

Fig.5 Typical output characteristics.

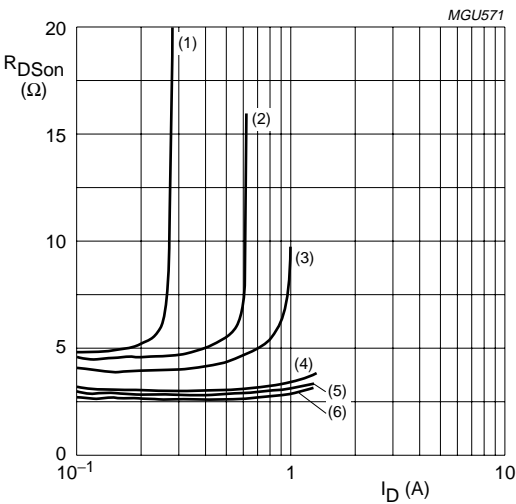
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$V_{DS} = 10\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$.

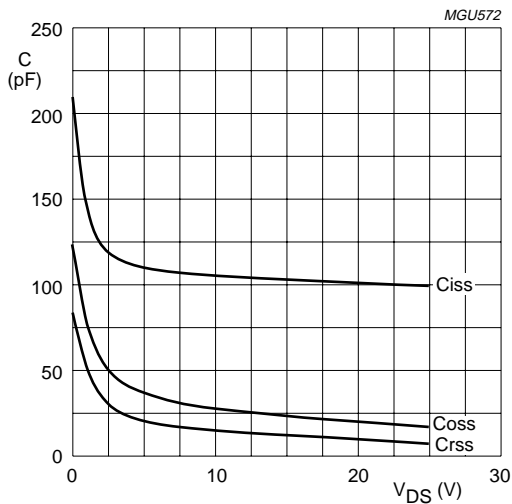
Fig.6 Typical transfer characteristics.



$T_j = 25\text{ }^\circ\text{C}$.

- | | | |
|-------------------------------|-------------------------------|------------------------------|
| (1) $V_{GS} = 2.5\text{ V}$. | (3) $V_{GS} = 3.5\text{ V}$. | (5) $V_{GS} = 5\text{ V}$. |
| (2) $V_{GS} = 3\text{ V}$. | (4) $V_{GS} = 4\text{ V}$. | (6) $V_{GS} = 10\text{ V}$. |

Fig.7 Drain-source on-state resistance as a function of drain current; typical values.

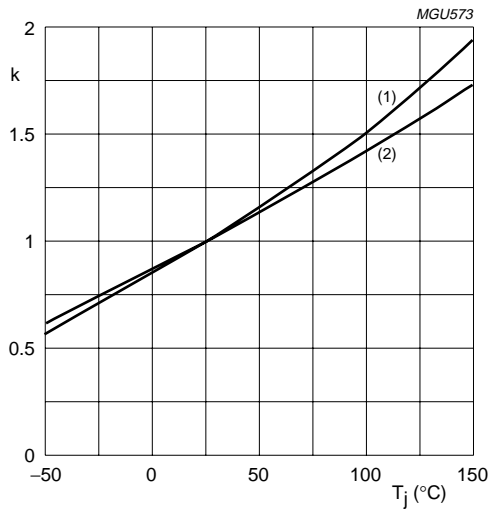


$V_{GS} = 0$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$.

Fig.8 Input, output and feedback capacitance as functions of drain-source voltage; typical values.

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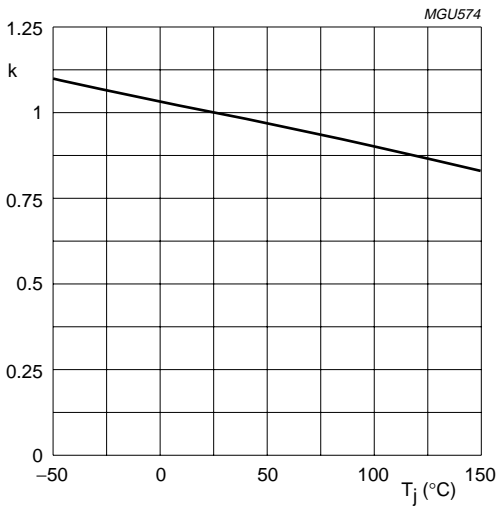
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$$k = \frac{R_{DSon} \text{ at } T_j}{R_{DSon} \text{ at } 25^\circ\text{C}}$$

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

Fig.9 Temperature coefficient of drain-source on-state resistance; typical values.



$$k = \frac{V_{GSth} \text{ at } T_j}{V_{GSth} \text{ at } 25^\circ\text{C}}$$

Typical V_{GSth} at 1 mA.

Fig.10 Temperature coefficient of gate-source threshold voltage; typical values.

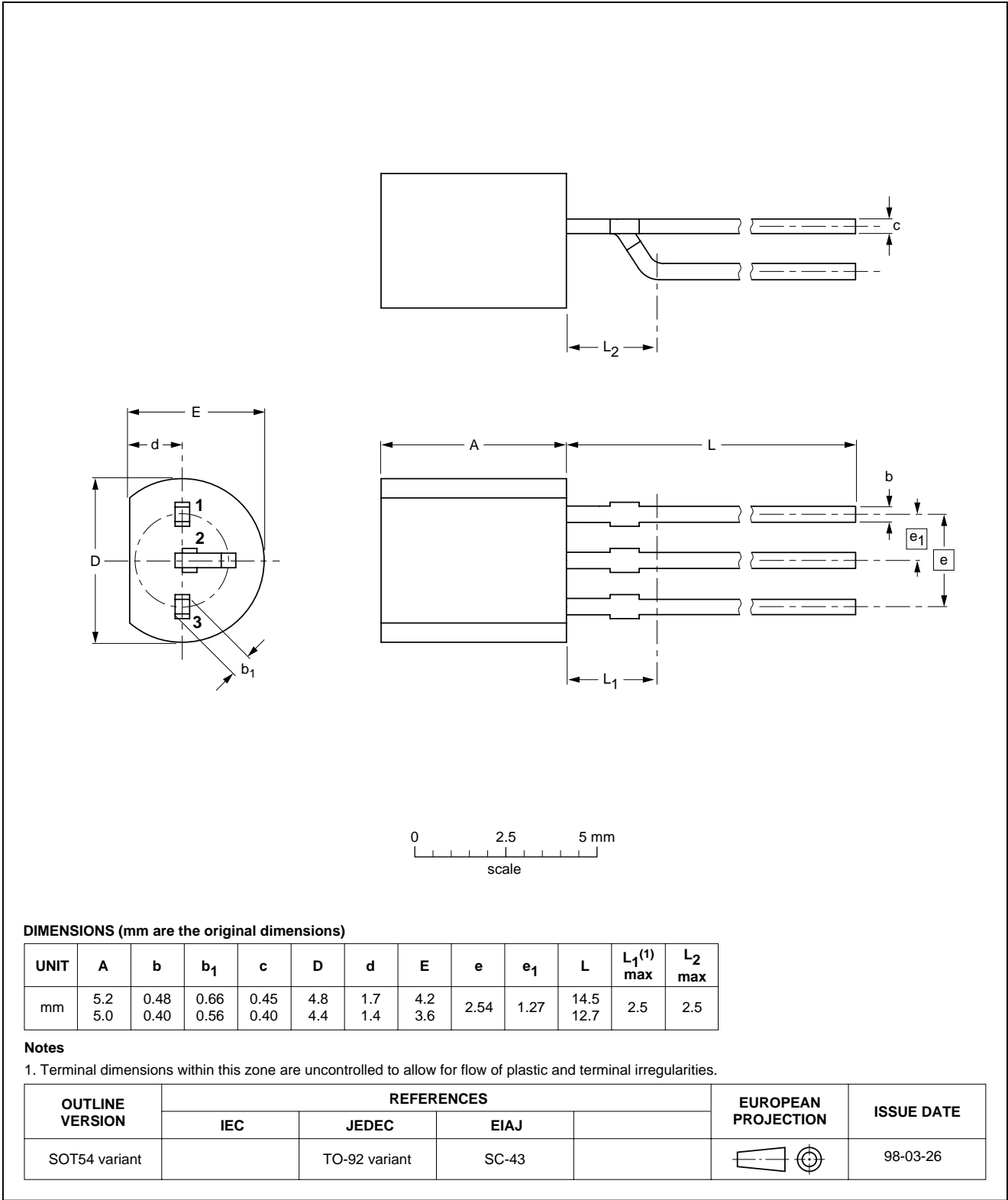
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PACKAGE OUTLINE

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

SOT54 variant



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DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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NOTES

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NOTES

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