# DATA SHEET

# BST100
## P-channel enhancement mode vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC13b

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Philips
Semiconductors

PHILIPS

# P-channel enhancement mode vertical D-MOS transistor

# BST100

## DESCRIPTION

P-channel vertical D-MOS transistor TO-92 variant envelope and intended for use in relay, high-speed and line-transformer drivers.

## FEATURES

- Very low $R_{DS(on)}$
- Direct interface to C-MOS
- High-speed switching
- No second breakdown

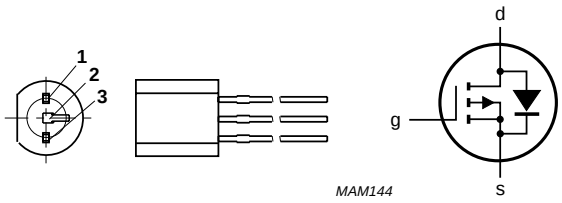
## QUICK REFERENCE DATA

| | | | | |
|---|---|---|---|---|
| Drain-source voltage | $-V_{DS}$ | max. | 60 | V |
| Gate-source voltage (open drain) | $\pm V_{GSO}$ | max. | 20 | V |
| Drain current (DC) | $-I_D$ | max. | 0.3 | A |
| Total power dissipation up to $T_{amb}$ = 25 °C | $P_{tot}$ | max. | 1 | W |
| Drain-source ON-resistance | | | | |
| $-I_D$ = 200 mA; $-V_{GS}$ = 10 V | $R_{DS(on)}$ | typ. | 4,5 | Ω |
| | | max. | 6 | Ω |
| Transfer admittance | | | | |
| $-I_D$ = 200 mA; $-V_{DS}$ = 15 V | $\lvert Y_{fs} \rvert$ | typ. | 200 | mS |

## PINNING - TO-92 VARIANT

1 = source
2 = gate
3 = drain

## PIN CONFIGURATION




Note: various pinout configurations available.

Fig.1 Simplified outline and symbol.

# P-channel enhancement mode vertical D-MOS transistor

# BST100

## RATINGS

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

| | | | | |
|---|---|---|---|---|
| Drain-source voltage | $-V_{DS}$ | max. | 60 | V |
| Gate-source voltage (open drain) | $\pm V_{GSO}$ | max. | 20 | V |
| Drain current (DC) | $-I_D$ | max. | 0.3 | A |
| Drain current (peak) | $-I_{DM}$ | max. | 0.8 | A |
| 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) | $R_{th\ j\text{-}a}$ | = | 125 | K/W |

**Note**

1. Transistor mounted on printed-circuit board, max. lead length 4 mm, mounting pad for drain lead min. 10 mm x 10 mm.

## CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified

| | | | | |
|---|---|---|---|---|
| Drain-source breakdown voltage | | | | |
| $-I_D$ = 10 μA; $V_{GS}$ = 0 | $-V_{(BR)DSS}$ | min. | 60 | V |
| Drain-source leakage current | | | | |
| $-V_{DS}$ = 48 V; $V_{GS}$ = 0 | $-I_{DSS}$ | max. | 1 | μA |
| Gate-source leakage current | | | | |
| $-V_{GS}$ = 20 V; $V_{DS}$ = 0 | $-I_{GSS}$ | max. | 100 | nA |
| Gate threshold voltage | | | | |
| $-I_D$ = 1 mA; $V_{DS}$ = $V_{GS}$ | $-V_{GS(th)}$ | min. | 1.5 | V |
| | | max. | 3.5 | V |
| Drain-source ON-resistance | | | | |
| $-I_D$ = 200 mA; $-V_{GS}$ = 10 V | $R_{DS(on)}$ | typ. | 4.5 | Ω |
| | | max. | 6 | Ω |
| Transfer admittance | | | | |
| $-I_D$ = 200 mA; $-V_{DS}$ = 15 V | $\lvert Y_{fs} \rvert$ | typ. | 200 | mS |
| Input capacitance at f = 1 MHz | | | | |
| $-V_{DS}$ = 10 V; $V_{GS}$ = 0 | $C_{iss}$ | typ. | 55 | pF |
| | | max. | 70 | pF |
| Output capacitance at f = 1 MHz | | | | |
| $-V_{DS}$ = 10 V; $V_{GS}$ = 0 | $C_{oss}$ | typ. | 30 | pF |
| | | max. | 45 | pF |
| Feedback capacitance at f = 1 MHz | | | | |
| $-V_{DS}$ = 10 V; $V_{GS}$ = 0 | $C_{rss}$ | typ. | 8 | pF |
| | | max. | 12 | pF |
| Switching times (see Figs 2 and 3) | | | | |
| $-I_D$ = 200 mA; $-V_{DD}$ = 50 V; $-V_{GS}$ = 0 to 10 V | $t_{on}$ | typ. | 4 | ns |
| | $t_{off}$ | typ. | 20 | ns |

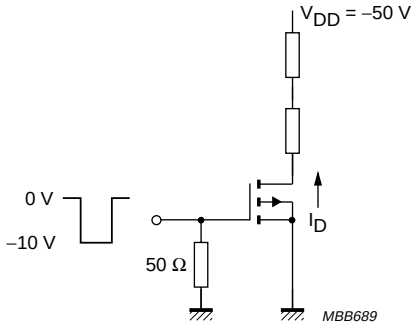



Fig.2 Switching times test circuit.

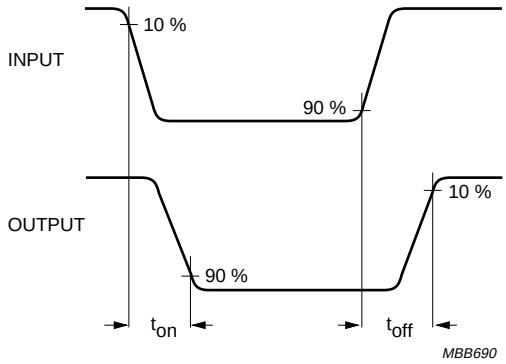



Fig.3 Input and output waveforms.

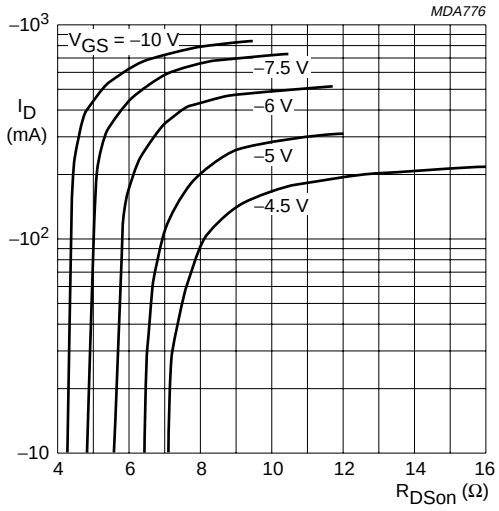



Fig.4 Drain current vs ON-resistance.
$T_j$ = 25 °C; typical values.

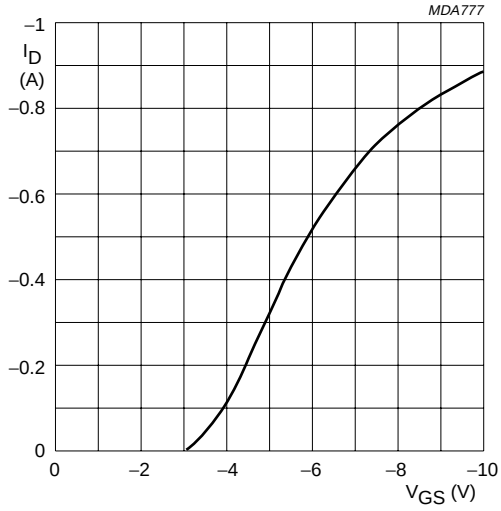



Fig.5 Transfer characteristics.
$T_j$ = 25 °C; $-V_{DS}$ = 10 V; typical values.

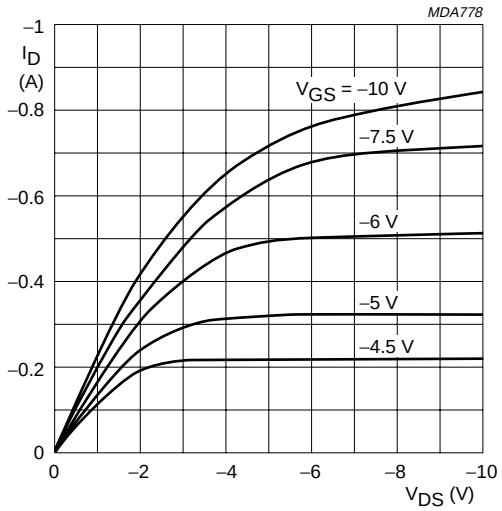
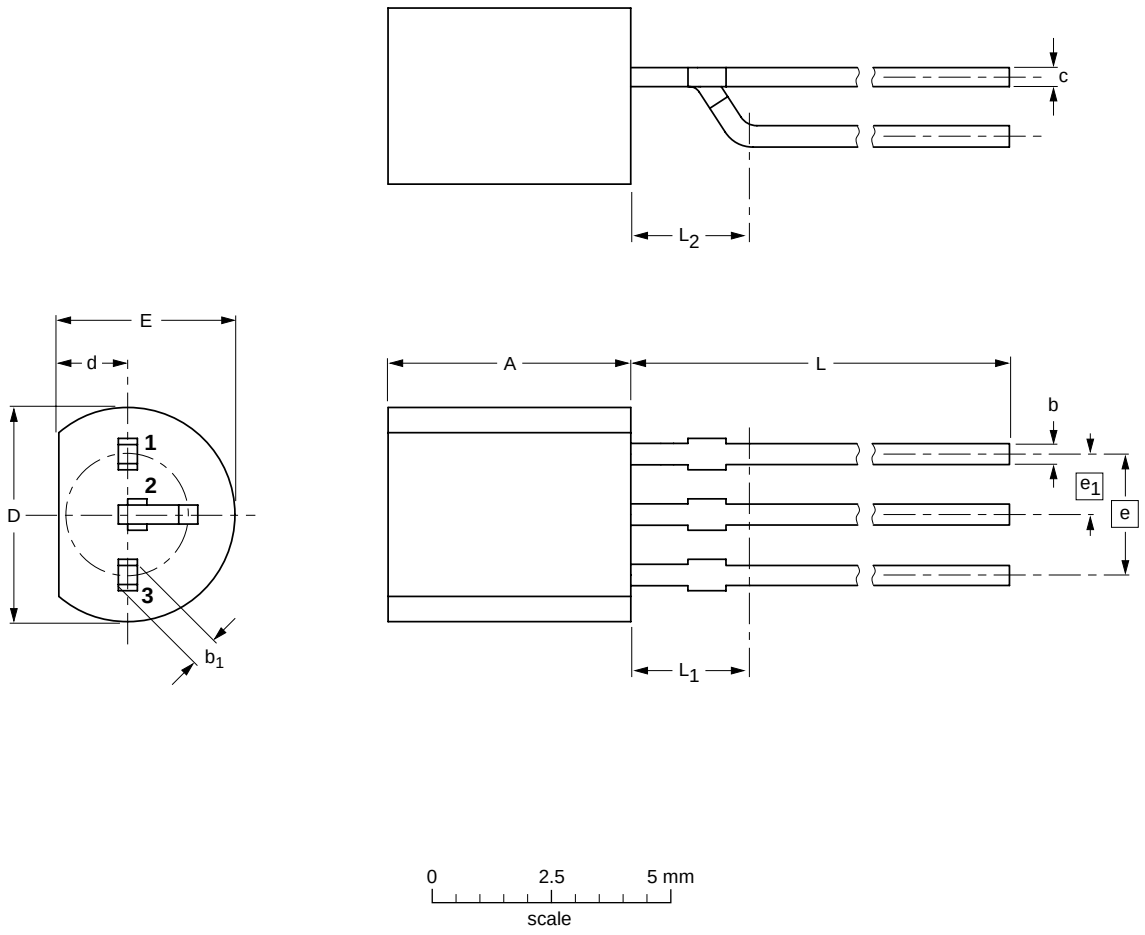



Fig.6 Output characteristics. $T_j$ = 25 °C; typical values.

## 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<br>5.0 | 0.48<br>0.40 | 0.66<br>0.56 | 0.45<br>0.40 | 4.8<br>4.4 | 1.7<br>1.4 | 4.2<br>3.6 | 2.54 | 1.27 | 14.5<br>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 |

## 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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