

DATA SHEET

J210; J211; J212 N-channel field-effect transistors

Product specification
File under Discrete Semiconductors, SC07

1997 Dec 01

N-channel field-effect transistors

J210; J211; J212

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 TO-92 (SOT54) 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 - TO-92 (SOT54)

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

Marking codes:
 J210: J210.
 J211: J211.
 J212: J212.

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	$I_D = 1 \text{ nA}; V_{DS} = 15 \text{ V}$			
	J210		–1	–3	V
	J211		–2.5	–4.5	V
	J212		–4	–6	V
I_{DSS}	drain current	$V_{GS} = 0; V_{DS} = 15 \text{ V}$			
	J210		2	15	mA
	J211		7	20	mA
	J212		15	40	mA
P_{tot}	total power dissipation	$T_{amb} \leq 50 \text{ °C}$	–	400	mW
$ y_{fs} $	common-source transfer admittance	$V_{GS} = 0; V_{DS} = 15 \text{ V}$			
	J210		4	12	mS
	J211		6	12	mS
	J212		7	12	mS

N-channel field-effect transistors

J210; J211; J212

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	$T_{amb} \leq 50\text{ °C}$; note 1; see Fig.13	–	400	mW
T_{stg}	storage temperature		–65	150	°C
T_j	operating junction temperature		–	150	°C

Note

1. Device mounted on a printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm².

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient; note 1	250	K/W

Note

1. Device mounted on a printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm².

N-channel field-effect transistors

J210; J211; J212

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	$I_D = 1\text{ nA}; V_{DS} = 15\text{ V}$			
	J210		–1	–3	V
	J211		–2.5	–4.5	V
	J212		–4	–6	V
V_{GSS}	gate-source forward voltage	$I_G = 0; V_{DS} = 0$	–	1	V
I_{DSS}	drain current	$V_{GS} = 0; V_{DS} = 15\text{ V}$			
	J10		2	15	mA
	J11		7	20	mA
	J12		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	$V_{GS} = 0; V_{DS} = 15\text{ V}$			
	J210		4	12	mS
	J211		6	12	mS
	J212		7	12	mS
$ y_{os} $	common source output admittance	$V_{GS} = 0; V_{DS} = 15\text{ V}$			
	J210		–	150	μS
	J211		–	200	μS
	J212		–	200	μS

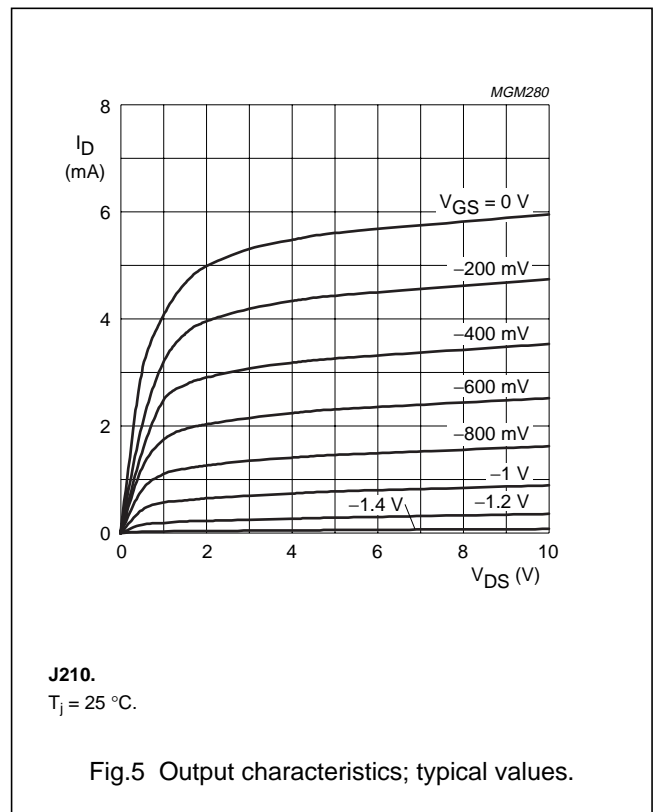
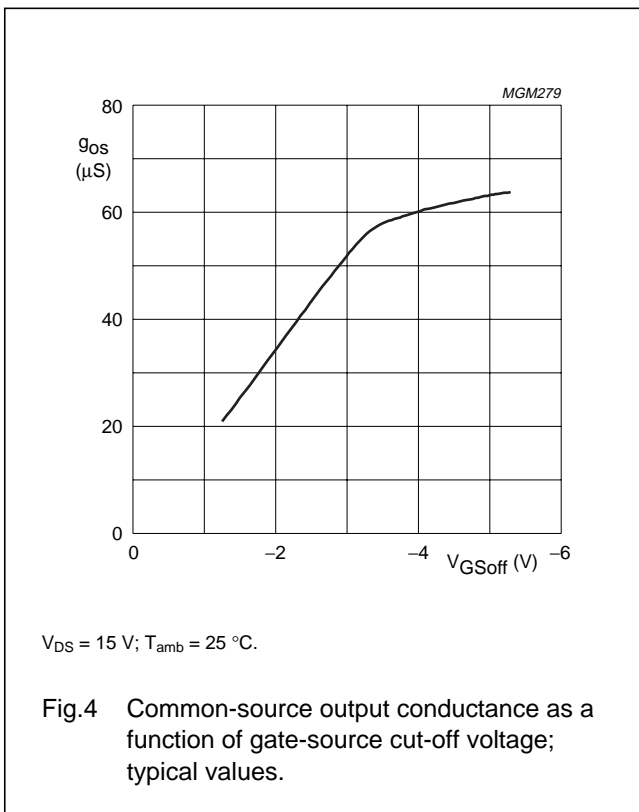
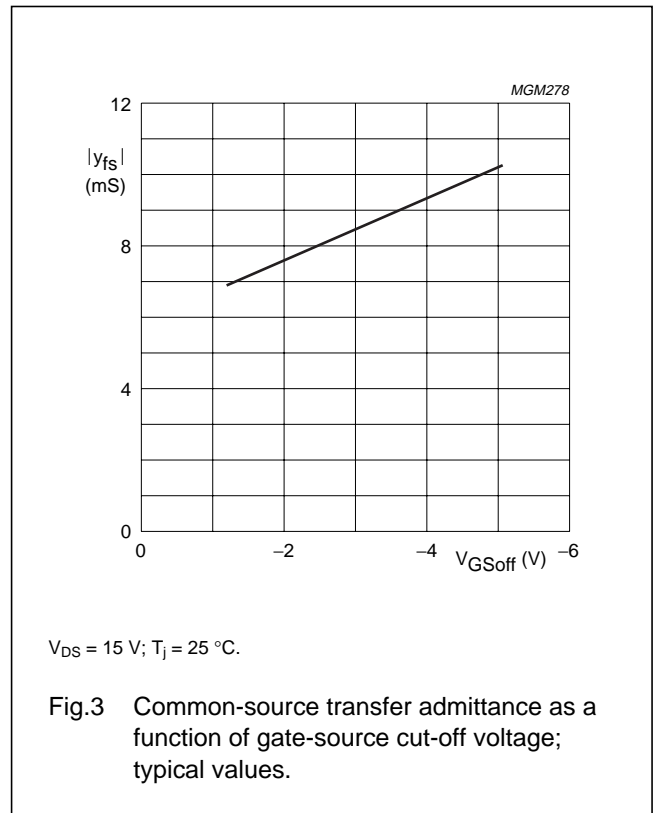
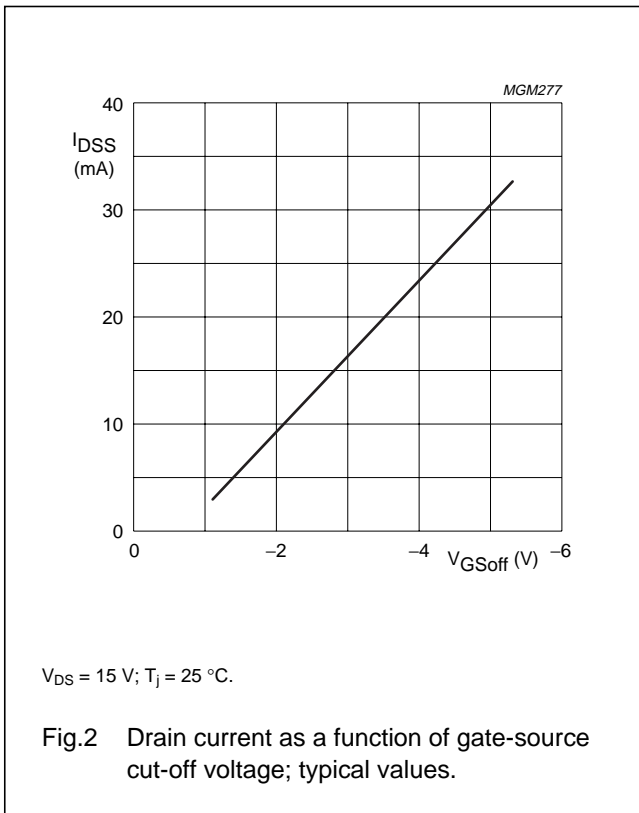
DYNAMIC CHARACTERISTICS

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

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/ $\sqrt{\text{Hz}}$

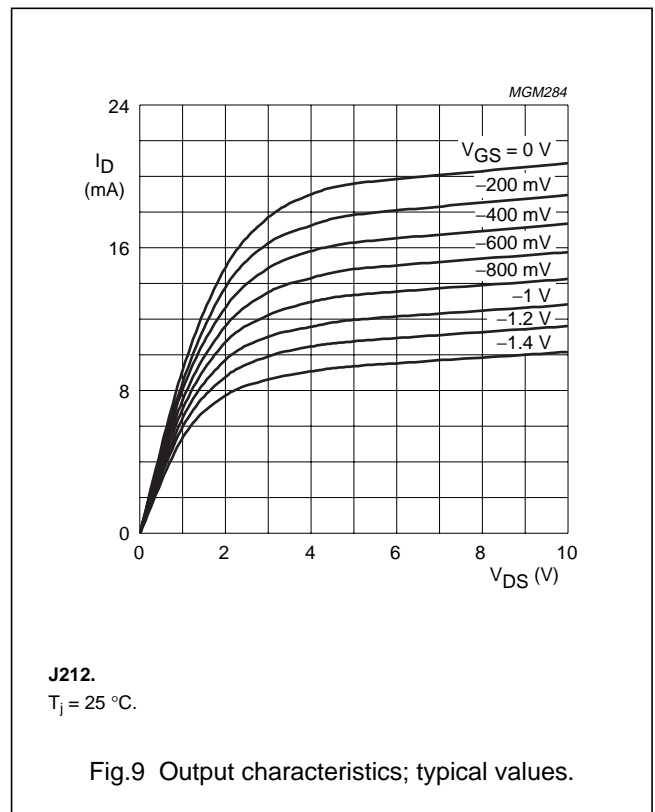
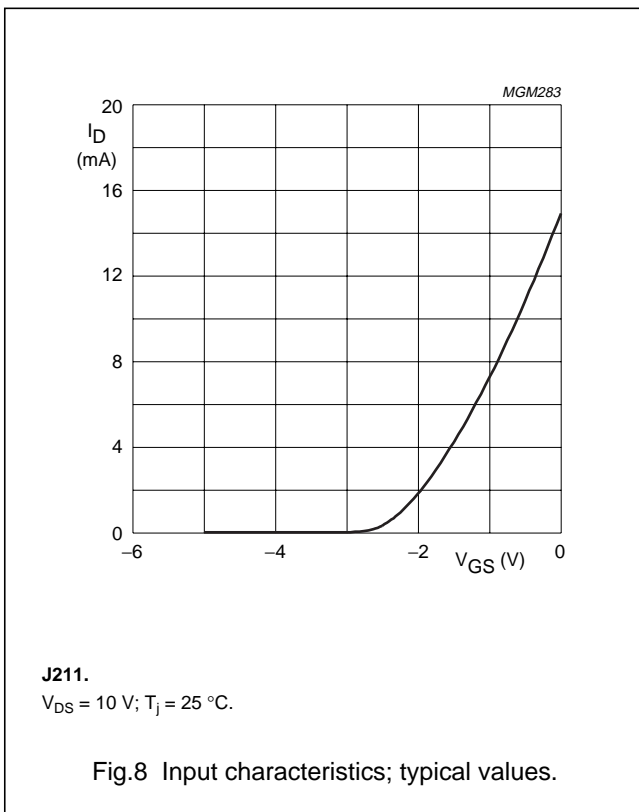
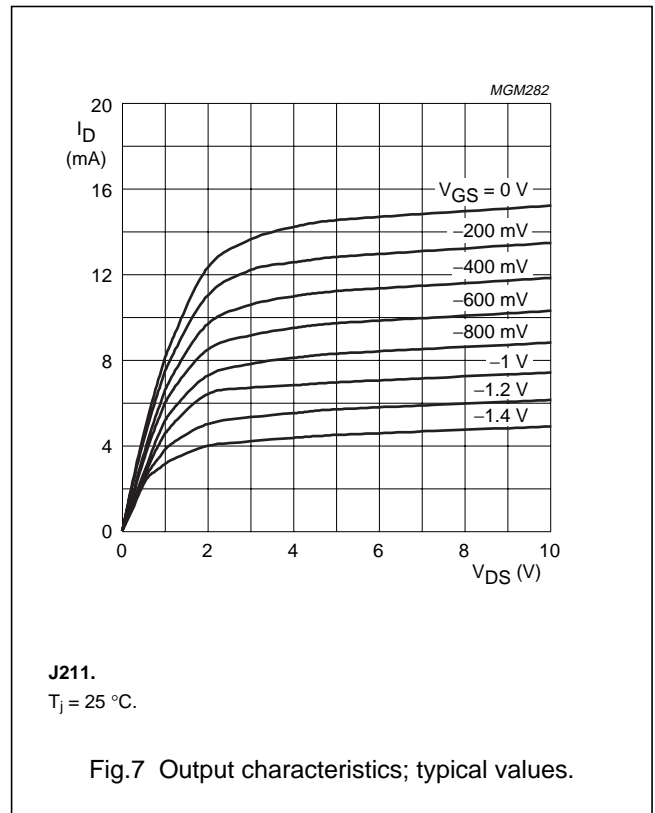
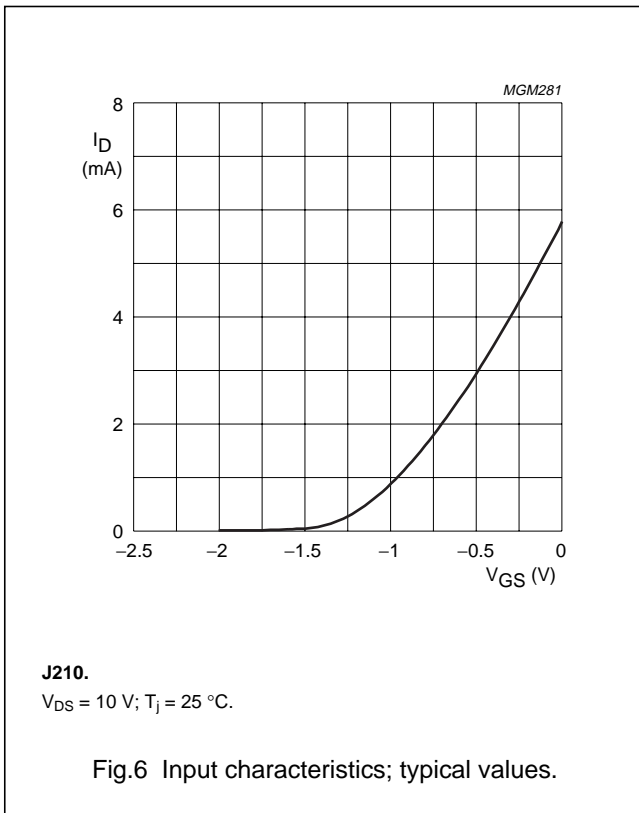
N-channel field-effect transistors

J210; J211; J212



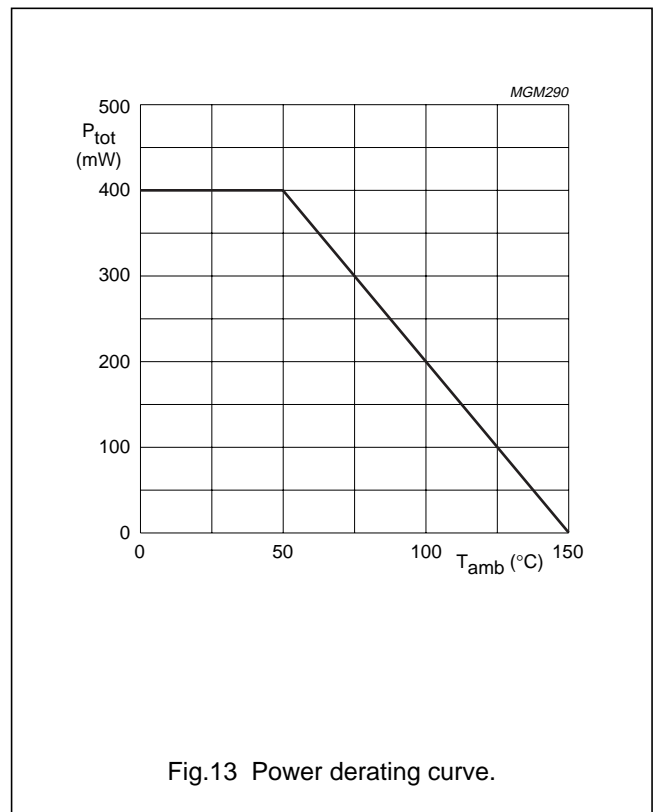
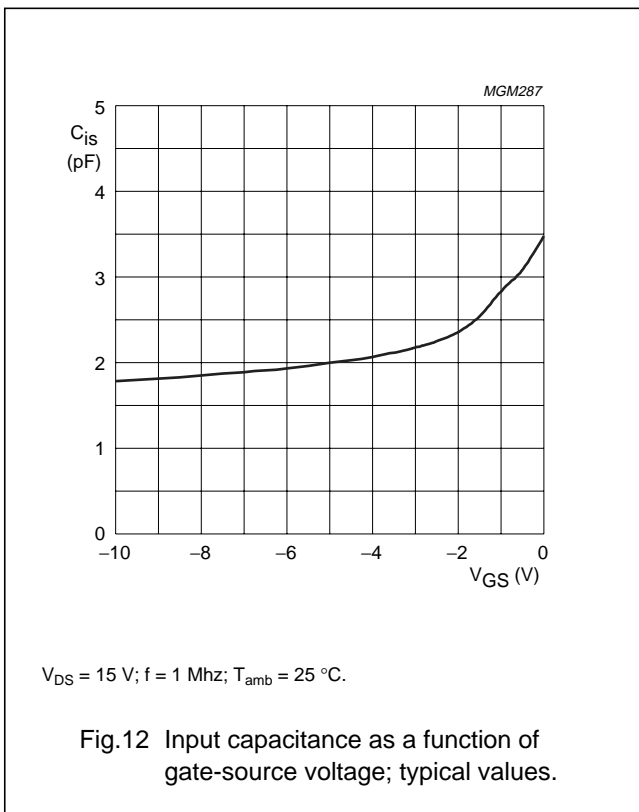
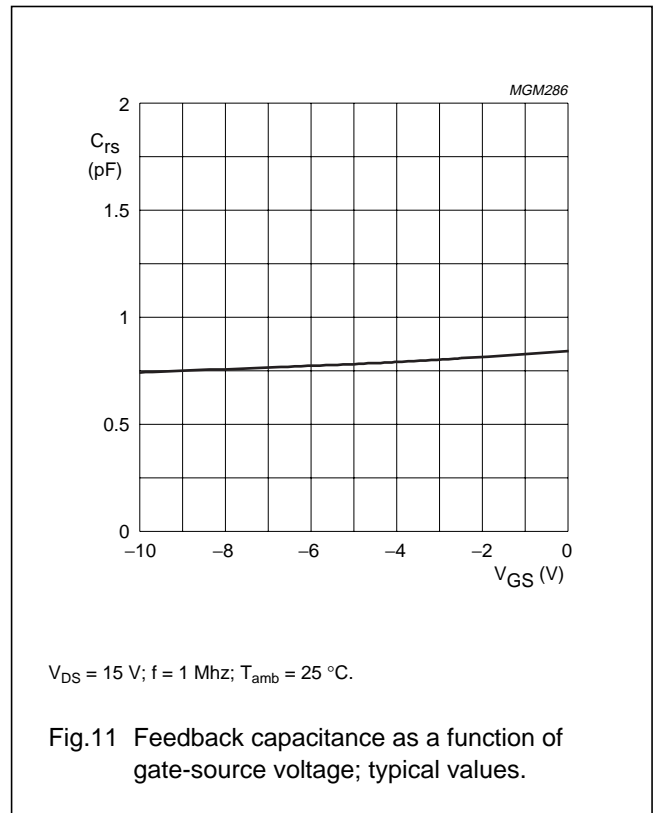
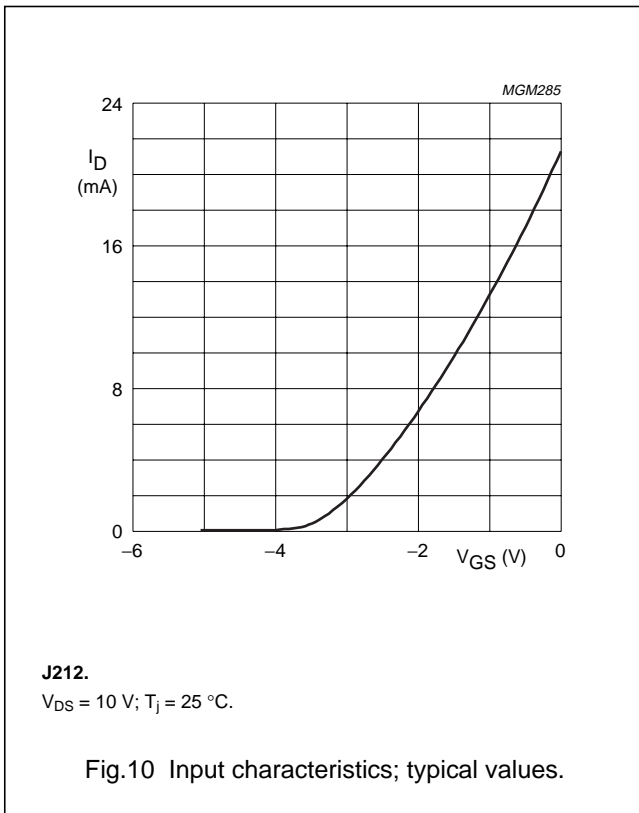
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J210; J211; J212



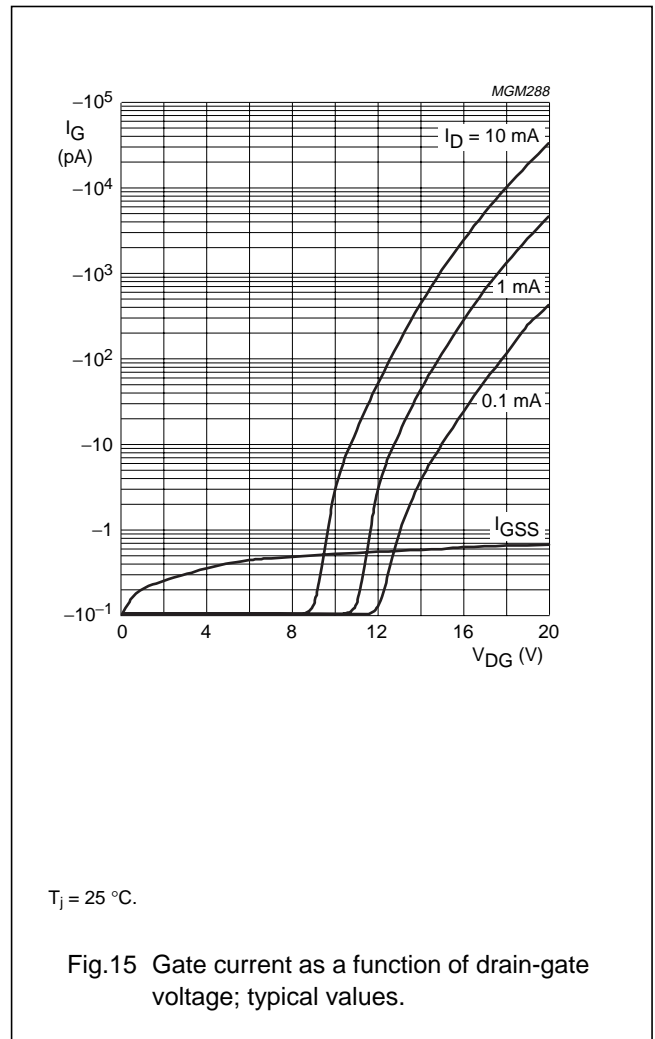
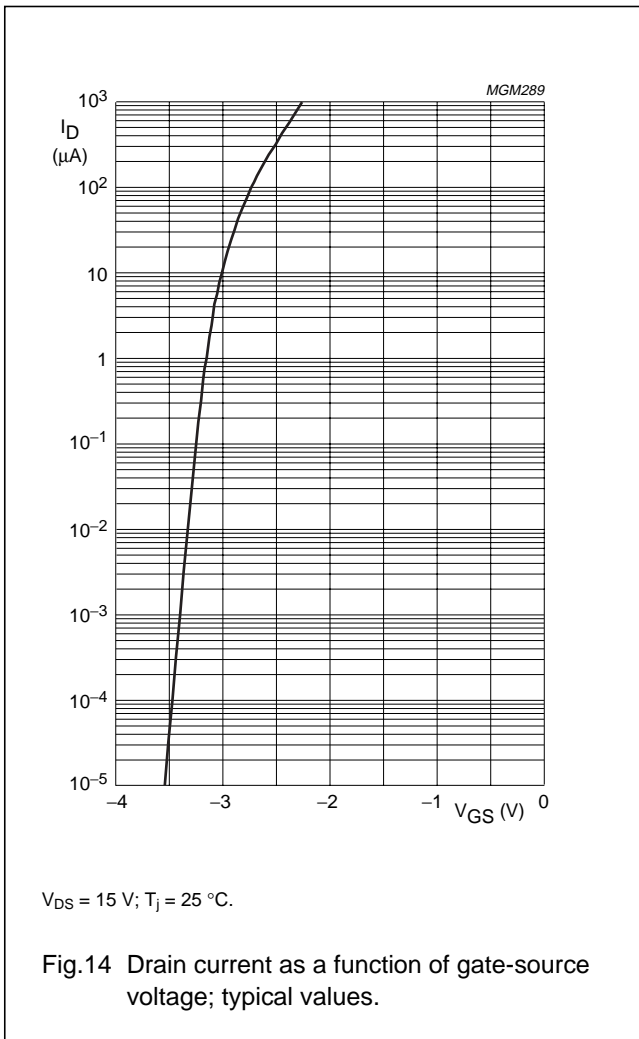
N-channel field-effect transistors

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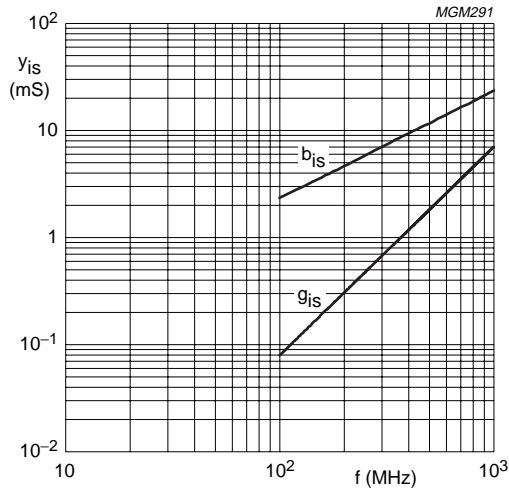
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J210; J211; J212



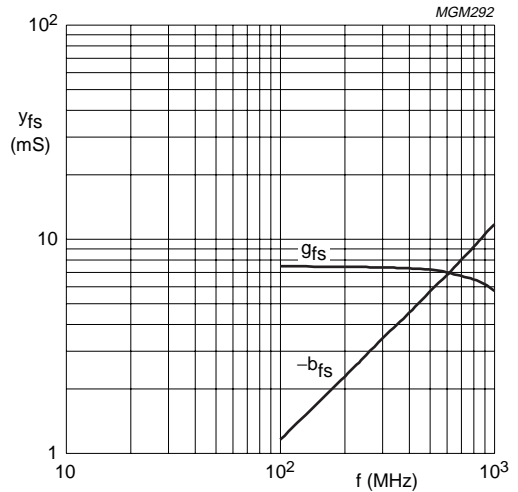
N-channel field-effect transistors

J210; J211; J212



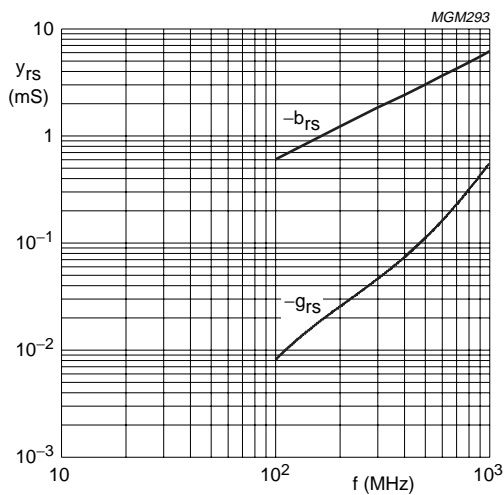
$V_{DS} = 15\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^\circ\text{C}.$

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



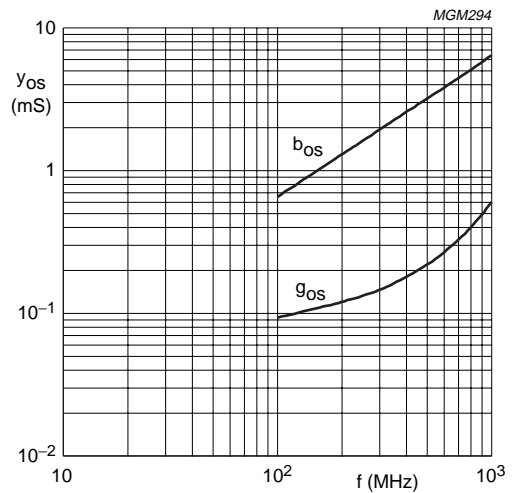
$V_{DS} = 15\text{ V}; V_{GS} = 0; T_{amb} = 25\text{ }^\circ\text{C}.$

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.

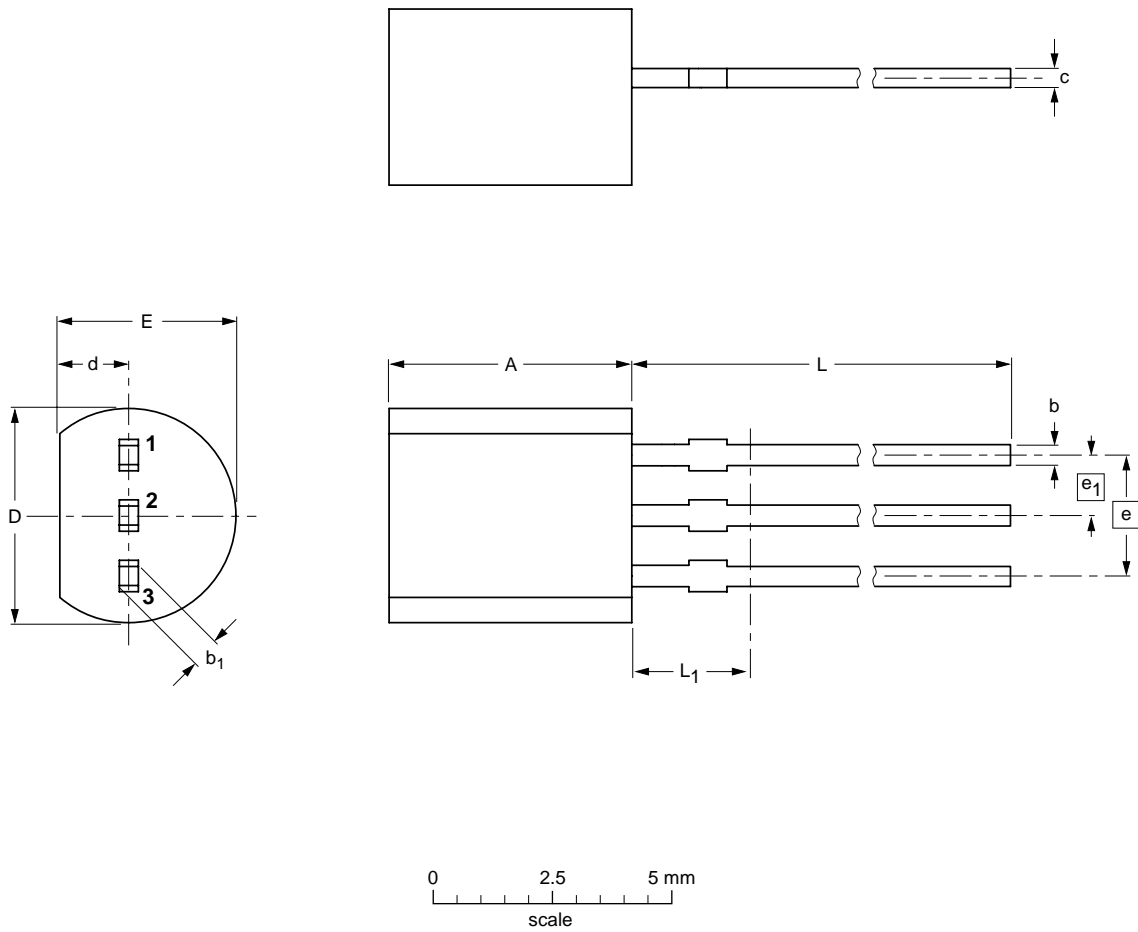
N-channel field-effect transistors

J210; J211; J212

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT54		TO-92	SC-43		97-02-28

N-channel field-effect transistors

J210; J211; J212

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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Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213, Tel. +43 160 1010,
Fax. +43 160 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 689 211, Fax. +359 2 689 102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. +45 32 88 2636, Fax. +45 31 57 0044

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615800, Fax. +358 9 61580920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

Greece: No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,
Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: see Singapore

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108,
Tel. +81 3 3740 5130, Fax. +81 3 3740 5077

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381

Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Ul. Lukiska 10, PL 04-123 WARSZAWA,
Tel. +48 22 612 2831, Fax. +48 22 612 2327

Portugal: see Spain

Romania: see Italy

Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
Tel. +7 095 755 6918, Fax. +7 095 755 6919

Singapore: Lorong 1, Toa Payoh, SINGAPORE 1231,
Tel. +65 350 2538, Fax. +65 251 6500

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South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
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Tel. +27 11 470 5911, Fax. +27 11 470 5494

South America: Al. Vicente Pinzon, 173, 6th floor,
04547-130 SÃO PAULO, SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 821 2382

Spain: Balmes 22, 08007 BARCELONA,
Tel. +34 3 301 6312, Fax. +34 3 301 4107

Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
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Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
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Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
TAIPEI, Taiwan Tel. +886 2 2134 2865, Fax. +886 2 2134 2874

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
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Turkey: Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,
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Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
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Printed in The Netherlands

117067/00/01/pp12

Date of release: 1997 Dec 01

Document order number: 9397 750 02789

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