

# DATA SHEET

**BFT46**

N-channel silicon FET

Product specification

December 1997



N-channel silicon FET

BFT46

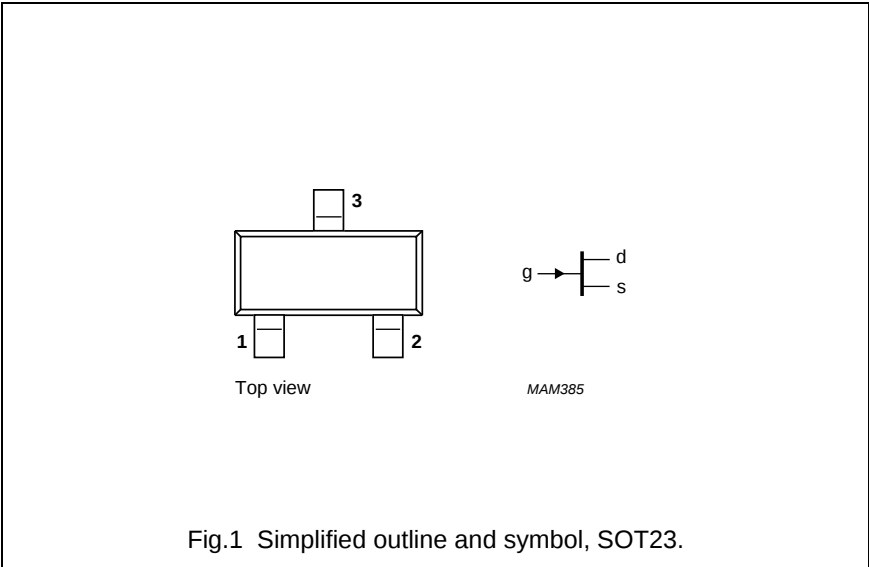
DESCRIPTION

Symmetrical n-channel silicon epitaxial planar junction field-effect transistor in a microminiature plastic envelope. The transistor is intended for low level general purpose amplifiers in thick and thin-film circuits.

PINNING

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

**Note :** Drain and source are interchangeable.



Marking code

BFT46 = M3p

QUICK REFERENCE DATA

|                                                                                       |              |      |                   |
|---------------------------------------------------------------------------------------|--------------|------|-------------------|
| Drain-source voltage                                                                  | $\pm V_{DS}$ | max. | 25 V              |
| Gate-source voltage (open drain)                                                      | $-V_{GSO}$   | max. | 25 V              |
| Total power dissipation up to $T_{amb} = 40\text{ }^{\circ}\text{C}$                  | $P_{tot}$    | max. | 250 mW            |
| Drain current                                                                         |              |      |                   |
| $V_{DS} = 10\text{ V}; V_{GS} = 0$                                                    | $I_{DSS}$    | $>$  | 0,2 mA            |
|                                                                                       |              | $<$  | 1,5 mA            |
| Transfer admittance (common source)                                                   |              |      |                   |
| $I_D = 0,2\text{ mA}; V_{DS} = 10\text{ V}; f = 1\text{ kHz}$                         | $ y_{fs} $   | $>$  | 0,5 mS            |
| Equivalent noise voltage                                                              |              |      |                   |
| $V_{DS} = 10\text{ V}; I_D = 200\text{ }\mu\text{A}; B = 0,6\text{ to }100\text{ Hz}$ | $V_n$        | $<$  | 0,5 $\mu\text{V}$ |

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**RATINGS**

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

|                                                                            |              |      |                                |
|----------------------------------------------------------------------------|--------------|------|--------------------------------|
| Drain-source voltage                                                       | $\pm V_{DS}$ | max. | 25 V                           |
| Drain-gate voltage (open source)                                           | $V_{DGO}$    | max. | 25 V                           |
| Gate-source voltage (open drain)                                           | $-V_{GSO}$   | max. | 25 V                           |
| Drain current                                                              | $I_D$        | max. | 10 mA                          |
| Gate current                                                               | $I_G$        | max. | 5 mA                           |
| Total power dissipation up to $T_{amb} = 40\text{ }^{\circ}\text{C}^{(1)}$ | $P_{tot}$    | max. | 250 mW                         |
| 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 <sup>(1)</sup> | $R_{th\ j-a}$ | = | 430 K/W |
|-----------------------------------------|---------------|---|---------|

**Note**

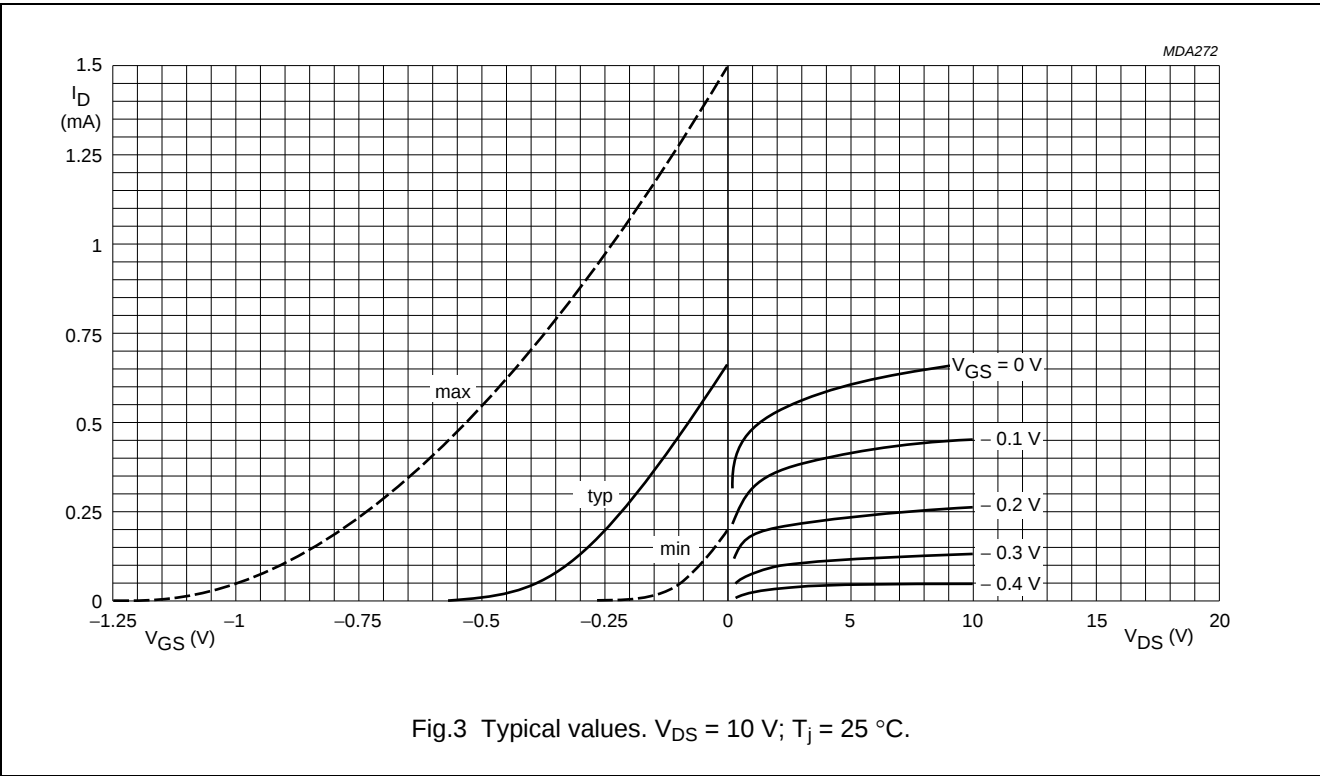
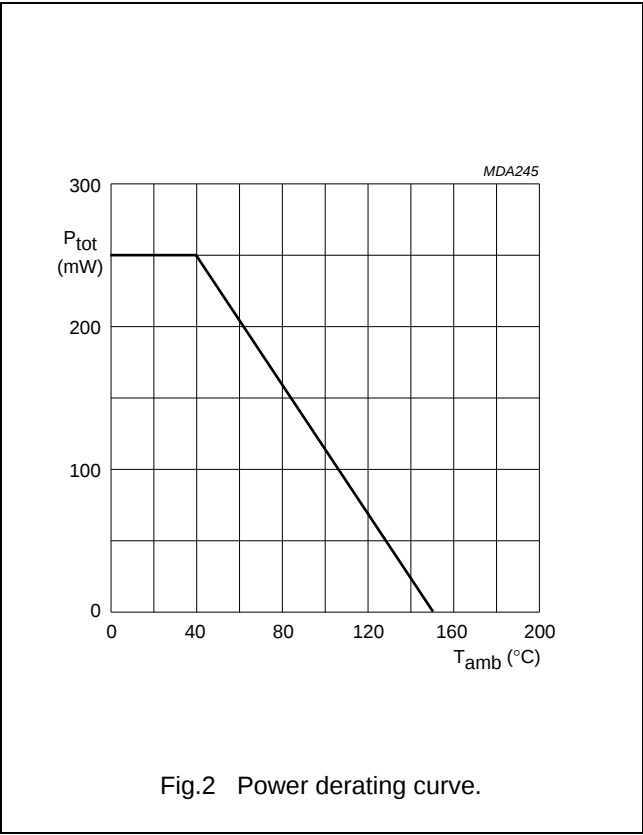
1. Mounted on a ceramic substrate of 8 mm × 10 mm × 0,7 mm.

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

|                                                                                            |              |   |                   |
|--------------------------------------------------------------------------------------------|--------------|---|-------------------|
| Gate cut-off current                                                                       |              |   |                   |
| $-V_{GS} = 10\text{ V}; V_{DS} = 0$                                                        | $-I_{GSS}$   | < | 0,2 nA            |
| Drain current                                                                              |              |   |                   |
| $V_{DS} = 10\text{ V}; V_{GS} = 0$                                                         | $I_{DSS}$    | > | 0,2 mA            |
|                                                                                            |              | < | 1,5 mA            |
| Gate-source voltage                                                                        |              |   |                   |
| $I_D = 50\text{ }\mu\text{A}; V_{DS} = 10\text{ V}$                                        | $-V_{GS}$    | > | 0,1 V             |
|                                                                                            |              | < | 1,0 V             |
| Gate-source cut-off voltage                                                                |              |   |                   |
| $I_D = 0,5\text{ nA}; V_{DS} = 10\text{ V}$                                                | $-V_{(P)GS}$ | < | 1,2 V             |
| y-parameters at $f = 1\text{ kHz}$ ;                                                       |              |   |                   |
| $V_{DS} = 10\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^{\circ}\text{C}$                   |              |   |                   |
| Transfer admittance                                                                        | $ y_{fs} $   | > | 1,0 mS            |
| Output admittance                                                                          | $ y_{os} $   | < | 10 $\mu\text{S}$  |
| $V_{DS} = 10\text{ V}; I_D = 200\text{ }\mu\text{A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ |              |   |                   |
| Transfer admittance                                                                        | $ y_{fs} $   | > | 0,5 mS            |
| Output admittance                                                                          | $ y_{os} $   | < | 5 $\mu\text{S}$   |
| Input capacitance at $f = 1\text{ MHz}$ ;                                                  |              |   |                   |
| $V_{DS} = 10\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^{\circ}\text{C}$                   | $C_{is}$     | < | 5 pF              |
| Feedback capacitance at $f = 1\text{ MHz}$ ;                                               |              |   |                   |
| $V_{DS} = 10\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^{\circ}\text{C}$                   | $C_{rs}$     | < | 1,5 pF            |
| Equivalent noise voltage                                                                   |              |   |                   |
| $V_{DS} = 10\text{ V}; I_D = 200\text{ }\mu\text{A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ |              |   |                   |
| $B = 0,6\text{ to }100\text{ Hz}$                                                          | $V_n$        | < | 0,5 $\mu\text{V}$ |

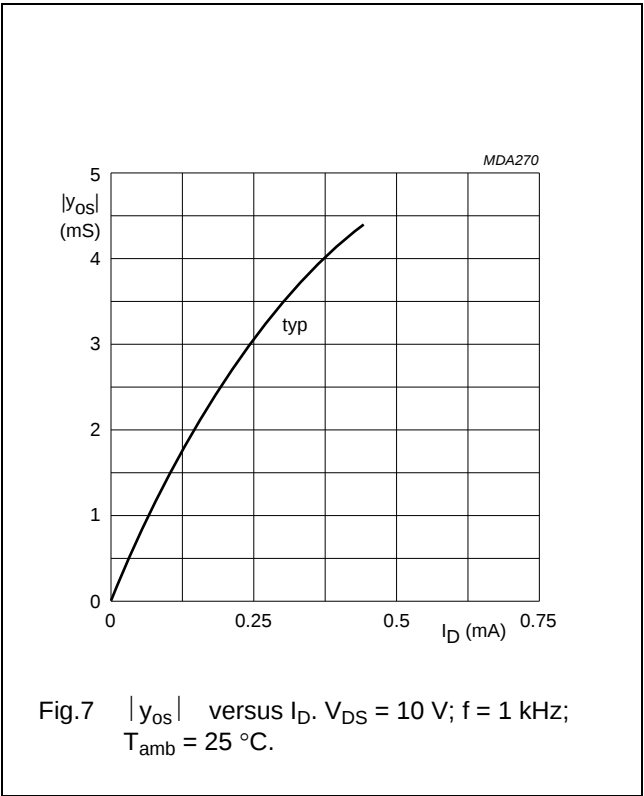
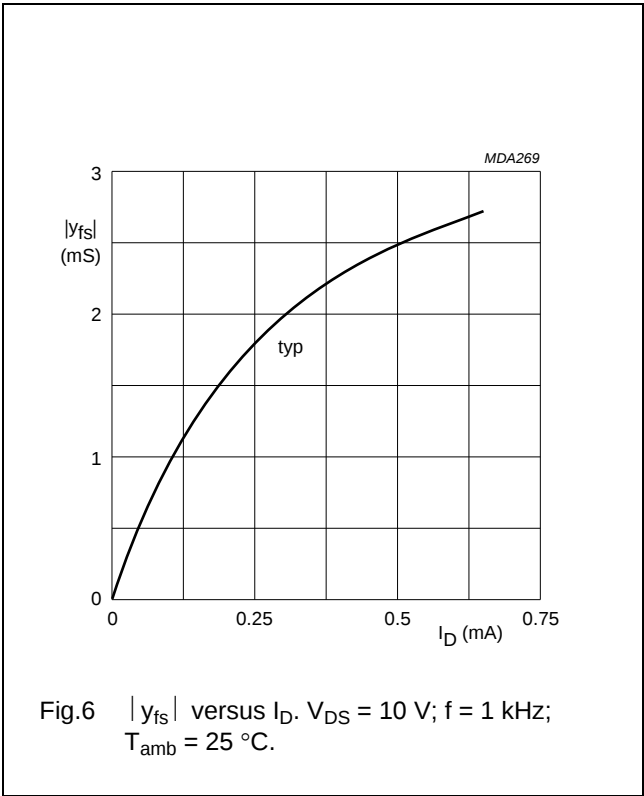
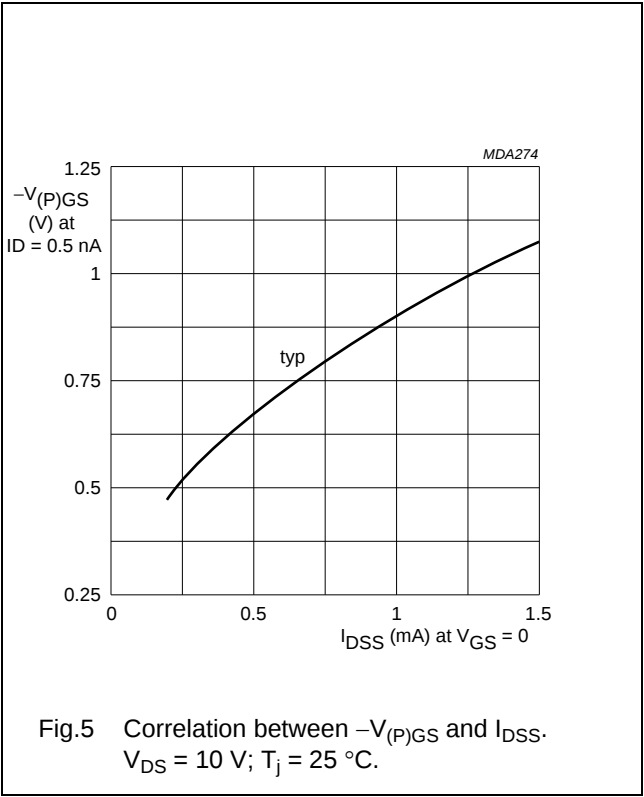
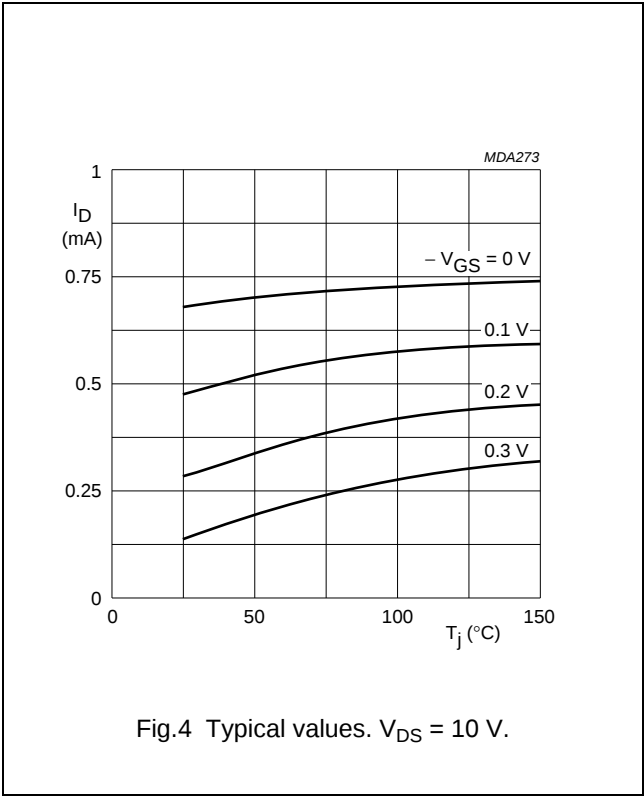
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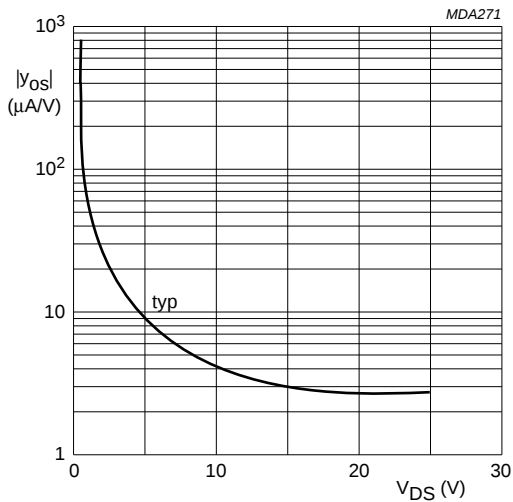


Fig.8  $|y_{os}|$  versus  $V_{DS}$ .  $I_D = 0,4$  mA;  $f = 1$  kHz;  $T_{amb} = 25$  °C.

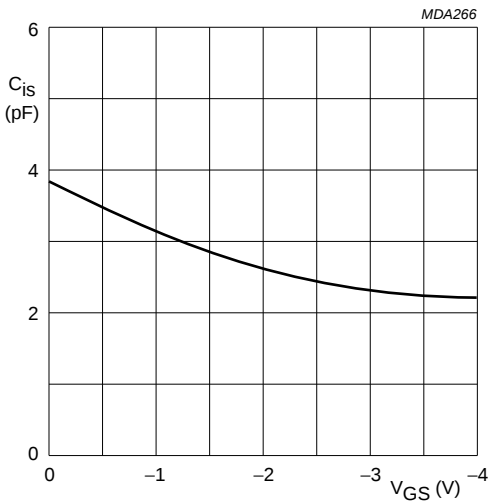


Fig.9 Typical values.  $V_{DS} = 10$  V;  $T_{amb} = 25$  °C.

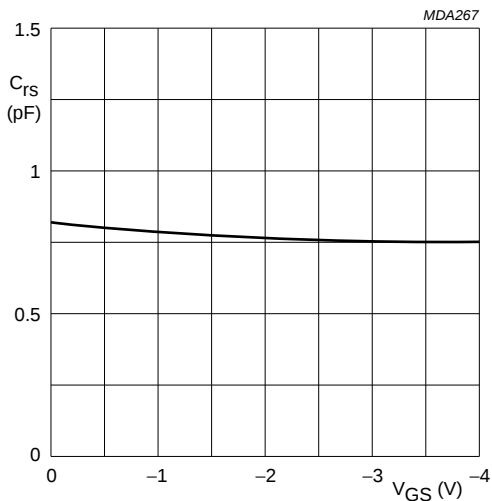


Fig.10 Typical values.  $V_{DS} = 10$  V,  $T_{amb} = 25$  °C.

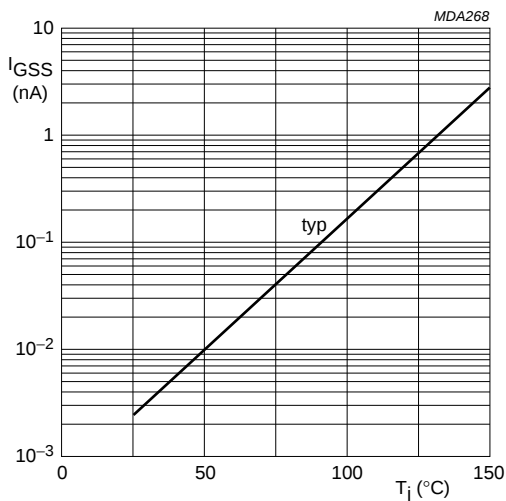
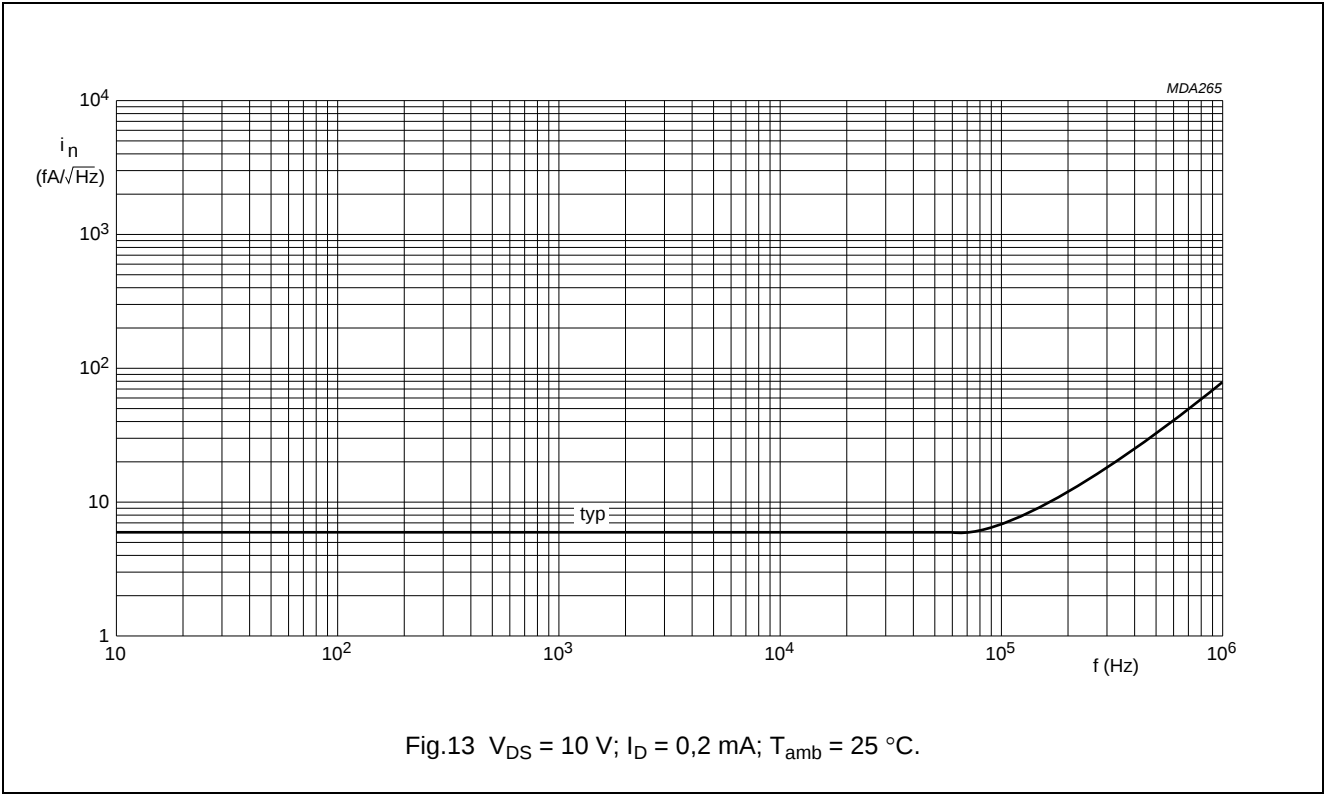
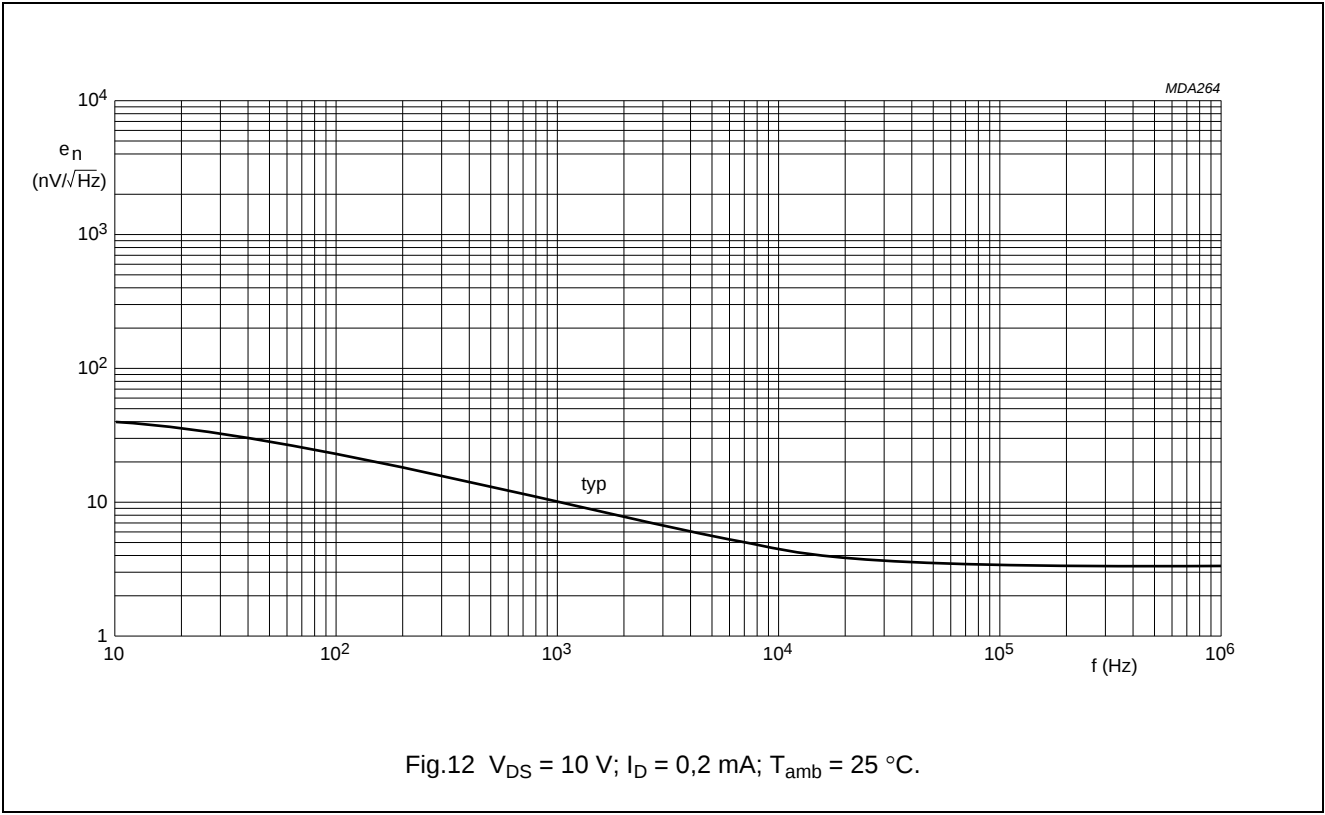


Fig.11  $I_{GSS}$  versus  $T_j$ .  $-V_{GSS} = 10$  V;  $V_{DS} = 0$ .

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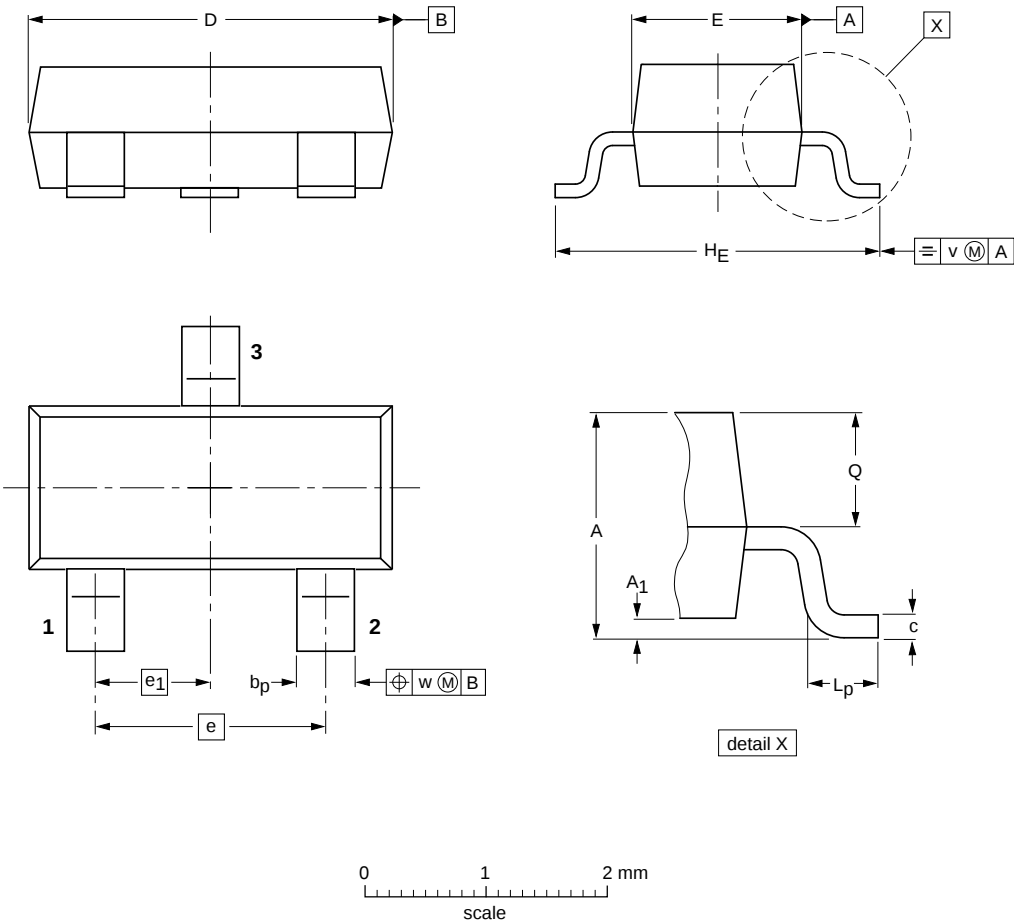
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max. | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                    | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE<br>VERSION | REFERENCES |          |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE                      |
|--------------------|------------|----------|-------|--|------------------------|---------------------------------|
|                    | IEC        | JEDEC    | JEITA |  |                        |                                 |
| SOT23              |            | TO-236AB |       |  |                        | <del>04-11-04</del><br>06-03-16 |

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## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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