

# DATA SHEET

## **BSP89**

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

## BSP89

### 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 SOT223 envelope, intended for use as a surface-mounted device in line current interrupters in telephone sets and for application in relay, high speed and line transformer drivers.

### PINNING - SOT223

PIN	DESCRIPTION
Code: BSP89	
1	gate
2	drain
3	source
4	drain

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{DS}$	drain-source voltage	240	V
$I_D$	DC drain current	350	mA
$R_{DS(on)}$	drain-source on-resistance	6	$\Omega$
$V_{GS(th)}$	gate-source threshold voltage	2	V

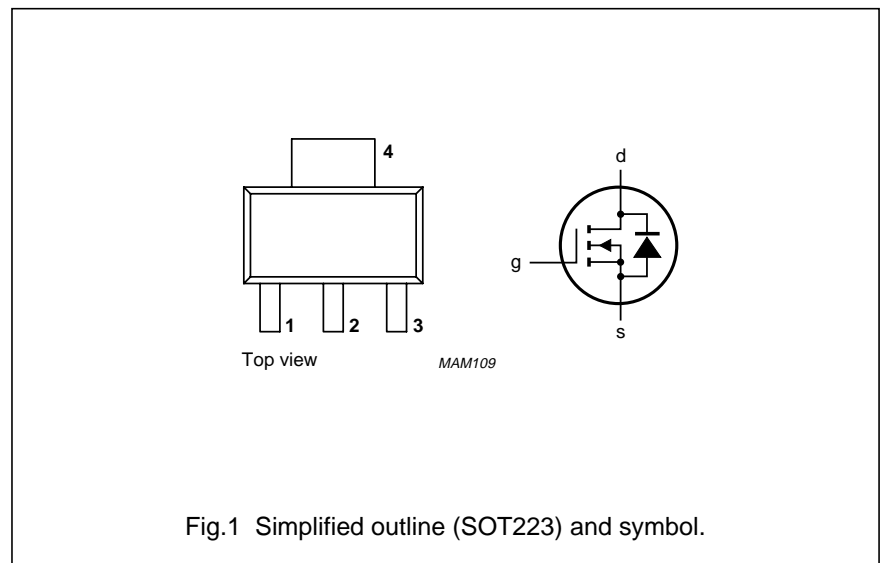


Fig.1 Simplified outline (SOT223) and symbol.

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	240	V
$\pm V_{GSO}$	gate-source voltage	open drain	–	20	V
$I_D$	DC drain current		–	350	mA
$I_{DM}$	peak drain current		–	1.4	A
$P_{tot}$	total power dissipation	up to $T_{amb} = 25\text{ }^\circ\text{C}$ (note 1)	–	1.5	W
$T_{stg}$	storage temperature range		–65	150	$^\circ\text{C}$
$T_j$	junction temperature		–	150	$^\circ\text{C}$

### THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j-a}$	from junction to ambient (note 1)	83.3 K/W

### Note

1. Transistor mounted on an epoxy printed circuit board, 40 x 40 x 1.5 mm, mounting pad for the drain tab minimum 6 cm<sup>2</sup>.

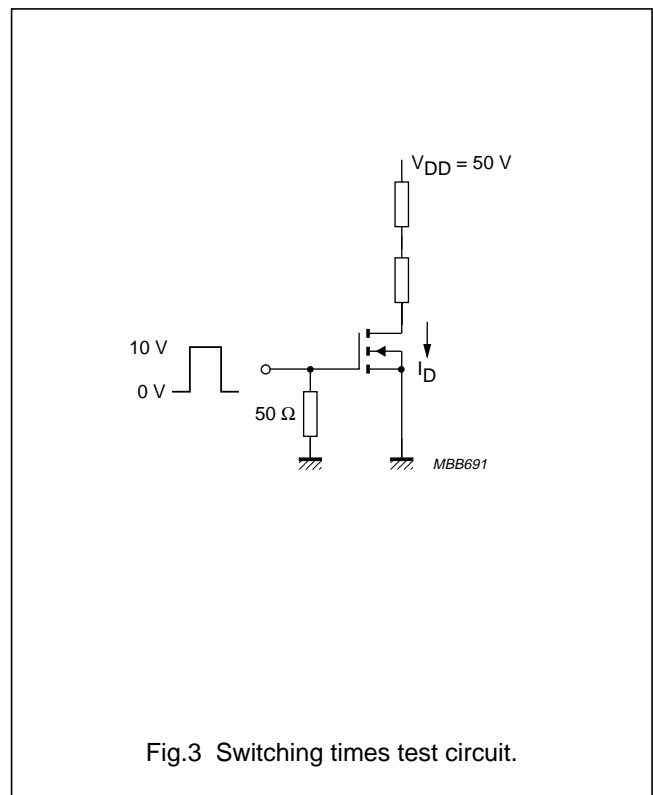
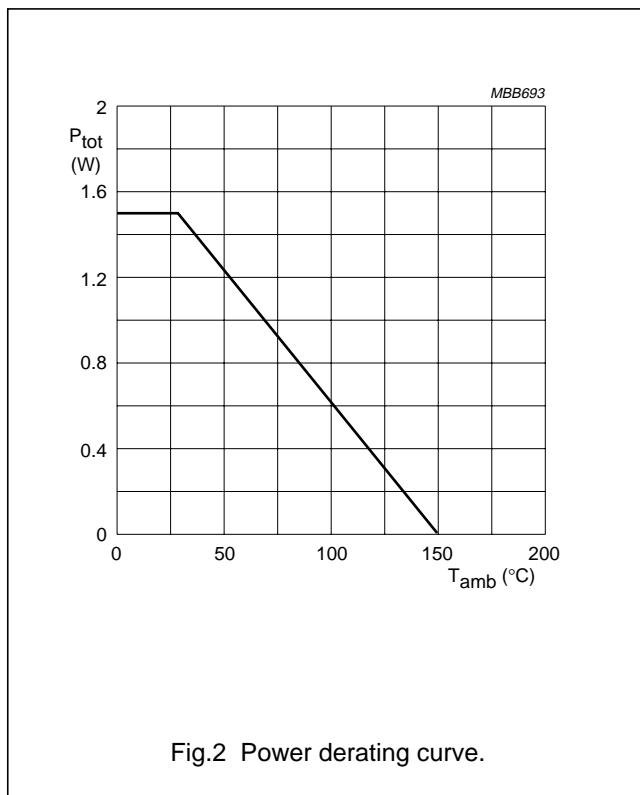
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## CHARACTERISTICS

T<sub>j</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>(BR)DSS</sub>	drain-source breakdown voltage	I <sub>D</sub> = 10 μA; V <sub>GS</sub> = 0	240	–	–	V
I <sub>DSS</sub>	drain-source leakage current	V <sub>DS</sub> = 60 V; V <sub>GS</sub> = 0	–	–	200	nA
±I <sub>GSS</sub>	gate-source leakage current	±V <sub>GS</sub> = 20 V; V <sub>DS</sub> = 0	–	–	100	nA
V <sub>GS(th)</sub>	gate-source threshold voltage	I <sub>D</sub> = 1 mA; V <sub>GS</sub> = V <sub>DS</sub>	0.8	–	2	V
R <sub>DS(on)</sub>	drain-source on-resistance	I <sub>D</sub> = 340 mA; V <sub>GS</sub> = 10 V	–	4	6	Ω
		I <sub>D</sub> = 340 mA; V <sub>GS</sub> = 4.5 V	–	–	10	Ω
Y <sub>fs</sub>	transfer admittance	I <sub>D</sub> = 340 mA; V <sub>DS</sub> = 25 V	140	350	–	mS
C <sub>iss</sub>	input capacitance	V <sub>DS</sub> = 25 V; V <sub>GS</sub> = 0; f = 1 MHz	–	65	140	pF
C <sub>oss</sub>	output capacitance	V <sub>DS</sub> = 25 V; V <sub>GS</sub> = 0; f = 1 MHz	–	20	30	pF
C <sub>rss</sub>	feedback capacitance	V <sub>DS</sub> = 25 V; V <sub>GS</sub> = 0; f = 1 MHz	–	5	9	pF
<b>Switching times (see Figs 3 and 4)</b>						
t <sub>on</sub>	turn-on time	I <sub>D</sub> = 250 mA; V <sub>DD</sub> = 50 V; V <sub>GS</sub> = 0 to 10 V	–	5	10	ns
t <sub>off</sub>	turn-off time	I <sub>D</sub> = 250 mA; V <sub>DD</sub> = 50 V; V <sub>GS</sub> = 0 to 10 V	–	20	30	ns



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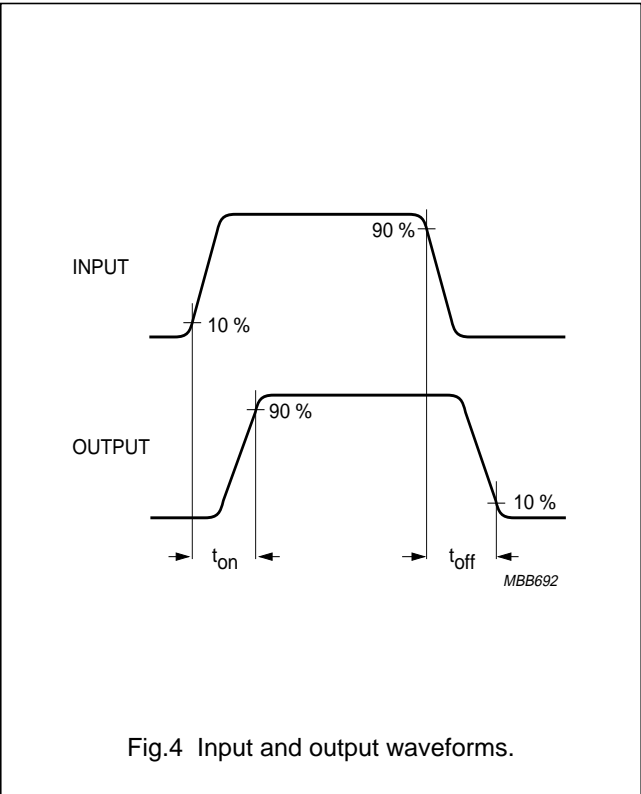


Fig.4 Input and output waveforms.

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## PACKAGE OUTLINES

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT223						96-11-11 97-02-28

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**BSP89****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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