

N-channel silicon field-effect transistors

PMBFJ308/309/310

NAPC/PHILIPS SEMICONDUCTOR

63E D

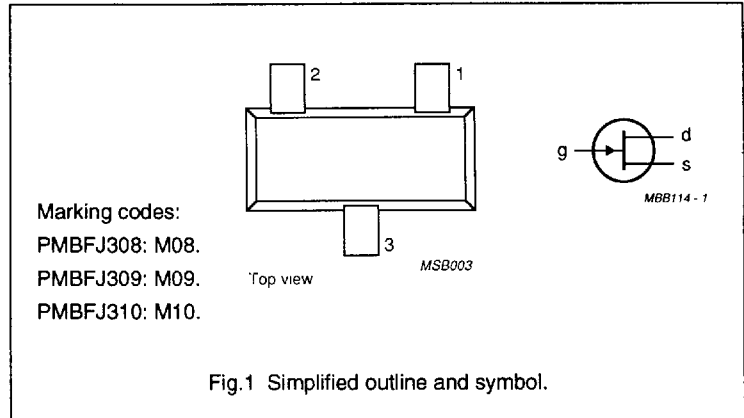
FEATURES

- Low noise
- Interchangeability of drain and source connections
- High gain.

DESCRIPTION

Silicon symmetrical n-channel junction FETs in a SOT23 envelope. They are intended for use in VHF amplifiers, the AM input stage of car radios, oscillators and mixers.

PIN CONFIGURATION



PINNING - SOT23

PIN	DESCRIPTION
1	source
2	drain
3	gate

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	drain-source voltage		—	25	V
I_{DSS}	drain current	$V_{DS} = 10\text{ V};$ $V_{GS} = 0$	12	60	mA
	PMBFJ308		12	30	mA
	PMBFJ309		24	60	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25\text{ °C}$	—	250	mW
$-V_{GS(off)}$	gate-source cut-off voltage	$V_{DS} = 10\text{ V};$ $I_D = 1\text{ }\mu\text{A}$	1	6.5	V
	PMBFJ308		1	4	V
	PMBFJ309		2	6.5	V
$ Y_{fs} $	common-source transfer admittance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA}$	10	—	mS

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{DS}$	drain-source voltage		–	25	V
$-V_{GSO}$	gate-source voltage		–	25	V
$-V_{GDO}$	gate-drain voltage		–	25	V
I_G	forward gate current	DC value	–	50	mA
P_{tot}	total power dissipation	up to $T_{amb} = 25\text{ °C}$	–	250	mW
T_{stg}	storage temperature range		–65	150	°C
T_J	junction temperature		–	150	°C

THERMAL RESISTANCE

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

Note

1. Device mounted on an FR4 printed-circuit board.

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STATIC CHARACTERISTICS

 $T_j = 25\text{ }^{\circ}\text{C}$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$-V_{(BR)GSS}$	gate-source breakdown voltage	$-I_G = 1\text{ }\mu\text{A}$ $V_{DS} = 0$	—	—	25	V
I_{DSS}	drain current	$V_{DS} = 10\text{ V};$ $V_{GS} = 0$				
	PMBFJ308		12	—	60	mA
	PMBFJ309		12	—	30	mA
	PMBFJ310		24	—	60	mA
$-I_{GSS}$	reverse gate leakage current	$-V_{GS} = 15\text{ V};$ $V_{DS} = 0$	—	—	1	nA
V_{GSS}	gate-source forward voltage	$V_{DS} = 0;$ $I_G = 1\text{ mA}$	—	—	1	V
$-V_{GS(off)}$	gate-source cut-off voltage	$V_{DS} = 10\text{ V};$ $I_D = 1\text{ }\mu\text{A}$				
	PMBFJ308		1	—	6.5	V
	PMBFJ309		1	—	4	V
	PMBFJ310		2	—	6.5	V
$R_{DS(on)}$	drain-source on-resistance	$V_{DS} = 100\text{ mV};$ $V_{GS} = 0$	—	50	—	Ω
$ Y_{fs} $	common-source transfer admittance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA}$	10	—	—	mS
$ Y_{os} $	common-source output admittance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA}$	—	—	250	μS

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DYNAMIC CHARACTERISTICS

 $T_J = 25\text{ }^{\circ}\text{C}$.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_{is}	input capacitance	$V_{DS} = 10\text{ V};$ $-V_{GS} = 10\text{ V};$ $f = 1\text{ MHz}$	3	5	pF
		$V_{DS} = 10\text{ V};$ $-V_{GS} = 0;$ $T_{amb} = 25\text{ }^{\circ}\text{C}$	6	—	pF
C_{rs}	feedback capacitance	$V_{DS} = 0;$ $-V_{GS} = 10\text{ V};$ $f = 1\text{ MHz}$	1.3	2.5	pF
g_{is}	common-source input conductance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 100\text{ MHz}$	200	—	μS
		$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 450\text{ MHz}$	3	—	mS
g_{fs}	common-source transfer conductance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 100\text{ MHz}$	13	—	mS
		$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 450\text{ MHz}$	12	—	mS
$-g_{rs}$	common-source feedback conductance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 100\text{ MHz}$	30	—	μS
		$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 450\text{ MHz}$	450	—	μS
g_{os}	common-source output conductance	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 100\text{ MHz}$	150	—	μS
		$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 450\text{ MHz}$	400	—	μS
e_n	equivalent input noise voltage	$V_{DS} = 10\text{ V};$ $I_D = 10\text{ mA};$ $f = 100\text{ Hz}$	6	—	$\frac{nV}{\sqrt{Hz}}$

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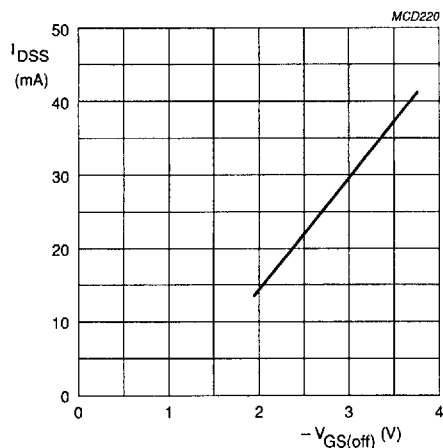
**PMBFJ308, 309 & 310.** $V_{DS} = 10 \text{ V}; T_J = 25^\circ\text{C}.$

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

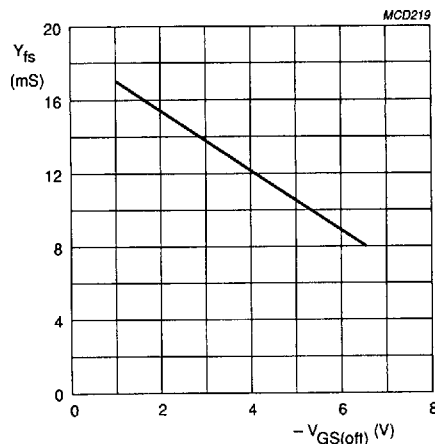
**PMBFJ308, 309 & 310.** $V_{DS} = 10 \text{ V}; I_D = 10 \text{ mA}; T_J = 25^\circ\text{C}.$

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

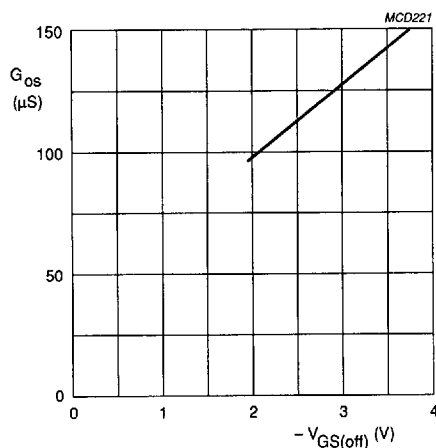
**PMBFJ308, 309 & 310.** $V_{DS} = 10 \text{ V}; I_D = 10 \text{ mA}; T_J = 25^\circ\text{C}.$

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

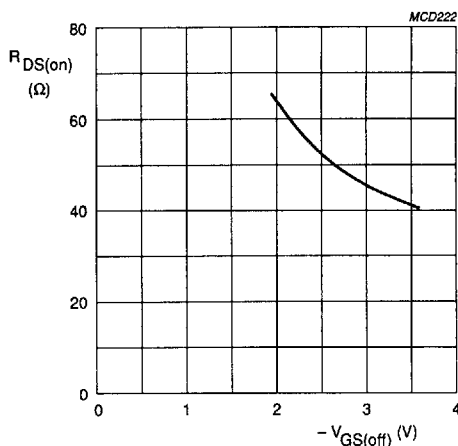
**PMBFJ308, 309 & 310.** $V_{DS} = 0.1 \text{ V}; V_{GS} = 0; T_J = 25^\circ\text{C}.$

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

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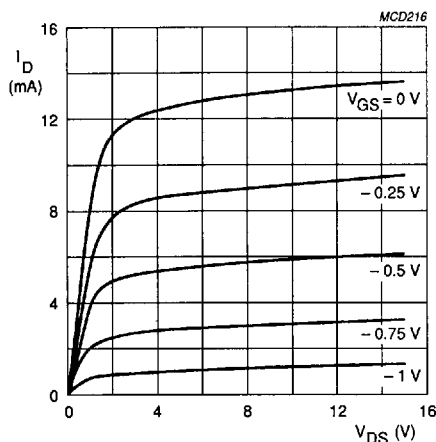
**PMBFJ308.** $T_j = 25^\circ\text{C}.$

Fig.6 Output characteristics, typical values.

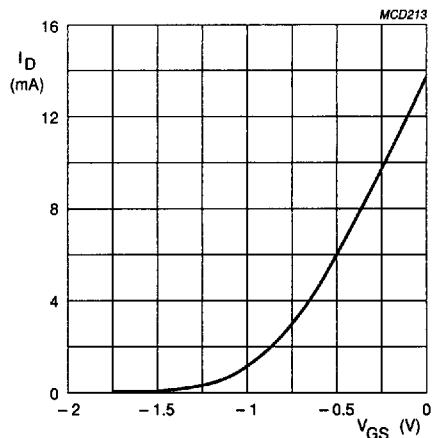
**PMBFJ308.** $V_{DS} = 10\text{ V}; T_j = 25^\circ\text{C}.$

Fig.7 Input characteristics, typical values.

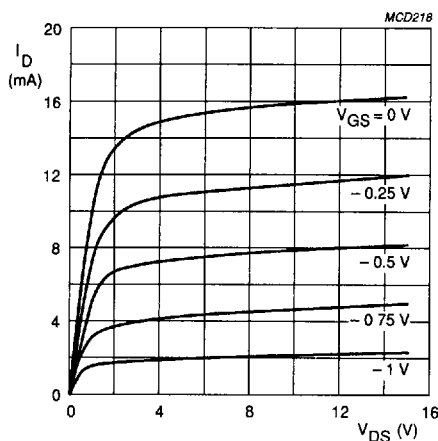
**PMBFJ309.** $T_j = 25^\circ\text{C}.$

Fig.8 Output characteristics, typical values.

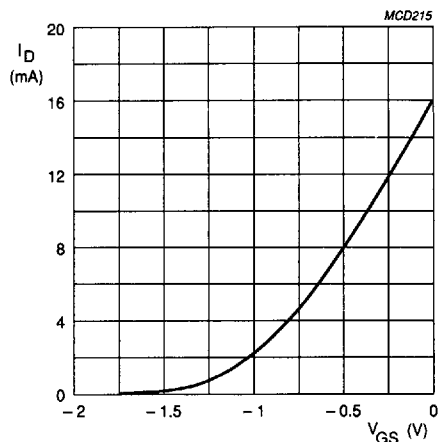
**PMBFJ309.** $V_{DS} = 10\text{ V}; T_j = 25^\circ\text{C}.$

Fig.9 Input characteristics, typical values.

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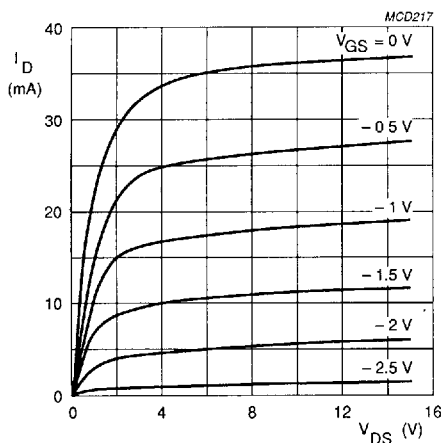
**PMBFJ310.** $T_J = 25\text{ }^{\circ}\text{C}.$

Fig.10 Output characteristics, typical values.

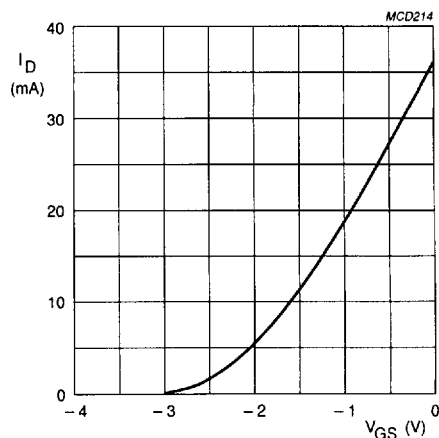
**PMBFJ310.** $V_{DS} = 10\text{ V}; T_J = 25\text{ }^{\circ}\text{C}.$

Fig.11 Input characteristics, typical values.

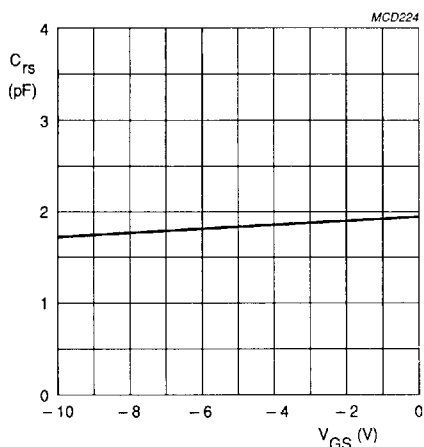
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}; T_J = 25\text{ }^{\circ}\text{C}.$

Fig.12 Feedback capacitance, typical values.

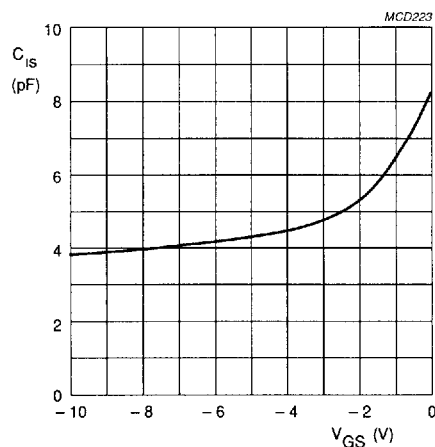
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}; T_J = 25\text{ }^{\circ}\text{C}.$

Fig.13 Input capacitance, typical values.

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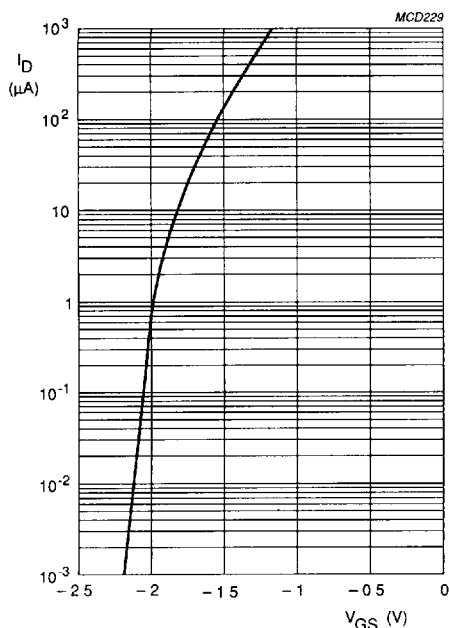
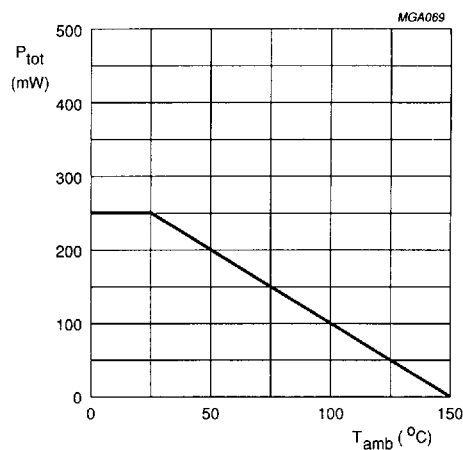
**PMBFJ308, 309 & 310.** $V_{DS} = 10 \text{ V}; T_J = 25^\circ\text{C}.$ Fig.14 Drain current as a function of
gate-source voltage, typical values.**PMBFJ308, 309 & 310.**

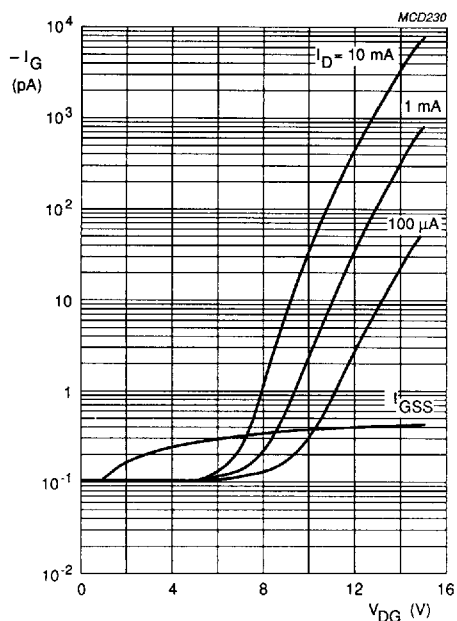
Fig.15 Power derating curve.

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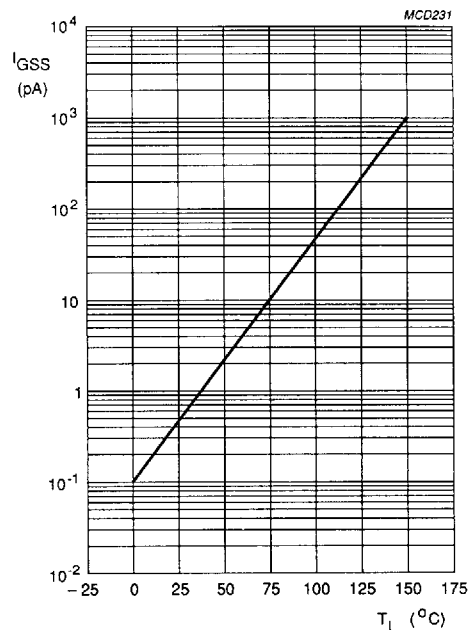
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 $T_J = 25^\circ\text{C}$.

Fig.16 Gate current as a function of drain-gate voltage, typical values.



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Fig.17 Gate current as a function of junction temperature, typical values.

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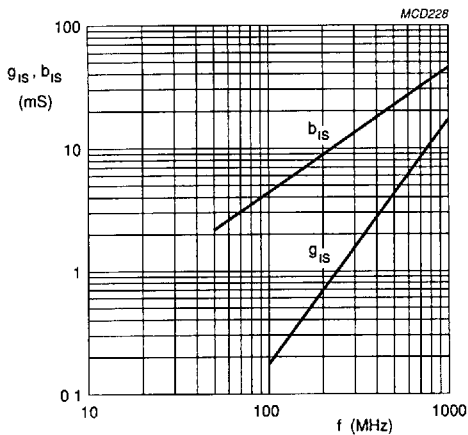
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}$; $I_D = 10\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.18 Input admittance, typical values.

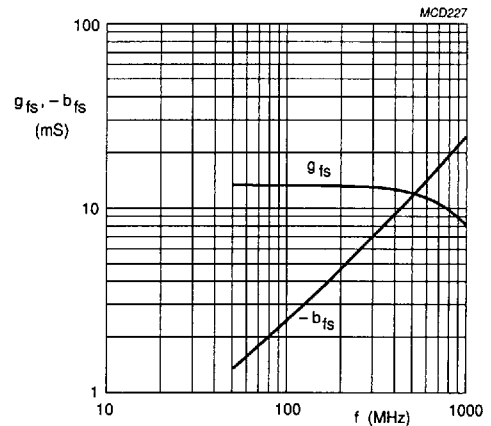
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}$; $I_D = 10\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.19 Forward admittance, typical values.

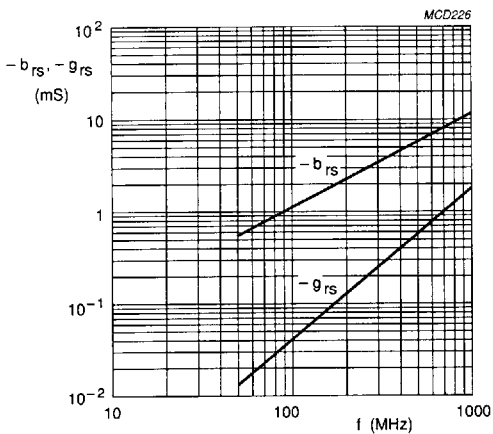
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}$; $I_D = 10\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.20 Reverse admittance, typical values.

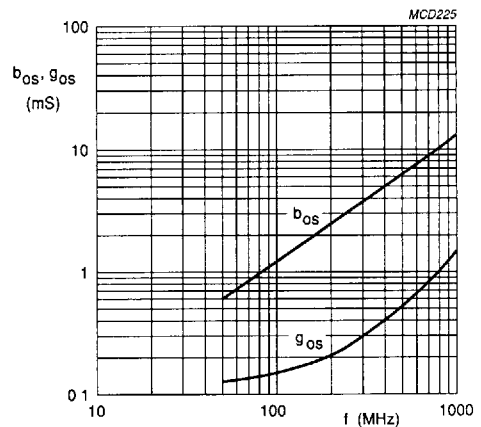
**PMBFJ308, 309 & 310.** $V_{DS} = 10\text{ V}$; $I_D = 10\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.21 Output admittance, typical values.