DATA SHEET

PMBFJ308; PMBFJ309; PMBFJ310
N-channel silicon field-effect transistors

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

1996 Sep 11

Philips Semiconductors

PHILIPS

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.

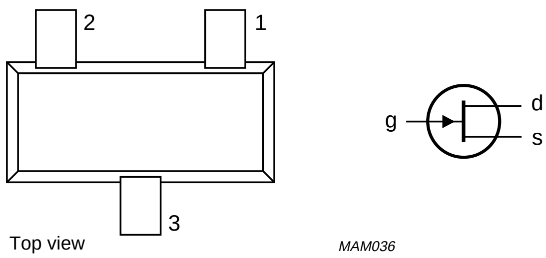
DESCRIPTION

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

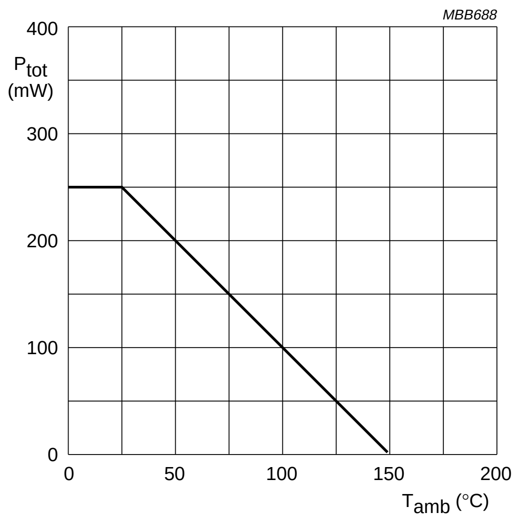


Fig.2 Power derating curve.

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

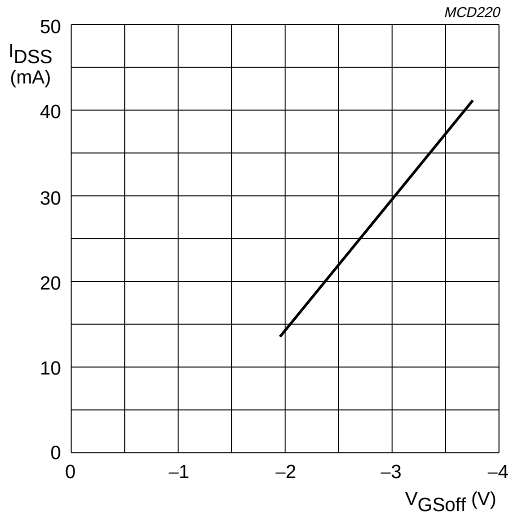
T_j = 25 °C; unless otherwise specified.

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

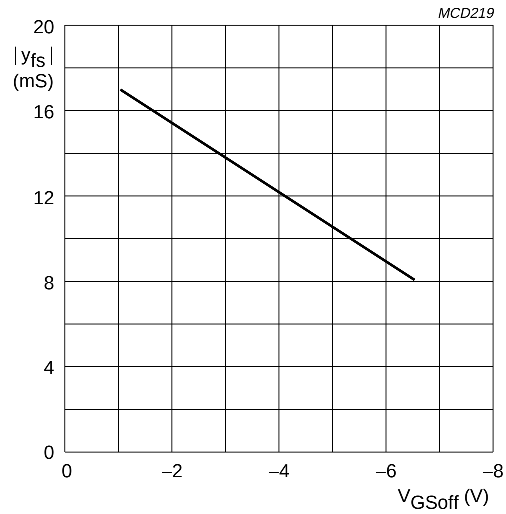
T_j = 25 °C; unless otherwise specified.

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



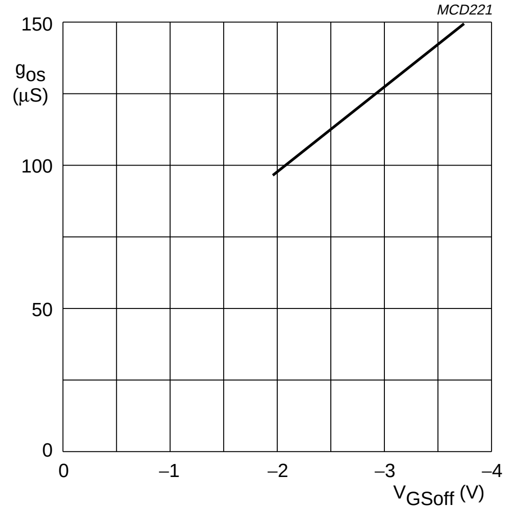
V_{DS} = 10 V; T_j = 25 °C.

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



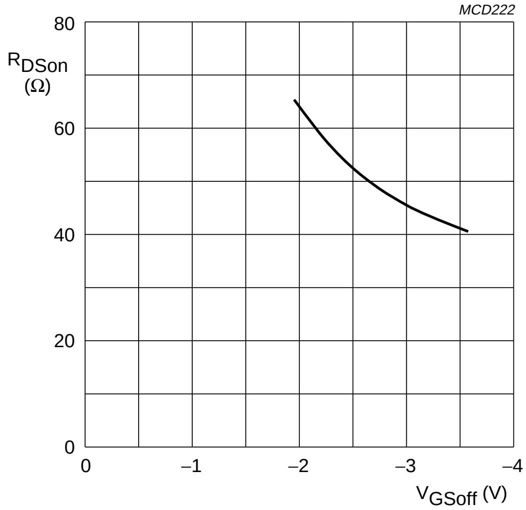
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

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



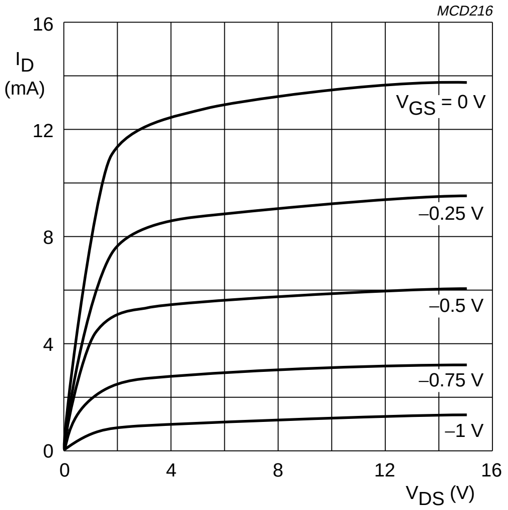
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

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



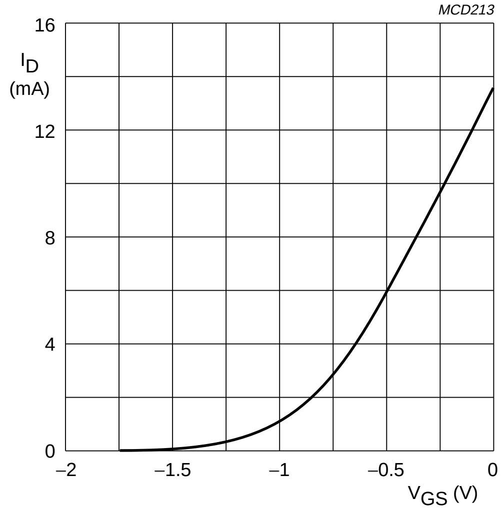
V_{DS} = 100 mV; V_{GS} = 0; T_j = 25 °C.

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



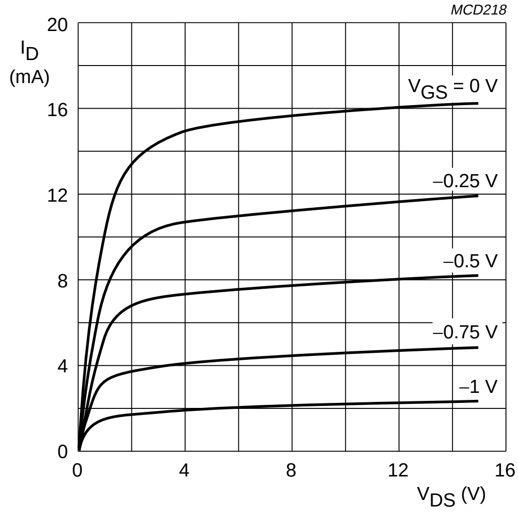
T_j = 25 °C.

Fig.7 Typical output characteristics; PMBFJ308.



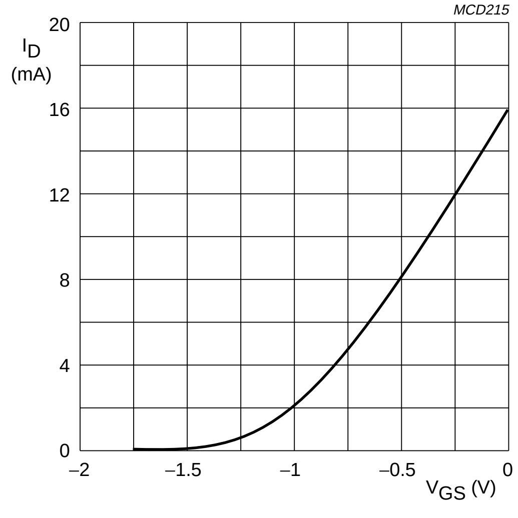
V_{DS} = 10 V; T_j = 25 °C.

Fig.8 Typical transfer characteristics; PMBFJ308.



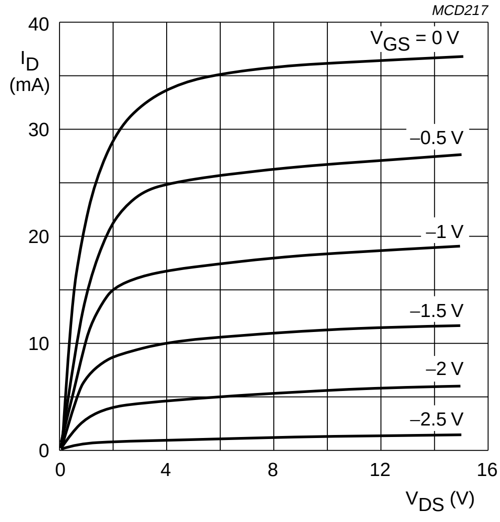
T_j = 25 °C.

Fig.9 Typical output characteristics; PMBFJ309.



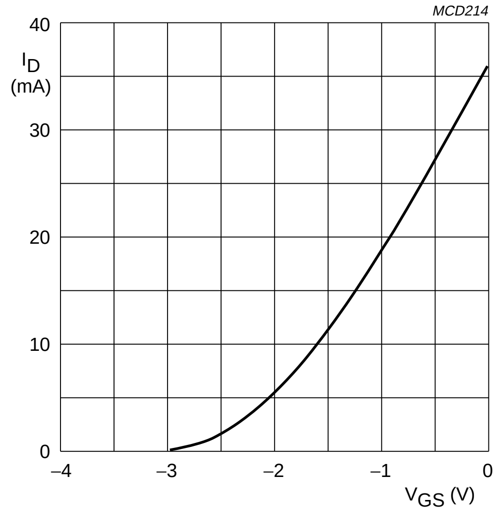
V_{DS} = 10 V; T_j = 25 °C.

Fig.10 Typical transfer characteristics; PMBFJ309.



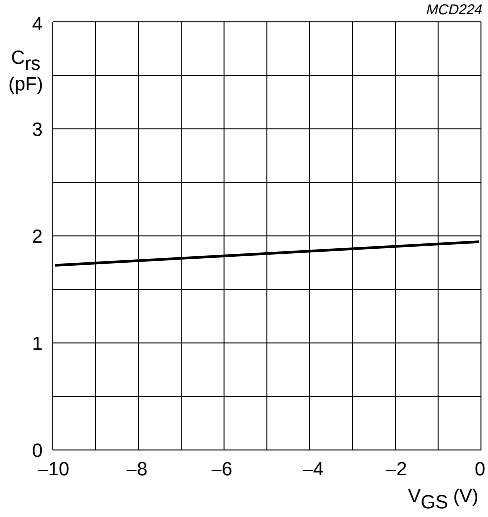
T_j = 25 °C.

Fig.11 Typical output characteristics; PMBFJ310.



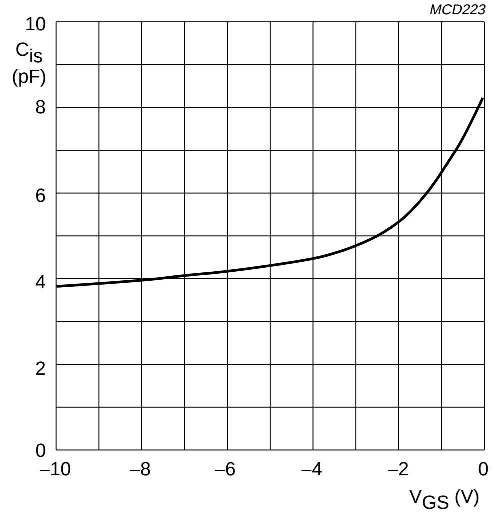
V_{DS} = 10 V; T_j = 25 °C.

Fig.12 Typical transfer characteristics; PMBFJ310.



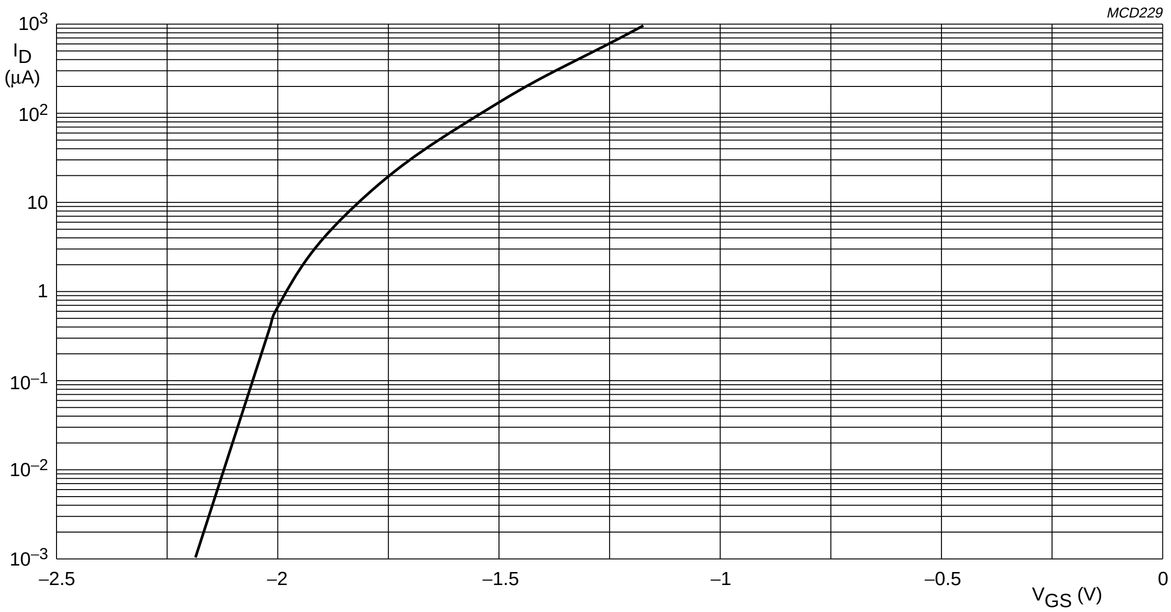
V_{DS} = 10 V; T_j = 25 °C.

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



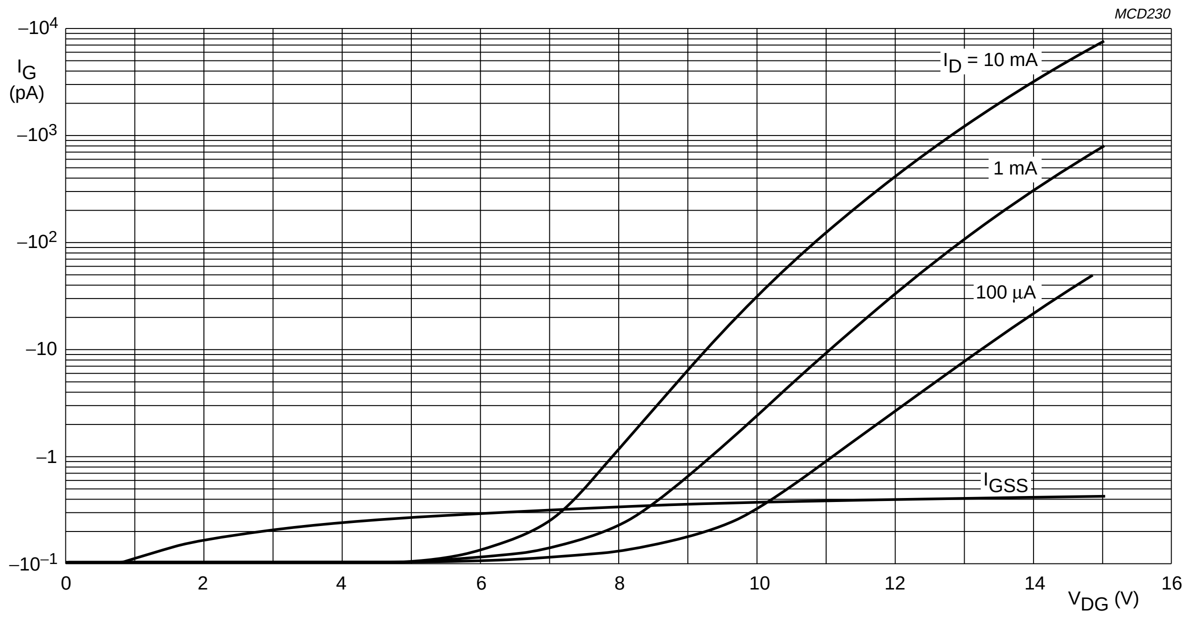
V_{DS} = 10 V; T_j = 25 °C.

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.

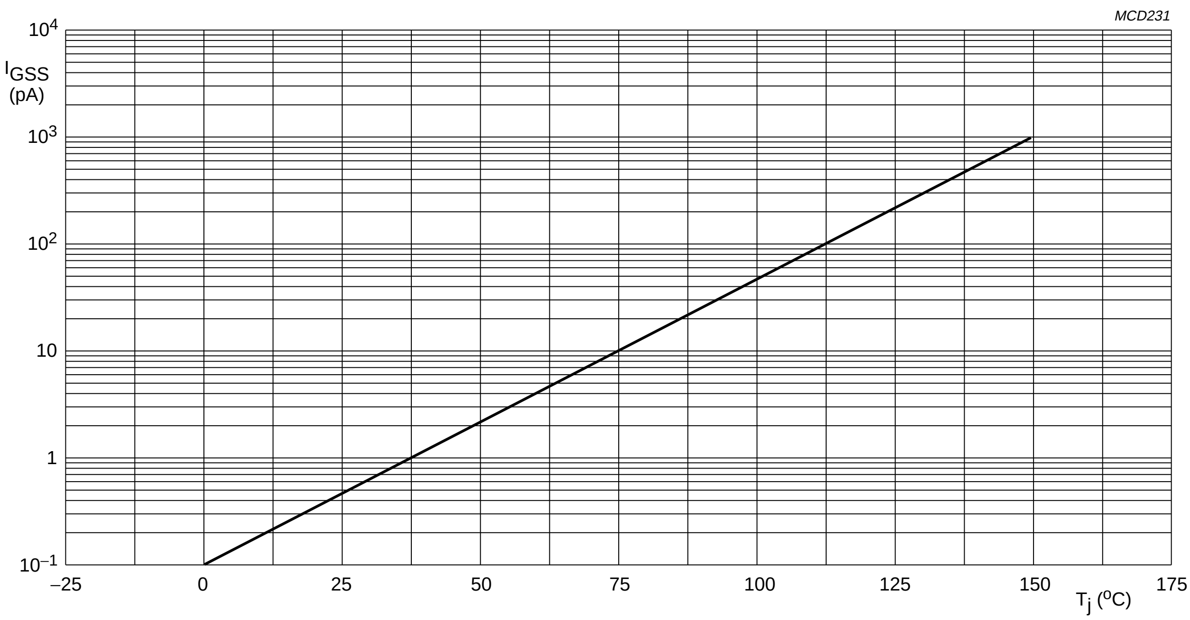
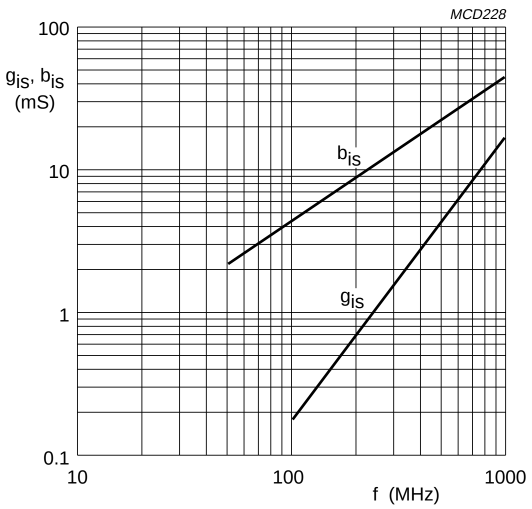
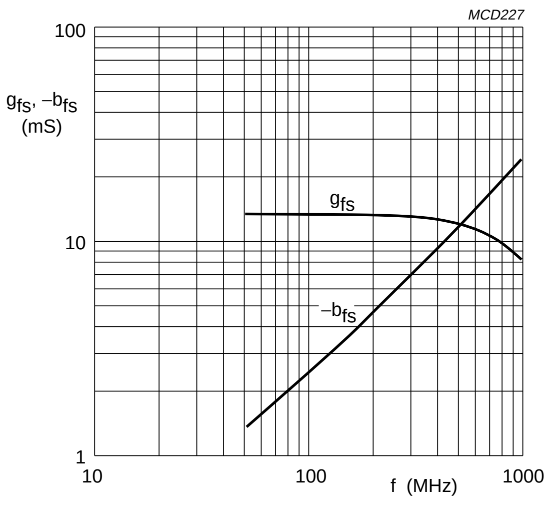


Fig.17 Gate current as a function of junction temperature; typical values.



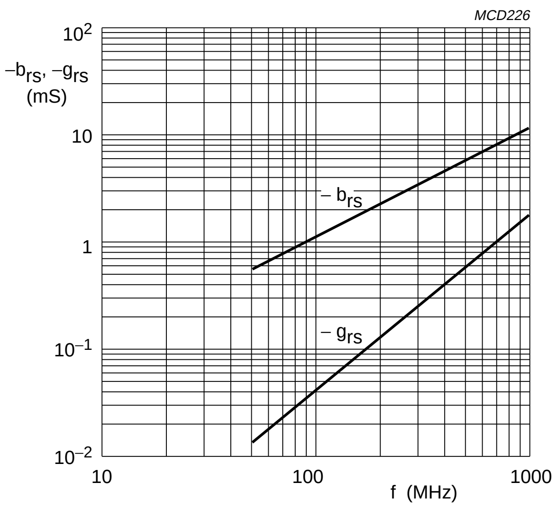
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig.18 Input admittance; typical values.



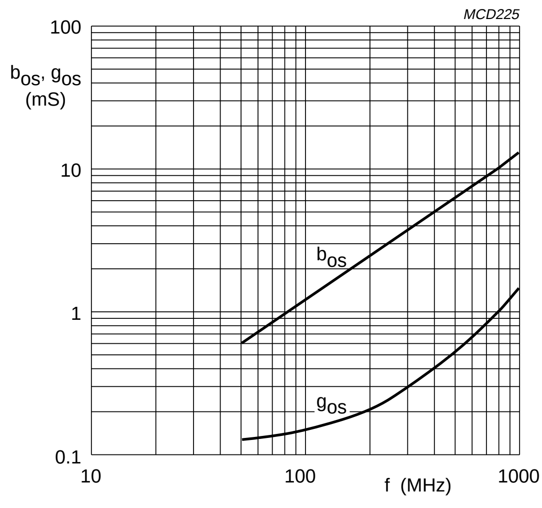
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig.19 Forward transfer admittance; typical values.



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

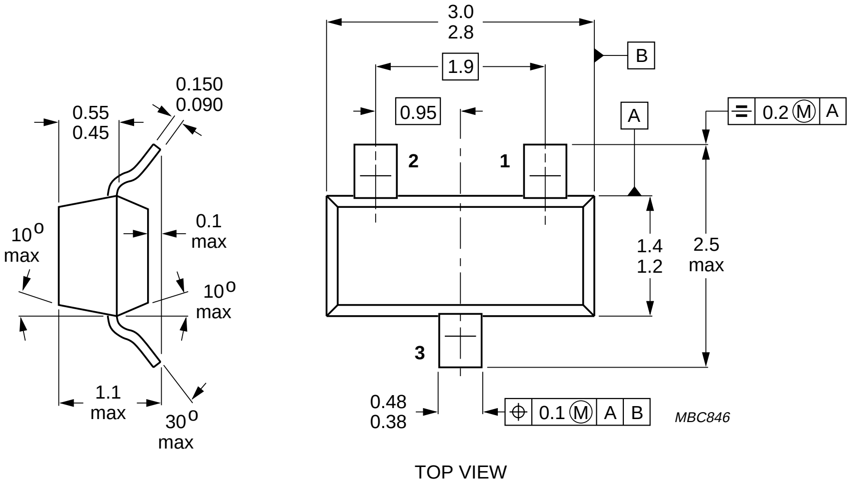
Fig.20 Reverse transfer admittance; typical values.



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

Fig.21 Output admittance; typical values.

PACKAGE OUTLINE



Dimensions in mm.

Fig.22 SOT 23.

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.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.