

# DATA SHEET

## **BF851A; BF851B; BF851C** N-channel junction FETs

Product specification  
File under Discrete Semiconductors, SC07

1995 Apr 14

**Philips Semiconductors**



**PHILIPS**

N-channel junction FETs

BF851A; BF851B; BF851C

FEATURES

- High transfer admittance
- Low input capacitance
- Low feedback capacitance
- Low noise.

APPLICATIONS

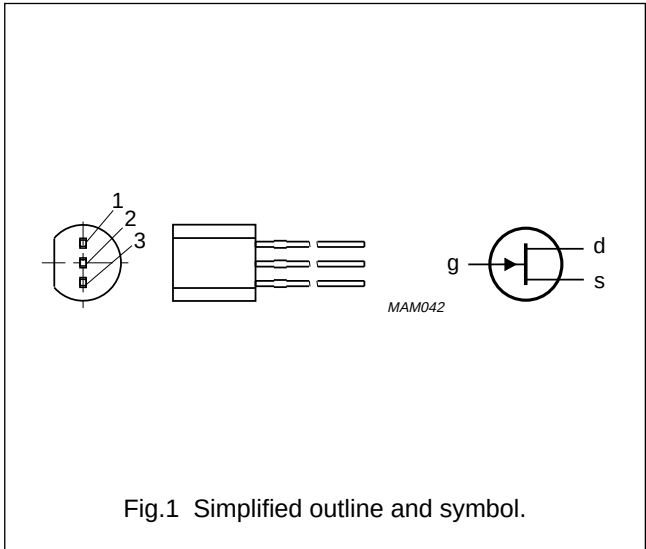
- Preamplifiers for AM tuners in car radios.

DESCRIPTION

N-channel symmetrical junction field effect transistors in a SOT54 (TO-92) package.

PINNING - SOT54 (TO-92)

| PIN | SYMBOL | DESCRIPTION |
|-----|--------|-------------|
| 1   | g      | gate        |
| 2   | s      | source      |
| 3   | d      | drain       |



CAUTION

The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

QUICK REFERENCE DATA

| SYMBOL     | PARAMETER                                                 | CONDITIONS                           | MIN.           | MAX.            | UNIT           |
|------------|-----------------------------------------------------------|--------------------------------------|----------------|-----------------|----------------|
| $V_{DS}$   | drain-source voltage (DC)                                 |                                      | –              | 25              | V              |
| $I_{DSS}$  | drain current<br>BF851A<br>BF851B<br>BF851C               | $V_{GS} = 0$ ; $V_{DS} = 8\text{ V}$ | 2<br>6<br>12   | 6.5<br>15<br>25 | mA<br>mA<br>mA |
| $P_{tot}$  | total power dissipation                                   | up to $T_{amb} = 40\text{ °C}$       | –              | 400             | mW             |
| $ y_{fs} $ | forward transfer admittance<br>BF851A<br>BF851B<br>BF851C | $V_{GS} = 0$ ; $V_{DS} = 8\text{ V}$ | 12<br>16<br>20 | 20<br>25<br>30  | mS<br>mS<br>mS |
| $C_{iss}$  | input capacitance                                         | $f = 1\text{ MHz}$                   | –              | 10              | pF             |
| $C_{rss}$  | reverse transfer capacitance                              | $f = 1\text{ MHz}$                   | –              | 3               | pF             |

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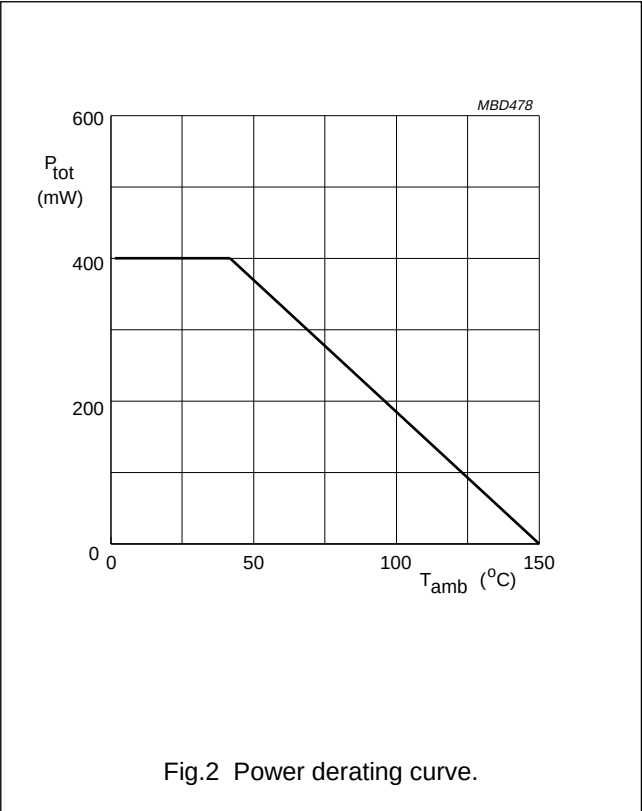
LIMITING VALUES

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

| SYMBOL           | PARAMETER                      | CONDITIONS                             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|----------------------------------------|------|------|------|
| V <sub>DS</sub>  | drain-source voltage (DC)      |                                        | –    | 25   | V    |
| V <sub>GSO</sub> | gate-source voltage            | open drain                             | –    | 25   | V    |
| V <sub>DGO</sub> | drain-gate voltage (DC)        | open source                            | –    | 25   | V    |
| I <sub>G</sub>   | forward gate current (DC)      |                                        | –    | 10   | mA   |
| P <sub>tot</sub> | total power dissipation        | up to T <sub>amb</sub> = 40 °C; note 1 | –    | 400  | mW   |
| T <sub>stg</sub> | storage temperature            |                                        | –65  | +150 | °C   |
| T <sub>j</sub>   | operating junction temperature |                                        | –    | 150  | °C   |

Note

1. Device mounted on an epoxy printed-circuit board; maximum lead length 4 mm; mounting pad for the drain lead minimum 10 mm<sup>2</sup>.



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## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                           | VALUE | UNIT |
|---------------|-----------------------------------------------------|-------|------|
| $R_{th\ j-a}$ | thermal resistance from junction to ambient; note 1 | 250   | K/W  |

## Note

1. Device mounted on an epoxy printed-circuit board; maximum lead length 4 mm; mounting pad for the drain lead minimum 10 mm<sup>2</sup>.

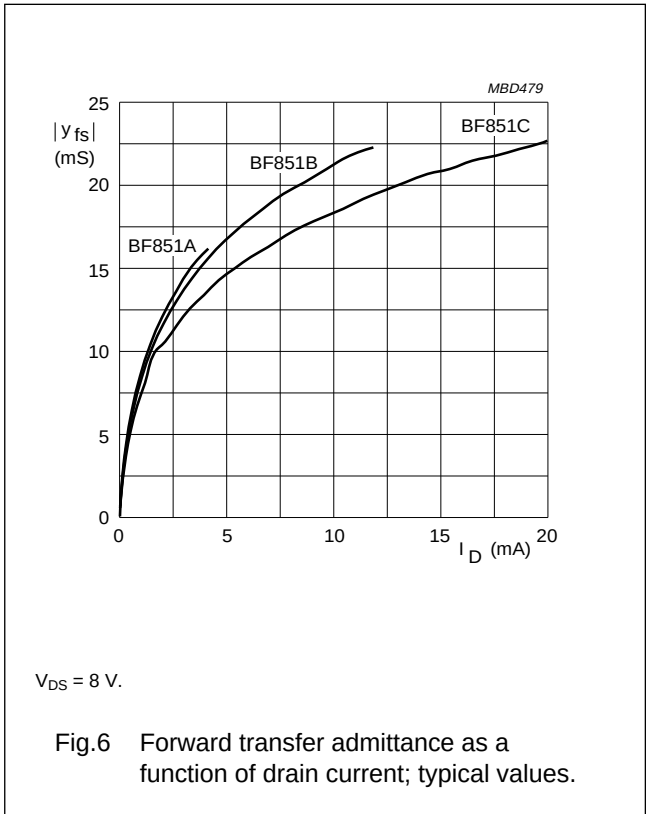
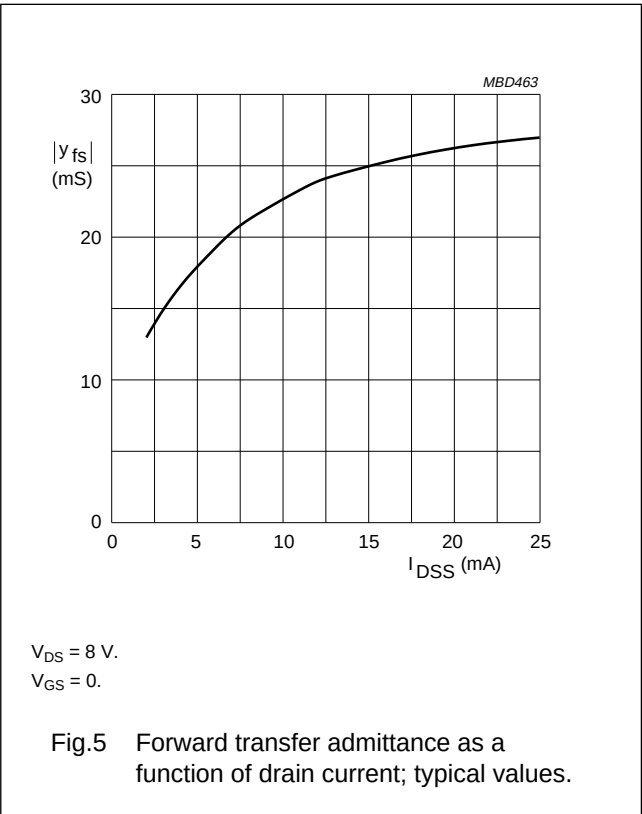
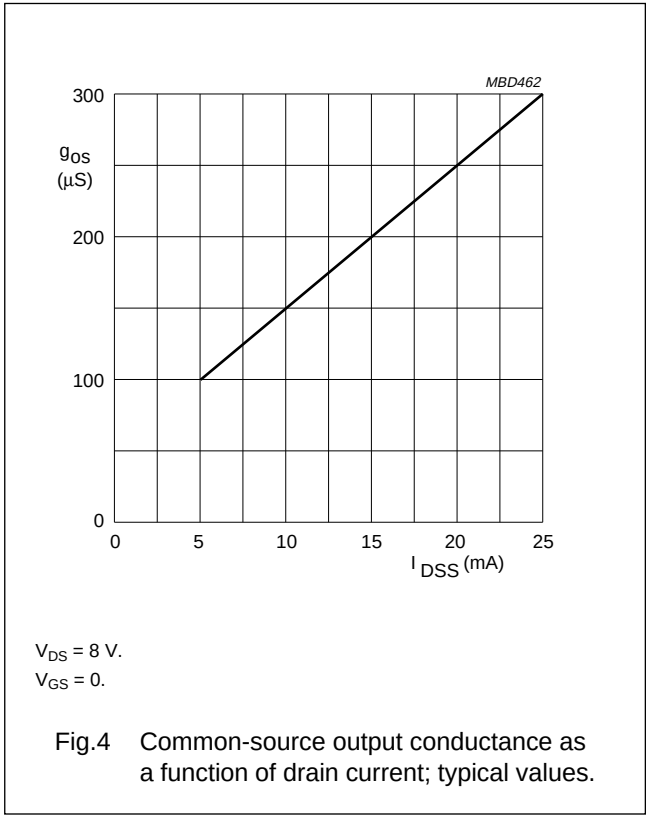
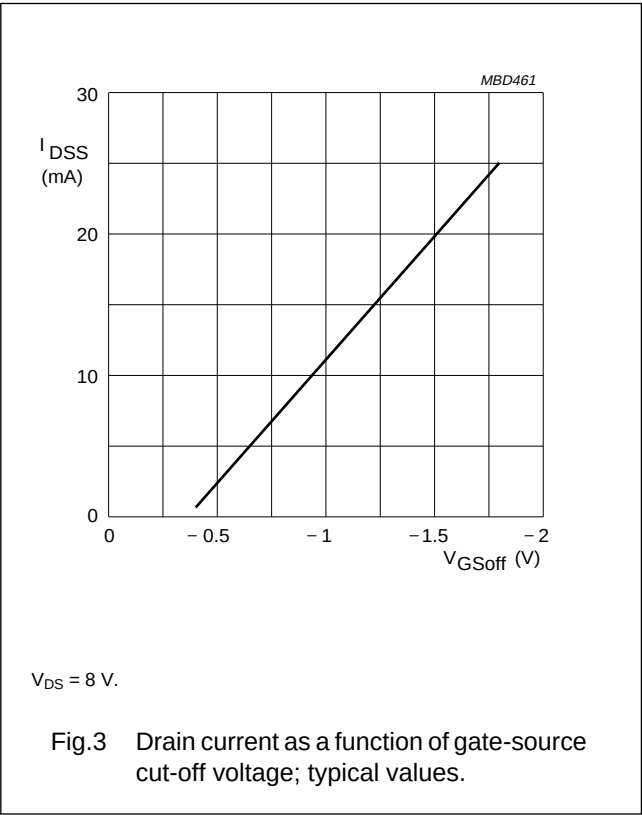
## CHARACTERISTICS

$T_j = 25\text{ }^{\circ}\text{C}$ ;  $V_{DS} = 8\text{ V}$ ;  $V_{GS} = 0$ ; unless otherwise specified.

| SYMBOL         | PARAMETER                        | CONDITIONS                             | MIN. | TYP. | MAX. | UNIT                   |
|----------------|----------------------------------|----------------------------------------|------|------|------|------------------------|
| $V_{(BR)GSS}$  | gate-source breakdown voltage    | $I_G = -1\text{ }\mu\text{A}$          | -25  | —    | —    | V                      |
| $V_{GSoff}$    | gate-source cut-off voltage      | $I_D = 1\text{ }\mu\text{A}$           |      |      |      |                        |
|                | BF851A                           |                                        | -0.2 | —    | -1   | V                      |
|                | BF851B                           |                                        | -0.5 | —    | -1.5 | V                      |
|                | BF851C                           |                                        | -0.8 | —    | -2   | V                      |
| $V_{GSS}$      | gate-source forward voltage      | $V_{DS} = 0$ ; $I_G = 1\text{ mA}$     | —    | —    | 1    | V                      |
| $I_{DSS}$      | drain current                    |                                        |      |      |      |                        |
|                | BF851A                           |                                        | 2    | —    | 6.5  | mA                     |
|                | BF851B                           |                                        | 6    | —    | 15   | mA                     |
|                | BF851C                           |                                        | 12   | —    | 25   | mA                     |
| $I_{GSS}$      | gate cut-off current             | $V_{GS} = -20\text{ V}$ ; $V_{DS} = 0$ | —    | —    | -1   | nA                     |
| $ y_{fs} $     | forward transfer admittance      |                                        |      |      |      |                        |
|                | BF851A                           |                                        | 12   | —    | 20   | mS                     |
|                | BF851B                           |                                        | 16   | —    | 25   | mS                     |
|                | BF851C                           |                                        | 20   | —    | 30   | mS                     |
| $g_{os}$       | common source output conductance |                                        |      |      |      |                        |
|                | BF851A                           |                                        | —    | —    | 200  | $\mu\text{S}$          |
|                | BF851B                           |                                        | —    | —    | 250  | $\mu\text{S}$          |
|                | BF851C                           |                                        | —    | —    | 300  | $\mu\text{S}$          |
| $C_{iss}$      | input capacitance                | $f = 1\text{ MHz}$                     | —    | —    | 10   | pF                     |
| $C_{rss}$      | reverse transfer capacitance     | $f = 1\text{ MHz}$                     | —    | 2.4  | 3    | pF                     |
| $V_n/\sqrt{B}$ | equivalent input noise voltage   | $V_{GS} = 0$ ; $f = 1\text{ MHz}$      | —    | 1.5  | —    | nV/ $\sqrt{\text{Hz}}$ |

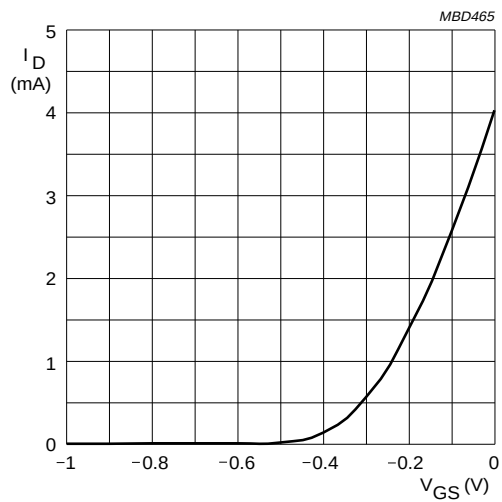
N-channel junction FETs

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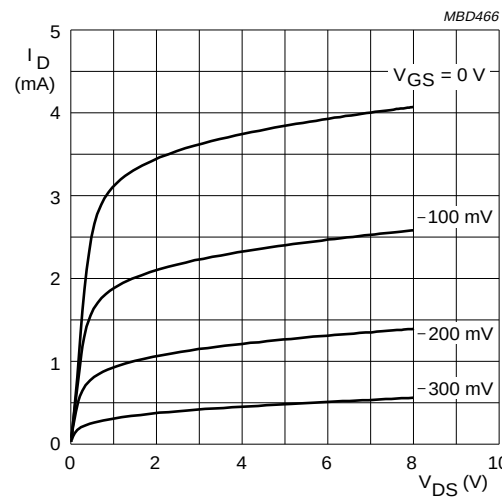
N-channel junction FETs

BF851A; BF851B; BF851C



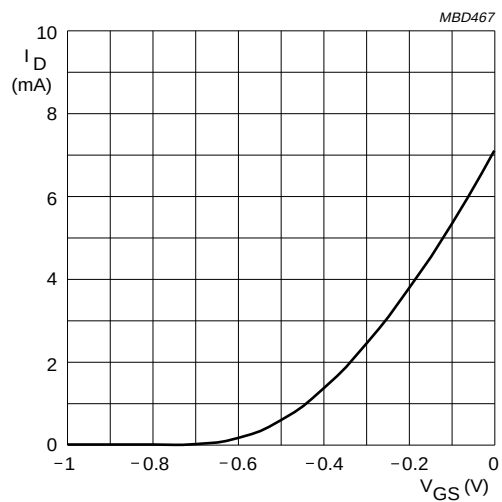
**BF851A**  
 $V_{DS} = 8$  V.

Fig.7 Typical input characteristics.



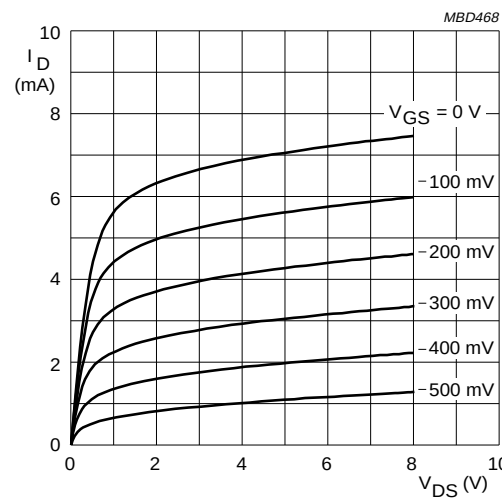
**BF851A**  
 $V_{DS} = 8$  V.

Fig.8 Typical output characteristics.



**BF851B**  
 $V_{DS} = 8$  V.

Fig.9 Typical input characteristics.

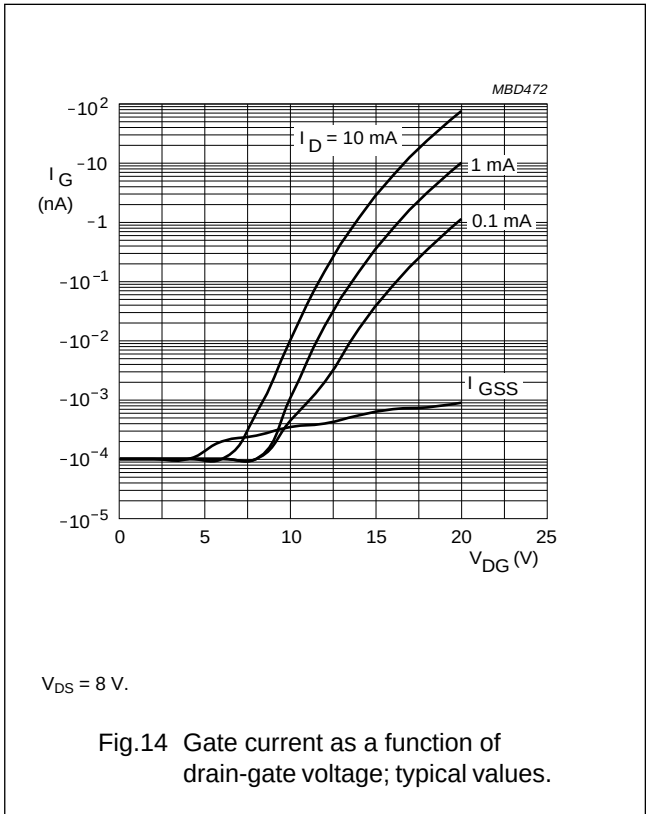
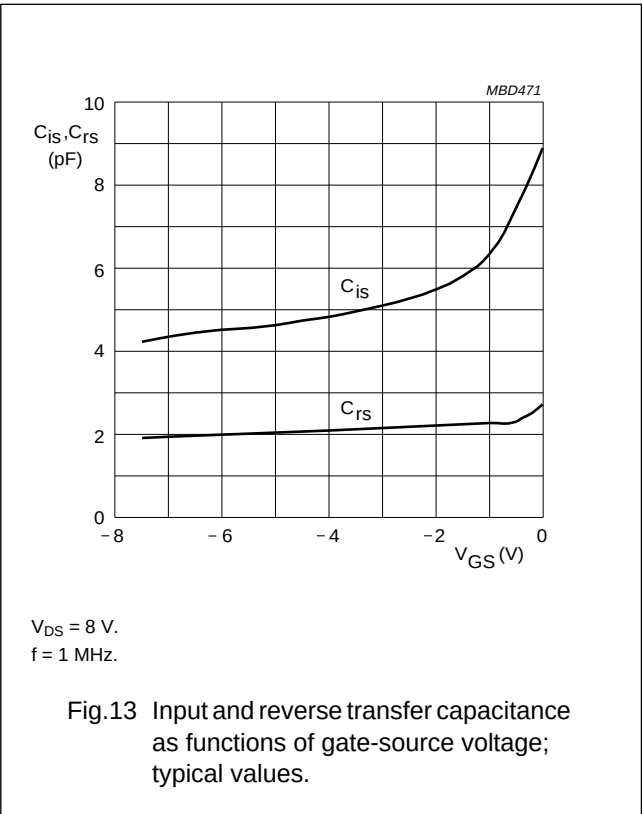
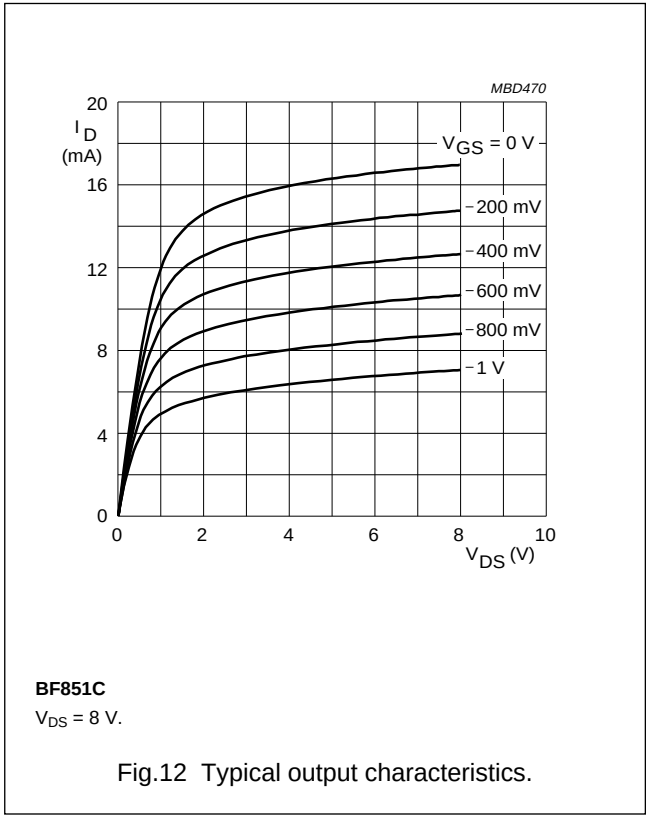
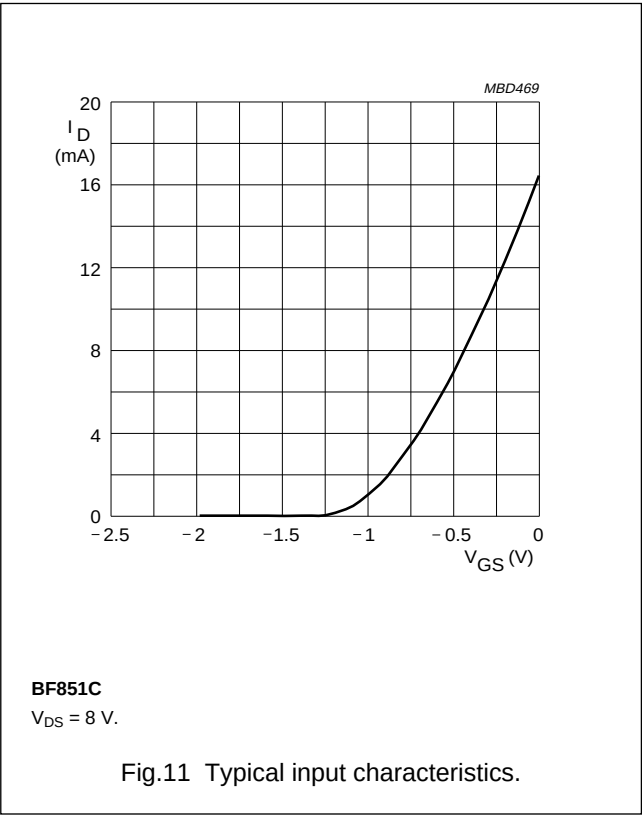


**BF851B**  
 $V_{DS} = 8$  V.

Fig.10 Typical output characteristics.

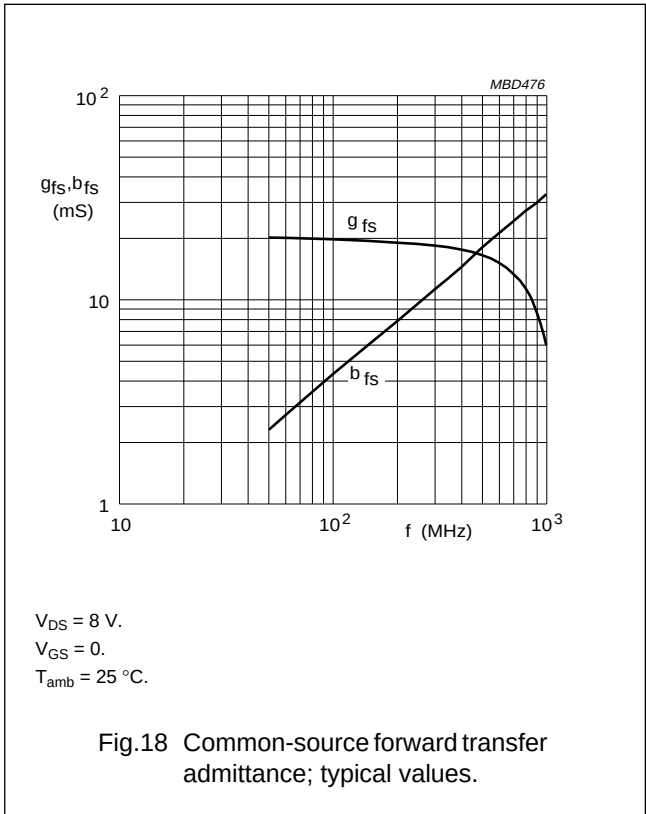
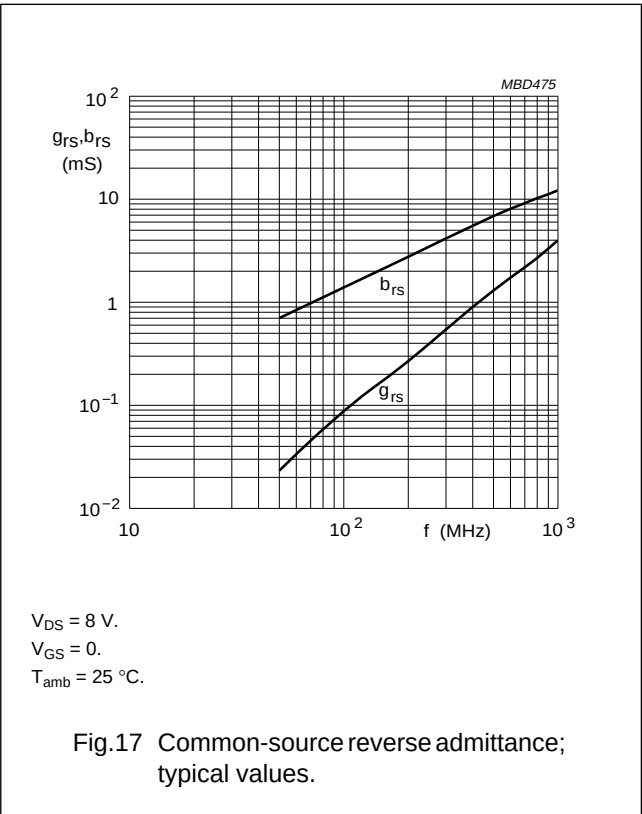
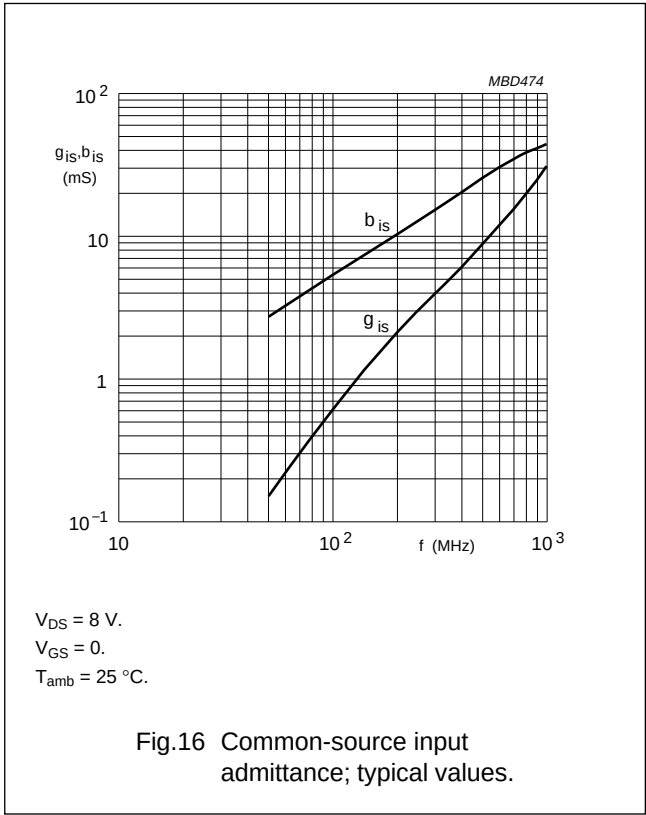
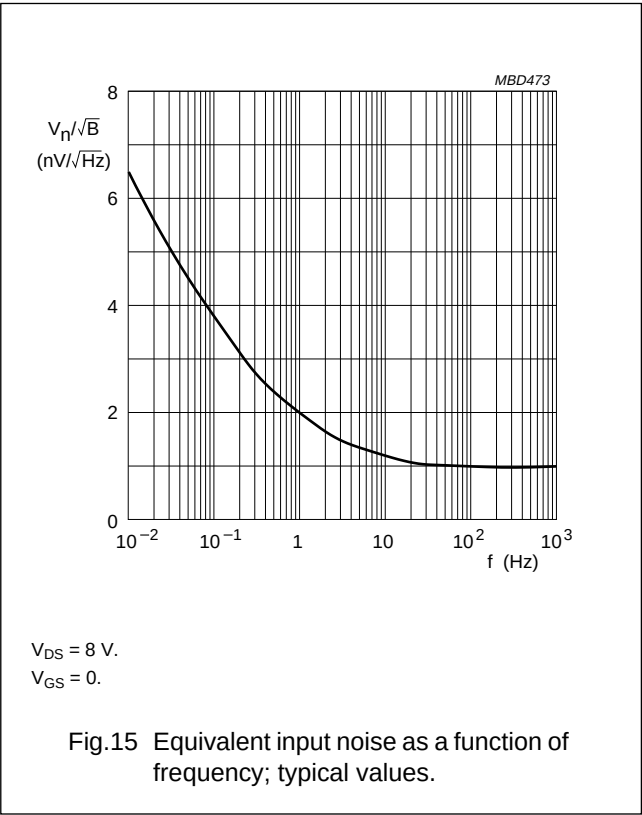
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N-channel junction FETs

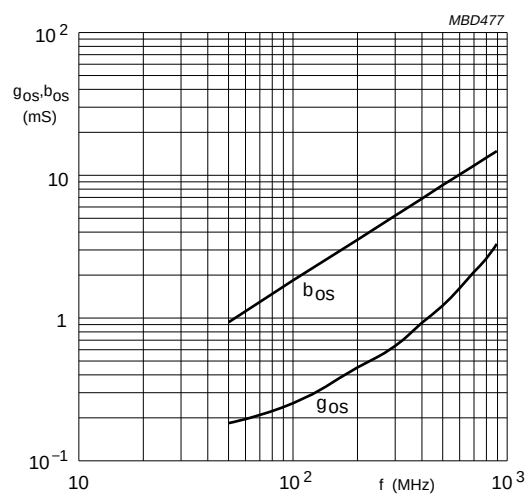
BF851A; BF851B; BF851C





## N-channel junction FETs

## BF851A; BF851B; BF851C



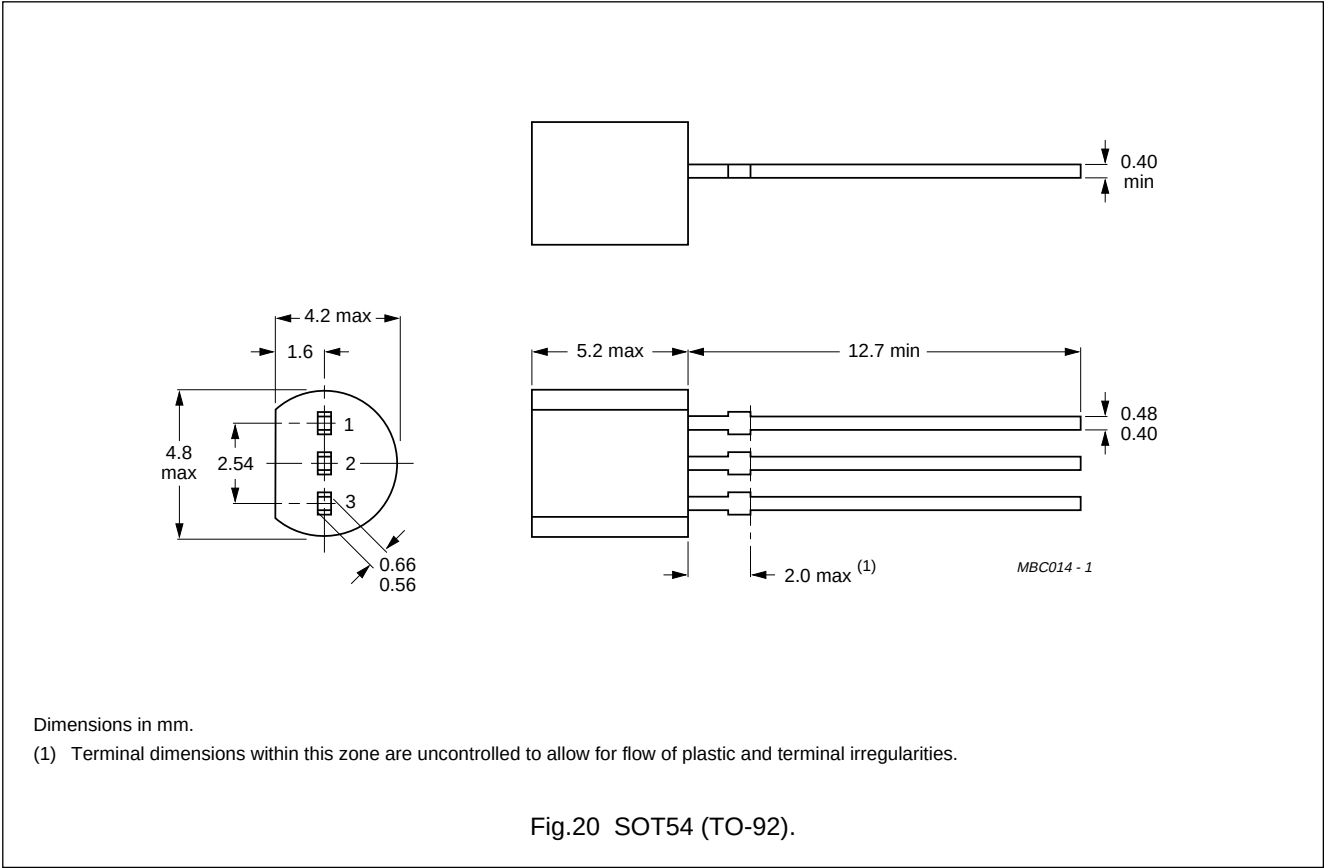
$V_{DS} = 8 \text{ V.}$   
 $V_{GS} = 0.$   
 $T_{amb} = 25 \text{ }^{\circ}\text{C.}$

Fig.19 Common-source output admittance;  
typical values.

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PACKAGE OUTLINE



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N-channel junction FETs

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BF851A; BF851B; BF851C

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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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