

DATA SHEET

BFR30; BFR31

N-channel field-effect transistors

Product specification
Supersedes data of April 1991

1997 Dec 05



N-channel field-effect transistors

BFR30; BFR31

DESCRIPTION

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

APPLICATIONS

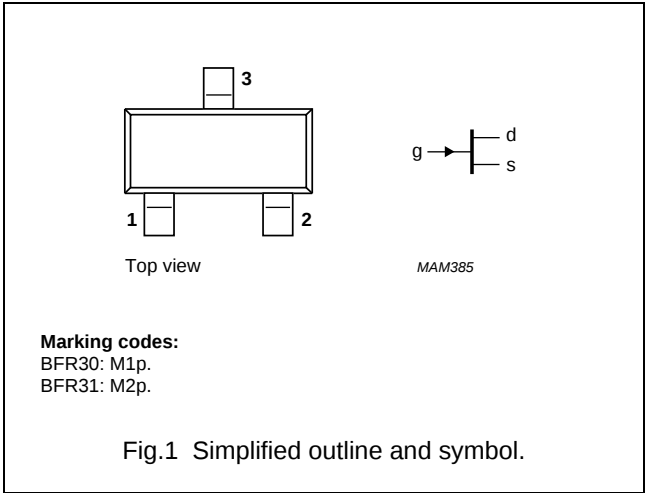
- Low level general purpose amplifiers in thick and thin-film circuits.

PINNING - SOT23

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

Note

1. Drain and source are interchangeable.



CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	± 25	V
V_{GSO}	gate-source voltage	open drain	–	–25	V
P_{tot}	total power dissipation	$T_{amb} \leq 40\text{ }^{\circ}\text{C}$	–	250	mW
I_{DSS}	drain current	$V_{GS} = 0; V_{DS} = 10\text{ V}$			
	BFR30		4	10	mA
	BFR31		1	5	mA
$ y_{fs} $	common-source transfer admittance	$I_D = 1\text{ mA}; V_{DS} = 10\text{ V}; f = 1\text{ kHz}$			
	BFR30		1	4	mS
	BFR31		1.5	4.5	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 _{DGO}	drain-gate voltage	open source	–	–25	V
V _{GSO}	gate-source voltage	open drain	–	–25	V
I _D	drain current		–	10	mA
I _G	forward gate current (DC)		–	5	mA
P _{tot}	total power dissipation	T _{amb} ≤ 40 °C; note 1; see Fig.2	–	250	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	operating junction temperature		–	150	°C

Note

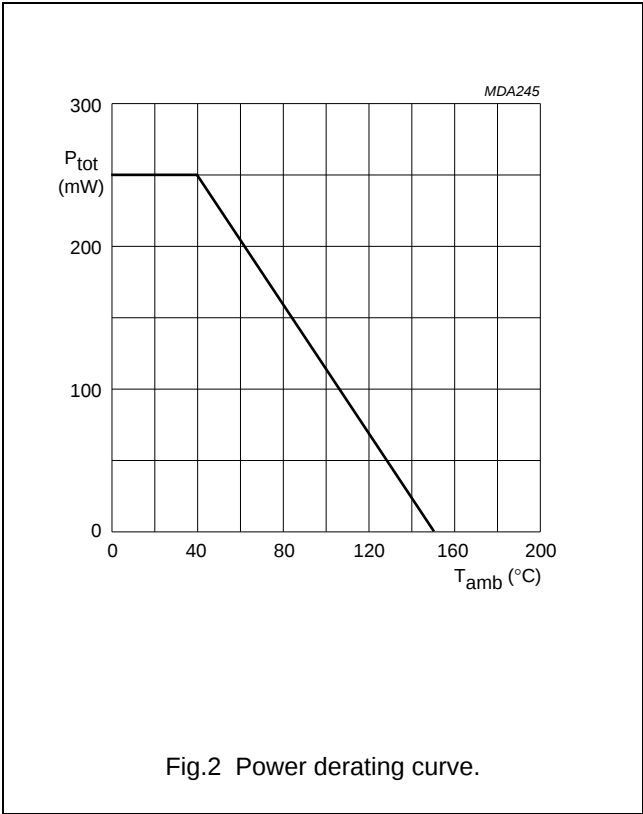
1. Mounted on a ceramic substrate of 8 × 10 × 0.7 mm.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	note 1	430	K/W

Note

1. Mounted on a ceramic substrate of 8 × 10 × 0.7 mm.



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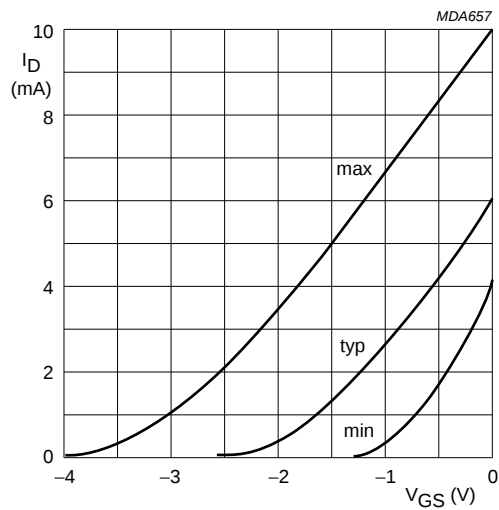
CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{GSS}	gate cut-off current	$V_{DS} = 0$; $V_{GS} = -10\text{ V}$	—	−0.2	nA
I_{DSS}	drain current BFR30 BFR31	$V_{GS} = 0$; $V_{DS} = 10\text{ V}$	4 1	10 5	mA mA
V_{GS}	gate-source voltage BFR30 BFR31	$I_D = 1\text{ mA}$; $V_{DS} = 10\text{ V}$	−0.7 0	−3 −1.3	V V
V_{GS}	gate-source voltage BFR30 BFR31	$I_D = 50\text{ }\mu\text{A}$; $V_{DS} = 10\text{ V}$	— —	−4 −2	V V
V_{GSoff}	gate-source cut-off voltage BFR30 BFR31	$I_D = 0.5\text{ nA}$; $V_{DS} = 10\text{ V}$	— —	−5 −2.5	V V
$ y_{fs} $	common-source transfer admittance BFR30 BFR31	$I_D = 1\text{ mA}$; $V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	1 1.5	4 4.5	mS mS
$ y_{fs} $	common-source transfer admittance BFR30 BFR31	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	0.5 0.75	— —	mS mS
$ y_{os} $	common source output admittance BFR30 BFR31	$I_D = 1\text{ mA}$; $V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$	— —	40 25	μS μS
$ y_{os} $	common source output admittance BFR30 BFR31	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$	— —	20 15	μS μS
C_{is}	input capacitance	$V_{DS} = 10\text{ V}$; $f = 1\text{ MHz}$ $I_D = 1\text{ mA}$ $I_D = 0.2\text{ nA}$	— —	4 4	pF pF
C_{rs}	feedback capacitance	$V_{DS} = 10\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$ $I_D = 1\text{ mA}$ $I_D = 200\text{ }\mu\text{A}$	— —	1.5 1.5	pF pF
V_n	equivalent input noise voltage	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 10\text{ V}$; $B = 0.6\text{ to }100\text{ Hz}$	—	0.5	μV

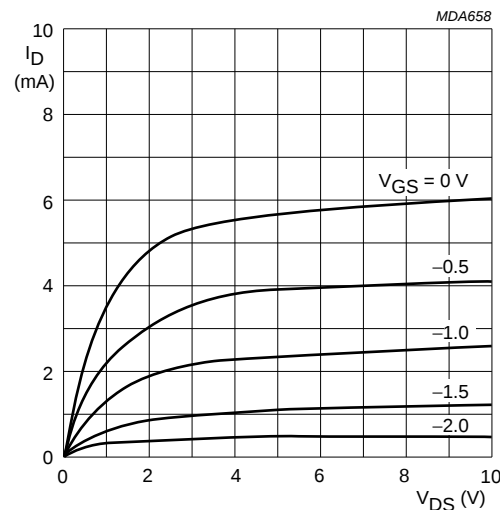
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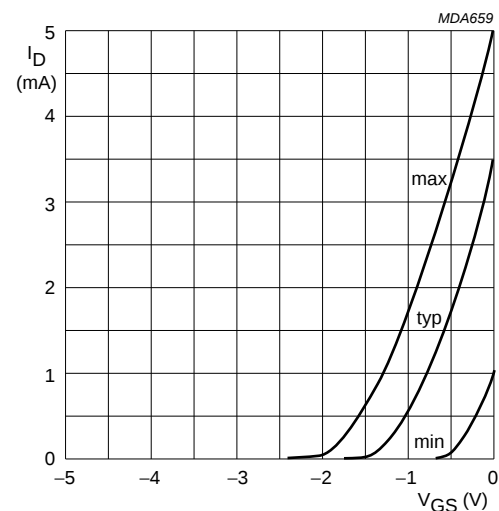
BFR30.
 $V_{DS} = 10\text{ V}; T_j = 25\text{ }^{\circ}\text{C}.$

Fig.3 Input characteristics.



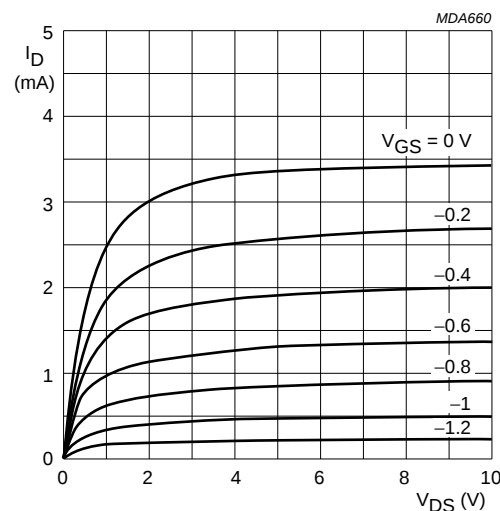
BFR30.
 $T_j = 25\text{ }^{\circ}\text{C}.$

Fig.4 Output characteristics; typical values.



BFR31.
 $V_{DS} = 10\text{ V}; T_j = 25\text{ }^{\circ}\text{C}.$

Fig.5 Input characteristics.

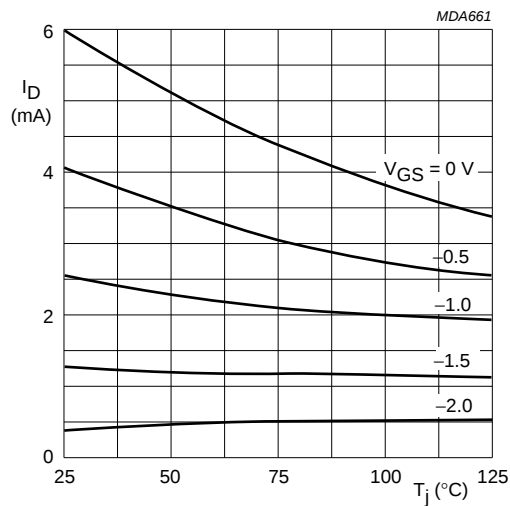


BFR31.
 $T_j = 25\text{ }^{\circ}\text{C}.$

Fig.6 Output characteristics; typical values.

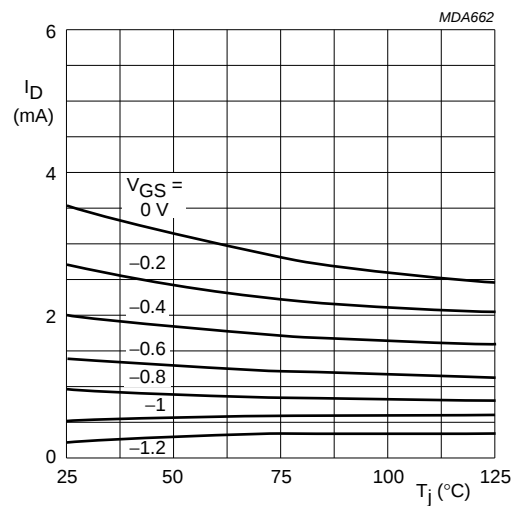
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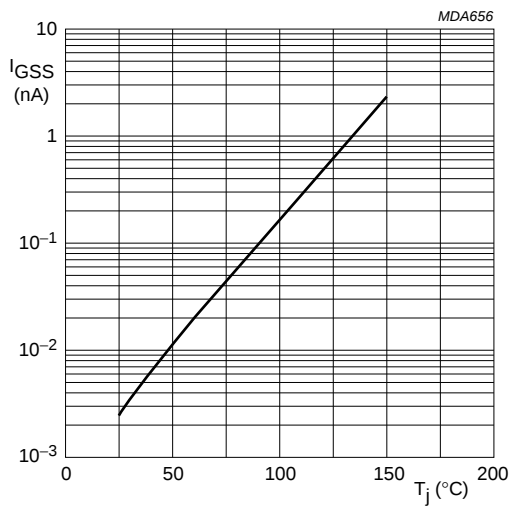
BFR30.
 $V_{DS} = 10\text{ V}.$

Fig.7 Drain current as a function of junction temperature; typical values.



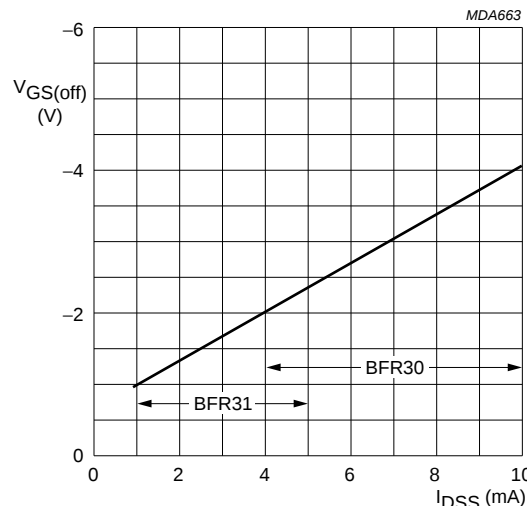
BFR31.
 $V_{DS} = 10\text{ V}.$

Fig.8 Drain current as a function of junction temperature; typical values.



$V_{GS} = -10\text{ V}; V_{DS} = 0.$

Fig.9 Gate cut-off current as a function of junction temperature; typical values.

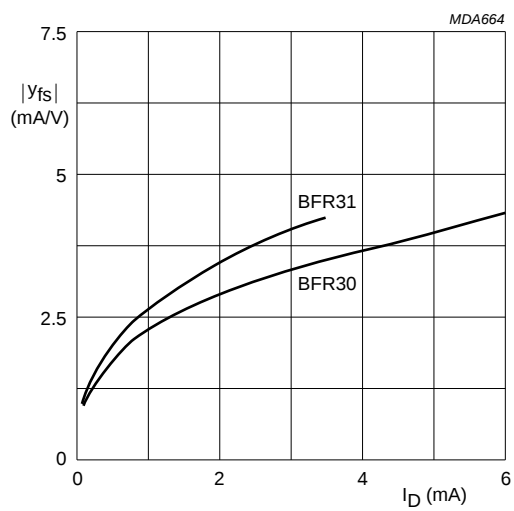


$I_D = 0.5\text{ nA}; V_{DS} = 10\text{ V}; V_{GS} = 0; T_j = 25\text{ °C}.$

Fig.10 Gate-source cut-off voltage as a function of drain current; typical values.

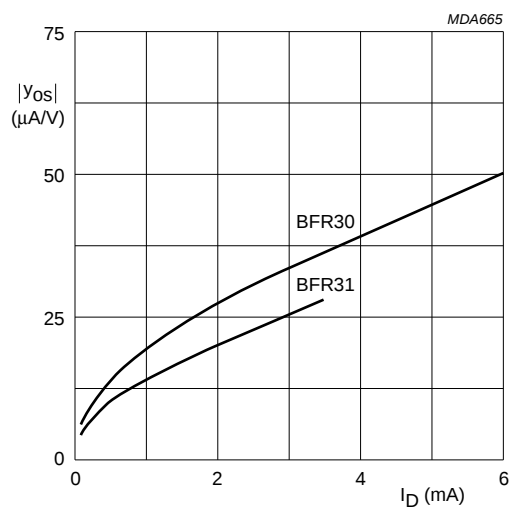
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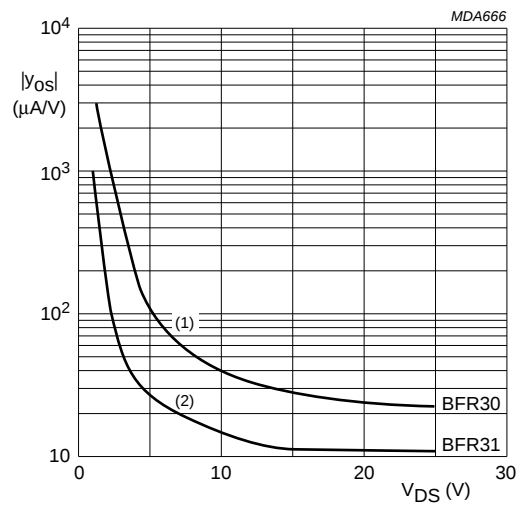
$V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.11 Common source transfer admittance as a function of drain current; typical values.



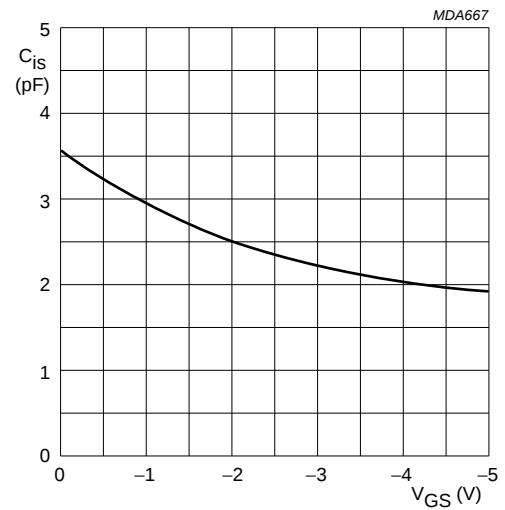
$V_{DS} = 10\text{ V}$; $f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

Fig.12 Common source output admittance as a function of drain current; typical values.



$f = 1\text{ kHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(1) $I_D = 4\text{ mA}$. (2) $I_D = 1\text{ mA}$.

Fig.13 Common source output admittance as a function of drain-source voltage; typical values.

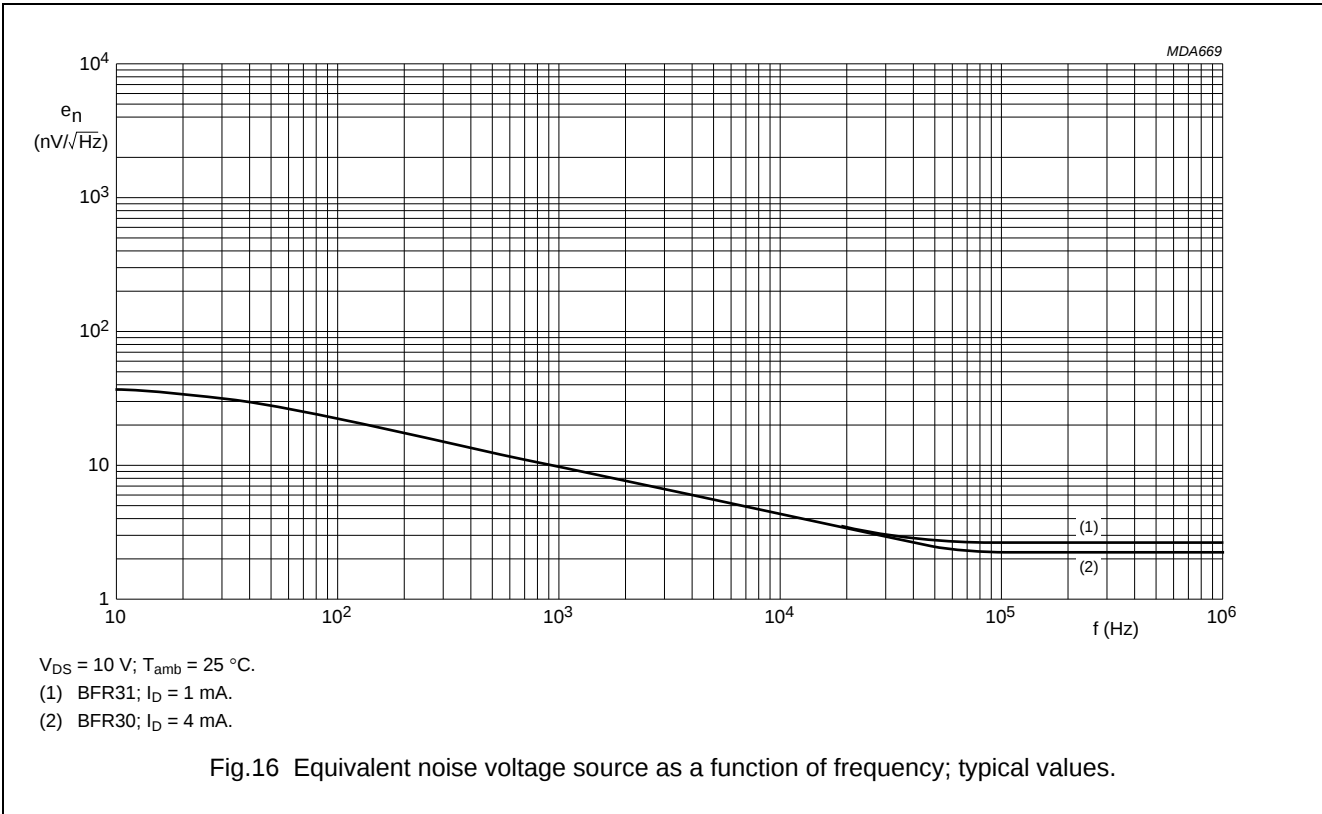
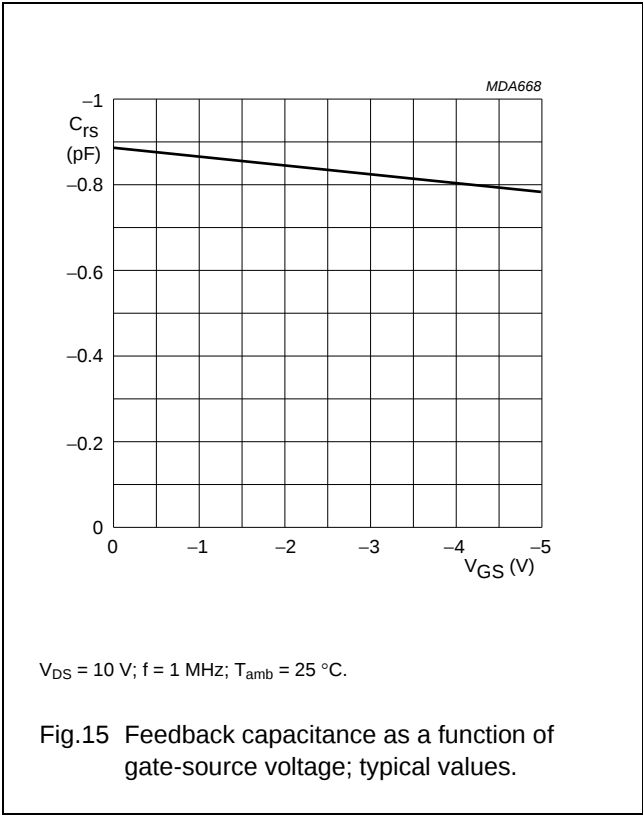


$V_{DS} = 10\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$.

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

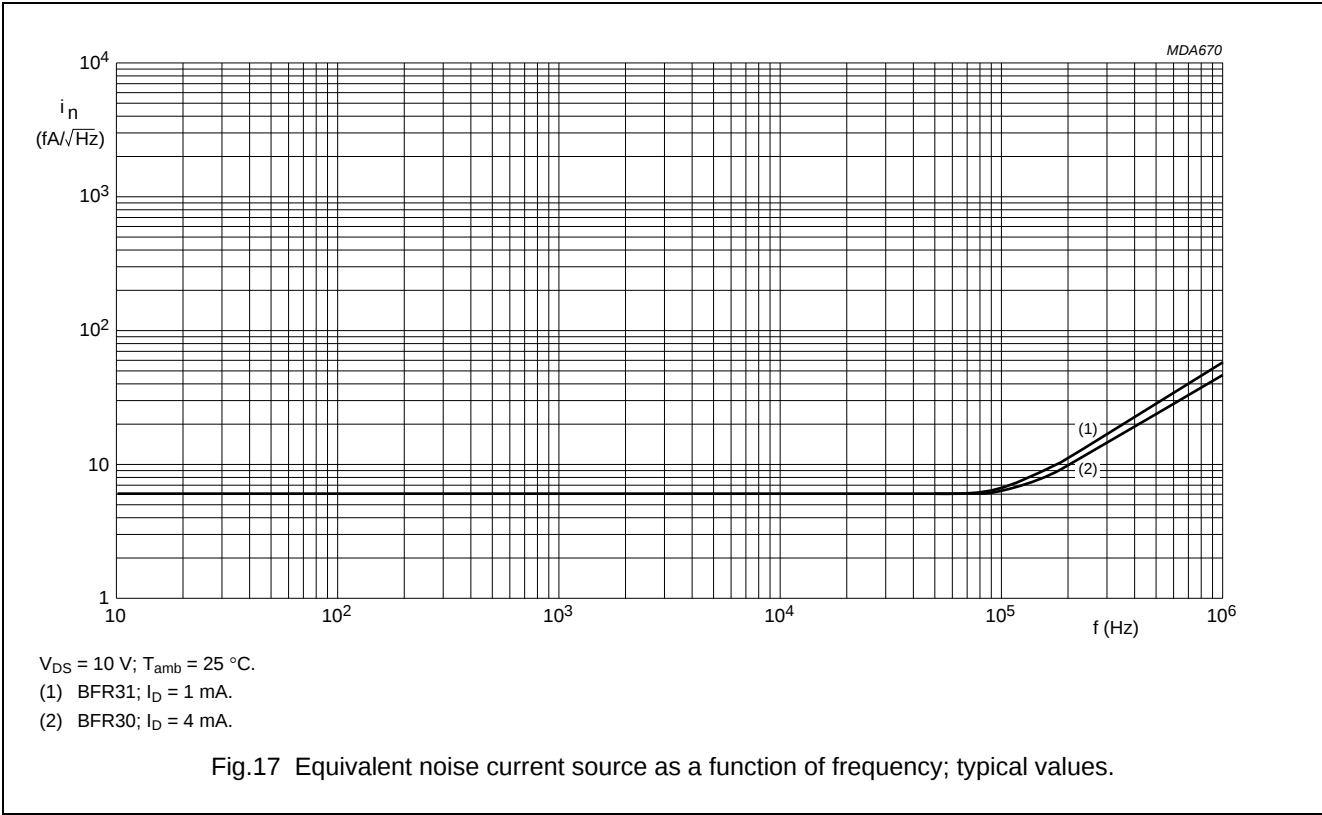
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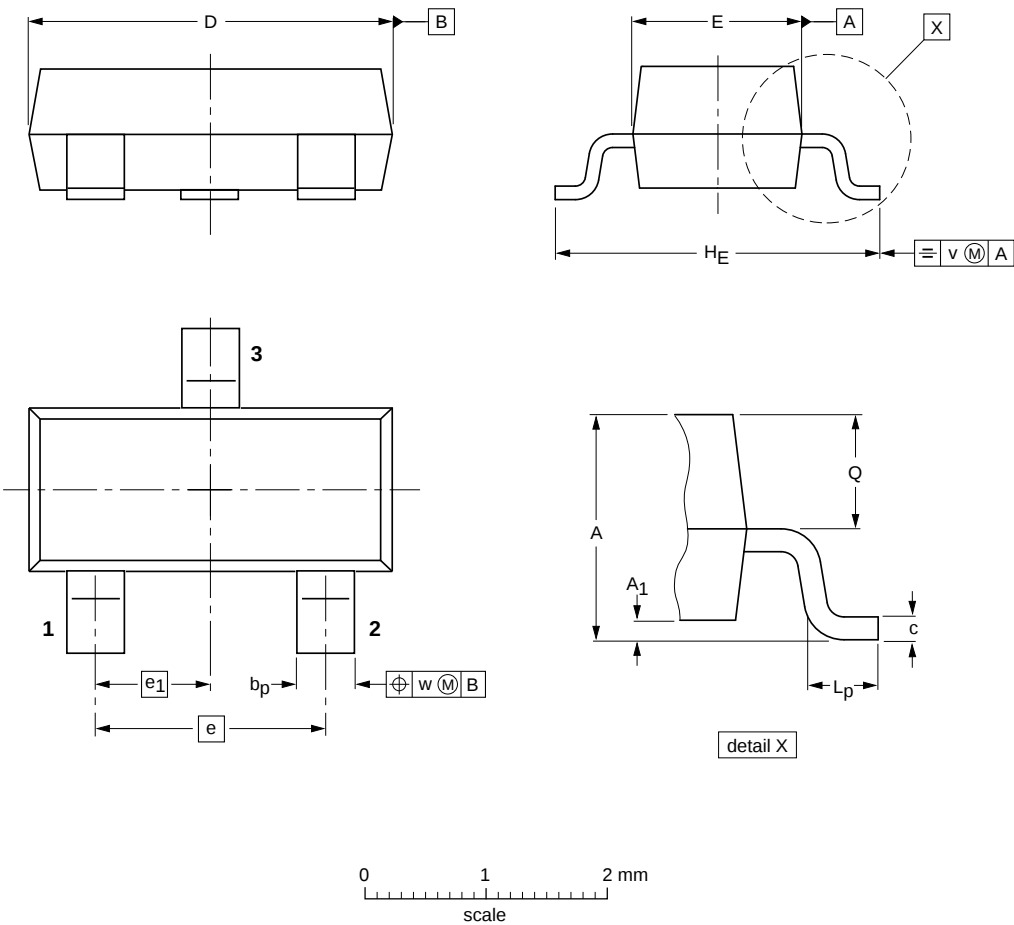
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PACKAGE OUTLINE

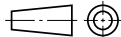
Plastic surface-mounted package; 3 leads

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	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16

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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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Contact information

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R77/02/pp13

Date of release: 1997 Dec 05

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