BST76A

N-channel enhancement mode vertical D-MOS transistor

Product specification
1997 Jun 20
Supersedes data of April 1995
File under Discrete Semiconductors, SC13b

Philips
Semiconductors

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N-channel enhancement mode vertical D-MOS transistor

BST76A

FEATURES

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

APPLICATIONS

- Line current interrupter 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 (TO-92)variant

	PIN SYMBOL DESCRIPTION	
1 s source		
2 g gate		
3 d drain		

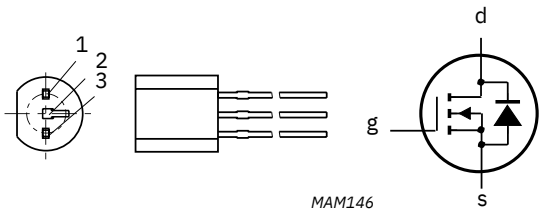


Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
VDS	drain-source voltage (DC)		–	180	V
VDS(SM)	drain-source voltage	non-repetitive peak; ≤2mS	–	200	V
VGSO	gate-source voltage (DC)	tp open drain	–	±20	V
ID	drain current (DC)		–	300	mA
Ptot	total power dissipation	Tamb ≤ 25 °C	–	1	W
RDSon	drain-source on-state resistance	ID=15mA; VGS=3V	7	10	Ω
|yfs|	forward transfer admittance	ID=300mA; VDS=15V	250	–	mS

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
VDS	drain-source voltage (DC)		–	180	V
VDS(SM)	drain-source voltage	non-repetitive peak; tp≤2mS	–	200	V
VGSO	gate-source voltage (DC)	open drain	–	±20	V
ID	drain current (DC)		–	300	mA
IDM	peak drain current		–	800	mA
Ptot	total power dissipation	Tamb≤25°C; note1	–	1	W
Tstg	storage temperature		−65	+150	°C
Tj	junction temperature		–	150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Rth j-a	thermal resistance from junction to ambient	note1	125	K/W

Note to the Limiting values and Thermal characteristics

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

CHARACTERISTICS

Tj=25°C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX.	UNIT
V(BR)DSS	drain-source breakdown voltage	VGS=0; ID=100μA	180	–	–	V
VGSth	gate-source threshold voltage	VDS=VGS; ID=100μA	0.7	–	2.4	V
IDSS	drain-source leakage current	VDS=120V; VGS=0	–	–	10	μA
IGSS	gate leakage current	VDS=0; VGS=±20V	–	–	±100	nA
RDSon	drain-source on-state resistance	VGS=3V; ID=15mA	–	7	10	Ω
		VGS=10V; ID=300mA	–	6	–	Ω
|yfs|	forward transfer admittance	ID=300mA; VDS=15V	–	250	–	mS
Ciss	input capacitance	VDS=10V; VGS=0; f=1MHz	–	50	60	pF
Coss	output capacitance	VDS=10V; VGS=0; f=1MHz	–	20	50	pF
Crss	reverse transfer capacitance	VDS=10V; VGS=0; f=1MHz	–	6	30	pF
Switching times	(see Figs 2 and 3)					
ton	turn-on time	VGS=0 to 10V; V_{DS} = 50 V; ID = 300 mA	–	–	100	ns
toff	turn-off time	VGS=10 to 0V; V_{DS} = 50 V; ID = 300 mA	–	–	150	ns

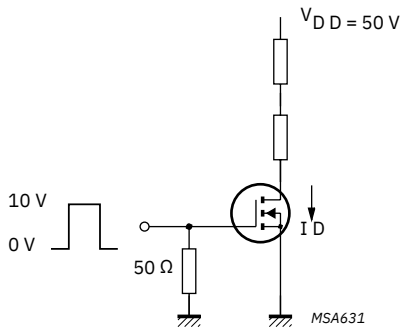


Fig.2 Switching times test circuit.

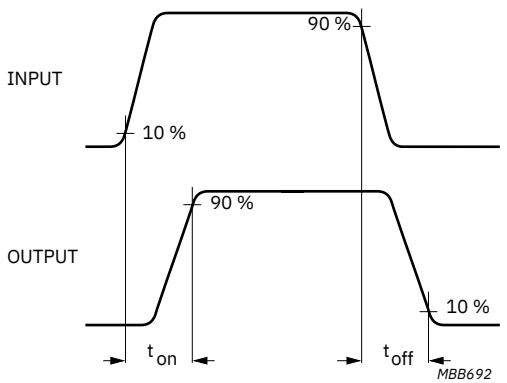


Fig.3 Input and output waveforms.

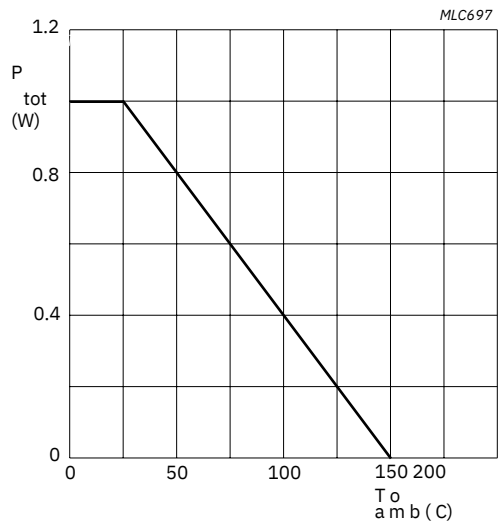
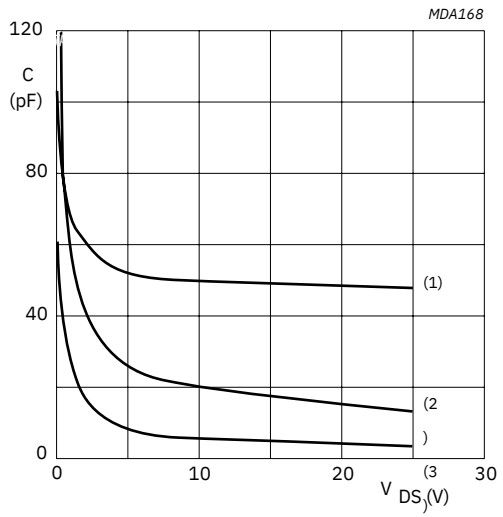
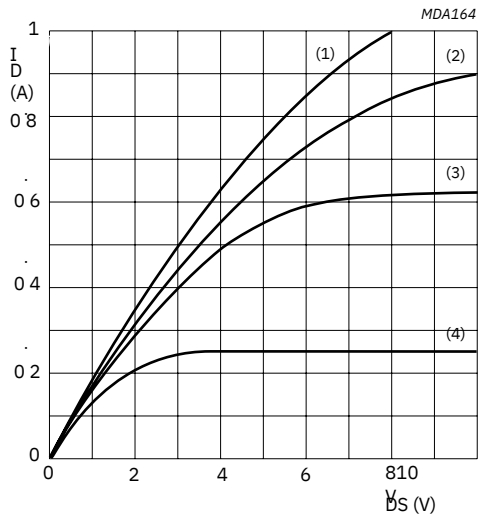


Fig.4 Power derating curve.



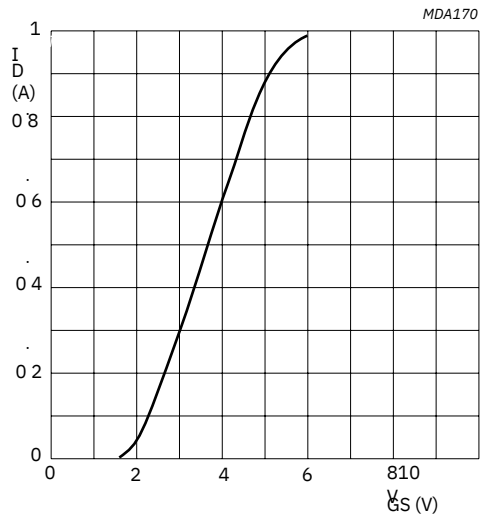
VGS=0; f=1MHz; Tj=25°C. (1) Ciss.
(2) Coss.
(3) Crss.

Fig.5 Capacitance as a function of drain-source voltage; typical values.



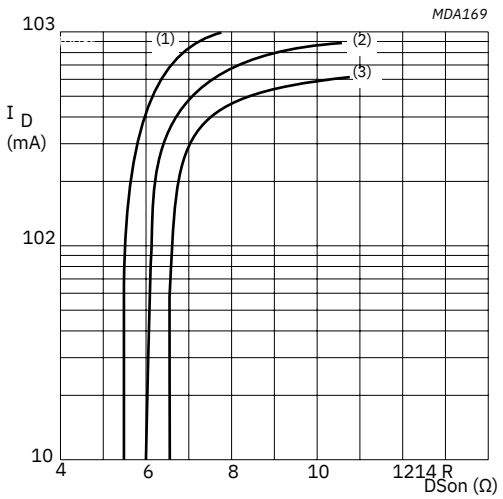
Tj = 25 °C.
(1) VGS = 10 V.
(2) VGS = 5 V.
(3) V_{GS} =4V.
(4) V_{GS} =3V.

Fig.6 Output characteristics; typical values.



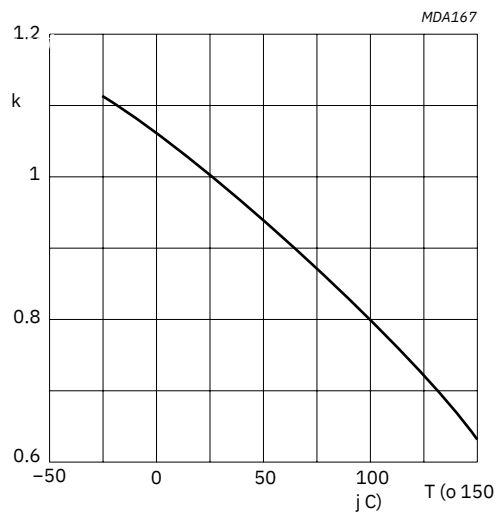
VDS =10V; Tj=25°C.

Fig.7 Transfer characteristic; typical values.



Tj = 25 °C.
(1) VGS = 10 V.
(2) VGS = 5 V.
(3) VGS = 4 V.

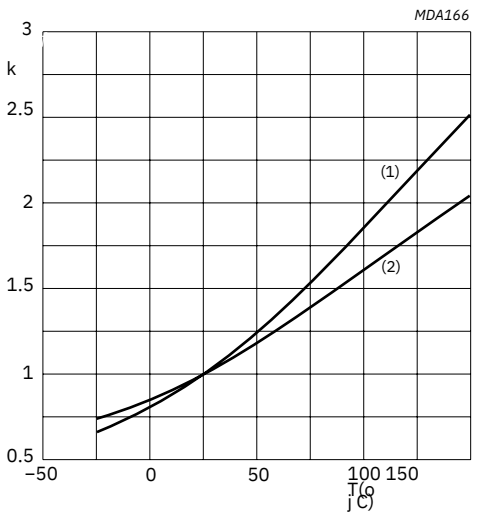
Fig.8 Drain current as a function of drain-source on-state resistance; typical values.



$k = \frac{V_{GSth} \text{ at } T}{V_{GSth} \text{ at } 25°C}$

V_{GSth} at 0.1mA.

Fig.9 Temperature coefficient of gate-source threshold voltage; typical values.



$k = \frac{R_{DSon}}{R_{DSon \text{ at } 25\ °C}}$

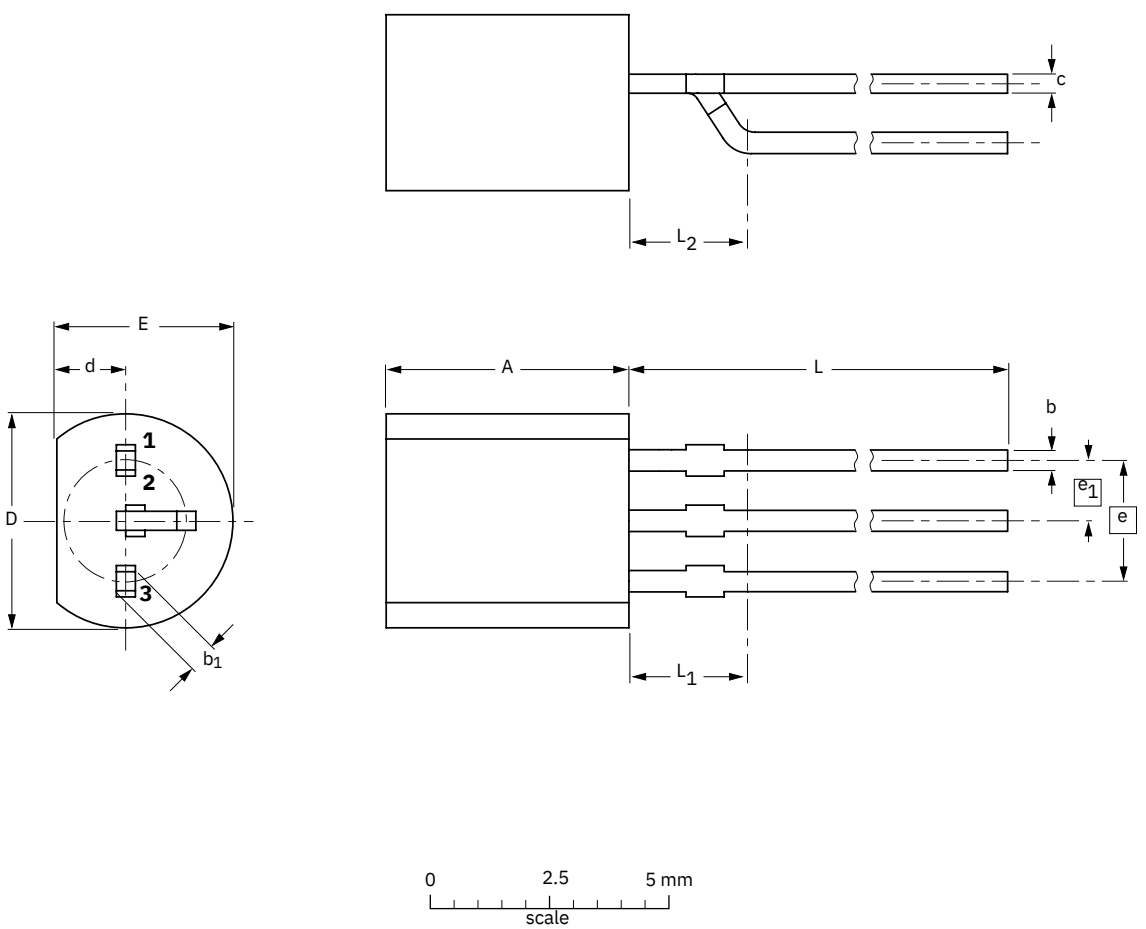
(1) ID=300mA; VGS=10V.

(2) ID=15mA; VGS=3V.

Fig.10Temperature coefficient of drain-source on-state resistance; typical values.

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads (on-circle) **SOT54 variant**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b1	c	D	d	E	e	e1	L	L1(1)	L2 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	14.5 12.7	2.54	1.27	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

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.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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