N-channel silicon field-effect transistors

PMBFJ308; PMBFJ309; PMBFJ310

FEATURES

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

APPLICATIONS

- AM input stage in car radios
- VHF amplifiers
- Oscillators and mixers.

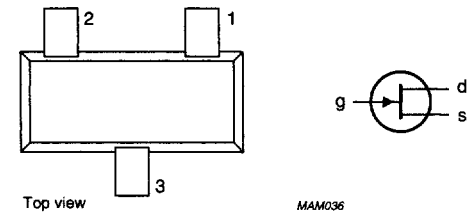
DESCRIPTION

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

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

PINNING - SOT23

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



Marking codes:
PMBFJ308: M08.
PMBFJ309: M09.
PMBFJ310: M10.

Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	±25	V
V_{GSoff}	gate-source cut-off voltage	V_{DS} = 10 V; I_D = 1 μA			
	PMBFJ308		–1	–6.5	V
	PMBFJ309		–1	–4	V
	PMBFJ310		–2	–6.5	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 10 V			
	PMBFJ308		12	60	mA
	PMBFJ309		12	30	mA
	PMBFJ310		24	60	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	250	mW
$\lvert y_{fs} \rvert$	forward transfer admittance	V_{DS} = 10 V; I_D = 10 mA	10	–	mS

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	±25	V
V_{GSO}	gate-source voltage	open drain	–	–25	V
V_{GDO}	gate-drain voltage	open source	–	–25	V
I_G	forward gate current (DC)		–	50	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	250	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

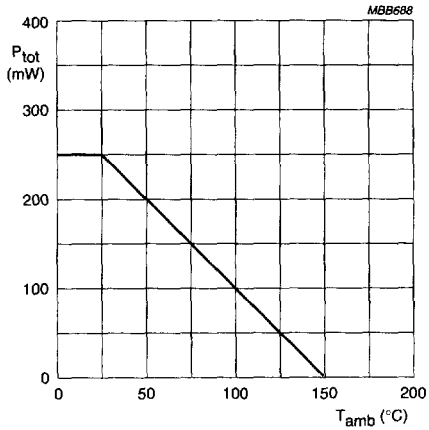


Fig.2 Power derating curve.

THERMAL CHARACTERISTICS

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

Note

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

STATIC CHARACTERISTICS

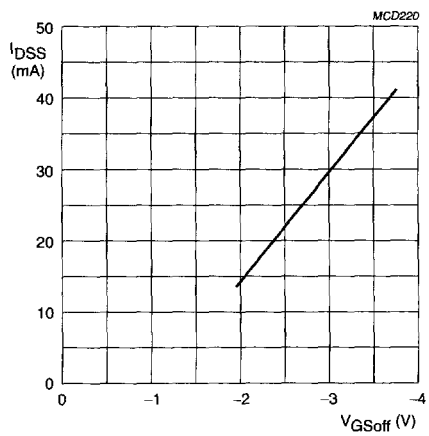
T_j = 25 °C; unless otherwise specified.

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

DYNAMIC CHARACTERISTICS

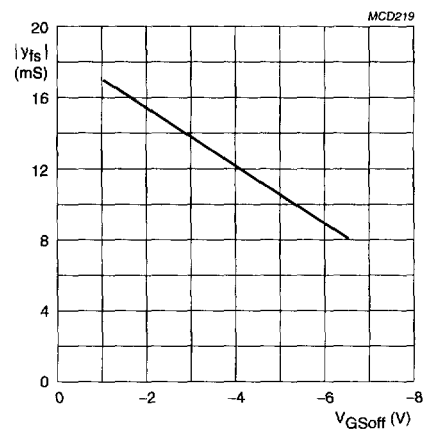
T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_{is}	input capacitance	V_{DS} = 10 V; V_{GS} = −10 V; f = 1 MHz	3	5	pF
		V_{DS} = 10 V; V_{GS} = 0; T_{amb} = 25 °C	6	–	pF
C_{rs}	reverse transfer capacitance	V_{DS} = 0; V_{GS} = −10 V; f = 1 MHz	1.3	2.5	pF
g_{is}	common source input conductance	V_{DS} = 10 V; I_D = 10 mA; f = 100 MHz	200	–	µS
		V_{DS} = 10 V; I_D = 10 mA; f = 450 MHz	3	–	mS
g_{fs}	common source transfer conductance	V_{DS} = 10 V; I_D = 10 mA; f = 100 MHz	13	–	mS
		V_{DS} = 10 V; I_D = 10 mA; f = 450 MHz	12	–	mS
g_{rs}	common source reverse conductance	V_{DS} = 10 V; I_D = 10 mA; f = 100 MHz	−30	–	µS
		V_{DS} = 10 V; I_D = 10 mA; f = 450 MHz	−450	–	µS
g_{os}	common source output conductance	V_{DS} = 10 V; I_D = 10 mA; f = 100 MHz	150	–	µS
		V_{DS} = 10 V; I_D = 10 mA; f = 450 MHz	400	–	µS
V_n	equivalent input noise voltage	V_{DS} = 10 V; I_D = 10 mA; f = 100 Hz	6	–	nV/√Hz



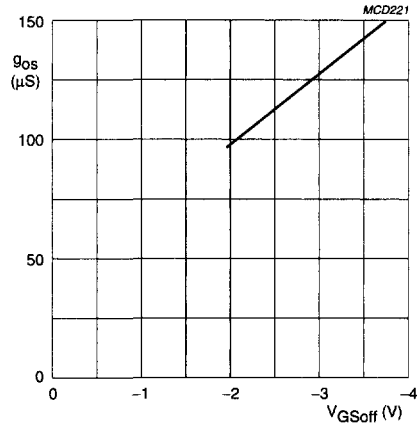
V_{DS} = 10 V; T_j = 25 °C.

Fig.3 Drain current as a function of gate-source cut-off voltage; typical values.



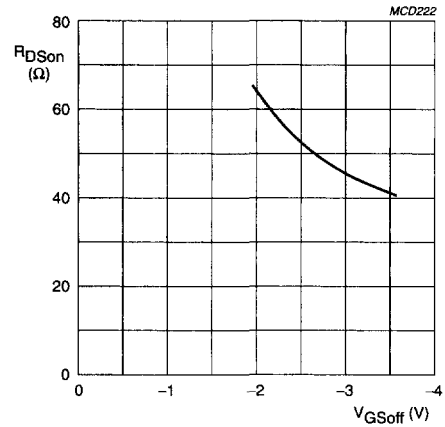
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

Fig.4 Forward transfer admittance as a function of gate-source cut-off voltage; typical values.



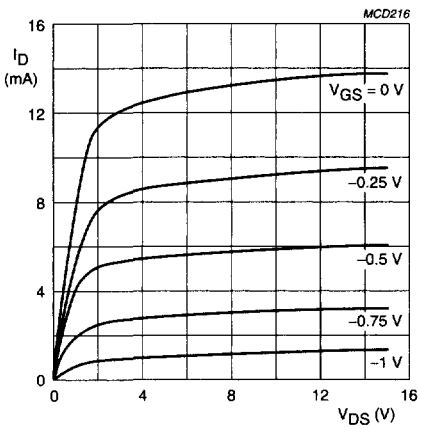
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

Fig.5 Common-source output conductance as a function of gate-source cut-off voltage; typical values.



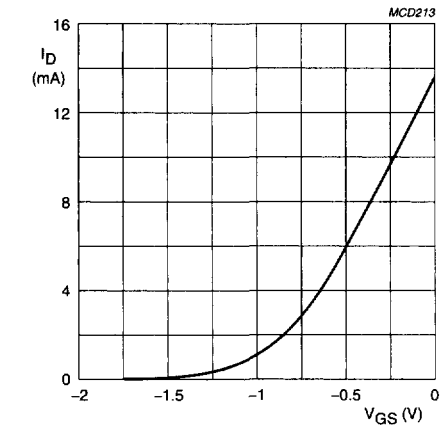
V_{DS} = 100 mV; V_{GS} = 0; T_j = 25 °C.

Fig.6 Drain-source on-state resistance as a function of gate-source cut-off voltage; typical values.



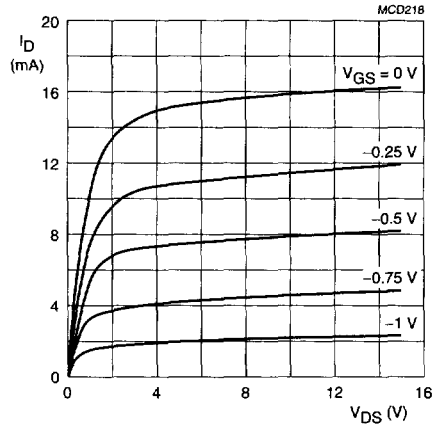
T_j = 25 °C.

Fig.7 Typical output characteristics; PMBFJ308.



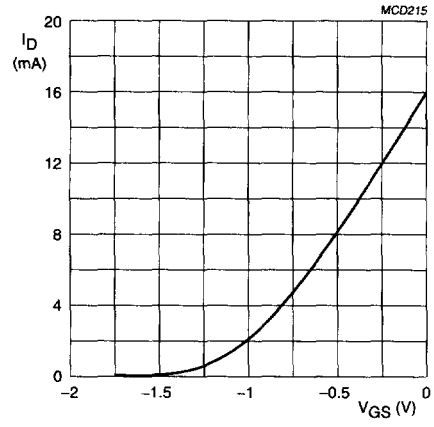
V_{DS} = 10 V; T_j = 25 °C.

Fig.8 Typical transfer characteristics; PMBFJ308.



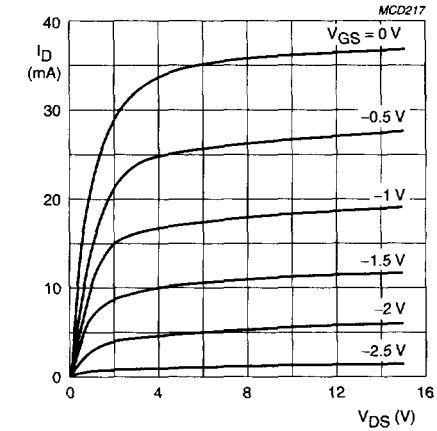
T_j = 25 °C.

Fig.9 Typical output characteristics; PMBFJ309.



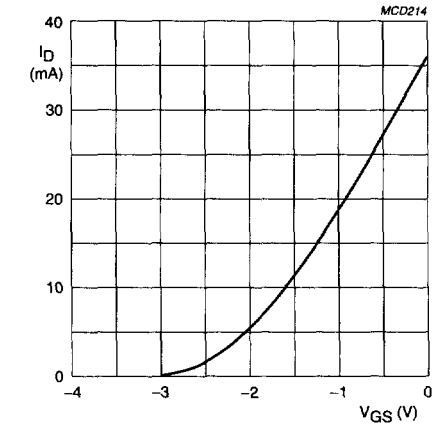
V_{DS} = 10 V; T_j = 25 °C.

Fig.10 Typical transfer characteristics; PMBFJ309.



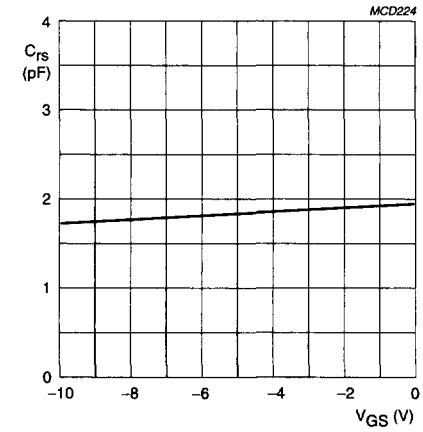
T_j = 25 °C.

Fig.11 Typical output characteristics; PMBFJ310.



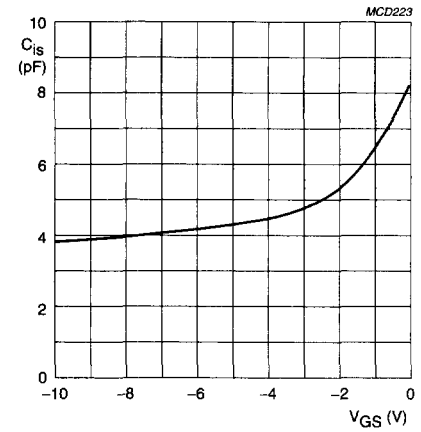
V_{DS} = 10 V; T_j = 25 °C.

Fig.12 Typical transfer characteristics; PMBFJ310.



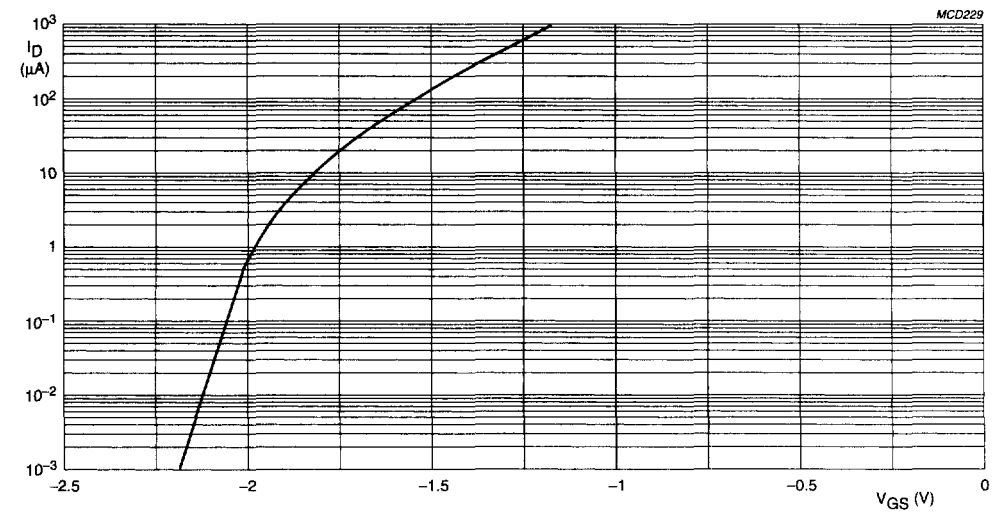
V_{DS} = 10 V; T_j = 25 °C.

Fig.13 Reverse transfer capacitance as a function of gate-source voltage; typical values.



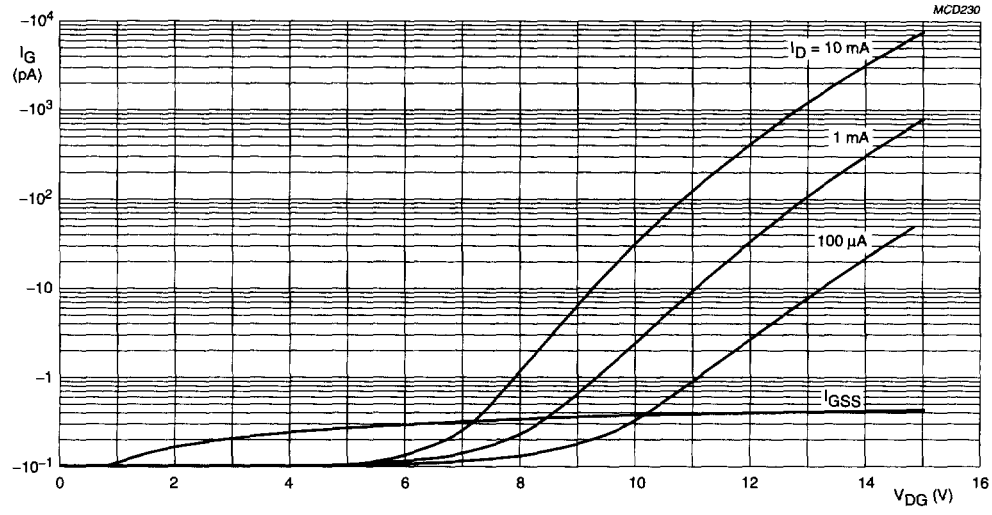
V_{DS} = 10 V; T_j = 25 °C.

Fig.14 Input capacitance as a function of gate-source voltage; typical values.



V_{DS} = 10 V; T_j = 25 °C.

Fig.15 Drain current as a function of gate-source voltage; typical values.



T_j = 25 °C.

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

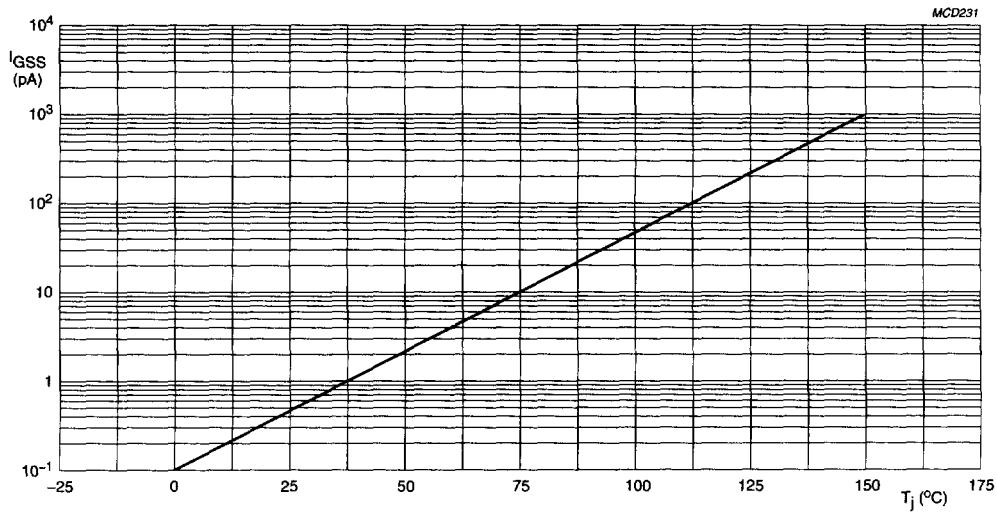
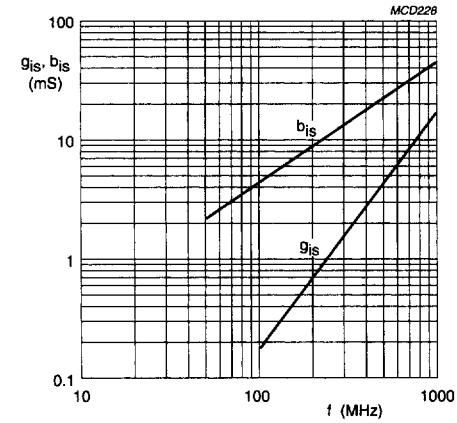
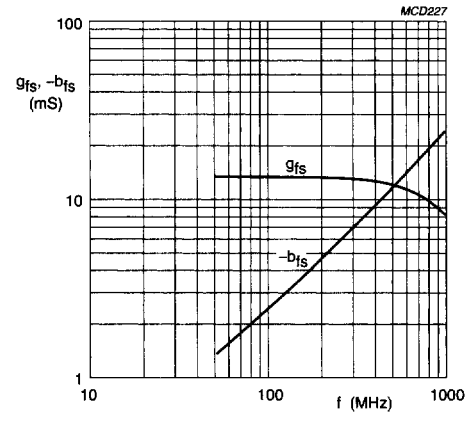


Fig.17 Gate current as a function of junction temperature; typical values.



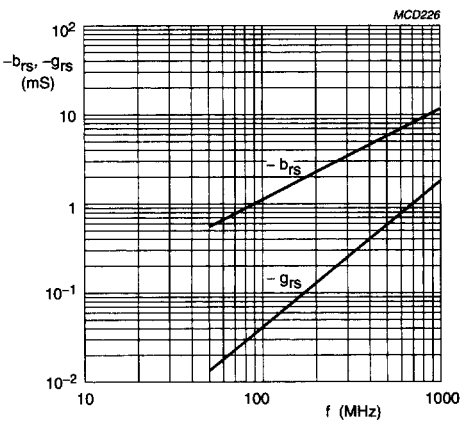
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig.18 Input admittance; typical values.



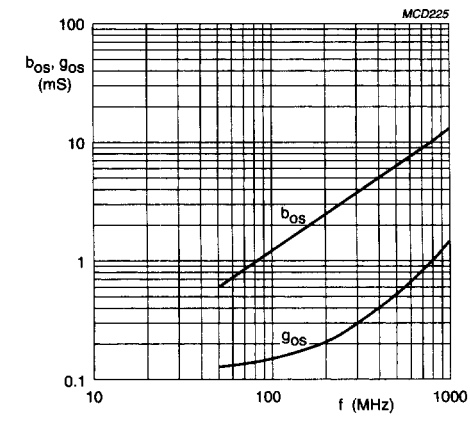
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig.19 Forward transfer admittance; typical values.



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

Fig.20 Reverse transfer admittance; typical values.



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

Fig.21 Output admittance; typical values.