

DATA SHEET

BS250

P-channel enhancement mode
vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC13b

April 1995

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BS250

DESCRIPTION

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

FEATURES

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

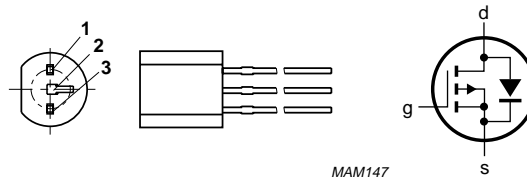
QUICK REFERENCE DATA

| | | | |
|---|---------------|--------------|---------------------------|
| Drain-source voltage | $-V_{DS}$ | max. | 45 V |
| Gate-source voltage (open drain) | $\pm V_{GSO}$ | max. | 20 V |
| Drain current (DC) | $-I_D$ | max. | 0.25 A |
| Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$ | P_{tot} | max. | 0.83 W |
| Drain-source ON-resistance $-I_D = 200\text{ mA}; -V_{GS} = 10\text{ V}$ | $R_{DS(on)}$ | typ. max. | 9 Ω 14 Ω |
| Transfer admittance $-I_D = 200\text{ mA}; -V_{DS} = 15\text{ V}$ | $ Y_{fs} $ | typ. | 125 mS |

PINNING - TO-92 VARIANT

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

PIN CONFIGURATION



MAM147

Note: Various pinout configurations available.

Fig.1 Simplified outline and symbol.

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RATINGS

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

| | | | |
|---|---------------|------|-----------------|
| Drain-source voltage | $-V_{DS}$ | max. | 45 V |
| Gate-source voltage (open drain) | $\pm V_{GSO}$ | max. | 20 V |
| Drain current (DC) | $-I_D$ | max. | 0.25 A |
| Drain current (peak value) | $-I_{DM}$ | max. | 0.5 A |
| Total power dissipation up to $T_{amb} = 25\text{ °C}$ (note 1) | P_{tot} | max. | 0.83 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) | $R_{th\ j-a}$ | = | 150 K/W |
|-----------------------------------|---------------|---|---------|

Note

1. Transistor mounted on printed-circuit board, max. lead length 4 mm.

CHARACTERISTICS

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

| | | | |
|---|----------------|--------------|---------------------------|
| Drain-source breakdown voltage – $I_D = 100\ \mu\text{A}$; $V_{GS} = 0$ | $-V_{(BR)DSS}$ | min. | 45 V |
| Drain-source leakage current – $V_{DS} = 25\text{ V}$; $V_{GS} = 0$ | $-I_{DSS}$ | max. | 0.5 μA |
| Gate-source leakage current – $V_{GS} = 15\text{ V}$; $V_{DS} = 0$ | $-I_{GSS}$ | max. | 20 nA |
| Gate threshold voltage – $I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$ | $-V_{GS(th)}$ | min. max. | 1.0 V 3.5 V |
| Drain-source ON-resistance – $I_D = 200\text{ mA}$; $-V_{GS} = 10\text{ V}$ | $R_{DS(on)}$ | typ. max. | 9 Ω 14 Ω |
| Transfer admittance – $I_D = 200\text{ mA}$; $-V_{DS} = 15\text{ V}$ | $ Y_{fs} $ | typ. | 125 mS |
| Input capacitance at $f = 1\text{ MHz}$ – $V_{DS} = 10\text{ V}$; $V_{GS} = 0$ | C_{iss} | typ. max. | 30 pF 45 pF |
| Output capacitance at $f = 1\text{ MHz}$ – $V_{DS} = 10\text{ V}$; $V_{GS} = 0$ | C_{oss} | typ. max. | 20 pF 30 pF |
| Feedback capacitance at $f = 1\text{ MHz}$ – $V_{DS} = 10\text{ V}$; $V_{GS} = 0$ | C_{rss} | typ. max. | 5 pF 10 pF |

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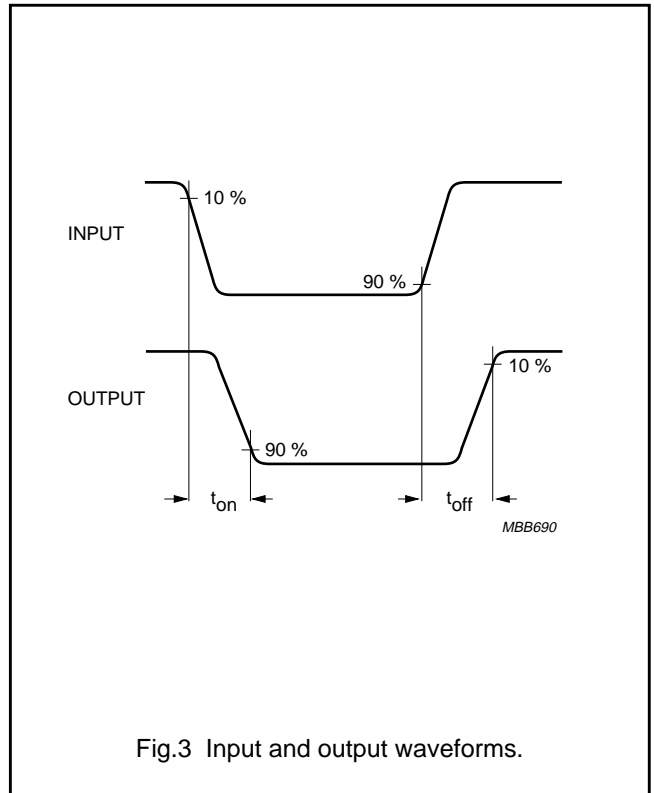
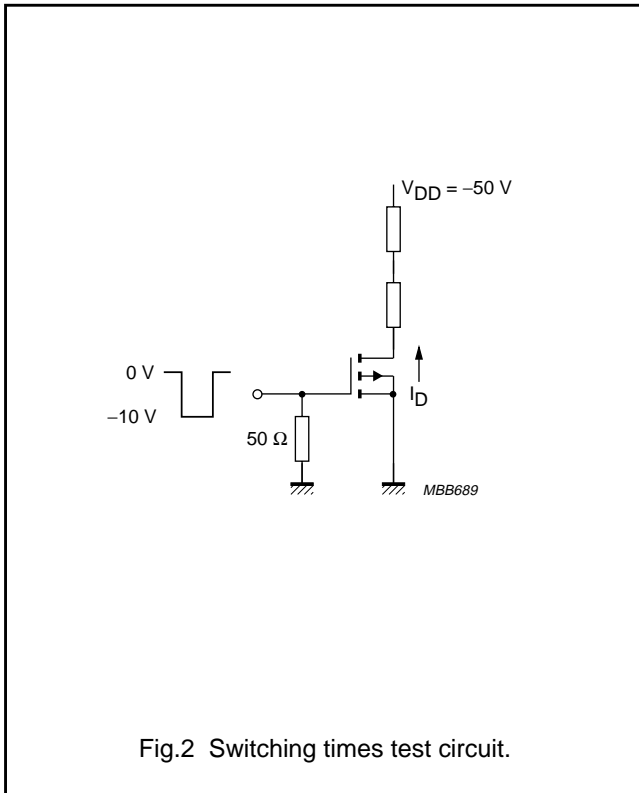
Switching times (see Figs 2 and 3)

$-I_D = 200 \text{ mA}$; $-V_{DD} = 40 \text{ V}$; $-V_{GS} = 0 \text{ to } 10 \text{ V}$

t_{on}
 t_{off}

typ.
typ.

4 ns
10 ns



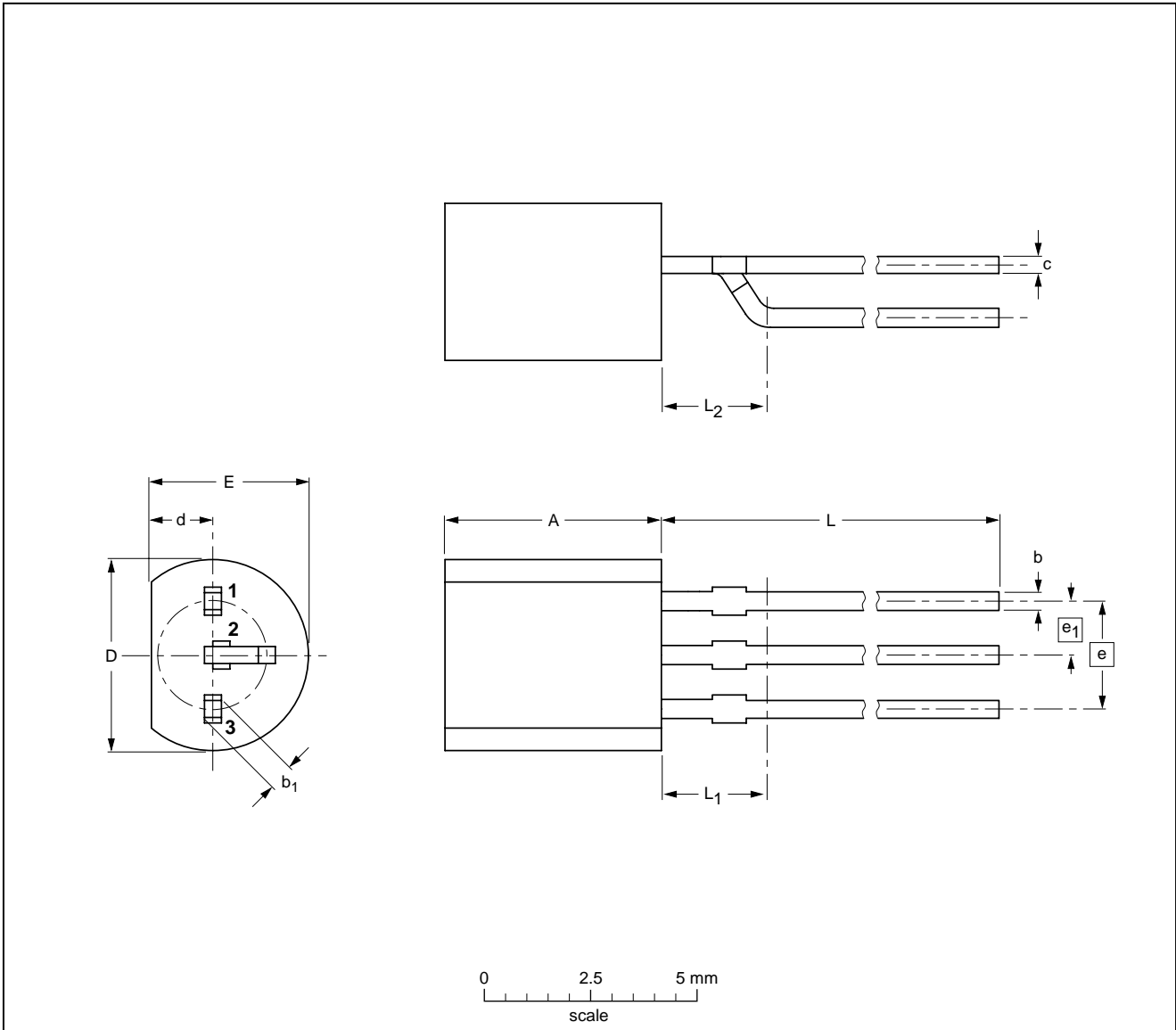
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PACKAGE OUTLINES

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 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 | 2.54 | 1.27 | 14.5 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 |

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BS250**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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