

DATA SHEET

BST84

N-channel enhancement mode
vertical D-MOS transistor

Product specification
File under Discrete Semiconductors, SC13b

April 1995

N-channel enhancement mode vertical D-MOS transistor

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DESCRIPTION

N-channel vertical D-MOS transistor in SOT89 envelope and designed for use as line current interrupter in telephone sets and for application in relay, high-speed and line-transformer drivers.

FEATURES

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

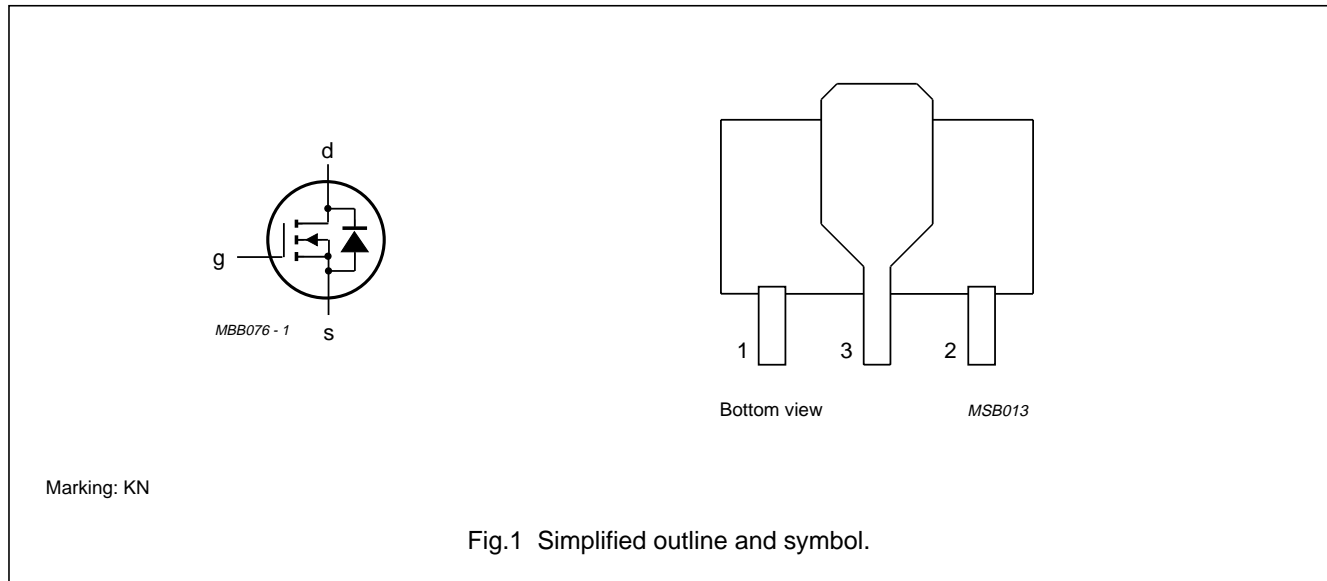
QUICK REFERENCE DATA

| | | | |
|--|---------------|------|-------------|
| Drain-source voltage | V_{DS} | max. | 200 V |
| Gate-source voltage (open drain) | $\pm V_{GS0}$ | max. | 20 V |
| Drain current (DC) | I_D | max. | 250 mA |
| Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$ | P_{tot} | max. | 1 W |
| Drain-source ON-resistance | $R_{DS(on)}$ | typ. | 6 Ω |
| $I_D = 250\text{ mA}; V_{GS} = 10\text{ V}$ | | max. | 12 Ω |
| Transfer admittance | $ Y_{fs} $ | typ. | 250 mS |
| $I_D = 250\text{ mA}; V_{DS} = 15\text{ V}$ | | | |

PINNING - SOT89

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

PIN CONFIGURATION



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RATINGS

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

| | | | |
|---|---------------|------|-------------------------------|
| Drain-source voltage | V_{DS} | max. | 200 V |
| Gate-source voltage (open drain) | $\pm V_{GSO}$ | max. | 20 V |
| Drain current (DC) | I_D | max. | 250 mA |
| Drain current (peak) | I_{DM} | max. | 800 mA |
| Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$ (note 1) | P_{tot} | max. | 1 W |
| Storage temperature range | T_{stg} | | -65 to + 150 $^\circ\text{C}$ |
| Junction temperature | T_j | max. | 150 $^\circ\text{C}$ |

THERMAL RESISTANCE

| | | | |
|-----------------------------------|---------------|---|---------|
| From junction to ambient (note 1) | $R_{th\ j-a}$ | = | 125 K/W |
|-----------------------------------|---------------|---|---------|

Note

1. Transistor mounted on a ceramic substrate with area of 2.5 cm² and thickness of 0.7 mm.

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CHARACTERISTICS

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

Drain-source breakdown voltage

$$I_D = 100\ \mu\text{A}; V_{GS} = 0$$

$$V_{(BR)DSS} \quad \text{min.} \quad 200\ \text{V}$$

Drain-source leakage current

$$V_{DS} = 160\ \text{V}; V_{GS} = 0$$

$$I_{DSS} \quad \text{max.} \quad 10\ \mu\text{A}$$

Gate-source leakage current

$$V_{GS} = 20\ \text{V}; V_{DS} = 0$$

$$I_{GSS} \quad \text{max.} \quad 100\ \text{nA}$$

Gate threshold voltage

$$I_D = 1\ \text{mA}; V_{DS} = V_{GS}$$

$$V_{GS(th)} \quad \begin{array}{l} \text{min.} \\ \text{max.} \end{array} \quad \begin{array}{l} 0.8\ \text{V} \\ 2.8\ \text{V} \end{array}$$

Drain-source ON-resistance

$$I_D = 250\ \text{mA}; V_{GS} = 10\ \text{V}$$

$$R_{DS(on)} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 6\ \Omega \\ 12\ \Omega \end{array}$$

Transfer admittance

$$I_D = 250\ \text{mA}; V_{DS} = 15\ \text{V}$$

$$|Y_{fs}| \quad \text{typ.} \quad 250\ \text{mS}$$

Input capacitance at $f = 1\ \text{MHz}$

$$V_{DS} = 10\ \text{V}; V_{GS} = 0$$

$$C_{iss} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 70\ \text{pF} \\ 90\ \text{pF} \end{array}$$

Output capacitance at $f = 1\ \text{MHz}$

$$V_{DS} = 10\ \text{V}; V_{GS} = 0$$

$$C_{oss} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 20\ \text{pF} \\ 30\ \text{pF} \end{array}$$

Feedback capacitance at $f = 1\ \text{MHz}$

$$V_{DS} = 10\ \text{V}; V_{GS} = 0$$

$$C_{rss} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 5\ \text{pF} \\ 10\ \text{pF} \end{array}$$

Switching times (see Figs 2 and 3)

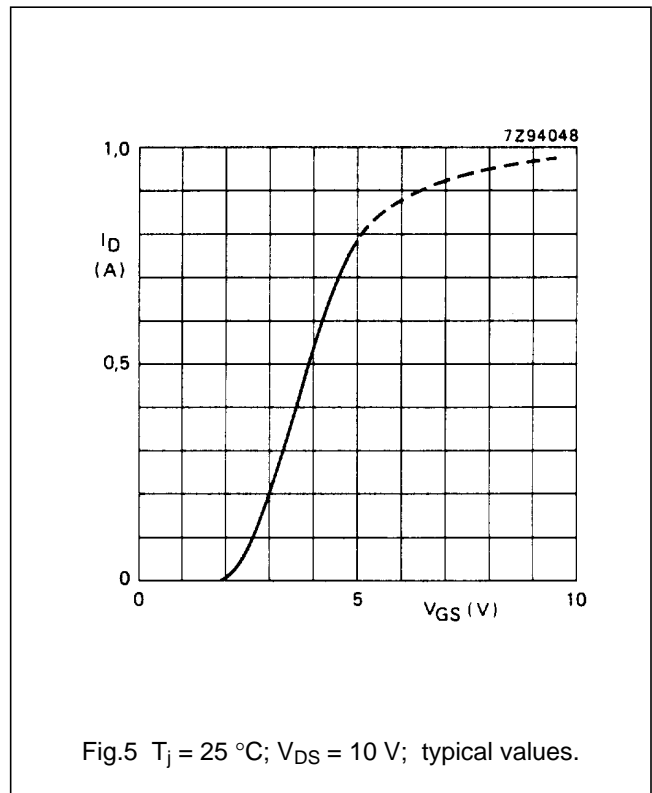
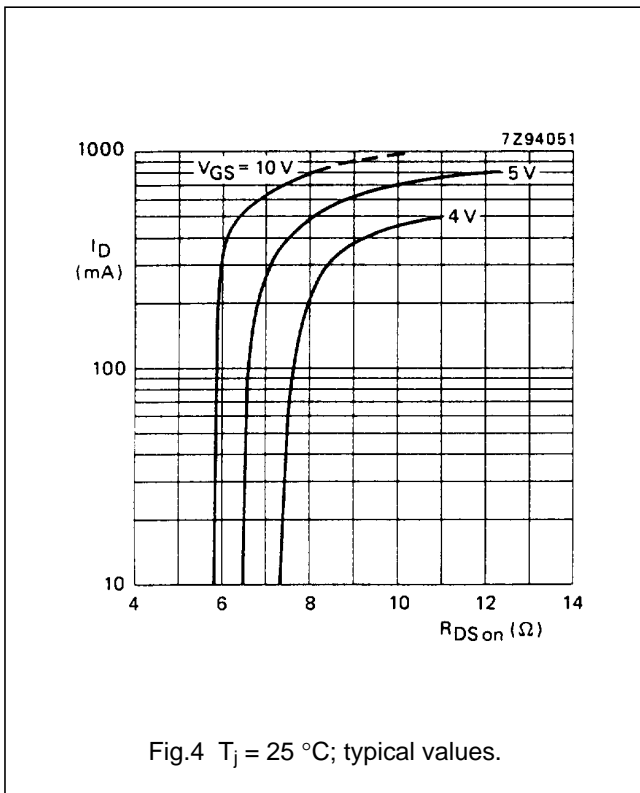
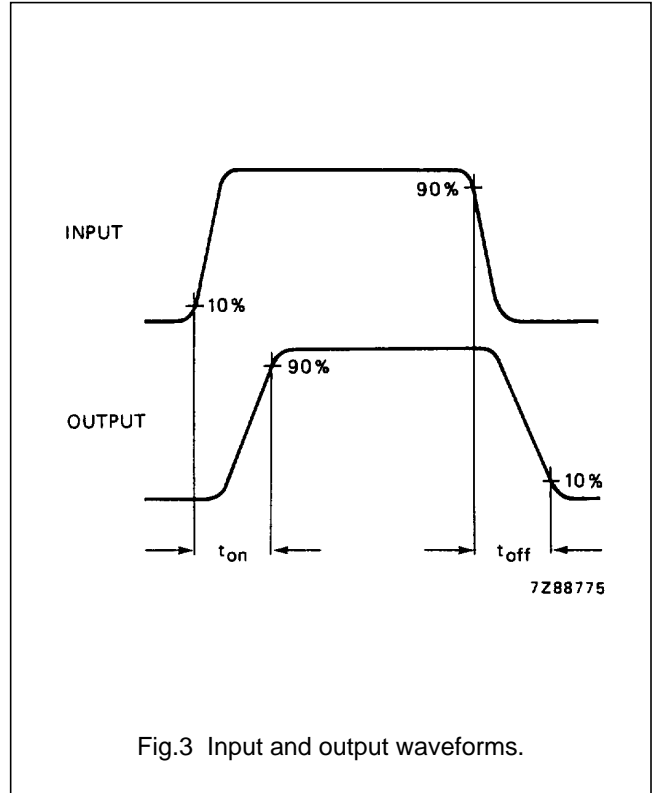
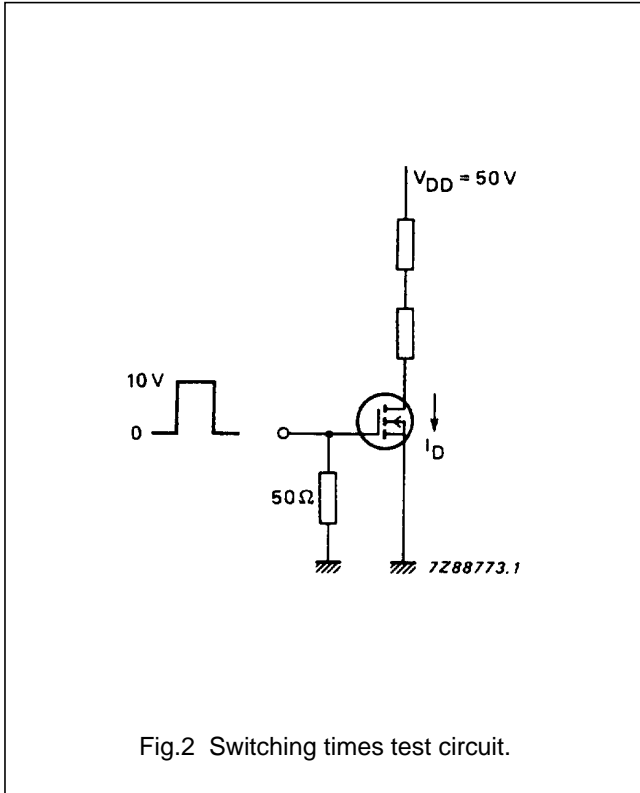
$$I_D = 250\ \text{mA}; V_{DD} = 50\ \text{V}; V_{GS} = 0\ \text{to}\ 10\ \text{V}$$

$$t_{on} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 4\ \text{ns} \\ 10\ \text{ns} \end{array}$$

$$t_{off} \quad \begin{array}{l} \text{typ.} \\ \text{max.} \end{array} \quad \begin{array}{l} 15\ \text{ns} \\ 25\ \text{ns} \end{array}$$

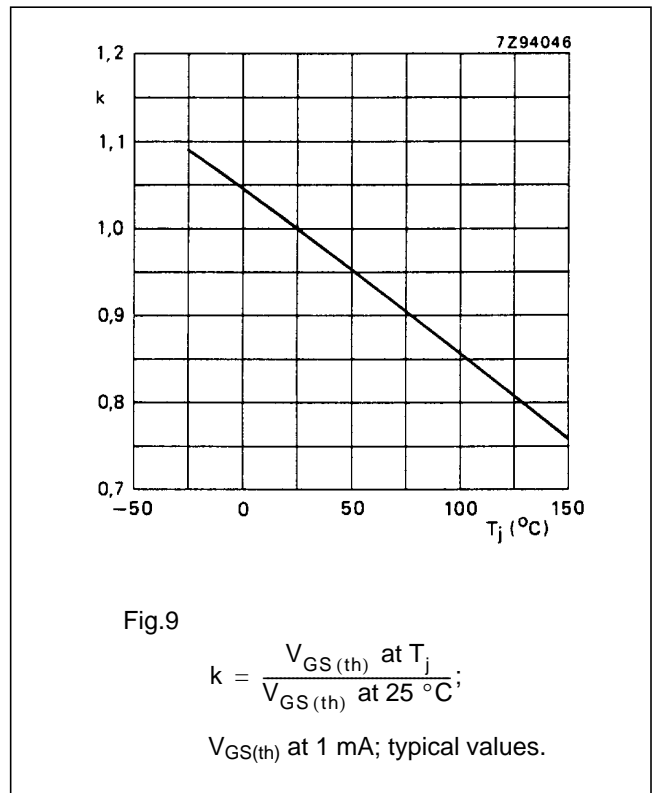
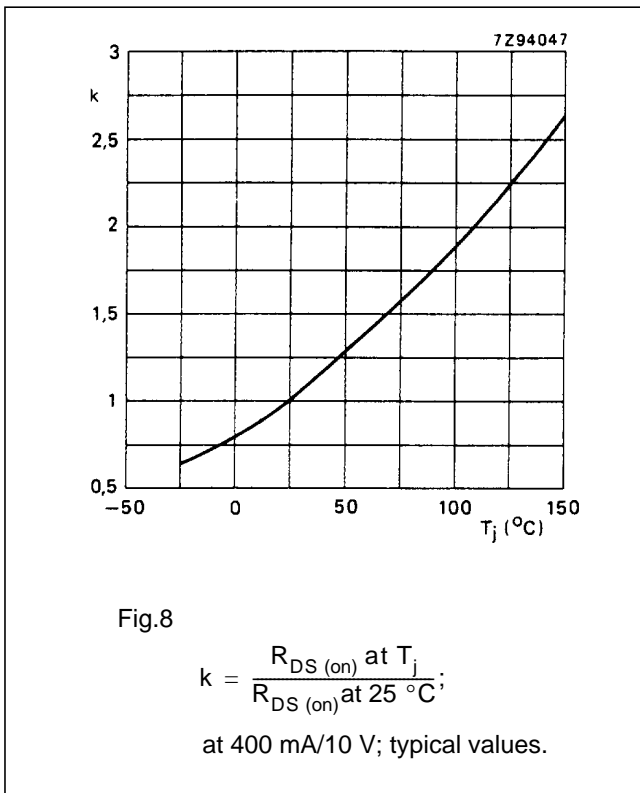
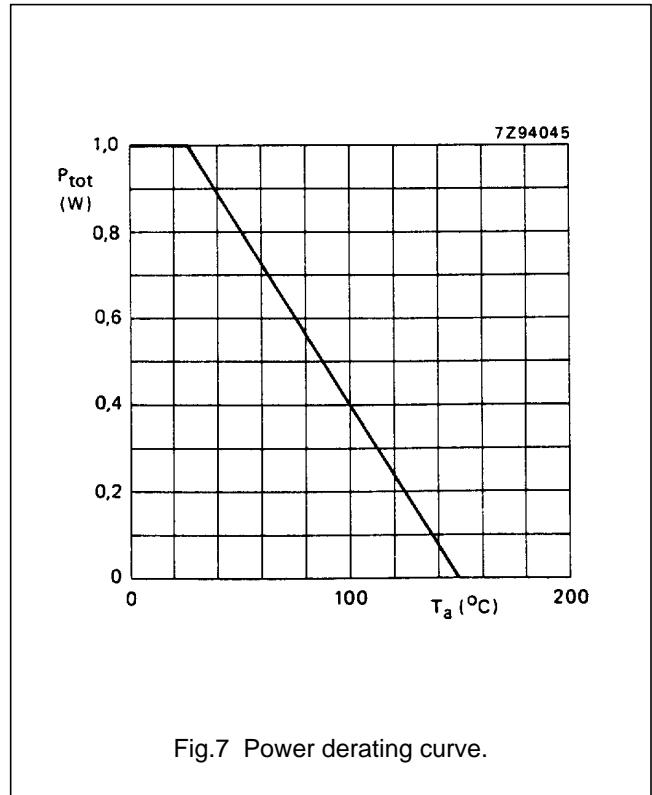
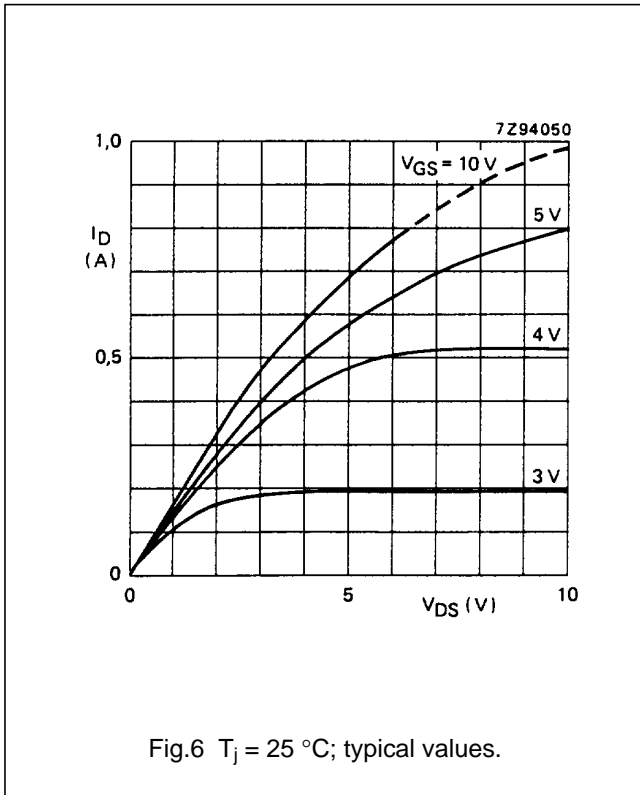
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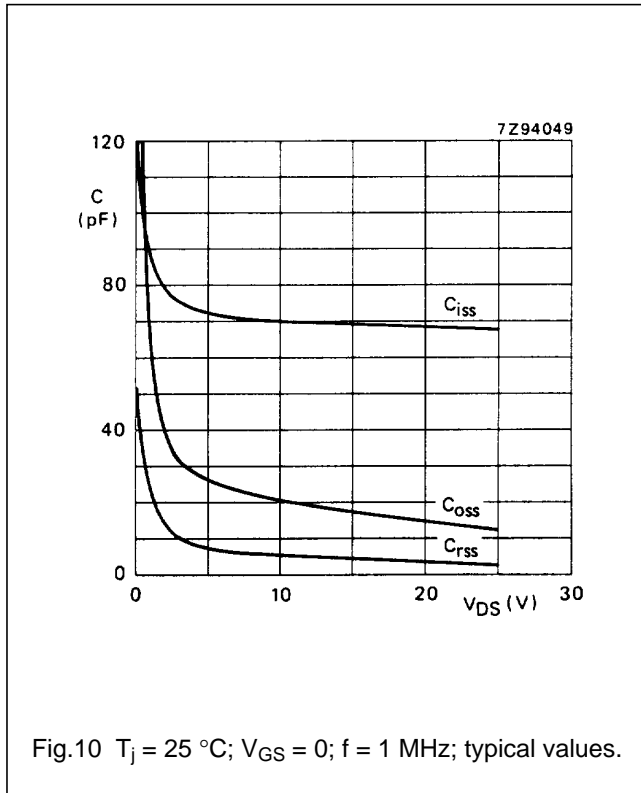
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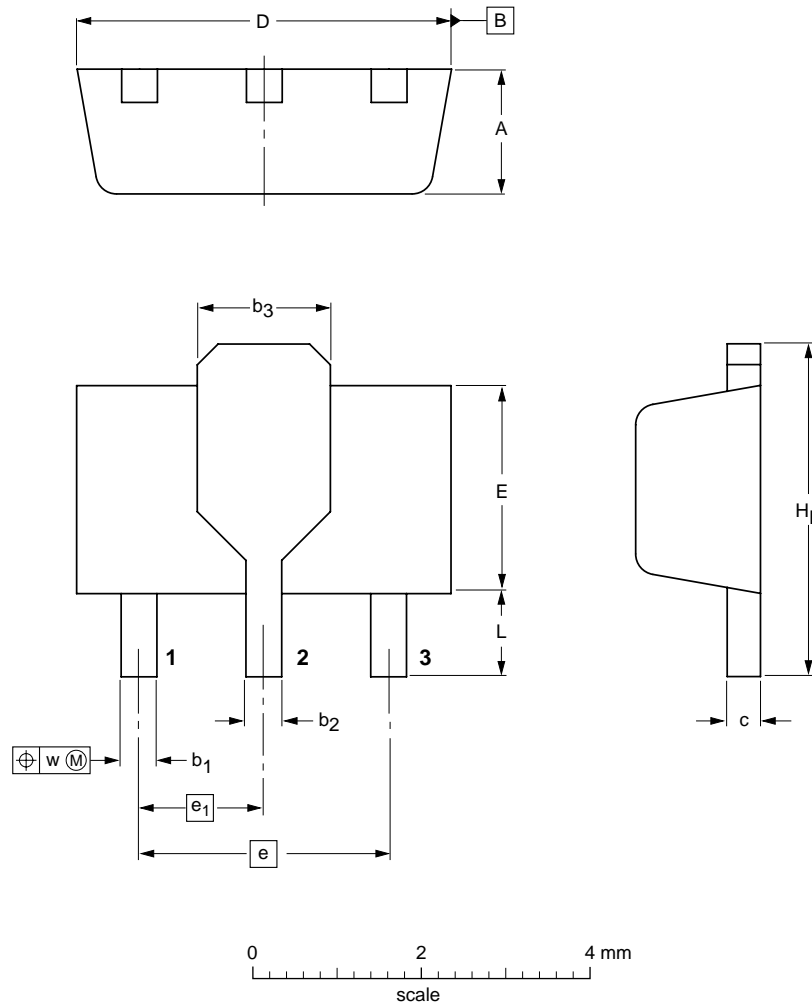
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PACKAGE OUTLINES

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b ₁ | b ₂ | b ₃ | c | D | E | e | e ₁ | H _E | L min. | w |
|------|------------|----------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|--------|------|
| mm | 1.6 1.4 | 0.48 0.35 | 0.53 0.40 | 1.8 1.4 | 0.44 0.37 | 4.6 4.4 | 2.6 2.4 | 3.0 | 1.5 | 4.25 3.75 | 0.8 | 0.13 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT89 | | | | | | 97-02-28 |

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BST84**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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