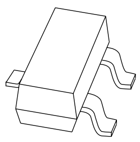


PMBFJ308; PMBFJ309; PMBFJ310

N-channel silicon field-effect transistors

Rev. 03 — 23 July 2004 Product data sheet

1. Product profile

1.1 General description

Symmetrical N-channel 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.

1.2 Features

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

1.3 Applications

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

1.4 Quick reference data

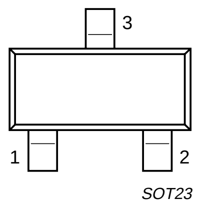
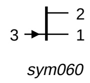
Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage		-	-	±25	V
V_{GSoff}	gate-source cut-off voltage					
	PMBFJ308	V_{DS} = 10 V; I_D = 1 μA	–1	-	–6.5	V
	PMBFJ309	V_{DS} = 10 V; I_D = 1 μA	–1	-	–4	V
	PMBFJ310	V_{DS} = 10 V; I_D = 1 μA	–2	-	–6.5	V
I_{DSS}	drain current					
	PMBFJ308	V_{GS} = 0 V; V_{DS} = 10 V	12	-	60	mA
	PMBFJ309	V_{GS} = 0 V; V_{DS} = 10 V	12	-	30	mA
	PMBFJ310	V_{GS} = 0 V; V_{DS} = 10 V	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

PHILIPS

2. Pinning information

Table 2: Discrete pinning [1]

Pin	Description	Simplified outline	Symbol
1	source		
2	drain		
3	gate		

[1] Drain and source are interchangeable.

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
PMBFJ308	-	plastic surface mounted package; 3 leads	SOT23
PMBFJ309			
PMBFJ310			

4. Marking

Table 4: Marking

Type number	Marking code [1]
PMBFJ308	48*
PMBFJ309	49*
PMBFJ310	50*

[1] * = p: Made in Hong Kong.
* = t: Made in Malaysia.
* = W: Made in China.

5. Limiting values

Table 5: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage (DC)		-	±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

Table 5: Limiting values *…continued*
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	-	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		-	150	°C

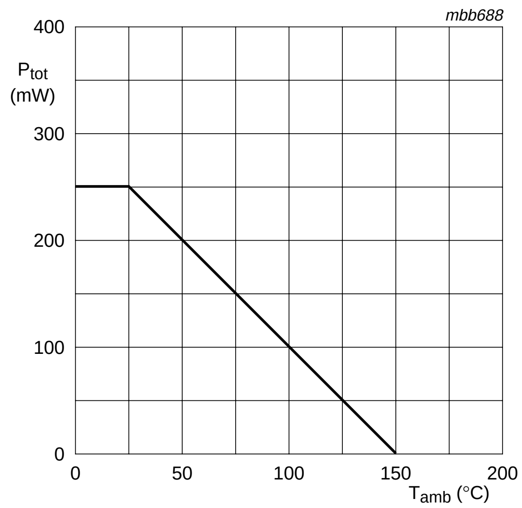


Fig 1. Power derating curve.

6. Thermal characteristics

Table 6: Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	[1]	500	K/W

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

7. Static characteristics

Table 7: 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 V	–25	-	-	V
V_{GSoff}	gate-source cut-off voltage					V
	PMBFJ308	I_D = 1 µA; V_{DS} = 10 V	–1	-	–6.5	V
	PMBFJ309	I_D = 1 µA; V_{DS} = 10 V	–1	-	–4	V
	PMBFJ310	I_D = 1 µA; V_{DS} = 10 V	–2	-	–6.5	V
V_{GSS}	gate-source forward voltage	I_G = 1 mA; V_{DS} = 0 V	-	-	1	V

Table 7: Static characteristics *...continued*

T_j = 25 °C; unless otherwise specified.

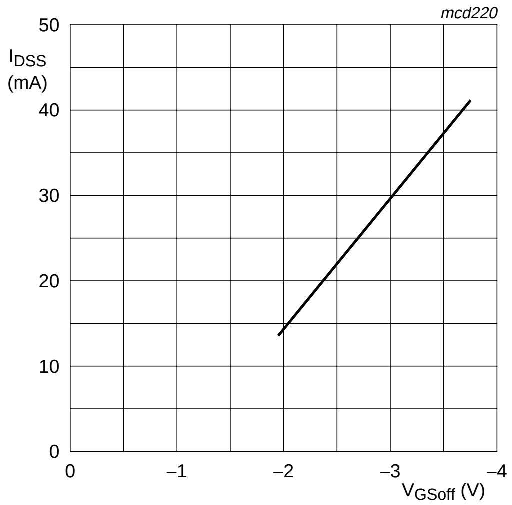
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{DSS}	drain-source leakage current					
	PMBFJ308	V_{GS} = 0 V; V_{DS} = 10 V	12	-	60	mA
	PMBFJ309	V_{GS} = 0 V; V_{DS} = 10 V	12	-	30	mA
	PMBFJ310	V_{GS} = 0 V; V_{DS} = 10 V	24	-	60	mA
I_{GSS}	gate-source leakage current	V_{GS} = –15 V; V_{DS} = 0 V	-	-	–1	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = 0 V; V_{DS} = 100 mV	-	50	-	Ω
$\|y_{fs}\|$	forward transfer admittance	I_D = 10 mA; V_{DS} = 10 V	10	-	-	mS
$\|y_{os}\|$	common source output admittance	I_D = 10 mA; V_{DS} = 10 V	-	-	250	µS

8. Dynamic characteristics

Table 8: Dynamic characteristics

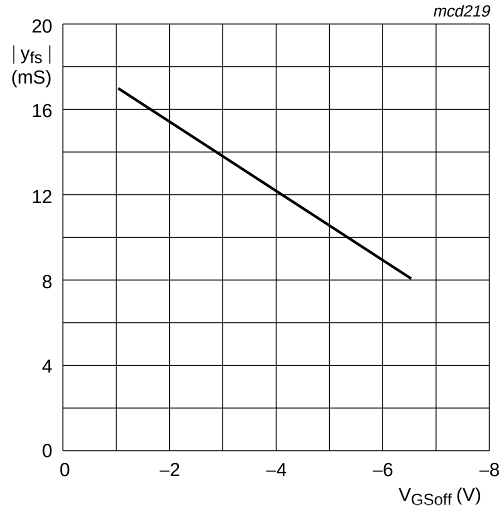
T_j = 25 °C; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{iss}	input capacitance	V_{DS} = 10 V				
		V_{GS} = –10 V; f = 1 MHz	-	3	5	pF
		V_{GS} = 0 V; T_{amb} = 25 °C	-	6	-	pF
C_{rss}	reverse transfer capacitance	V_{DS} = 0 V; V_{GS} = –10 V; f = 1 MHz	-	1.3	2.5	pF
g_{is}	input conductance	V_{DS} = 10 V; I_D = 10 mA				
		f = 100 MHz	-	200	-	µS
		f = 450 MHz	-	3	-	mS
g_{fs}	transfer conductance	V_{DS} = 10 V; I_D = 10 mA				
		f = 100 MHz	-	13	-	mS
		f = 450 MHz	-	12	-	mS
g_{rs}	reverse conductance	V_{DS} = 10 V; I_D = 10 mA				
		f = 100 MHz	-	–30	-	µS
		f = 450 MHz	-	–450	-	µS
g_{os}	output conductance	V_{DS} = 10 V; I_D = 10 mA				
		f = 100 MHz	-	150	-	µS
		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



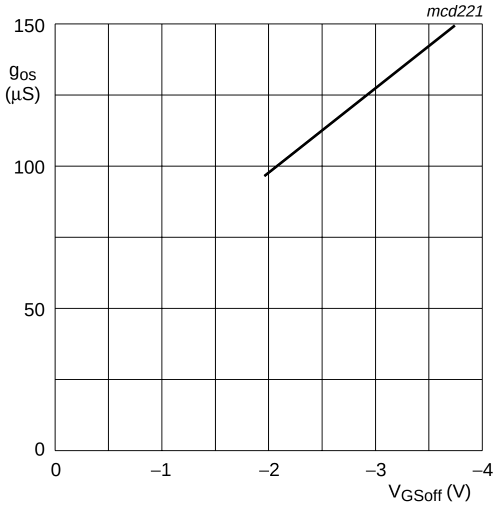
V_{DS} = 10 V; T_j = 25 °C.

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



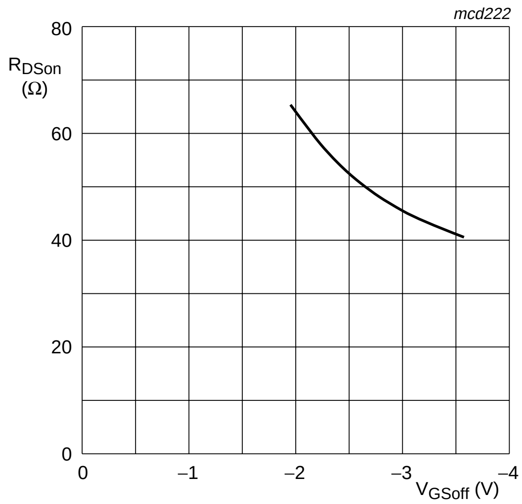
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

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



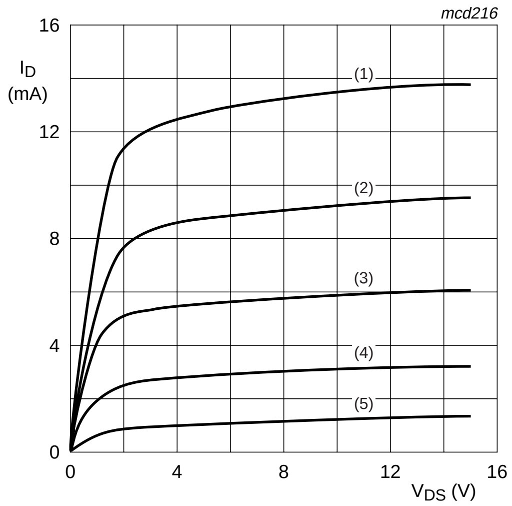
V_{DS} = 10 V; I_D = 10 mA; T_j = 25 °C.

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



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

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



T_j = 25 °C.

(1) V_{GS} = 0 V.

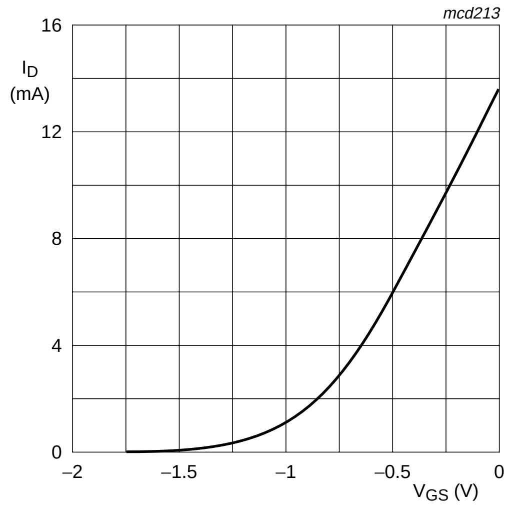
(2) V_{GS} = −0.25 V.

(3) V_{GS} = −0.5 V.

(4) V_{GS} = −0.75 V.

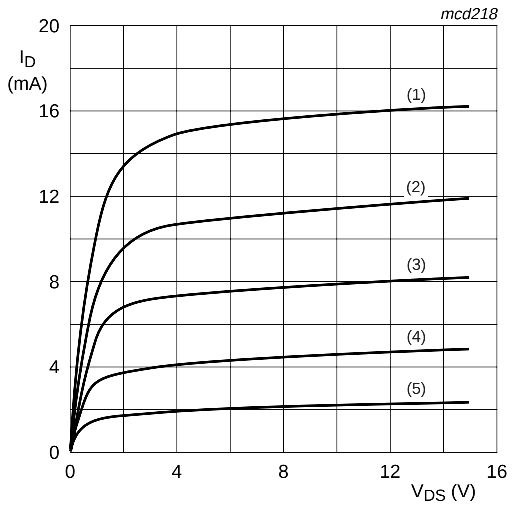
(5) V_{GS} = −1 V.

Fig 6. Typical output characteristics; PMBFJ308.



V_{DS} = 10 V; T_j = 25 °C.

Fig 7. Typical transfer characteristics; PMBFJ308.



T_j = 25 °C.

(1) V_{GS} = 0 V.

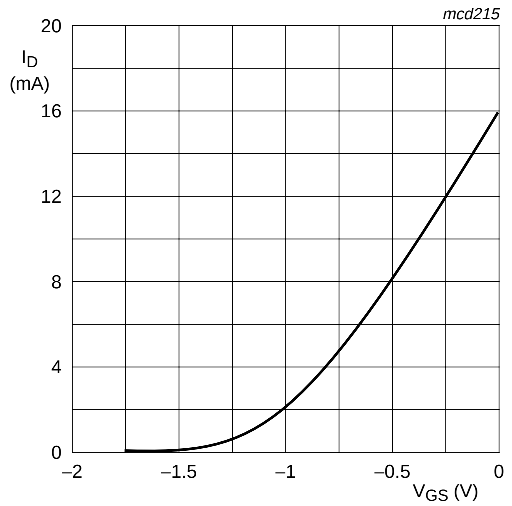
(2) V_{GS} = −0.25 V.

(3) V_{GS} = −0.5 V.

(4) V_{GS} = −0.75 V.

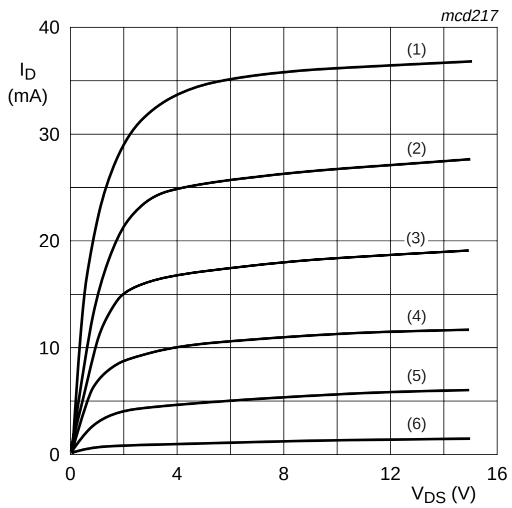
(5) V_{GS} = −1 V.

Fig 8. Typical output characteristics; PMBFJ309.



V_{DS} = 10 V; T_j = 25 °C.

Fig 9. Typical transfer characteristics; PMBFJ309.



T_j = 25 °C.

(1) V_{GS} = 0 V.

(2) V_{GS} = −0.5 V.

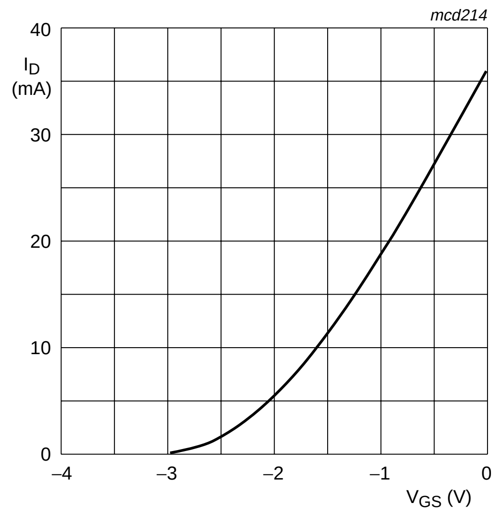
(3) V_{GS} = −1 V.

(4) V_{GS} = −1.5 V.

(5) V_{GS} = −2 V.

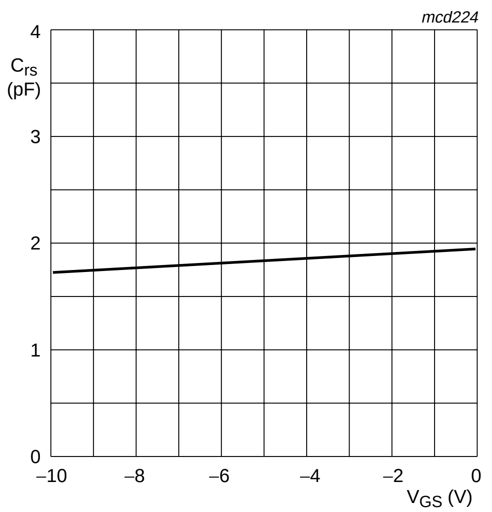
(6) V_{GS} = −2.5 V.

Fig 10. Typical output characteristics; PMBFJ310.



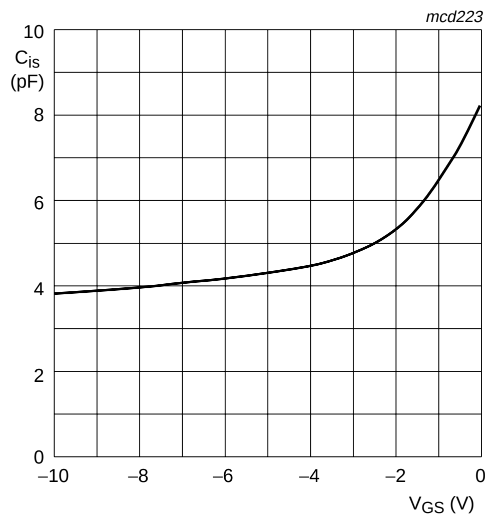
V_{DS} = 10 V; T_j = 25 °C.

Fig 11. Typical transfer characteristics; PMBFJ310.



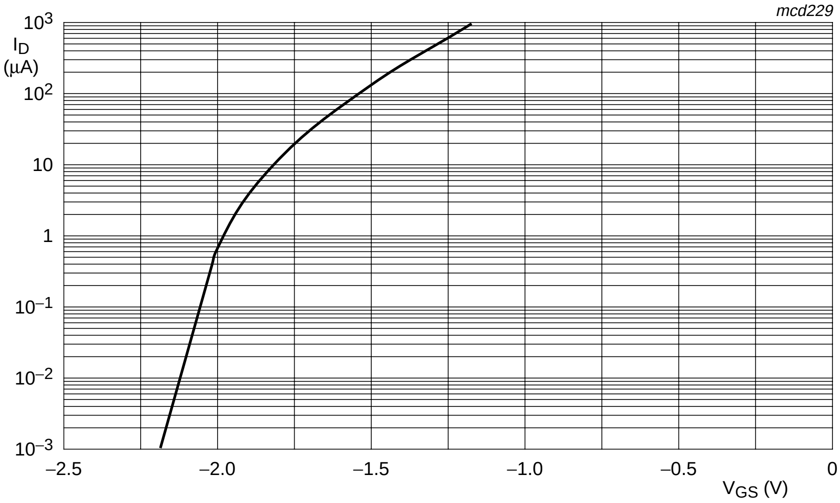
V_{DS} = 10 V; T_j = 25 °C.

Fig 12. Reverse transfer capacitance as a function of gate-source voltage; typical values.



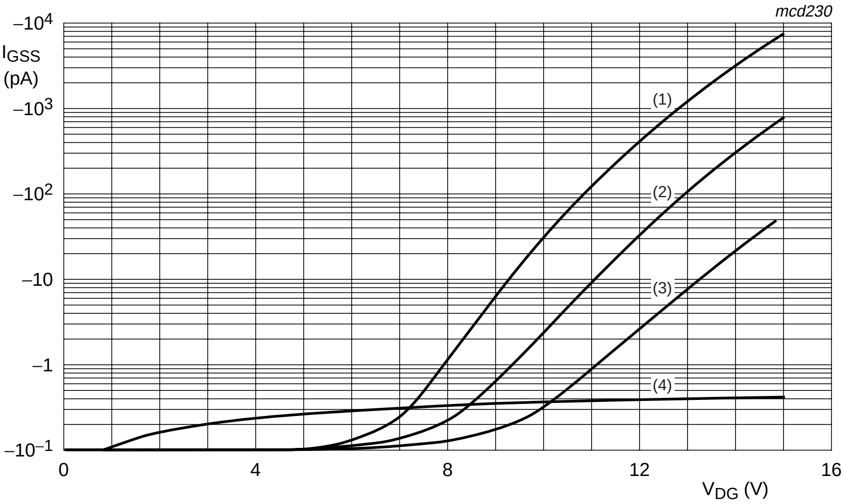
V_{DS} = 10 V; T_j = 25 °C.

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



V_{DS} = 10 V; T_j = 25 °C.

Fig 14. Drain current as a function of gate-source voltage; typical values.



T_j = 25 °C.

(1) I_D = 10 mA.

(2) I_D = 1 mA.

(3) I_D = 100 μA.

(4) I_{GSS}.

Fig 15. Gate current as a function of drain-gate voltage; typical values.

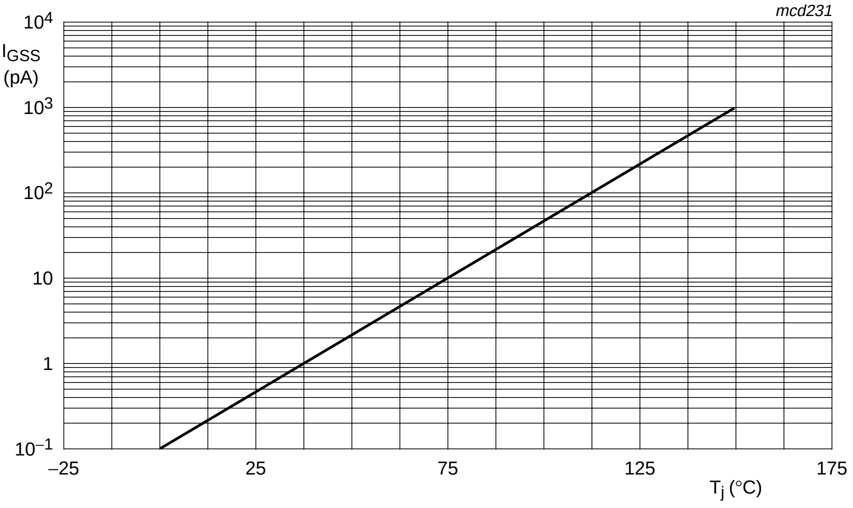
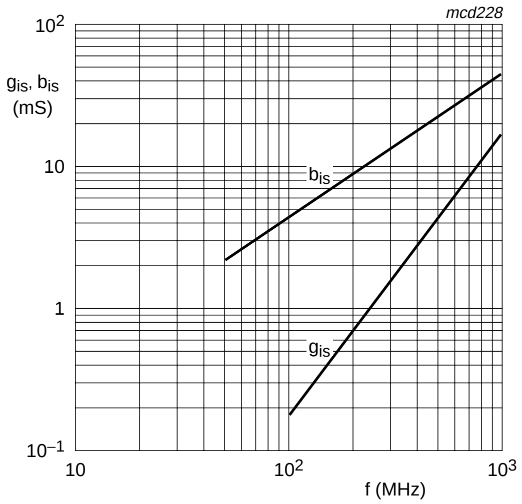
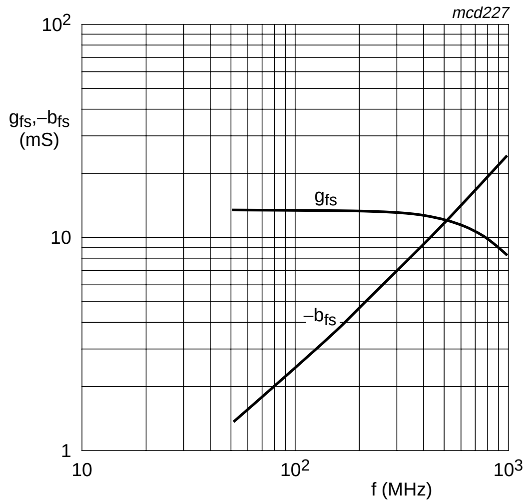


Fig 16. Gate current as a function of junction temperature; typical values.



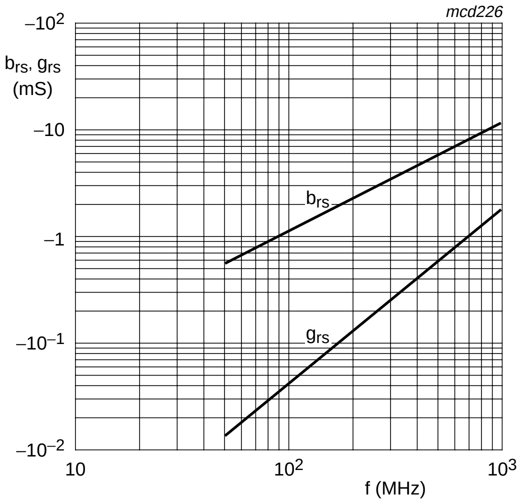
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig 17. Input admittance; typical values.



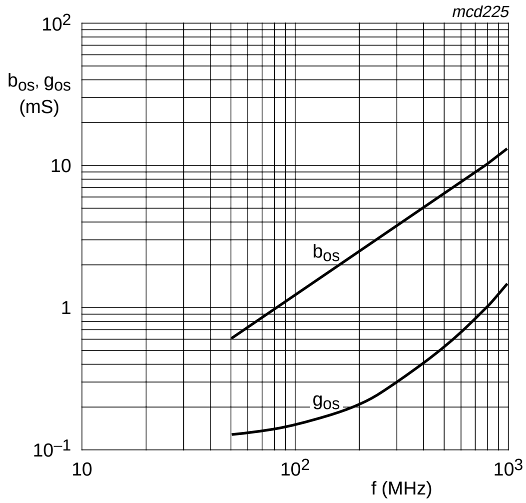
V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig 18. Forward transfer admittance; typical values.



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

Fig 19. Reverse transfer admittance; typical values.

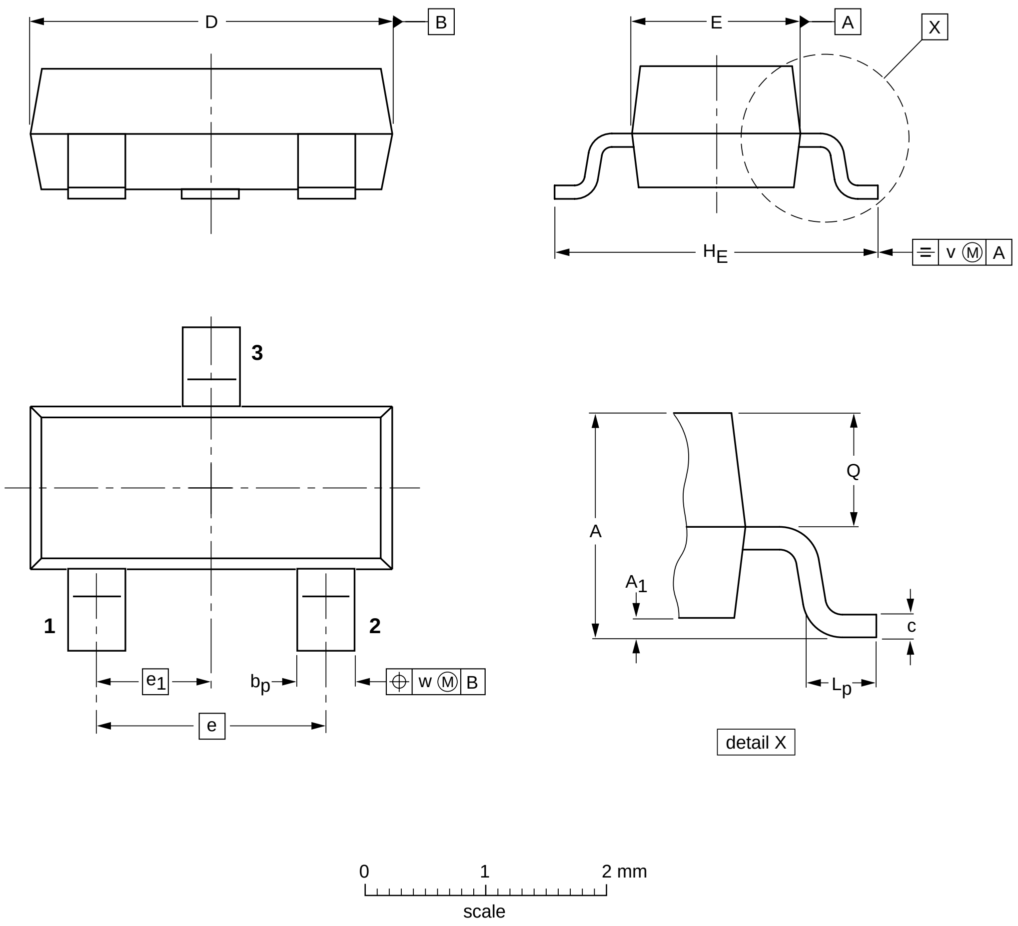


V_{DS} = 10 V; I_D = 10 mA; T_{amb} = 25 °C.

Fig 20. Output admittance; typical values.

9. Package outline

Plastic surface mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				~~97-02-28~~ 99-09-13

Fig 21. Package outline.

10. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
PMBFJ308_309_310_3	20040723	Product data sheet	-	9397 750 13403	PMBFJ308_309_310_2
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors. • Table 4 "Marking": added new marking codes.				
PMBFJ308_309_310_2	19960911	Product specification	-	9397 750 01141	-

11. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

12. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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 — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

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14. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**

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