

# DATA SHEET

## **BST86**

N-channel enhancement mode  
vertical D-MOS transistor

Product specification  
File under Discrete Semiconductors, SC13b

April 1995

N-channel enhancement mode vertical  
D-MOS transistor

BST86

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in SOT89 envelope and designed for use as Surface Mounted Device (SMD) in thin and thick-film circuits for application with relay, high-speed and line-transformer drivers.

FEATURES

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

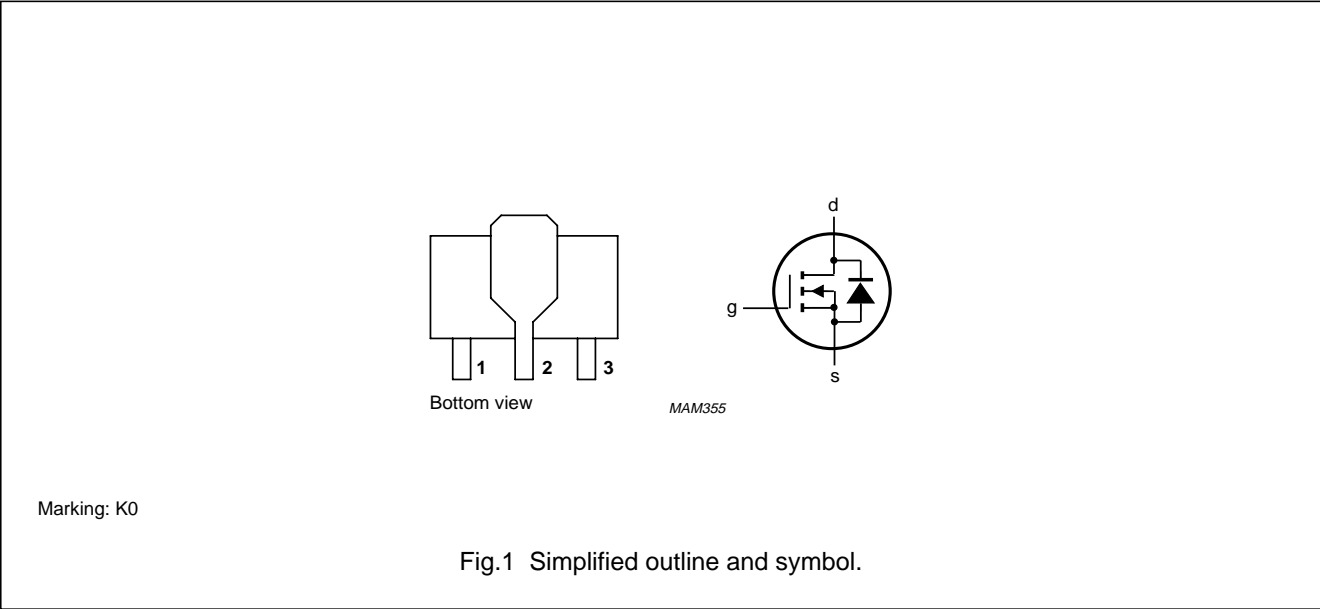
QUICK REFERENCE DATA

Drain-source voltage	$V_{DS}$	max.	180	V
Drain-source voltage (non-repetitive peak; $t_p \leq 2$ ms)	$V_{DS(SM)}$	max.	200	V
Gate-source voltage (open drain)	$\pm V_{GSO}$	max.	20	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 $I_D = 15$ mA; $V_{GS} = 3$ V	$R_{DS(on)}$	typ. max.	7 10	$\Omega$ $\Omega$
Transfer admittance $I_D = 300$ mA; $V_{DS} = 15$ V	$ Y_{fs} $	typ.	250	mS

PINNING - SOT89

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

PIN CONFIGURATION



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**BST86****RATINGS**

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

Drain-source voltage	$V_{DS}$	max.	180 V
Drain-source voltage (non-repetitive peak; $t_p \leq 2$ ms)	$V_{DS(SM)}$	max.	200 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.	800 mA
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)	$R_{th\ j-a}$	=	125 K/W
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**Note**

1. Transistor mounted on a ceramic substrate of 2.5 cm<sup>2</sup> and thickness of 0.7 mm.

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## CHARACTERISTICS

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

Drain-source breakdown voltage

$I_D = 100\text{ }\mu\text{A}; V_{GS} = 0$

$V_{(BR)DSS}$  min. 180 V

Drain-source leakage current

$V_{DS} = 120\text{ V}; V_{GS} = 0$

$I_{DSS}$  max. 10  $\mu\text{A}$

Gate-source leakage current

$V_{GS} = 20\text{ V}; V_{DS} = 0$

$I_{GSS}$  max. 100 nA

Gate threshold voltage

$I_D = 100\text{ }\mu\text{A}; V_{DS} = V_{GS}$

$V_{GS(th)}$  min. 0.7 V  
max. 2.7 V

Drain-source ON-resistance

$I_D = 15\text{ mA}; V_{GS} = 3\text{ V}$

$R_{DS(on)}$  typ. 7  $\Omega$   
max. 10  $\Omega$

$I_D = 300\text{ mA}; V_{GS} = 10\text{ V}$

$R_{DS(on)}$  typ. 6  $\Omega$

Transfer admittance

$I_D = 300\text{ mA}; V_{DS} = 15\text{ V}$

$|Y_{fs}|$  typ. 250 mS

 Input capacitance at  $f = 1\text{ MHz}$ 

$V_{DS} = 10\text{ V}; V_{GS} = 0$

$C_{iss}$  typ. 50 pF  
max. 65 pF

 Output capacitance at  $f = 1\text{ MHz}$ 

$V_{DS} = 10\text{ V}; V_{GS} = 0$

$C_{oss}$  typ. 20 pF  
max. 30 pF

 Feedback capacitance at  $f = 1\text{ MHz}$ 

$V_{DS} = 10\text{ V}; V_{GS} = 0$

$C_{rss}$  typ. 6 pF  
max. 10 pF

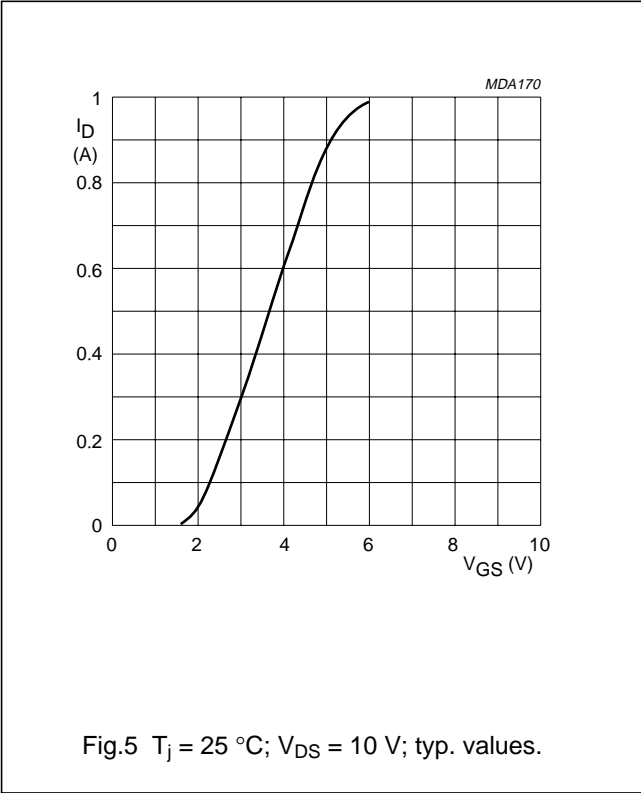
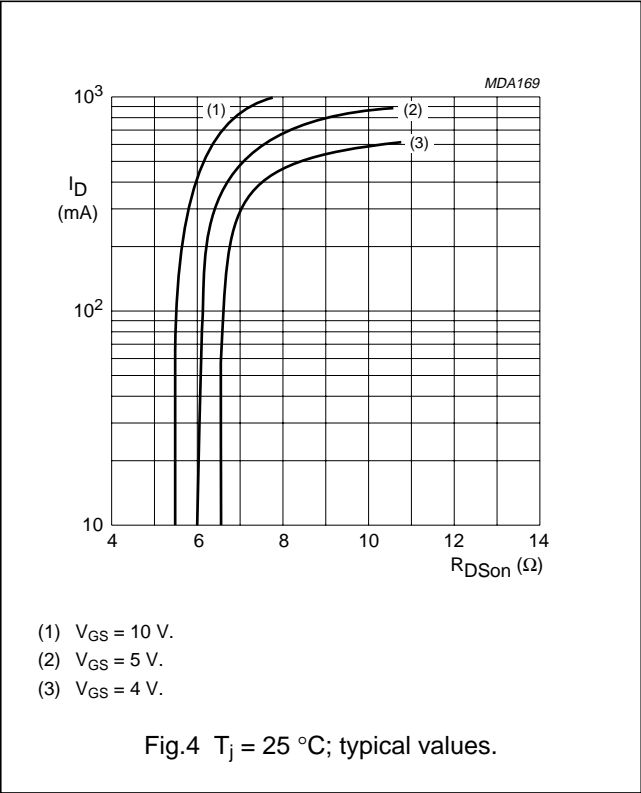
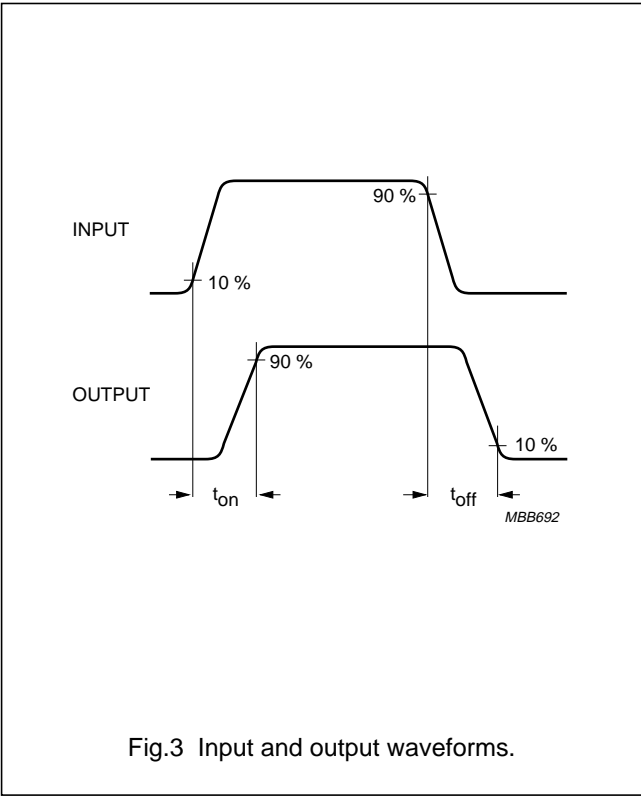
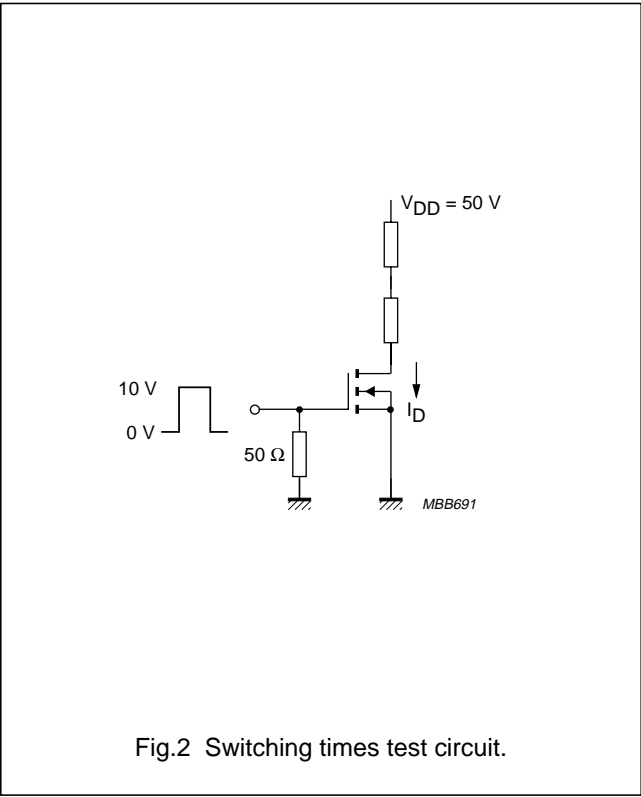
Switching times (see as 2 and 3)

$I_D = 300\text{ mA}; V_{DD} = 50\text{ V}; V_{GS} = 0\text{ to }10\text{ V}$

$t_{on}$  max. 10 ns  
 $t_{off}$  max. 15 ns

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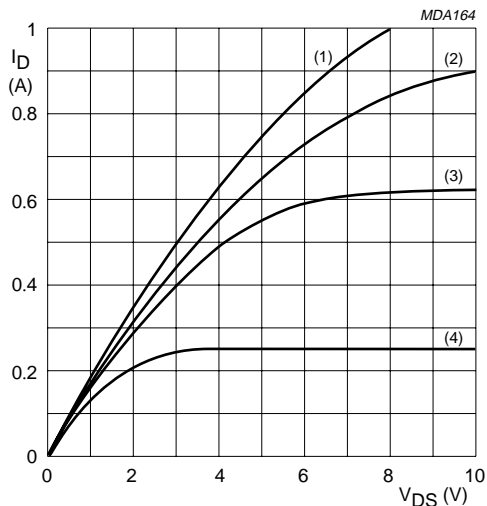


Fig.6  $T_j = 25$  °C; typical values.

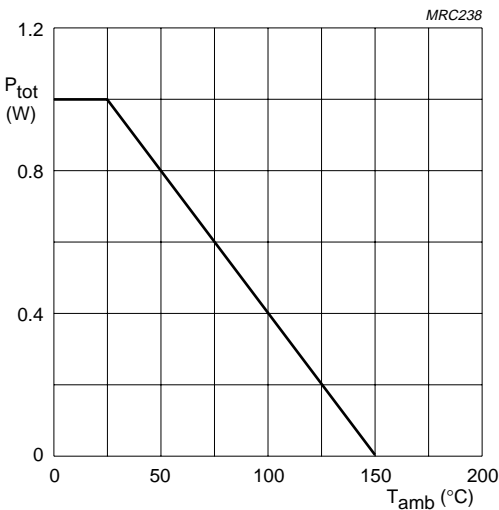


Fig.7 Power derating curve.

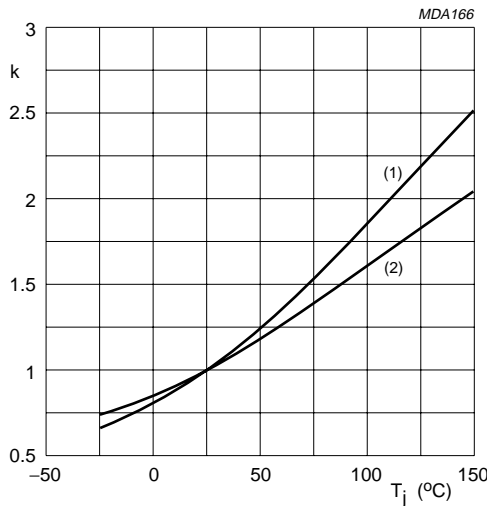


Fig.8

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

typical values.

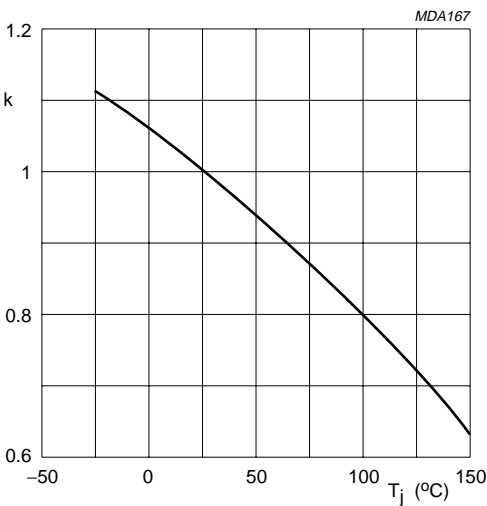


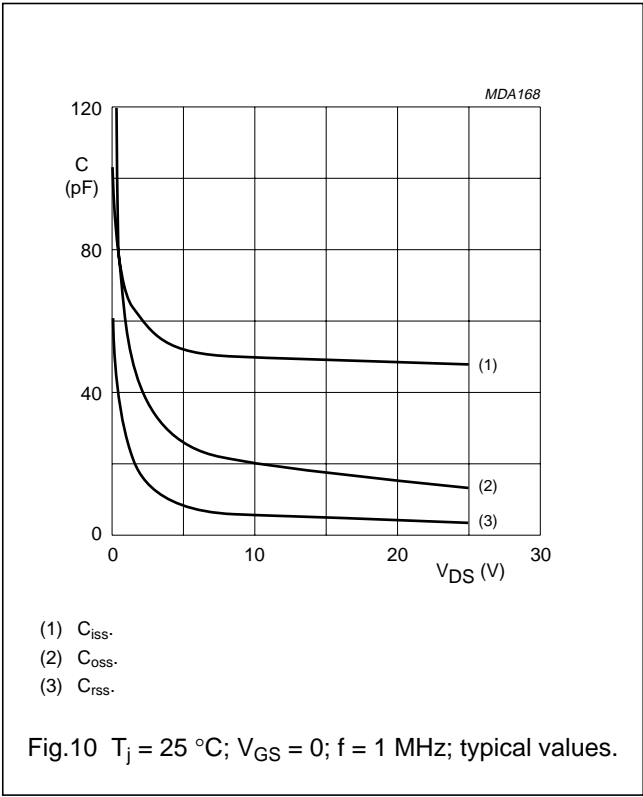
Fig.9

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

$V_{GS(th)}$  at 0.1. mA; typical values.

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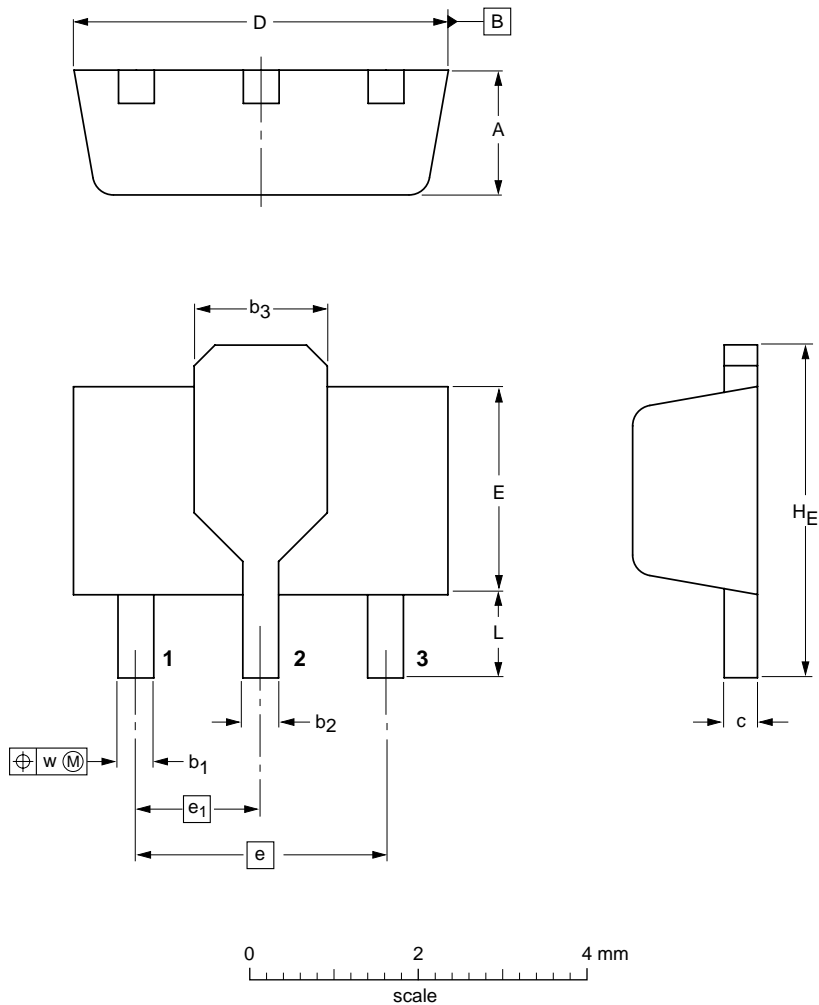
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT89						97-02-28



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**BST86****DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Application information</b>	
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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