

# DATA SHEET

## **BST76A**

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

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

1997 Jun 20

# N-channel enhancement mode vertical D-MOS transistor

## BST76A

### FEATURES

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

### APPLICATIONS

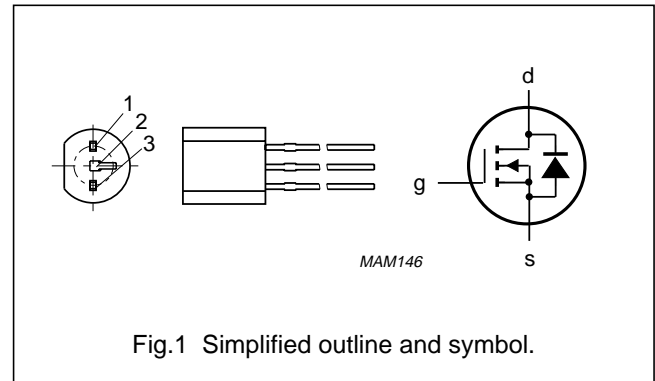
- Line current interrupter in telephone sets
- Relay, high-speed and line transformer drivers.

### 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       |



### QUICK REFERENCE DATA

| SYMBOL       | PARAMETER                        | CONDITIONS                           | TYP. | MAX.     | UNIT     |
|--------------|----------------------------------|--------------------------------------|------|----------|----------|
| $V_{DS}$     | drain-source voltage (DC)        |                                      | –    | 180      | V        |
| $V_{DS(SM)}$ | drain-source voltage             | non-repetitive peak; $t_p \leq 2$ mS | –    | 200      | V        |
| $V_{GS0}$    | gate-source voltage (DC)         | open drain                           | –    | $\pm 20$ | V        |
| $I_D$        | drain current (DC)               |                                      | –    | 300      | mA       |
| $P_{tot}$    | total power dissipation          | $T_{amb} \leq 25$ °C                 | –    | 1        | W        |
| $R_{DSon}$   | drain-source on-state resistance | $I_D = 15$ mA; $V_{GS} = 3$ V        | 7    | 10       | $\Omega$ |
| $ y_{fs} $   | forward transfer admittance      | $I_D = 300$ mA; $V_{DS} = 15$ V      | 250  | –        | mS       |

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## LIMITING VALUES

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

| SYMBOL       | PARAMETER                 | CONDITIONS                           | MIN. | MAX.     | UNIT |
|--------------|---------------------------|--------------------------------------|------|----------|------|
| $V_{DS}$     | drain-source voltage (DC) |                                      | –    | 180      | V    |
| $V_{DS(SM)}$ | drain-source voltage      | non-repetitive peak; $t_p \leq 2$ mS | –    | 200      | V    |
| $V_{GSO}$    | gate-source voltage (DC)  | open drain                           | –    | $\pm 20$ | V    |
| $I_D$        | drain current (DC)        |                                      | –    | 300      | mA   |
| $I_{DM}$     | peak drain current        |                                      | –    | 800      | mA   |
| $P_{tot}$    | total power dissipation   | $T_{amb} \leq 25$ °C; note 1         | –    | 1        | W    |
| $T_{stg}$    | storage temperature       |                                      | –65  | +150     | °C   |
| $T_j$        | junction temperature      |                                      | –    | 150      | °C   |

## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1     | 125   | K/W  |

### Note to the Limiting values and Thermal characteristics

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

## CHARACTERISTICS

$T_j = 25$  °C unless otherwise specified.

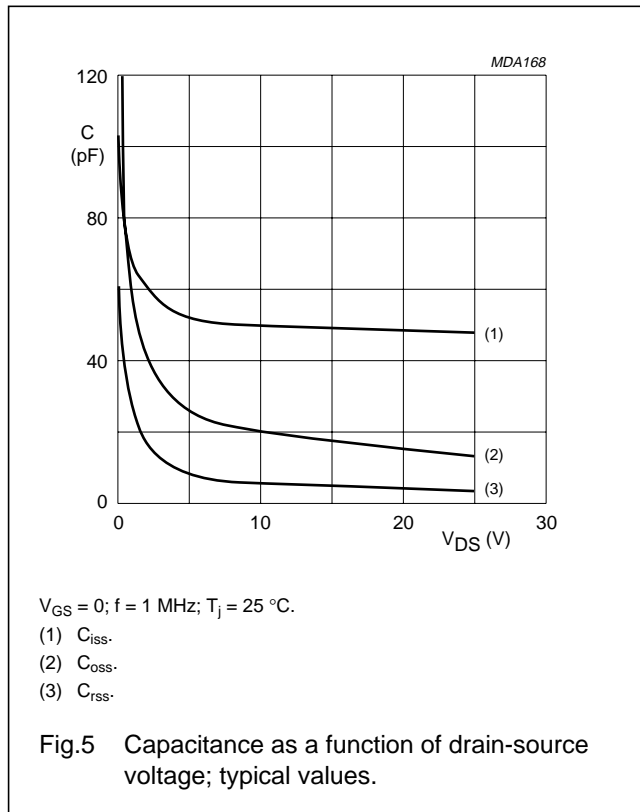
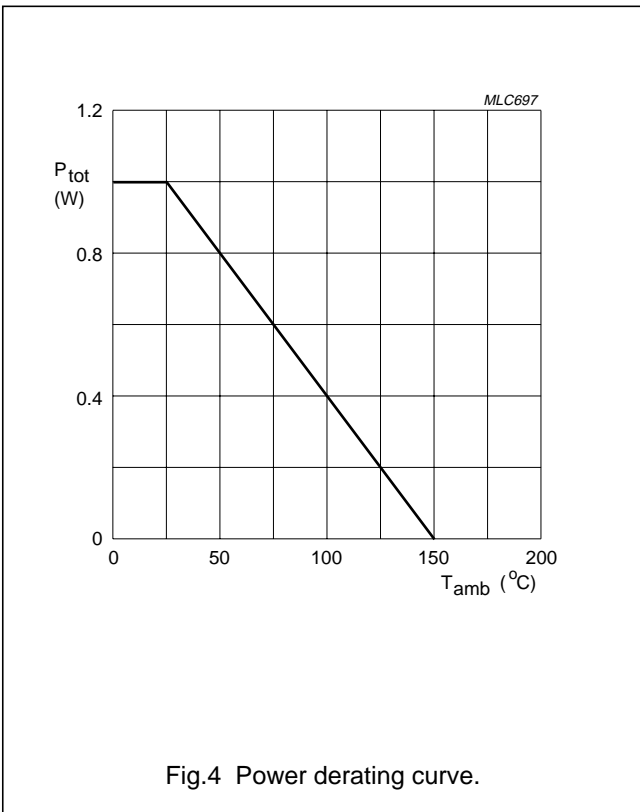
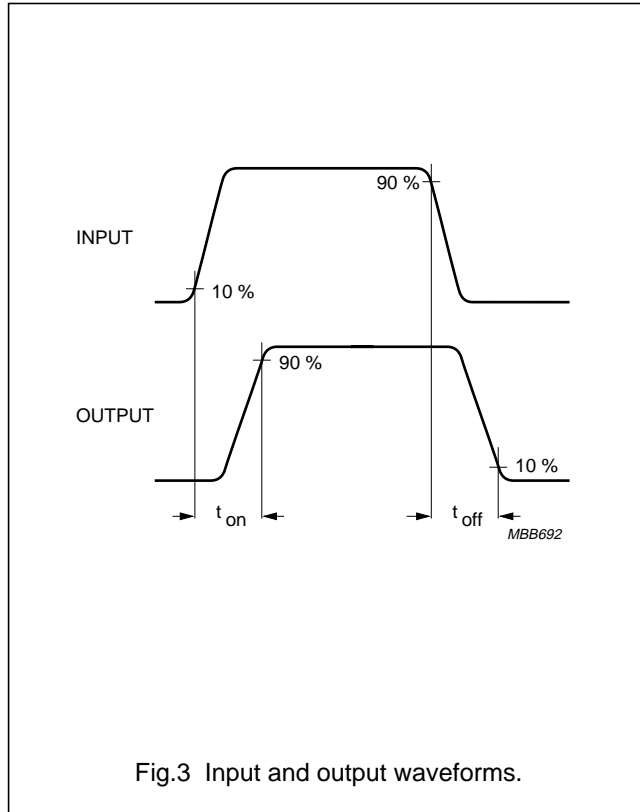
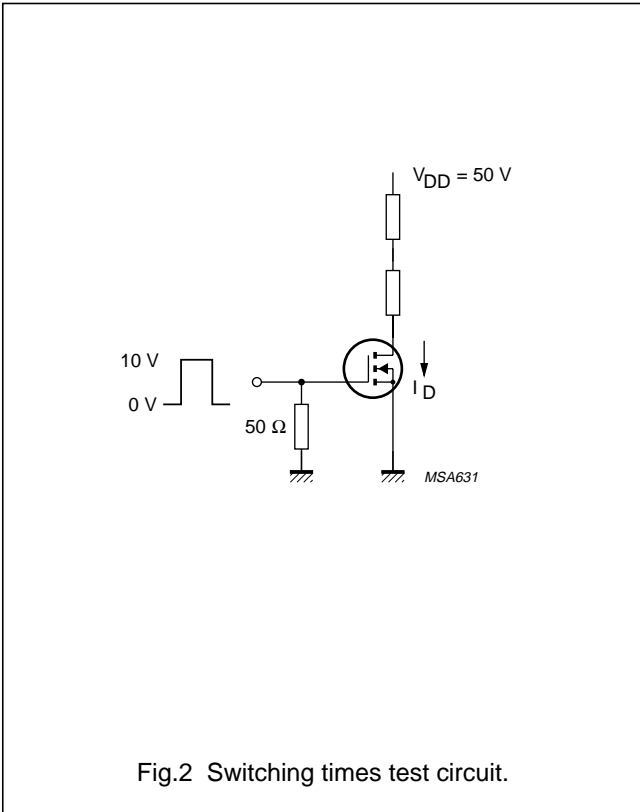
| SYMBOL        | PARAMETER                        | CONDITIONS                                  | MIN. | TYP. | MAX.      | UNIT     |
|---------------|----------------------------------|---|------|------|-----------|----------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage   | $V_{GS} = 0$ ; $I_D = 100$ $\mu$ A          | 180  | –    | –         | V        |
| $V_{GSth}$    | gate-source threshold voltage    | $V_{DS} = V_{GS}$ ; $I_D = 100$ $\mu$ A     | 0.7  | –    | 2.4       | V        |
| $I_{DSS}$     | drain-source leakage current     | $V_{DS} = 120$ V; $V_{GS} = 0$              | –    | –    | 10        | $\mu$ A  |
| $I_{GSS}$     | gate leakage current             | $V_{DS} = 0$ ; $V_{GS} = \pm 20$ V          | –    | –    | $\pm 100$ | nA       |
| $R_{DSon}$    | drain-source on-state resistance | $V_{GS} = 3$ V; $I_D = 15$ mA               | –    | 7    | 10        | $\Omega$ |
|               |                                  | $V_{GS} = 10$ V; $I_D = 300$ mA             | –    | 6    | –         | $\Omega$ |
| $ y_{fs} $    | forward transfer admittance      | $I_D = 300$ mA; $V_{DS} = 15$ V             | –    | 250  | –         | mS       |
| $C_{iss}$     | input capacitance                | $V_{DS} = 10$ V; $V_{GS} = 0$ ; $f = 1$ MHz | –    | 50   | 65        | pF       |
| $C_{oss}$     | output capacitance               | $V_{DS} = 10$ V; $V_{GS} = 0$ ; $f = 1$ MHz | –    | 20   | 30        | pF       |
| $C_{rss}$     | reverse transfer capacitance     | $V_{DS} = 10$ V; $V_{GS} = 0$ ; $f = 1$ MHz | –    | 6    | 10        | pF       |

### Switching times (see Figs 2 and 3)

|           |               |  |   |   |    |    |
|-----------|---------------|--|---|---|----|----|
| $t_{on}$  | turn-on time  | $V_{GS} = 0$ to 10 V; $V_{DS} = 50$ V;<br>$I_D = 300$ mA | – | – | 10 | ns |
| $t_{off}$ | turn-off time | $V_{GS} = 10$ to 0 V; $V_{DS} = 50$ V;<br>$I_D = 300$ mA | – | – | 15 | ns |

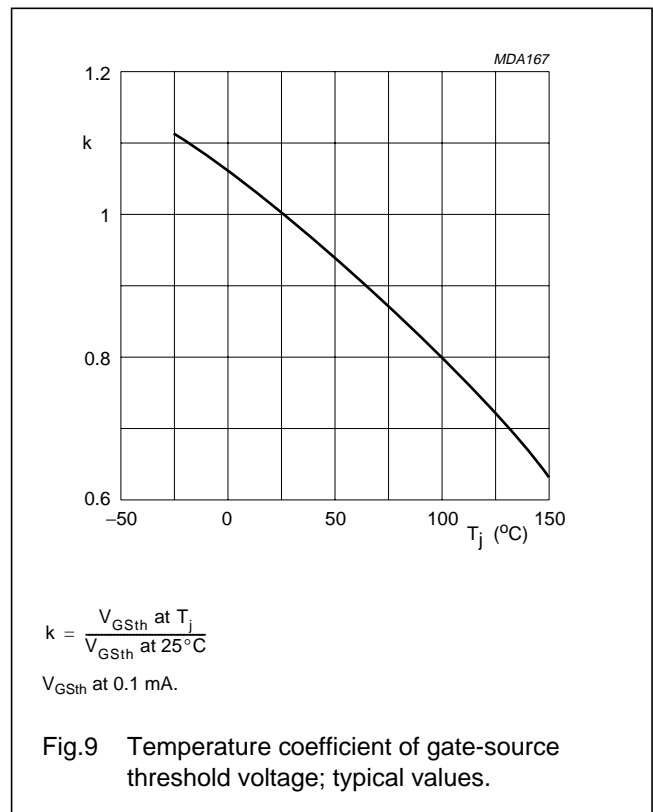
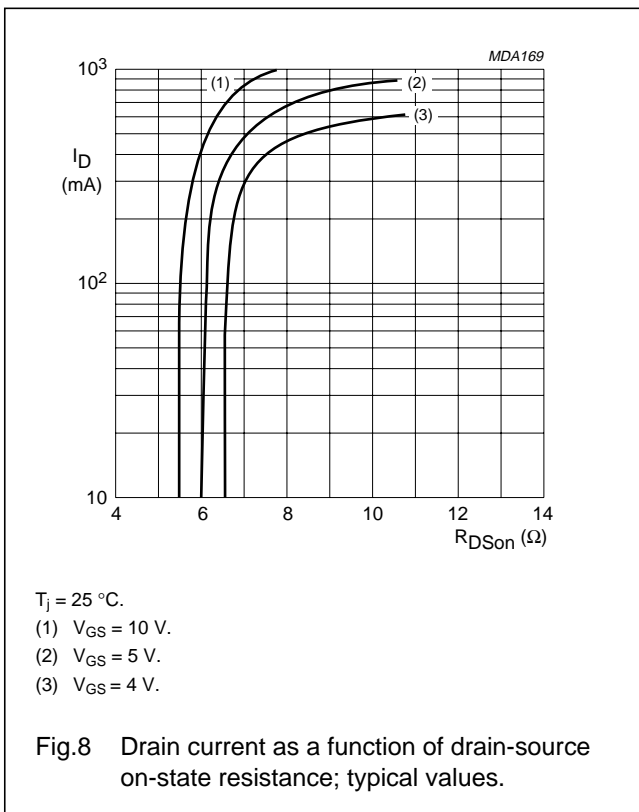
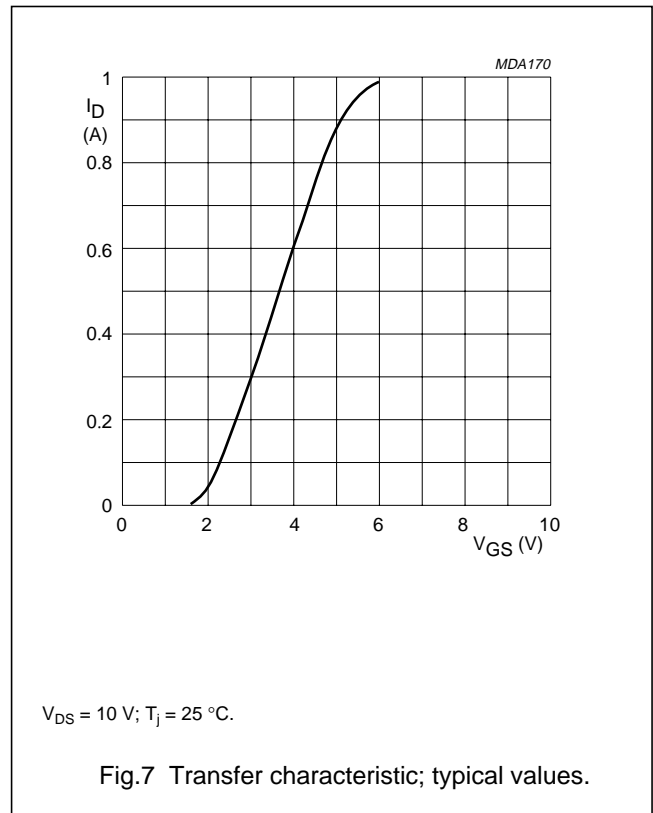
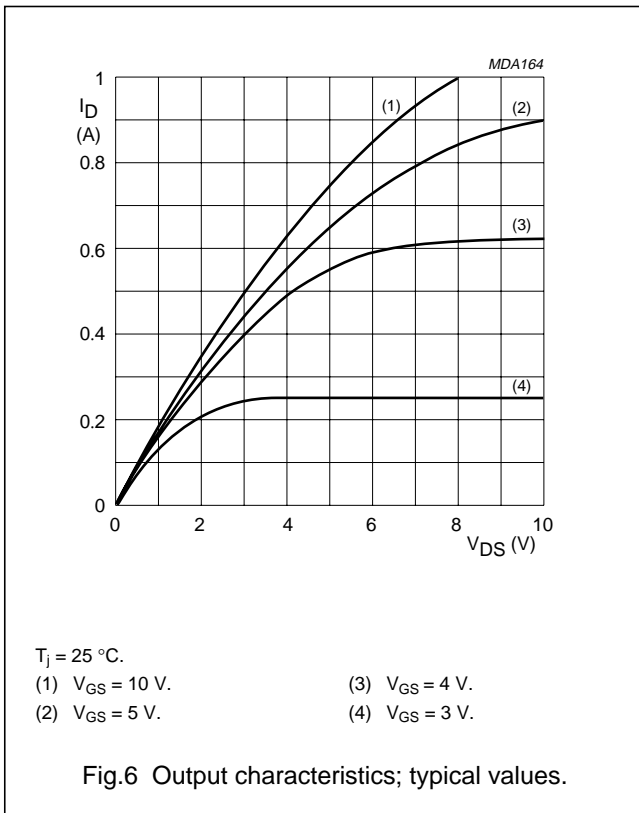
N-channel enhancement mode vertical D-MOS transistor

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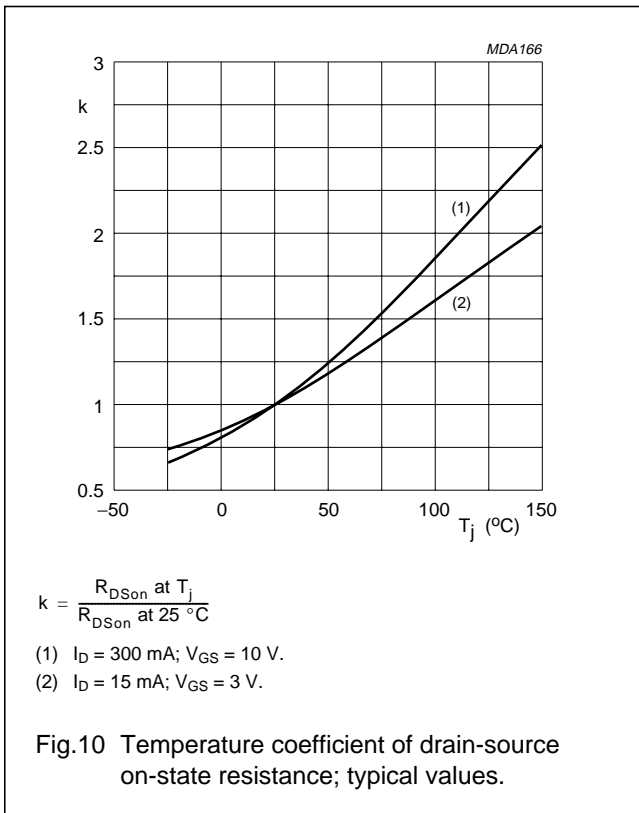
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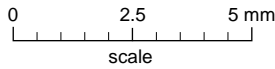
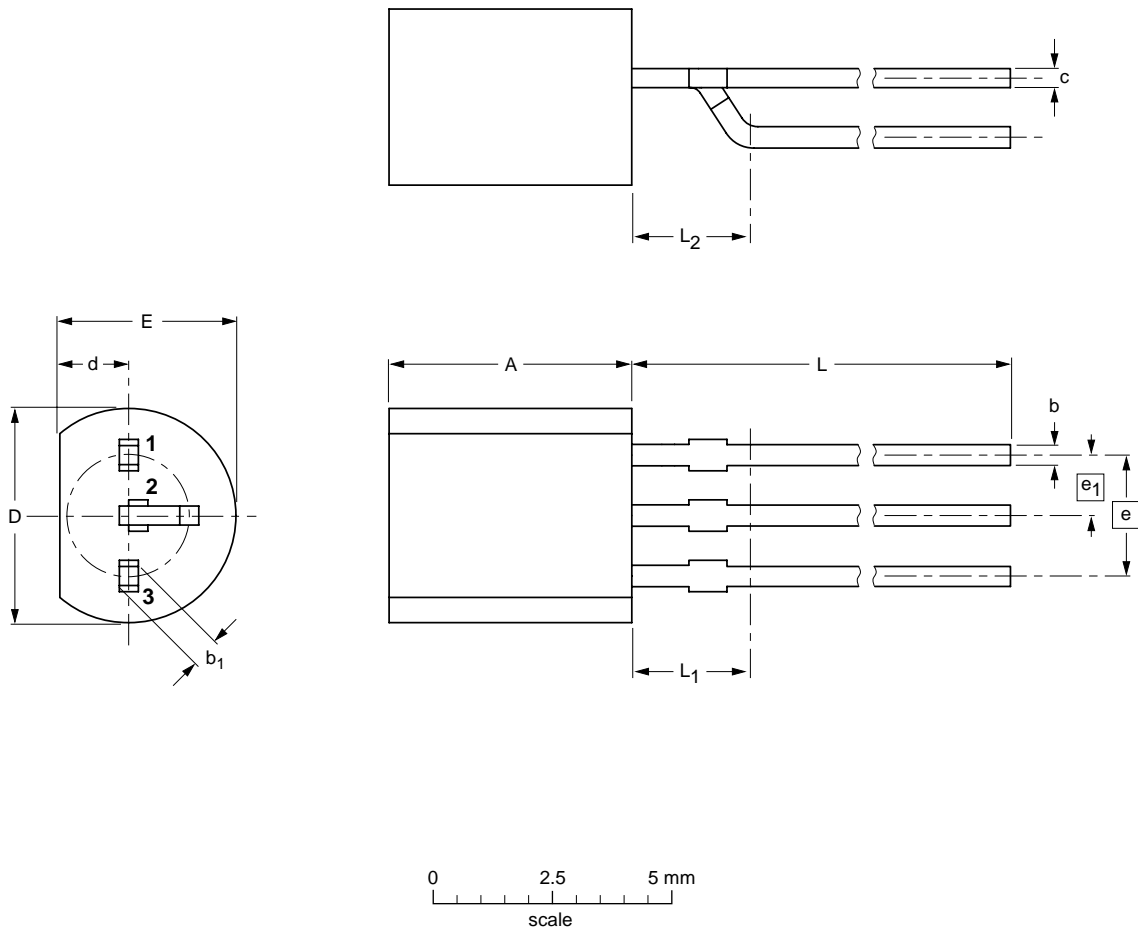
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PACKAGE OUTLINE

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

SOT54 variant



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | b            | b <sub>1</sub> | c            | D          | d          | E          | e    | e <sub>1</sub> | L            | L <sub>1</sub> <sup>(1)</sup><br>max | L <sub>2</sub><br>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<br>VERSION | REFERENCES |       |       | EUROPEAN<br>PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|------------------------|------------|
|                    | IEC        | JEDEC | EIAJ  |                        |            |
| SOT54 variant      |            | TO-92 | SC-43 |                        | 97-04-14   |

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### 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>Limiting values</b>  |   |
| 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. |   |
| <b>Application information</b>  |   |
| 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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Printed in The Netherlands

137107/00/02/pp12

Date of release: 1997 Jun 20

Document order number: 9397 750 02336

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