

DATA SHEET

BST72A N-channel vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC13b

April 1995

N-channel vertical D-MOS transistor

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DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in TO-92 variant envelope and designed for use in telephone ringer circuits and for application with relay, high-speed and line-transformer drivers.

FEATURES

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

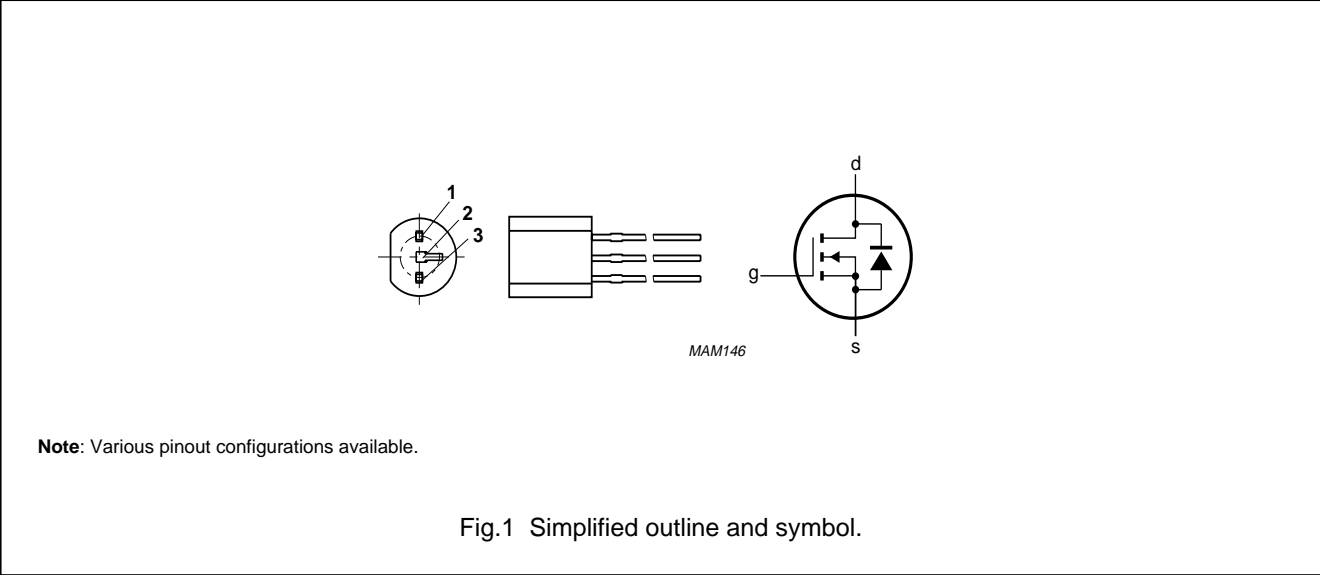
QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	80 V
Drain-source voltage (non-repetitive peak; $t_p \leq 2$ ms)	$V_{DS(SM)}$	max.	100 V
Gate-source voltage (open drain)	V_{GSO}	max.	20 V
Drain current (DC)	I_D	max.	300 mA
Total power dissipation up to $T_{amb} = 25\text{ }^{\circ}\text{C}$	P_{tot}	max.	0.83 W
Drain-source ON-resistance $I_D = 150\text{ mA}; V_{GS} = 5\text{ V}$	$R_{DS(on)}$	typ. max.	7 Ω 10 Ω
Transfer admittance $I_D = 200\text{ mA}; V_{DS} = 5\text{ V}$	$ Y_{fs} $	typ.	150 mS

PINNING - TO-92 VARIANT

- 1 = source
- 2 = gate
- 3 = drain

PIN CONFIGURATION



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RATINGS

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

Drain-source voltage	V_{DS}	max.	80 V
Drain-source voltage (non-repetitive peak; $t_p \leq 2$ ms)	$V_{DS(SM)}$	max.	100 V
Gate-source voltage (open drain)	V_{GSO}	max.	20 V
Drain current (DC)	I_D	max.	300 mA
Drain current (peak)	I_{DM}	max.	600 mA
Total power dissipation up to $T_{amb} = 25$ °C (note 1)	P_{tot}	max.	0.83 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)	$R_{th\ j-a}$	=	150 K/W
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Note

1. Transistor mounted on printed circuit board, max. lead length 4 mm.

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

Drain-source breakdown voltage

 $I_D = 10\text{ }\mu\text{A}; V_{GS} = 0$ $V_{(BR)DS}$ min. 80 V

Drain-source leakage current

 $V_{DS} = 60\text{ V}; V_{GS} = 0$ I_{DSS} max. 1.0 μA

Gate-source leakage current

 $V_{GS} = 20\text{ V}; V_{DS} = 0$ I_{GSS} max. 100 nA

Gate threshold voltage

 $I_D = 1\text{ mA}; V_{DS} = V_{GS}$ $V_{GS(th)}$ min. 1.5 V
max. 3.5 V

Drain-source ON-resistance (see Fig.4)

 $I_D = 150\text{ mA}; V_{GS} = 5\text{ V}$ $R_{DS(on)}$ typ. 7 Ω
max. 10 Ω

Transfer admittance

 $I_D = 200\text{ mA}; V_{DS} = 5\text{ V}$ $|Y_{fs}|$ typ. 150 mSInput capacitance at $f = 1\text{ MHz}$ $V_{DS} = 10\text{ V}; V_{GS} = 0$ C_{iss} typ. 15 pF
max. 30 pFOutput capacitance at $f = 1\text{ MHz}$ $V_{DS} = 10\text{ V}; V_{GS} = 0$ C_{oss} typ. 13 pF
max. 20 pFFeedback capacitance at $f = 1\text{ MHz}$ $V_{DS} = 10\text{ V}; V_{GS} = 0$ C_{rss} typ. 3 pF
max. 6 pF

Switching times (see Figs 2 and 3)

 $I_D = 200\text{ mA}; V_{DS} = 50\text{ V}; V_{GS} = 0\text{ to }10\text{ V}$ t_{on} typ. 4 ns
max. 10 ns t_{off} typ. 4 ns
max. 10 ns

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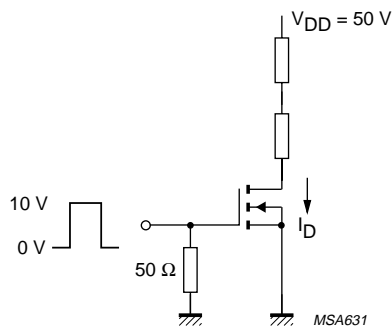


Fig.2 Switching times test circuit.

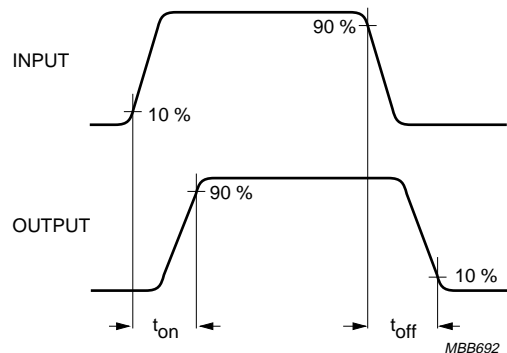


Fig.3 Input and output waveforms.

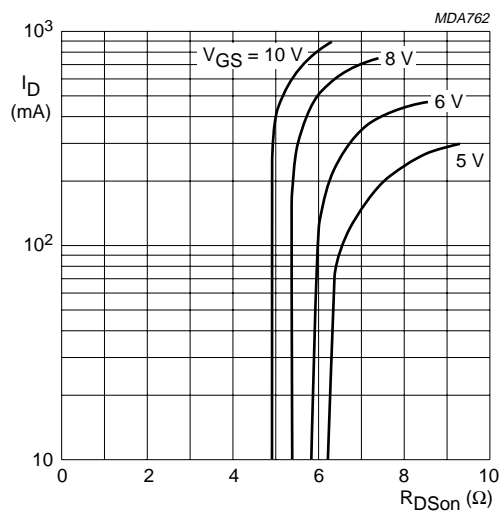


Fig.4 $T_j = 25\text{ }^{\circ}\text{C}$; typical values.

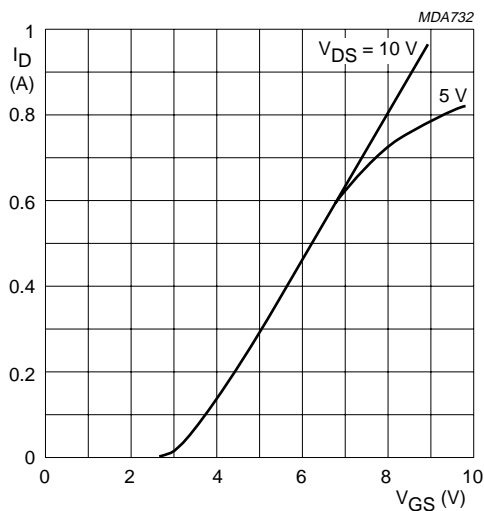


Fig.5 $T_j = 25\text{ }^{\circ}\text{C}$; typical values.

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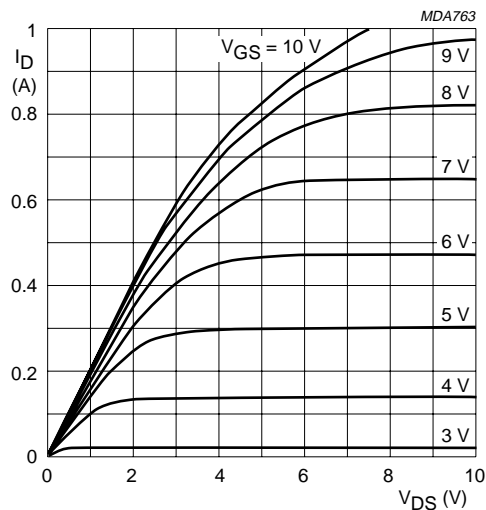


Fig.6 $T_j = 25\text{ }^\circ\text{C}$; typical values.

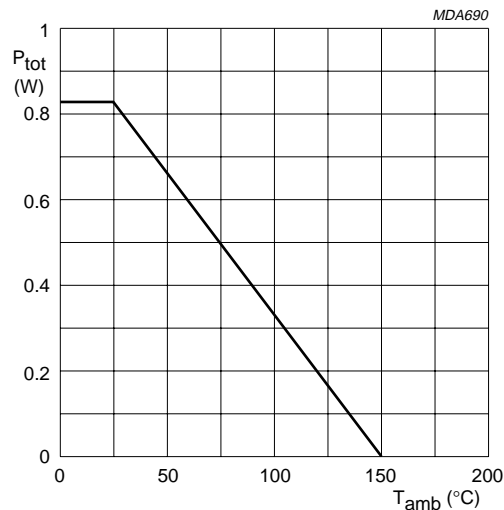


Fig.7 Power derating curve.

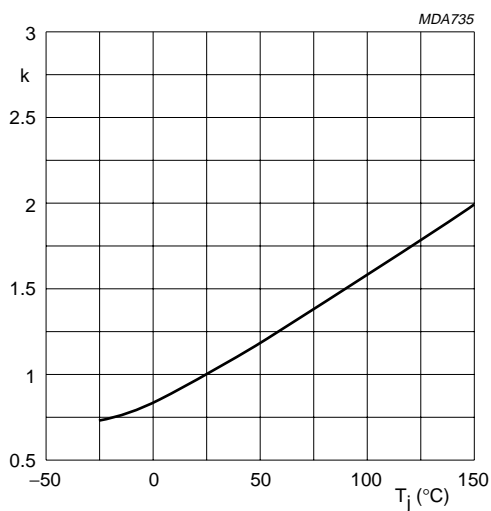


Fig.8

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

typ. values at 150 mA/5 V.

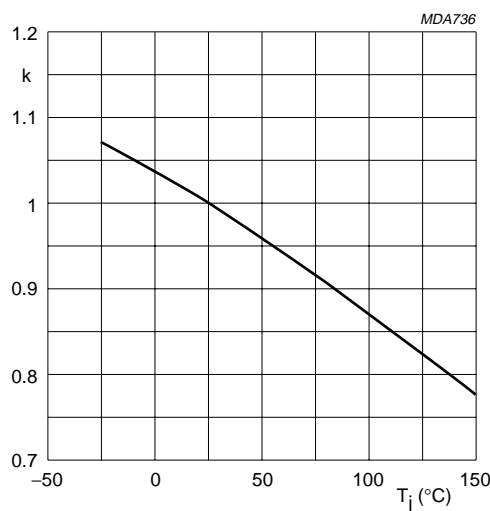


Fig.9

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

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

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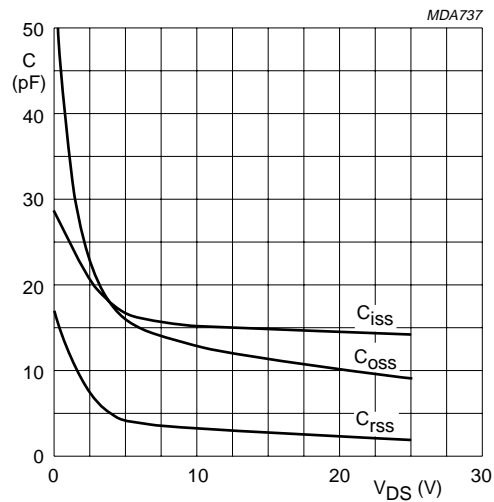


Fig.10 $T_j = 25\text{ }^{\circ}\text{C}$; $V_{GS} = 0$; $f = 1\text{ MHz}$; typical values.

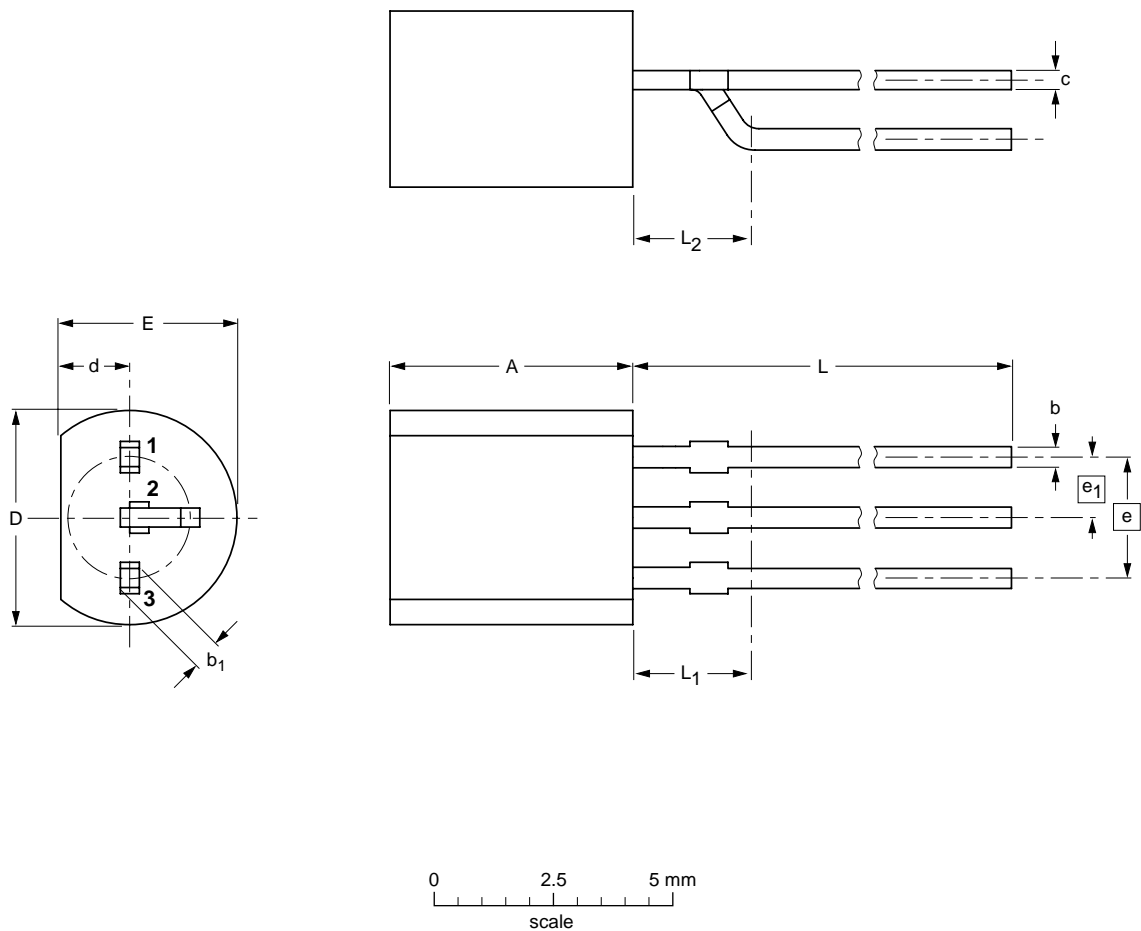
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PACKAGE OUTLINES

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

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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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NOTES

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Printed in The Netherlands

137107/00/01/pp12

Date of release: April 1995

Document order number: 9397 750 02497

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