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

FEATURES

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

DESCRIPTION

N-channel symmetrical silicon junction FETs in a surface-mountable SOT23 envelope. These devices are specially designed for use as impedance converters in (for example) electret microphones and infra-red detectors, and as VHF amplifiers in oscillators and mixers.

PINNING - SOT23

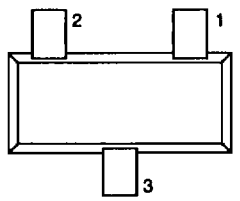
PIN	DESCRIPTION
1	source
2	drain
3	gate

CAUTION

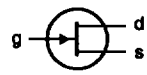
The device is supplied in an antistatic package. The gate-source input must be protected against static charge during transport and handling.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	drain-source voltage		–	30	V
I_{DSS}	drain current	V_{DS} = 15 V; V_{GS} = 0			
	BF556A		3	7	mA
	BF556B		6	13	mA
	BF556C		11	18	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	250	mW
$-V_{GS(off)}$	gate-source cut-off voltage	V_{DS} = 15 V; I_D = 200 μA	0.5	7.5	V
$\lvert Y_{fs} \rvert$	common source transfer admittance	V_{DS} = 15 V; V_{GS} = 0	4.5	–	mS



Top view



MAM036

Marking codes:
BF556A: M84.
BF556B: M85.
BF556C: M86.

Fig.1 Simplified outline and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	drain-source voltage		–	30	V
$-V_{GSO}$	gate-source voltage		–	30	V
$-V_{GDO}$	gate-drain voltage		–	30	V
I_G	DC forward gate current		–	10	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C (note 1)	–	250	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j\text{-}a}$	from junction to ambient (note 1)	500 K/W

Note

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

STATIC CHARACTERISTICS

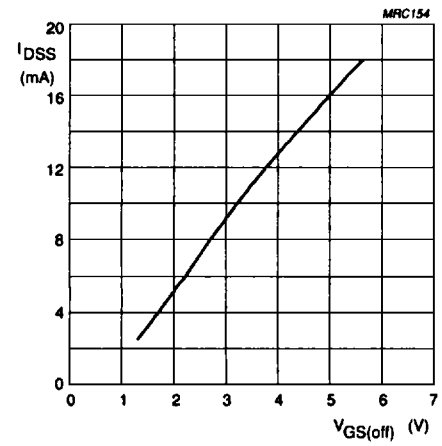
T_j = 25 °C unless otherwise specified.

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

DYNAMIC CHARACTERISTICS

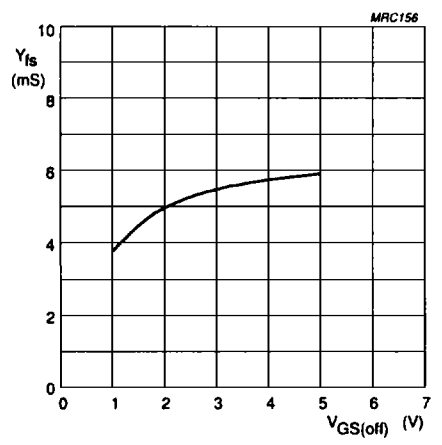
T_a = 25 °C unless otherwise specified.

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}	feedback 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 feedback 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	VDS = 10 V; I_D = 1 mA; f = 100 Hz	40	nV/√Hz



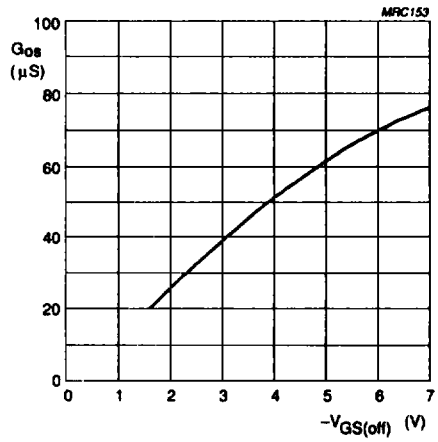
V_{DS} = 15 V.

Fig.2 Drain current as a function of gate-source cut-off voltage; typical values.



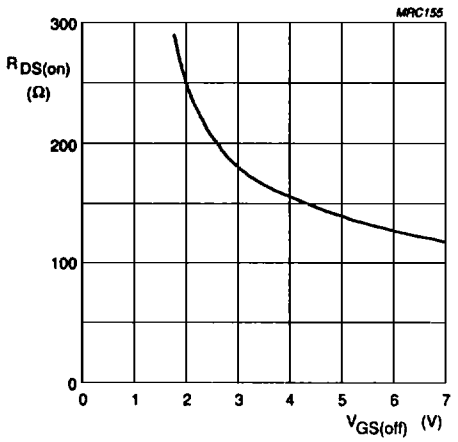
V_{DS} = 15 V; I_D = 1 µA.

Fig.3 Common source transfer admittance as a function of gate-source cut-off voltage; typical values.



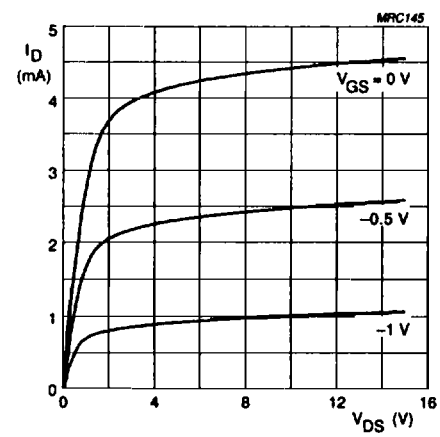
V_{DS} = 15 V.

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



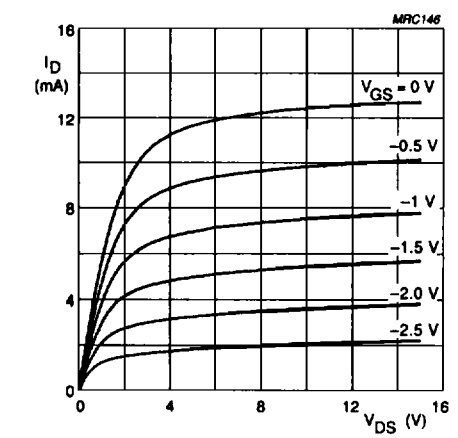
V_{DS} = 100 mV; V_{GS} = 0.

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



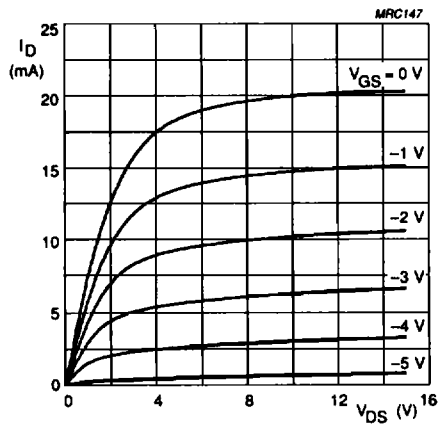
BF556A

Fig.6 Typical output characteristics.



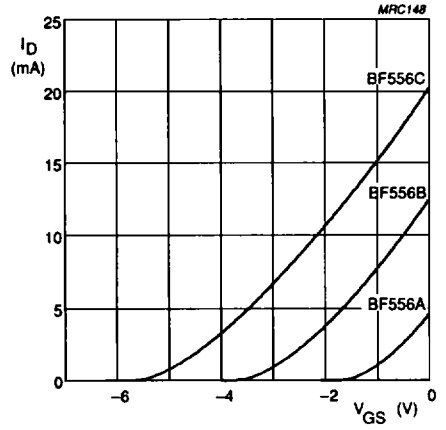
BF556B

Fig.7 Typical output characteristics.



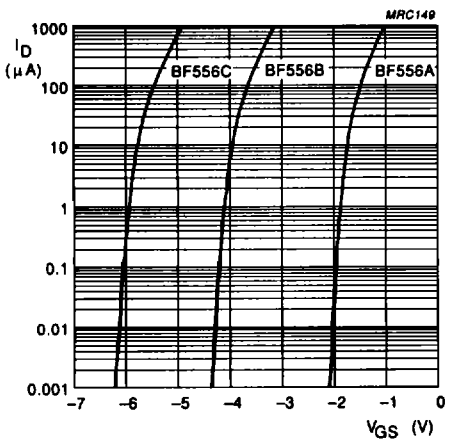
BF556C

Fig.8 Typical output characteristics.



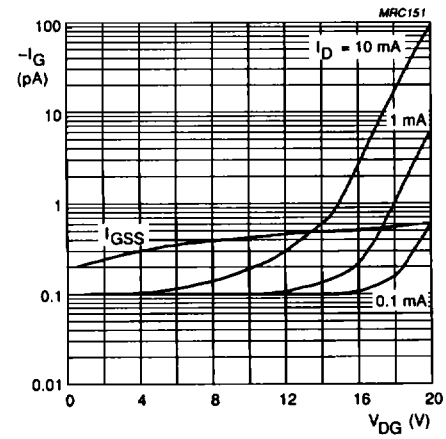
V_{DS} = 15 V.

Fig.9 Typical input characteristics.



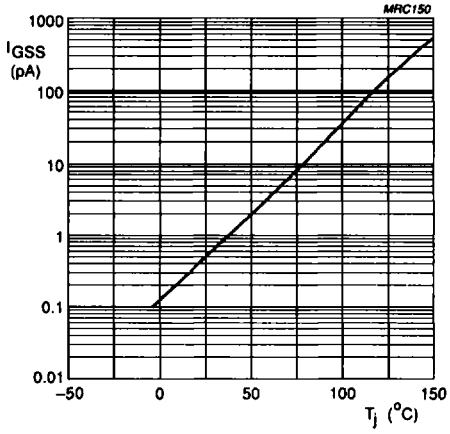
V_{DS} = 15 V.

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.



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

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

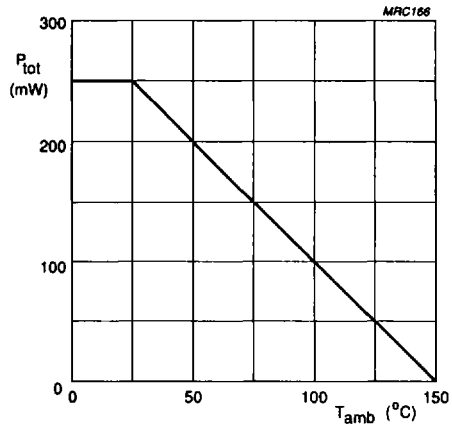
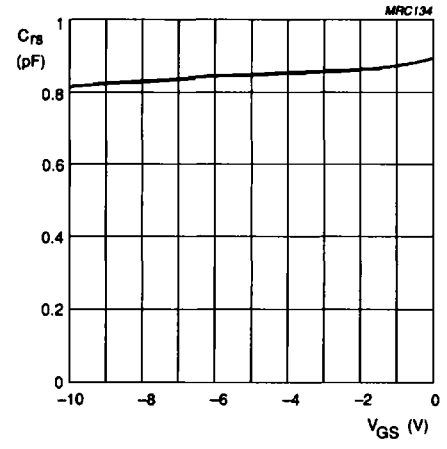
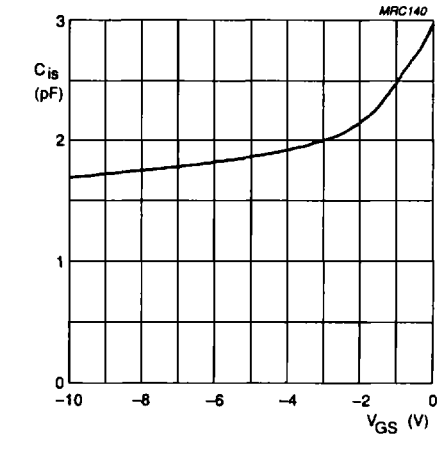


Fig.13 Power derating curve.



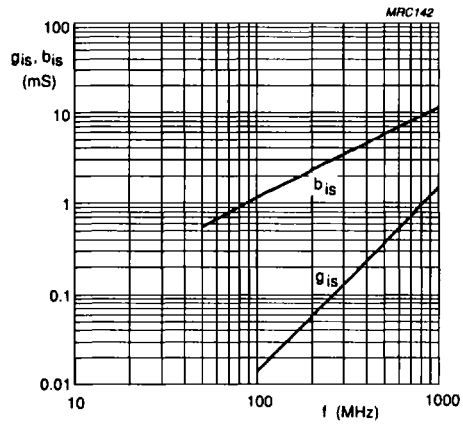
V_{DS} = 15 V.

Fig.14 Typical feedback capacitance.



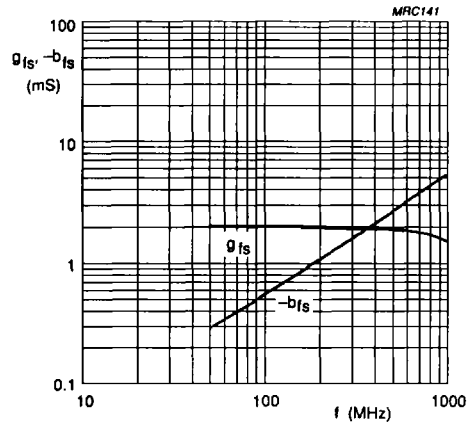
V_{DS} = 15 V.

Fig.15 Typical input capacitance.



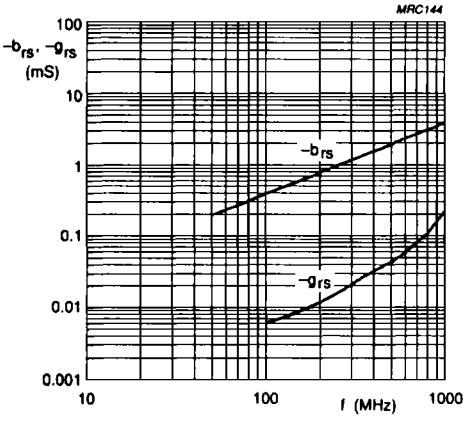
V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.16 Common source input conductance; typical values.



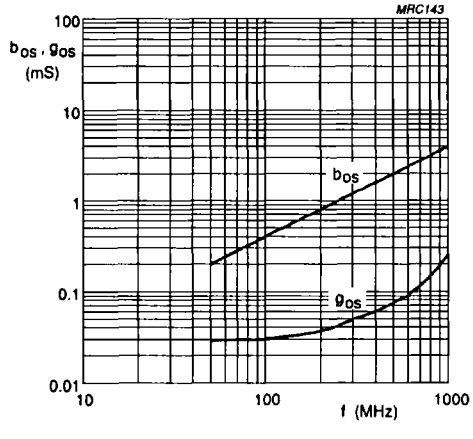
V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.17 Common source transfer conductance; typical values.



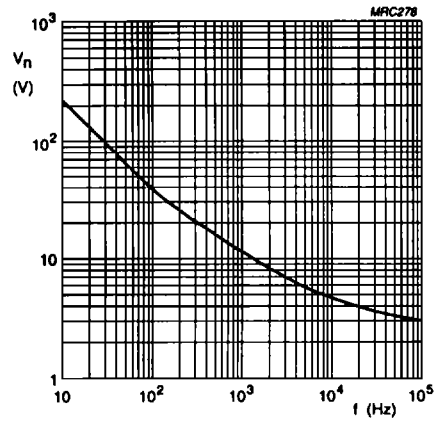
V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.18 Common source feedback conductance; typical values.



V_{DS} = 10 V; I_D = 1 mA; T_{amb} = 25 °C.

Fig.19 Common source output conductance; typical values.



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

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