

DATA SHEET

BF556A; BF556B; BF556C N-channel silicon junction field-effect transistors

Product specification
Supersedes data of April 1995
File under Discrete Semiconductors, SC07

1996 Jul 29

N-channel silicon junction
field-effect transistors

BF556A; BF556B; BF556C

FEATURES

- Low leakage level (typ. 500 fA)
- High gain
- Low cut-off voltage.

APPLICATIONS

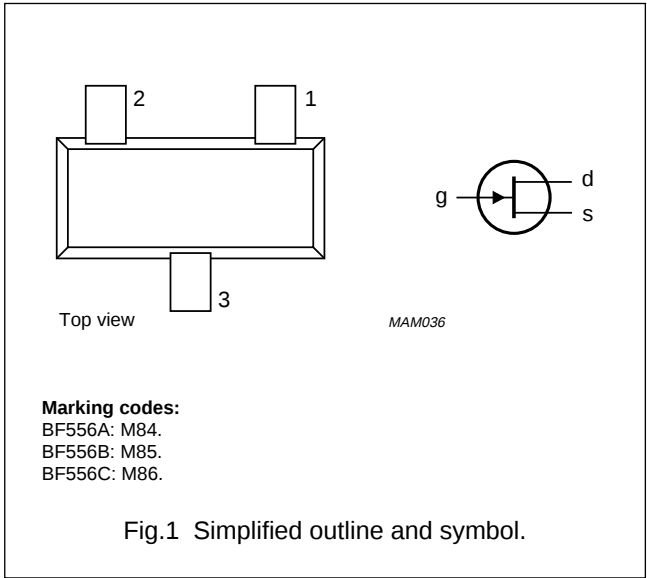
- Impedance converters in e.g. electret microphones and infra-red detectors
- VHF amplifiers in oscillators and mixers.

DESCRIPTION

N-channel symmetrical silicon junction field-effect transistors in a SOT23 package.

PINNING - SOT23

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



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)		–	± 30	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 200 \mu A$; $V_{DS} = 15 V$	–0.5	–7.5	V
I_{DSS}	drain current BF556A BF556B BF556C	$V_{GS} = 0$; $V_{DS} = 15 V$	3 6 11	7 13 18	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25 \text{ }^\circ C$	–	250	mW
$ y_{fs} $	forward transfer admittance	$V_{GS} = 0$; $V_{DS} = 15 V$	4.5	–	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)		–	± 30	V
V_{GSO}	gate-source voltage	open drain	–	–30	V
V_{GDO}	gate-drain voltage (DC)	open source	–	–30	V
I_G	forward gate current (DC)		–	10	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25\text{ °C}$; note 1	–	250	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

Note

- Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm².

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient; note 1	500	K/W

Note

- Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm².

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$; $V_{DS} = 0$	–30	–	–	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 15\text{ V}$	–0.5		–7.5	V
I_{DSS}	drain current BF556A BF556B BF556C	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$	3 6 11	– – –	7 13 18	mA mA mA
I_{GSS}	gate leakage current	$V_{GS} = -20\text{ V}$; $V_{DS} = 0$	–	–0.5	–5000	pA
$ y_{fs} $	forward transfer admittance	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$	4.5	–	–	mS
$ y_{os} $	common source output admittance	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$	–	40	–	μS

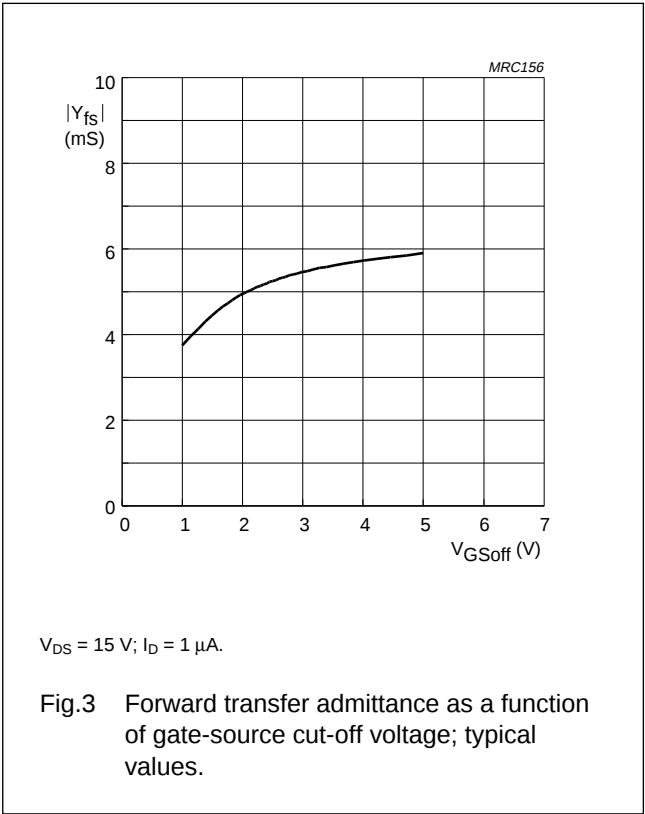
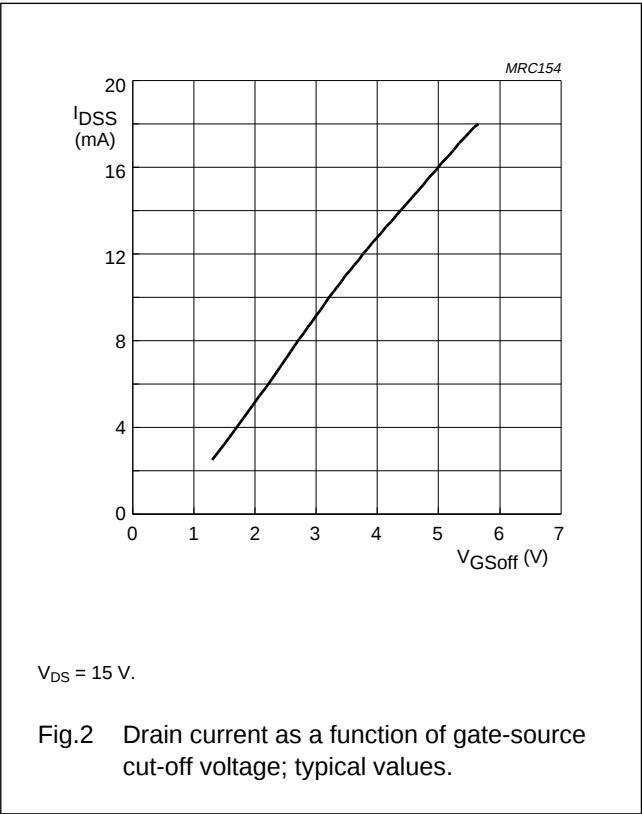
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DYNAMIC CHARACTERISTICS

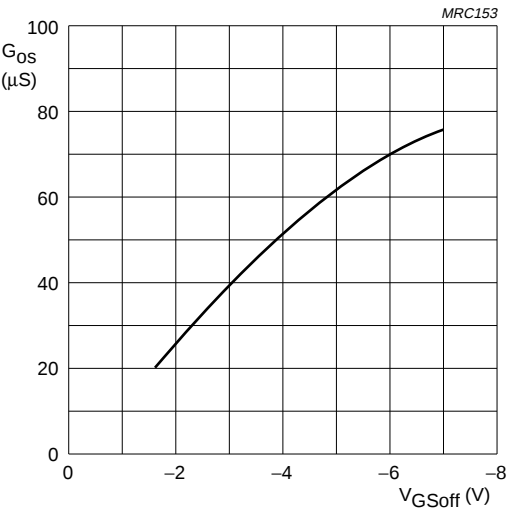
T_{amb} = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	UNIT
C _{is}	input capacitance	V _{DS} = 15 V; V _{GS} = -10 V; f = 1 MHz	1.7	pF
		V _{DS} = 15 V; V _{GS} = 0; f = 1 MHz	3	pF
C _{rs}	reverse transfer capacitance	V _{DS} = 15 V; V _{GS} = -10 V; f = 1 MHz	0.8	pF
		V _{DS} = 15 V; V _{GS} = 0; f = 1 MHz	0.9	pF
g _{is}	common source input conductance	V _{DS} = 10 V; I _D = 1 mA; f = 100 MHz	15	μS
		V _{DS} = 10 V; I _D = 1 mA; f = 450 MHz	300	μS
g _{fs}	common source transfer conductance	V _{DS} = 10 V; I _D = 1 mA; f = 100 MHz	2	mS
		V _{DS} = 10 V; I _D = 1 mA; f = 450 MHz	1.8	mS
g _{rs}	common source reverse conductance	V _{DS} = 10 V; I _D = 1 mA; f = 100 MHz	-6	μS
		V _{DS} = 10 V; I _D = 1 mA; f = 450 MHz	-40	μS
g _{os}	common source output conductance	V _{DS} = 10 V; I _D = 1 mA; f = 100 MHz	30	μS
		V _{DS} = 10 V; I _D = 1 mA; f = 450 MHz	60	μS
V _n	equivalent input noise voltage	V _{DS} = 10 V; I _D = 1 mA; f = 100 Hz	40	nV/√Hz



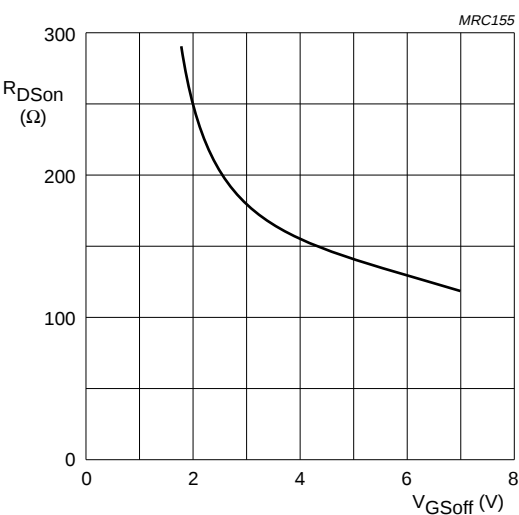
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$V_{DS} = 15\text{ V}$.

Fig.4 Common-source output conductance as a function of gate-source cut-off voltage; typical values.



$V_{DS} = 100\text{ mV}$; $V_{GS} = 0$.

Fig.5 Drain-source on-state resistance as a function of gate-source cut-off voltage; typical values.

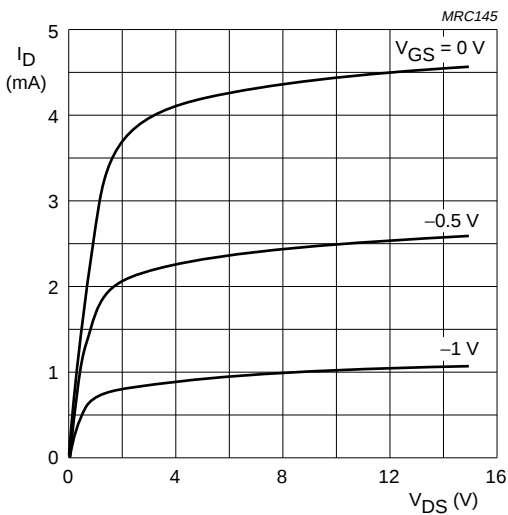


Fig.6 Typical output characteristics; BF556A.

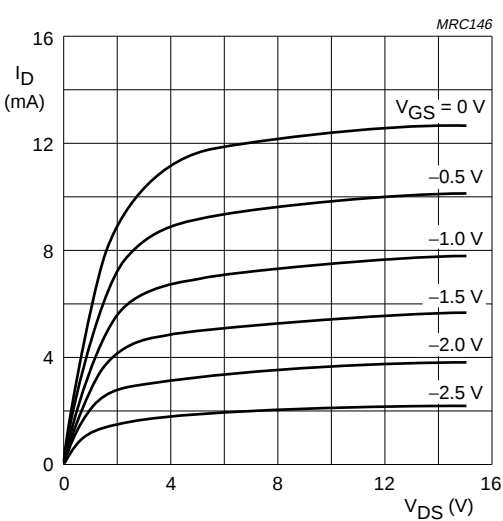


Fig.7 Typical output characteristics; BF556B.

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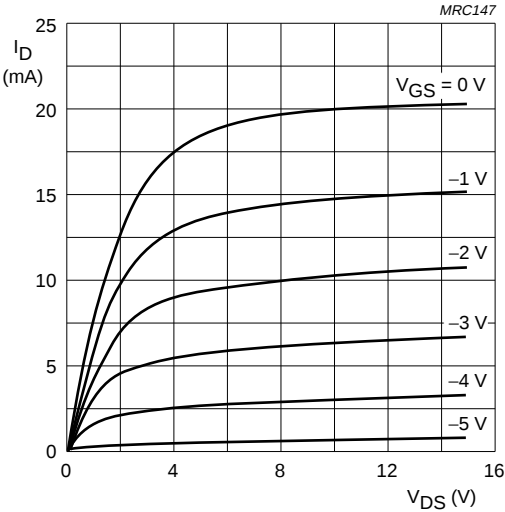
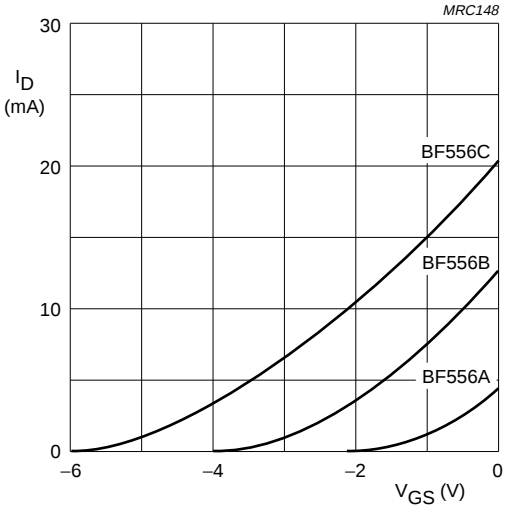
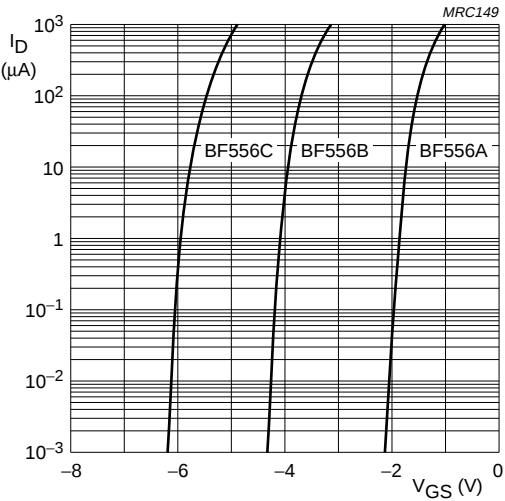


Fig.8 Typical output characteristics; BF556C.



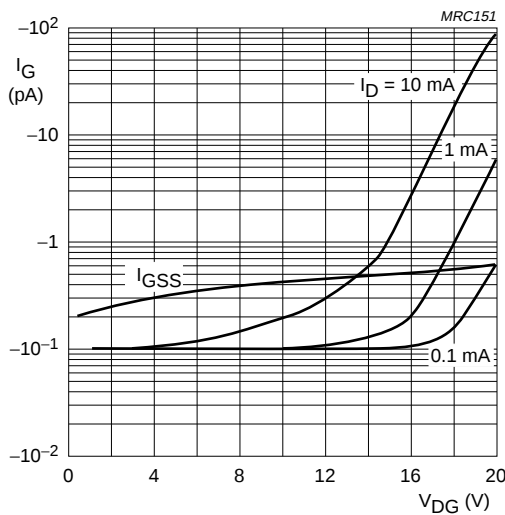
$V_{DS} = 15$ V.

Fig.9 Typical input characteristics.



$V_{DS} = 15$ V.

Fig.10 Drain current as a function of gate-source voltage; typical values.

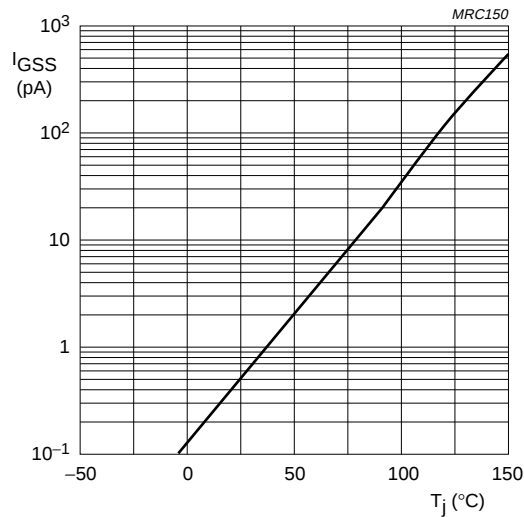


$I_D = 10$ mA only for BF556B and BF556C.

Fig.11 Gate current as a function of drain-gate voltage; typical values.

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$V_{DS} = 0$; $V_{GS} = -20$ V.

Fig.12 Gate current as a function of junction temperature; typical values.

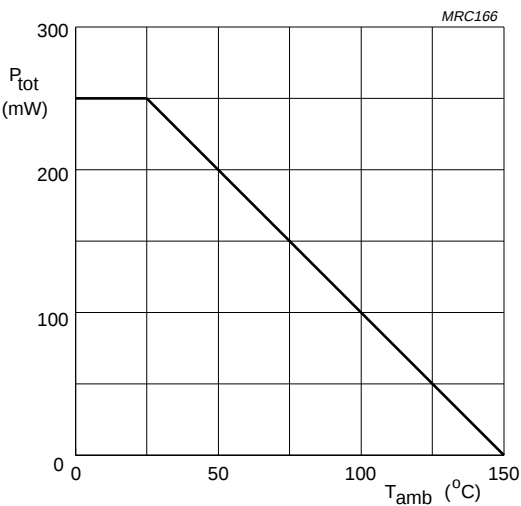
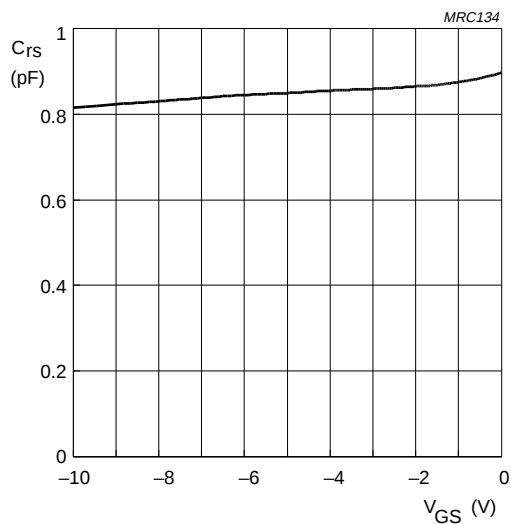
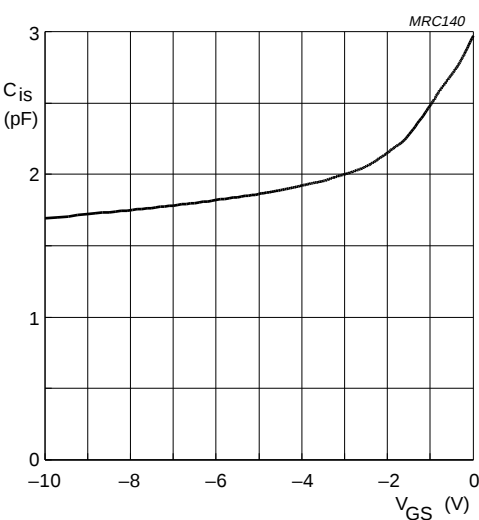


Fig.13 Power derating curve.



$V_{DS} = 15$ V.

Fig.14 Reverse transfer capacitance; typical values.

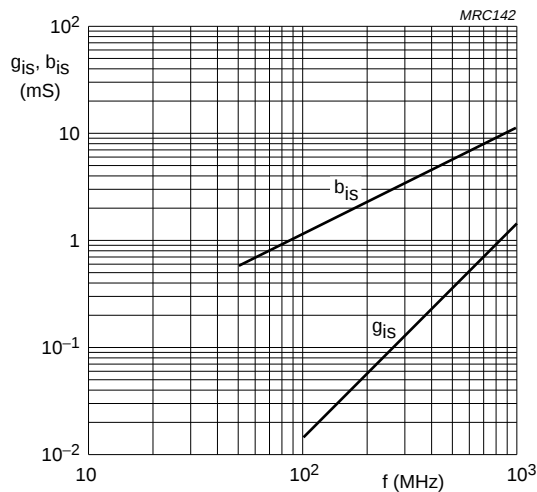


$V_{DS} = 15$ V.

Fig.15 Input capacitance; typical values.

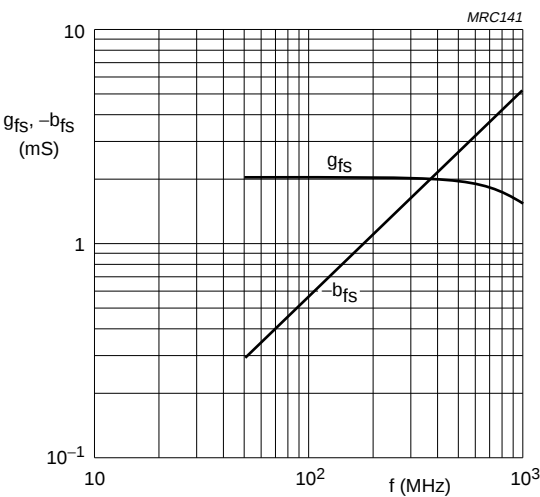
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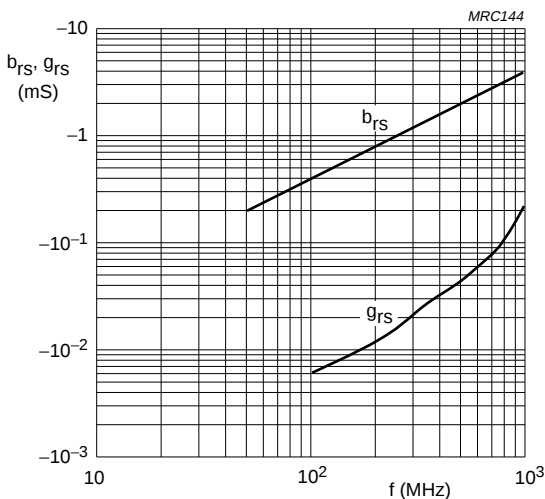
$V_{DS} = 10\text{ V}$; $I_D = 1\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.16 Common-source input admittance; typical values.



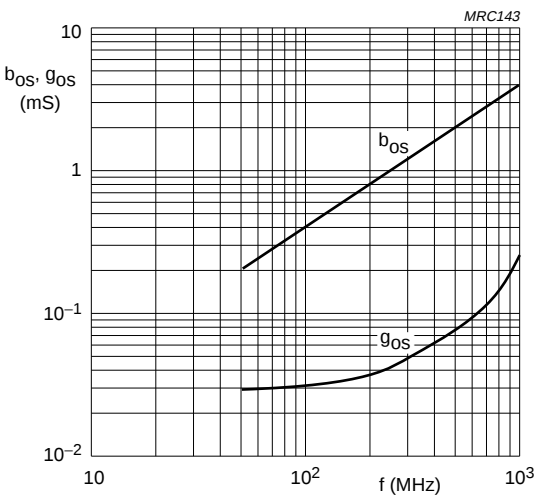
$V_{DS} = 10\text{ V}$; $I_D = 1\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.17 Common-source transfer admittance; typical values.



$V_{DS} = 10\text{ V}$; $I_D = 1\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.18 Common-source reverse admittance; typical values.

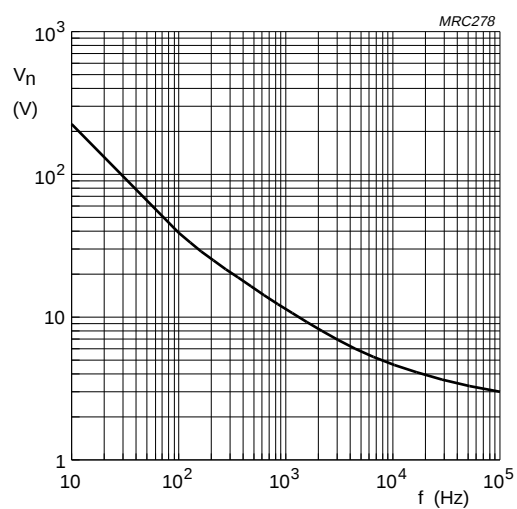


$V_{DS} = 10\text{ V}$; $I_D = 1\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

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

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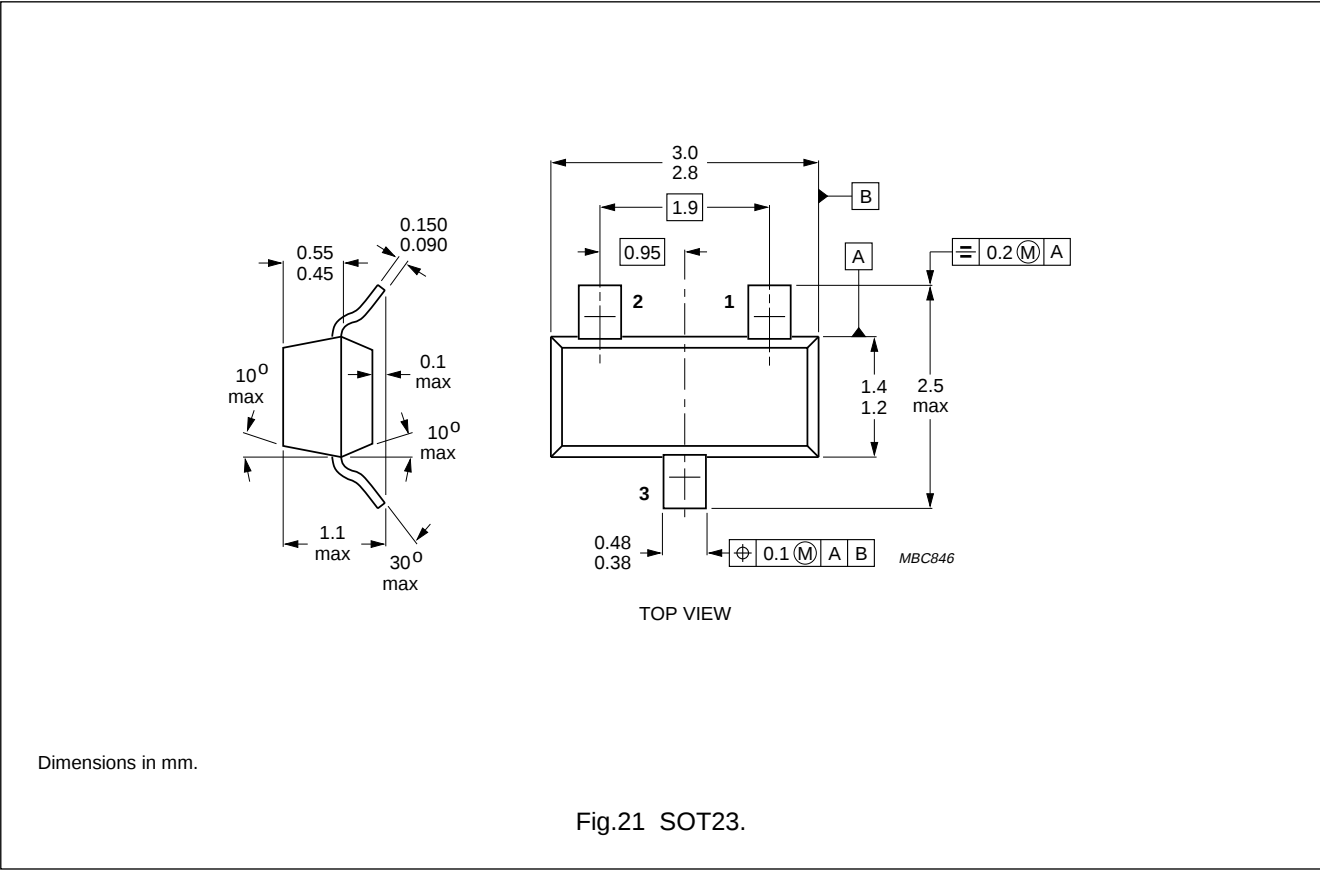
$V_{DS} = 10$ V; $I_D = 1$ mA.

Fig.20 Equivalent noise voltage as a function of frequency.

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PACKAGE OUTLINE



**N-channel silicon junction
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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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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