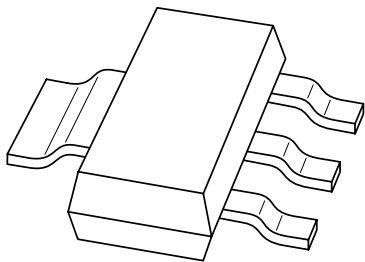


DATA SHEET



BSP89

**N-channel enhancement mode
vertical D-MOS transistor**

Product specification
Supersedes data of 1997 Jun 23

2001 May 18

N-channel enhancement mode vertical D-MOS transistor

BSP89

FEATURES

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

DESCRIPTION

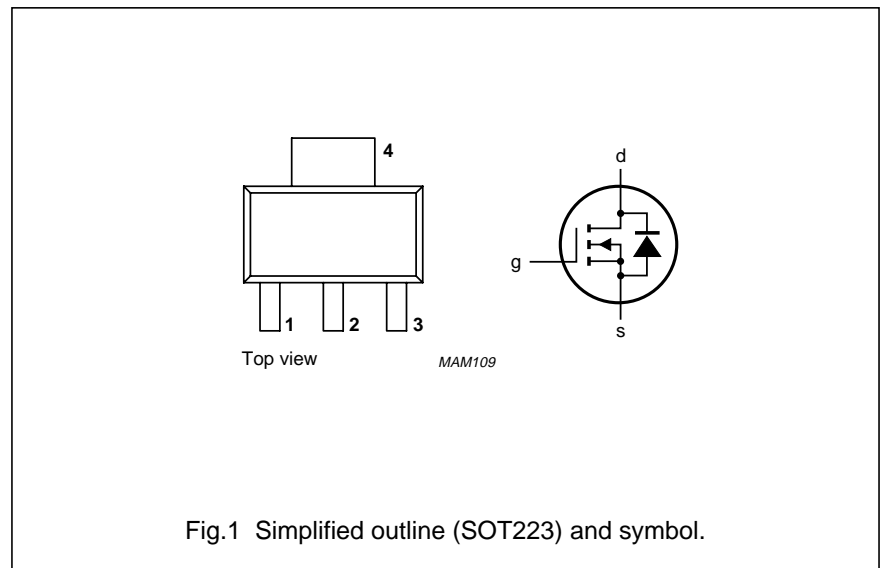
N-channel enhancement mode vertical D-MOS transistor in a SOT223 package, intended for use as a surface-mounted device in line current interrupters in telephone sets and for application in relay, high speed and line transformer drivers.

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 (DC)	240	V
V_{GSth}	gate-source threshold voltage	2	V
I_D	drain current (DC)	375	mA
R_{DSon}	drain-source on-state resistance	5	Ω



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	240	V
V_{GSO}	gate-source voltage (DC)	open drain	–	± 20	V
I_D	drain current (DC)		–	375	mA
I_{DM}	peak drain current		–	1.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$; note 1	–	1.5	W
T_{stg}	storage temperature		–55	+150	$^\circ\text{C}$
T_j	junction temperature		–	150	$^\circ\text{C}$

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 cm².

N-channel enhancement mode vertical D-MOS transistor

BSP89

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance 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 cm².

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 10\ \mu\text{A}; V_{GS} = 0$	240	–	–	V
I_{DSS}	drain-source leakage current	$V_{DS} = 60\ \text{V}; V_{GS} = 0$	–	–	200	nA
I_{GSS}	gate-source leakage current	$V_{GS} = \pm 20\ \text{V}; V_{DS} = 0$	–	–	100	nA
V_{GSth}	gate-source threshold voltage	$I_D = 1\ \text{mA}; V_{GS} = V_{DS}$	0.8	–	2	V
R_{DSon}	drain-source on-state resistance	$I_D = 340\ \text{mA}; V_{GS} = 10\ \text{V}$	–	2.8	5	Ω
		$I_D = 340\ \text{mA}; V_{GS} = 4.5\ \text{V}$	–	–	7.5	Ω
$ Y_{fs} $	transfer admittance	$I_D = 340\ \text{mA}; V_{DS} = 25\ \text{V}$	140	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	$V_{DS} = 25\ \text{V}; V_{GS} = 0; f = 1\ \text{MHz}$	–	20	30	pF
C_{rss}	reverse transfer capacitance	$V_{DS} = 25\ \text{V}; V_{GS} = 0; f = 1\ \text{MHz}$	–	10	15	pF
Switching times (see Figs 3 and 4)						
t_{on}	turn-on time	$I_D = 250\ \text{mA}; V_{DD} = 50\ \text{V}; V_{GS} = 0\ \text{to}\ 10\ \text{V}$	–	6	10	ns
t_{off}	turn-off time	$I_D = 250\ \text{mA}; V_{DD} = 50\ \text{V}; V_{GS} = 0\ \text{to}\ 10\ \text{V}$	–	47	60	ns

N-channel enhancement mode vertical D-MOS transistor

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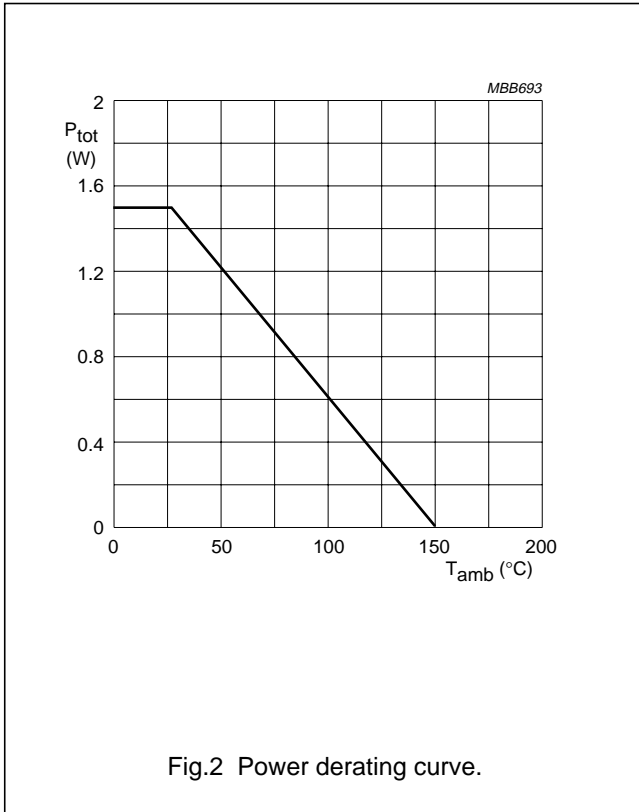


Fig.2 Power derating curve.

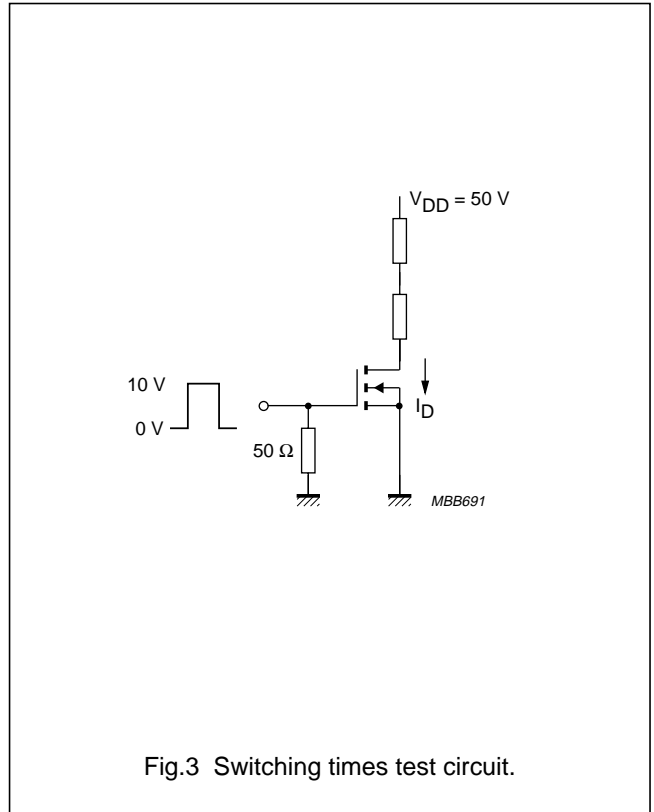


Fig.3 Switching times test circuit.

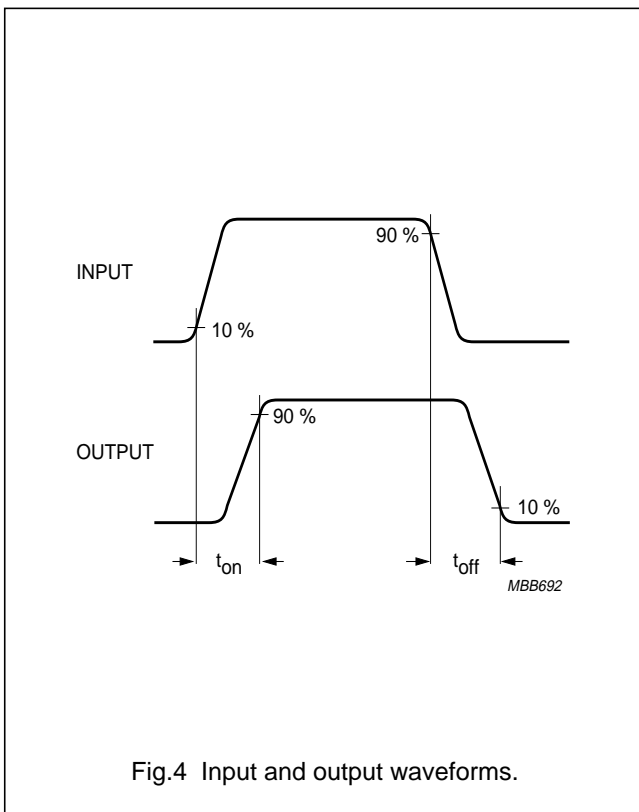


Fig.4 Input and output waveforms.

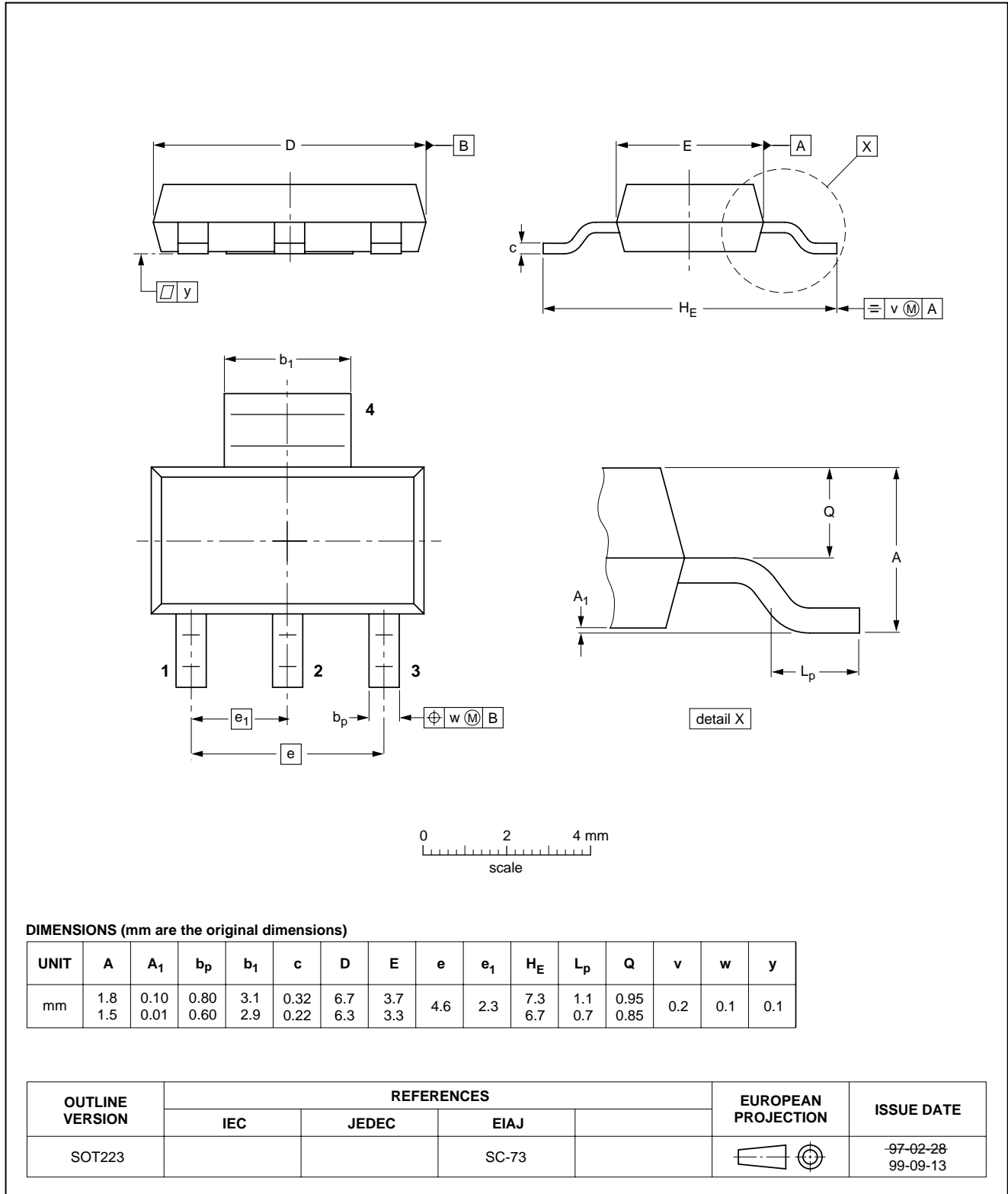
N-channel enhancement mode
vertical D-MOS transistor

BSP89

PACKAGE OUTLINE

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

SOT223



N-channel enhancement mode vertical D-MOS transistor

BSP89

DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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N-channel enhancement mode
vertical D-MOS transistor

BSP89

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