

DATA SHEET

PMBFJ210; PMBFJ211; PMBFJ212 N-channel field-effect transistors

Product specification
File under Discrete Semiconductors, SC07

1997 Dec 01

N-channel field-effect transistors

PMBFJ210; PMBFJ211; PMBFJ212

FEATURES

- High speed switching
- Interchangeability of drain and source connections
- High impedance.

APPLICATIONS

- Analog switches
- Choppers, multiplexers and commutators
- Audio amplifiers.

DESCRIPTION

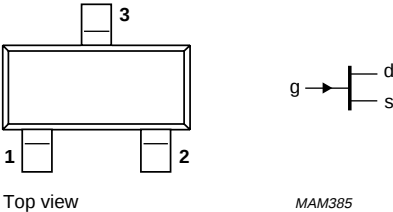
N-channel symmetrical junction field-effect transistor in a SOT23 package.

CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

PINNING - SOT23

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



Top view

MAM385

Marking codes:
PMBFJ210: M68.
PMBFJ211: M69.
PMBFJ212: M70.

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	$I_D = 1\text{ nA}; V_{DS} = 15\text{ V}$	–1 –2.5 –4	–3 –4.5 –6	V V V
I_{DSS}	drain current	$V_{GS} = 0; V_{DS} = 15\text{ V}$	2 7 15	15 20 40	mA mA mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	250	mW
$ y_{fs} $	common-source transfer admittance	$V_{GS} = 0; V_{DS} = 15\text{ V}$	4 6 7	12 12 12	mS mS mS

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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_{DGO}	drain-gate voltage	open source	–	–25	V
I_G	forward gate current (DC)		–	10	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1; see Fig.13	–	250	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance 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.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$; $V_{DS} = 0$	–	–25	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 1\text{ nA}$; $V_{DS} = 15\text{ V}$			
	PMBFJ210		–1	–3	V
	PMBFJ211		–2.5	–4.5	V
	PMBFJ212		–4	–6	V
V_{GSS}	gate-source forward voltage	$I_G = 0$; $V_{DS} = 0$	–	1	V
I_{DSS}	drain current	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$			
	PMBFJ10		2	15	mA
	PMBFJ11		7	20	mA
	PMBFJ12		15	40	mA
I_{GSS}	reverse gate leakage current	$V_{GS} = -15\text{ V}$; $V_{DS} = 0$	–	–100	pA
$ y_{fs} $	common-source transfer admittance	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$			
	PMBFJ210		4	12	mS
	PMBFJ211		6	12	mS
	PMBFJ212		7	12	mS
$ y_{os} $	common source output admittance	$V_{GS} = 0$; $V_{DS} = 15\text{ V}$			
	PMBFJ210		–	150	μS
	PMBFJ211		–	200	μS
	PMBFJ212		–	200	μS

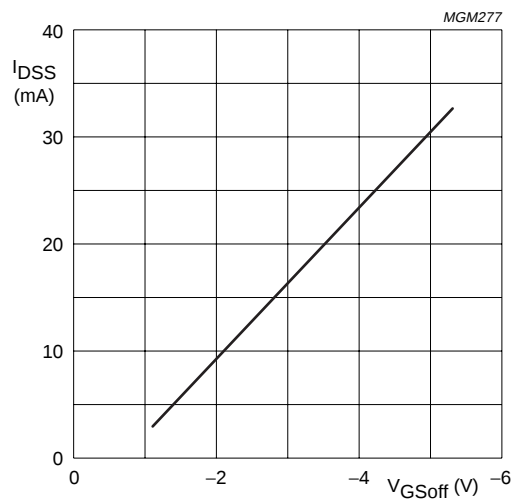
DYNAMIC CHARACTERISTICS

 $T_{amb} = 25\text{ }^{\circ}\text{C}$.

SYMBOL	PARAMETER	CONDITIONS	TYP.	UNIT
C_{is}	input capacitance	$V_{DS} = 15\text{ V}$; $V_{GS} = -10\text{ V}$; $f = 1\text{ MHz}$	2	pF
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	4	pF
C_{os}	output capacitance	$V_{DS} = 15\text{ V}$; $V_{GS} = -10\text{ V}$; $f = 1\text{ MHz}$	0.8	pF
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	2	pF
C_{rs}	feedback capacitance	$V_{DS} = 15\text{ V}$; $V_{GS} = -10\text{ V}$; $f = 1\text{ MHz}$	0.8	pF
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	0.9	pF
g_{is}	common source input conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 100\text{ MHz}$	70	μS
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 450\text{ MHz}$	1.1	mS
g_{fs}	common source transfer conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 100\text{ MHz}$	7.5	mS
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 450\text{ MHz}$	7.5	mS
g_{rs}	common source feedback conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 100\text{ MHz}$	–8	μS
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 450\text{ MHz}$	–90	μS
g_{os}	common source output conductance	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 100\text{ MHz}$	95	μS
		$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 450\text{ MHz}$	200	μS
V_n	equivalent input noise voltage	$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $f = 1\text{ kHz}$	5	nV/ $\sqrt{\text{Hz}}$

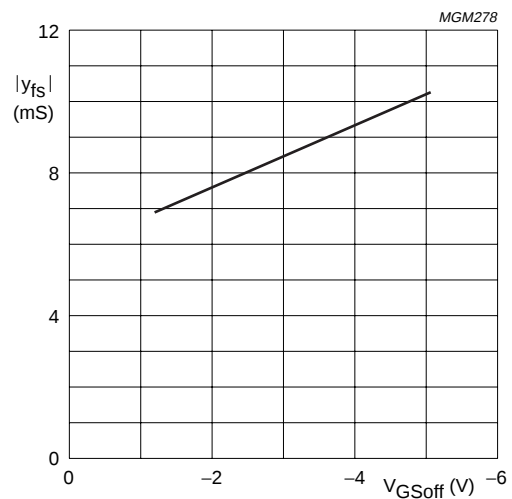
N-channel field-effect transistors

PMBFJ210; PMBFJ211; PMBFJ212



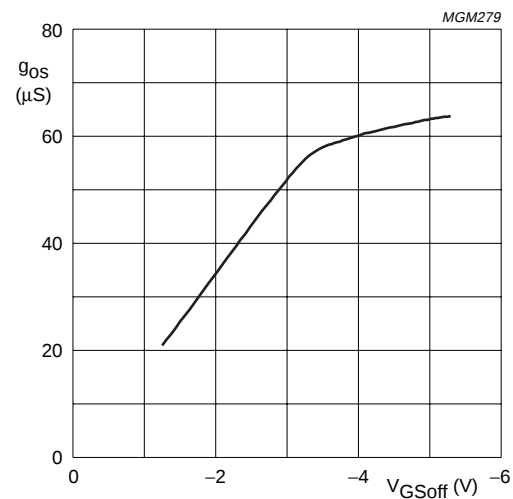
$V_{DS} = 15\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$.

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



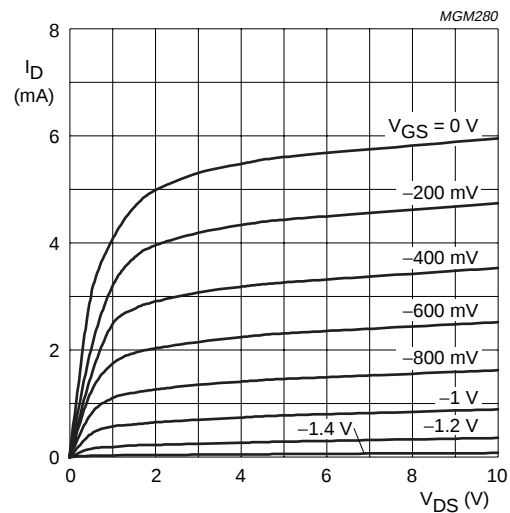
$V_{DS} = 15\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$.

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



$V_{DS} = 15\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

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

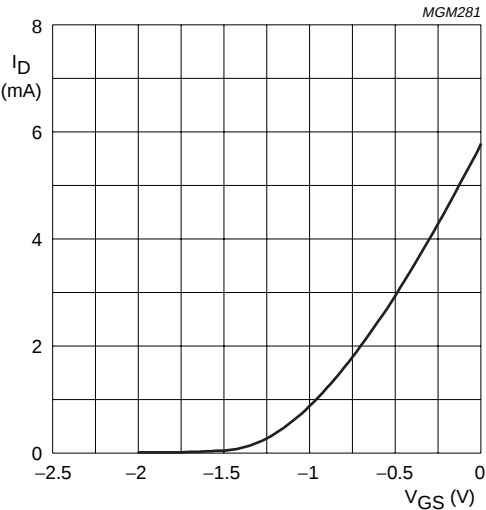


PMBFJ210.
 $T_j = 25\text{ }^{\circ}\text{C}$.

Fig.5 Output characteristics; typical values.

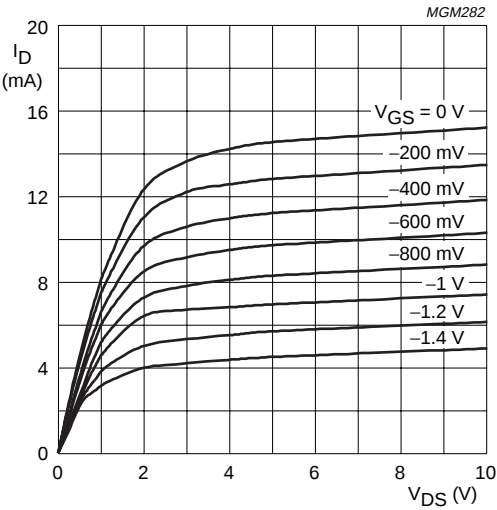
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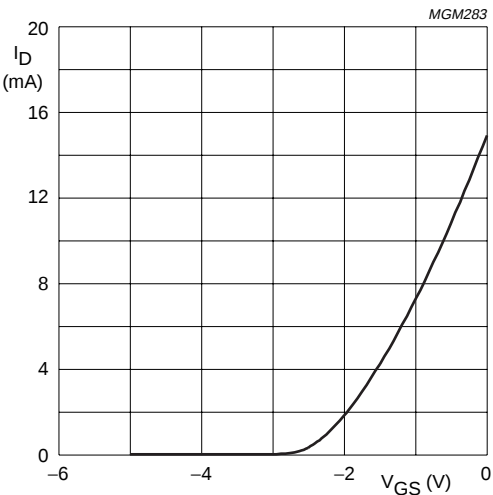
PMBFJ210.
 $V_{DS} = 10$ V; $T_j = 25$ °C.

Fig.6 Input characteristics; typical values.



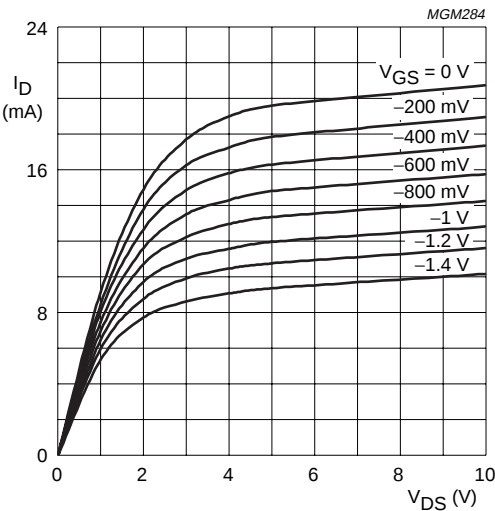
PMBFJ211.
 $T_j = 25$ °C.

Fig.7 Output characteristics; typical values.



PMBFJ211.
 $V_{DS} = 10$ V; $T_j = 25$ °C.

Fig.8 Input characteristics; typical values.

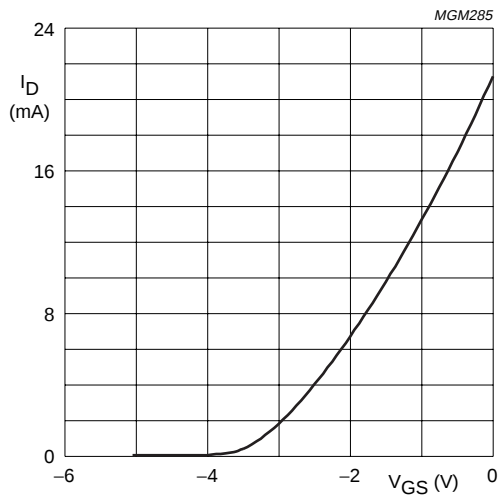


PMBFJ212.
 $T_j = 25$ °C.

Fig.9 Output characteristics; typical values.

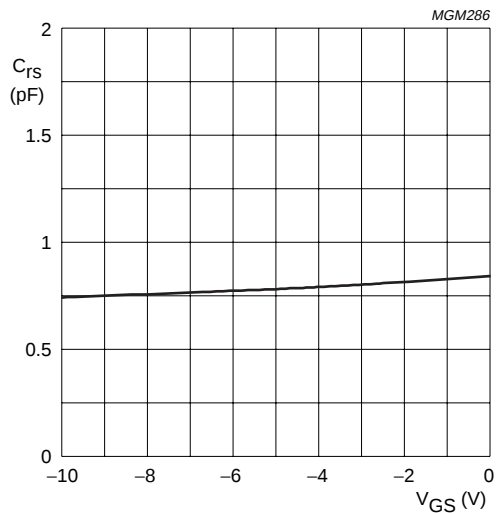
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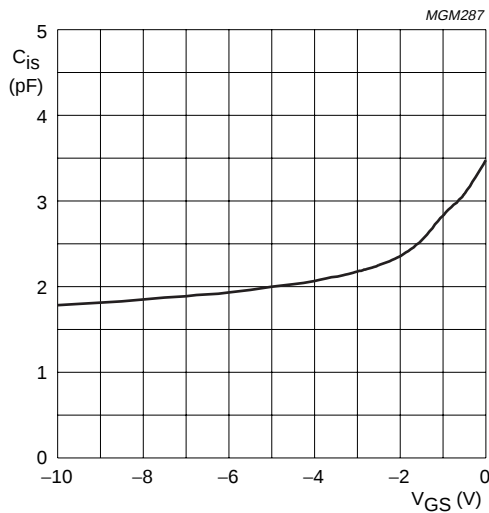
PMBFJ212.
 $V_{DS} = 10\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$.

Fig.10 Input characteristics; typical values.



$V_{DS} = 15\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^\circ\text{C}$.

Fig.11 Feedback capacitance as a function of gate-source voltage; typical values.



$V_{DS} = 15\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^\circ\text{C}$.

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

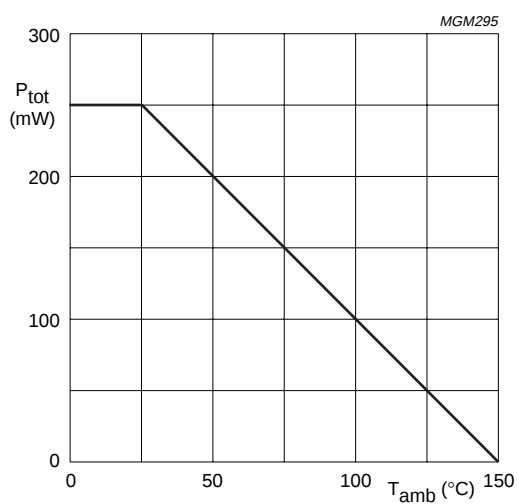
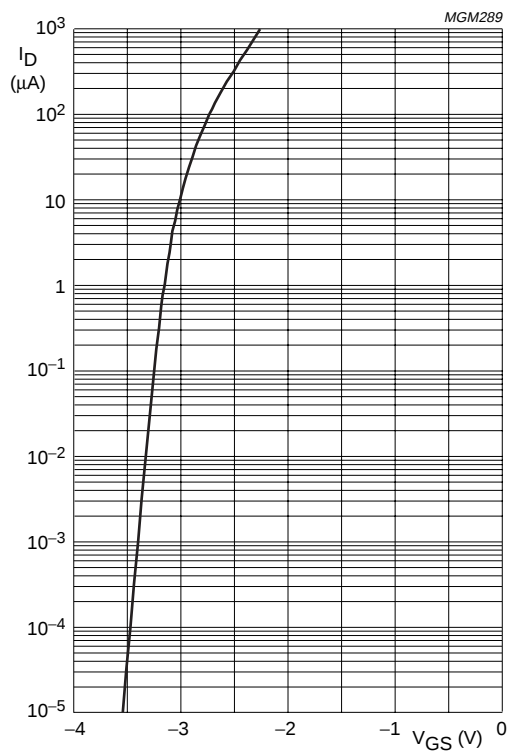


Fig.13 Power derating curve.

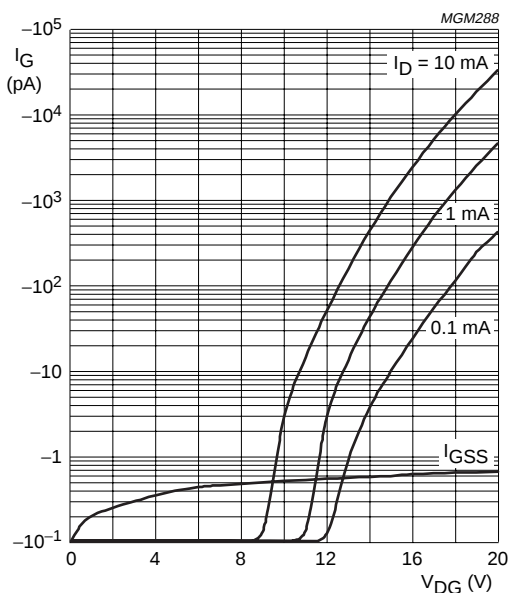
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$V_{DS} = 15\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$.

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

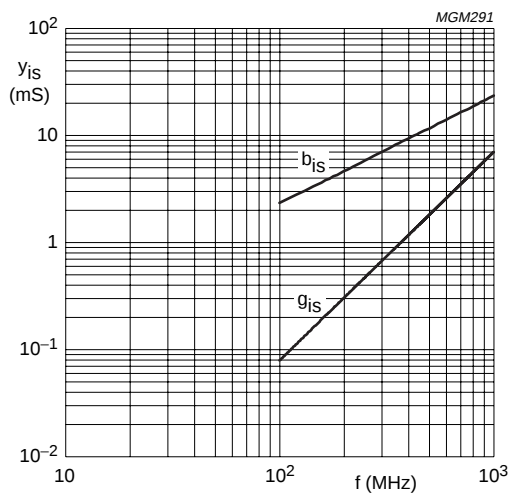


$T_j = 25\text{ }^\circ\text{C}$.

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

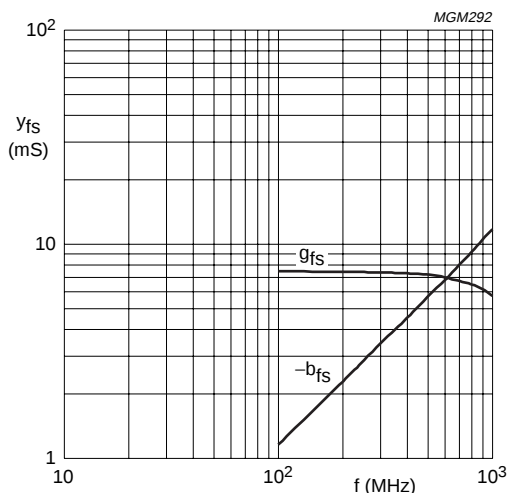
N-channel field-effect transistors

PMBFJ210; PMBFJ211; PMBFJ212



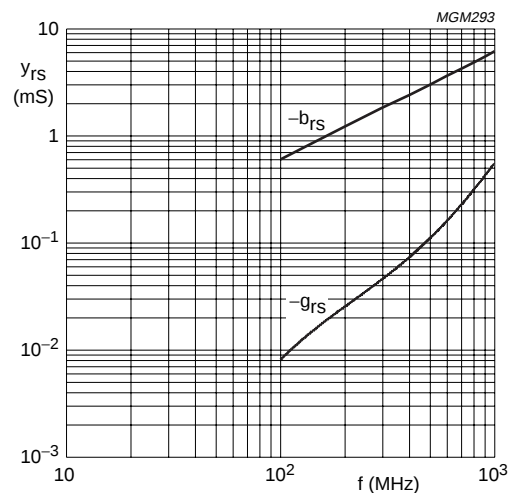
$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.16 Common source input admittance as a function of frequency; typical values.



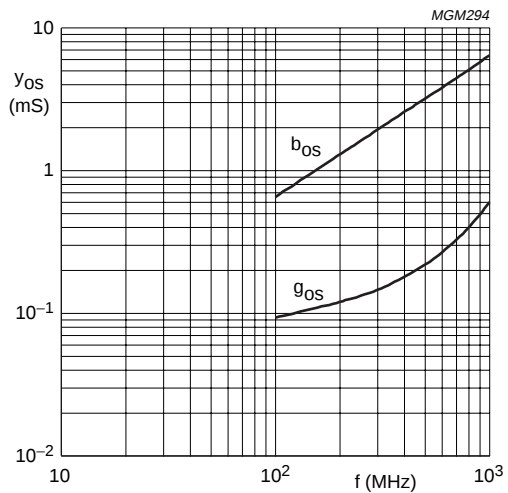
$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.17 Common source transfer admittance as a function of frequency; typical values.



$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.18 Common source reverse admittance as a function of frequency; typical values.



$V_{DS} = 15\text{ V}$; $V_{GS} = 0$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.19 Common source output admittance as a function of frequency; typical values.

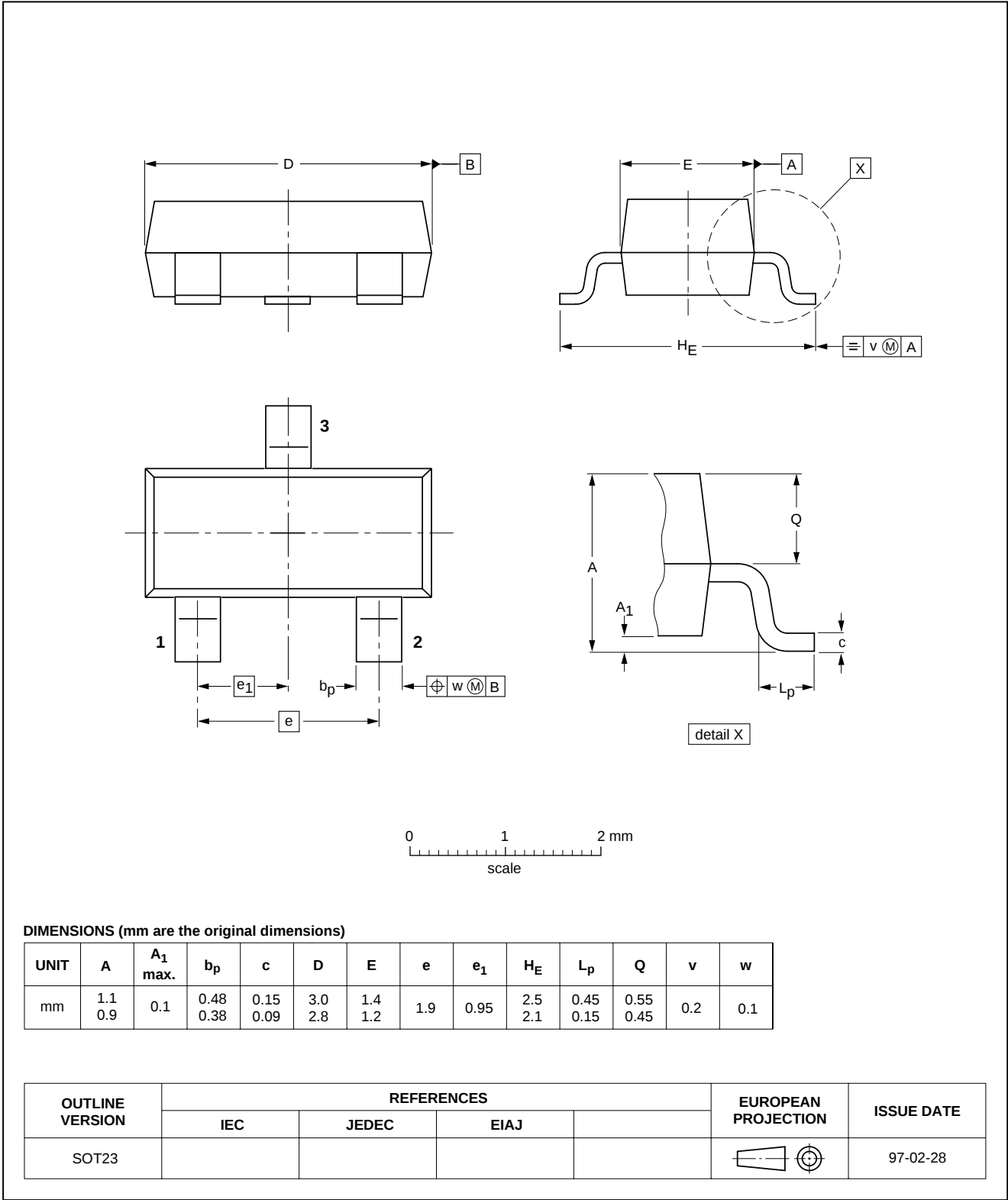
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



N-channel field-effect transistors

PMBFJ210; PMBFJ211; PMBFJ212

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.	

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Printed in The Netherlands

117067/00/01/pp12

Date of release: 1997 Dec 01

Document order number: 9397 750 02788

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