

DATA SHEET

BFR30; BFR31 N-channel field-effect transistors

Product specification
Supersedes data of April 1991
File under Discrete Semiconductors, SC07

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

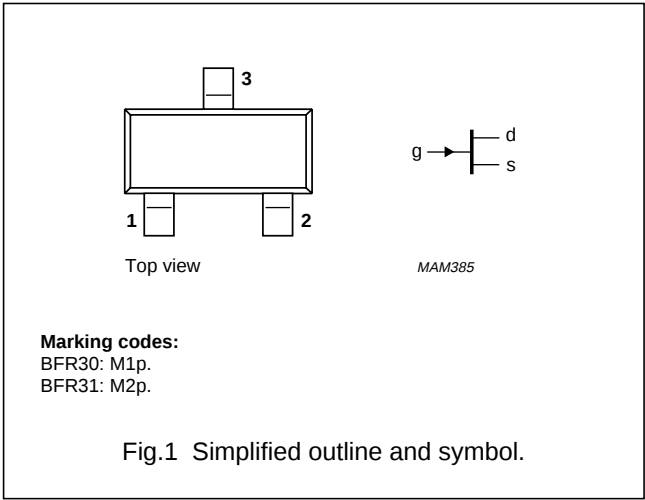
- Low level general purpose amplifiers in thick and thin-film circuits.

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. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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

N-channel field-effect transistors

BFR30; BFR31

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

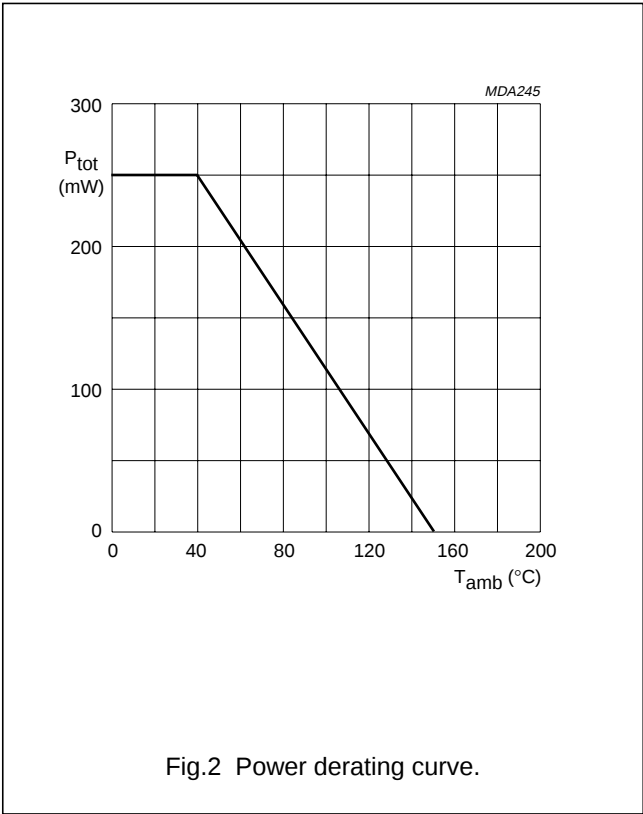
1. Mounted on a ceramic substrate of 8 × 10 × 0.7 mm.

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.



N-channel field-effect transistors

BFR30; BFR31

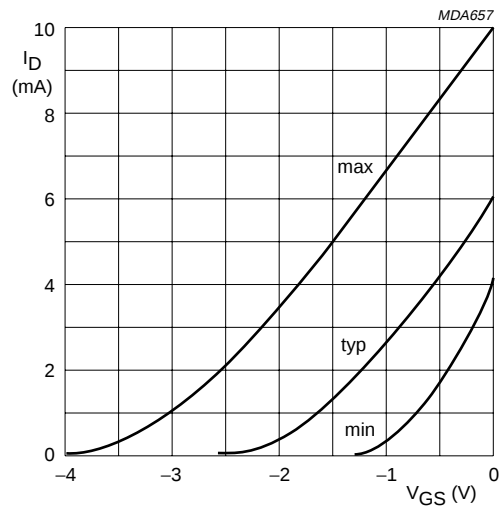
CHARACTERISTICS

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

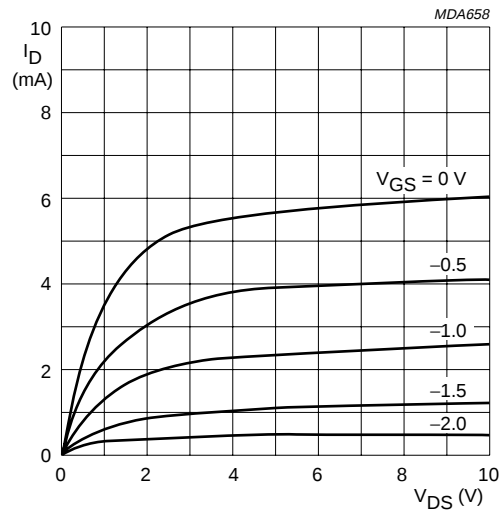
N-channel field-effect transistors

BFR30; BFR31



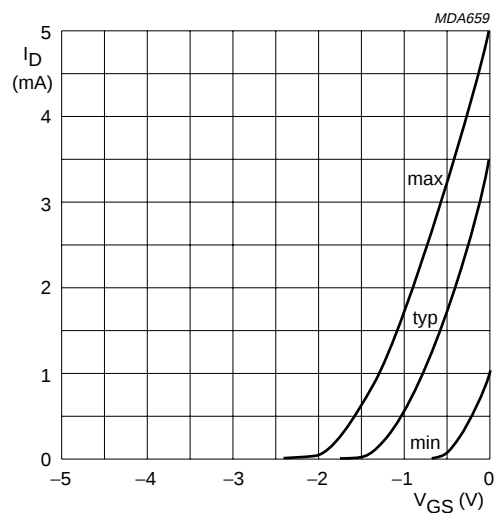
BFR30.
 $V_{DS} = 10\text{ V}; T_j = 25\text{ }^{\circ}\text{C}.$

Fig.3 Input characteristics.



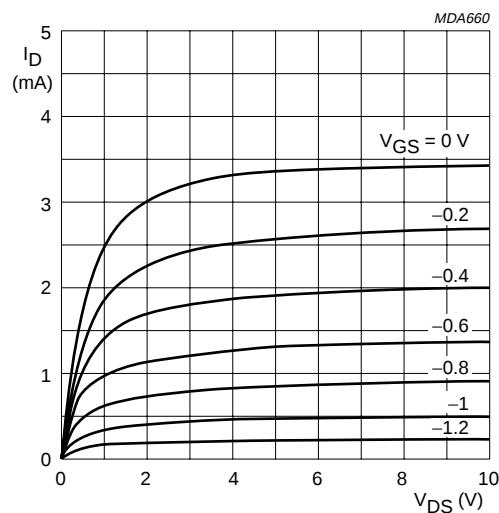
BFR30.
 $T_j = 25\text{ }^{\circ}\text{C}.$

Fig.4 Output characteristics; typical values.



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

Fig.5 Input characteristics.

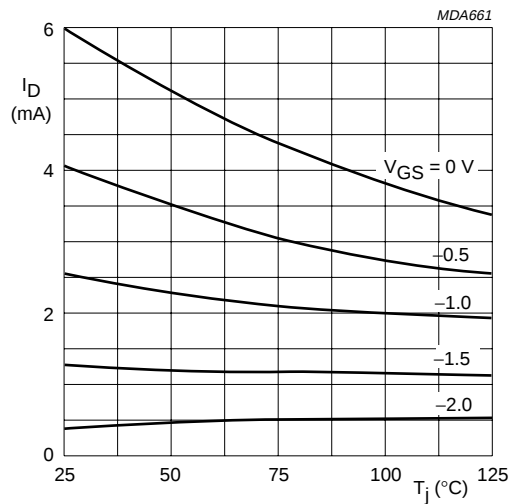


BFR31.
 $T_j = 25\text{ }^{\circ}\text{C}.$

Fig.6 Output characteristics; typical values.

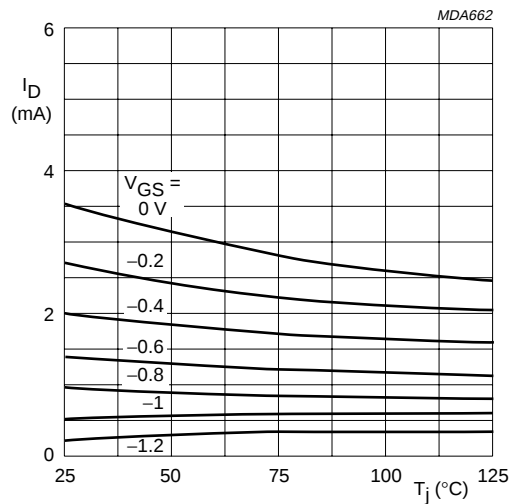
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BFR30; BFR31



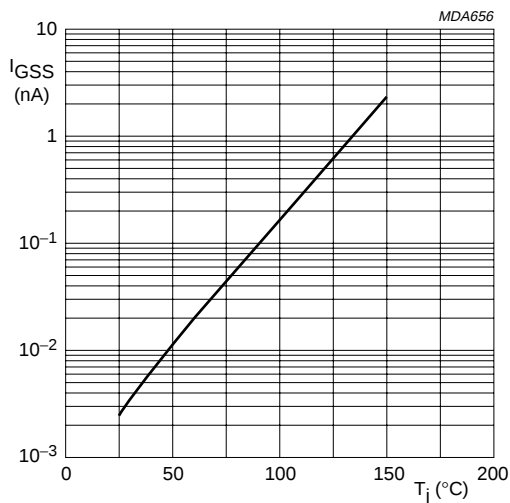
BFR30.
 $V_{DS} = 10\text{ V}.$

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



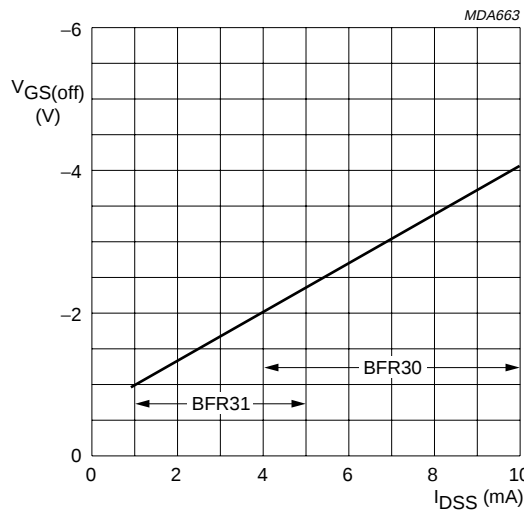
BFR31.
 $V_{DS} = 10\text{ V}.$

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.

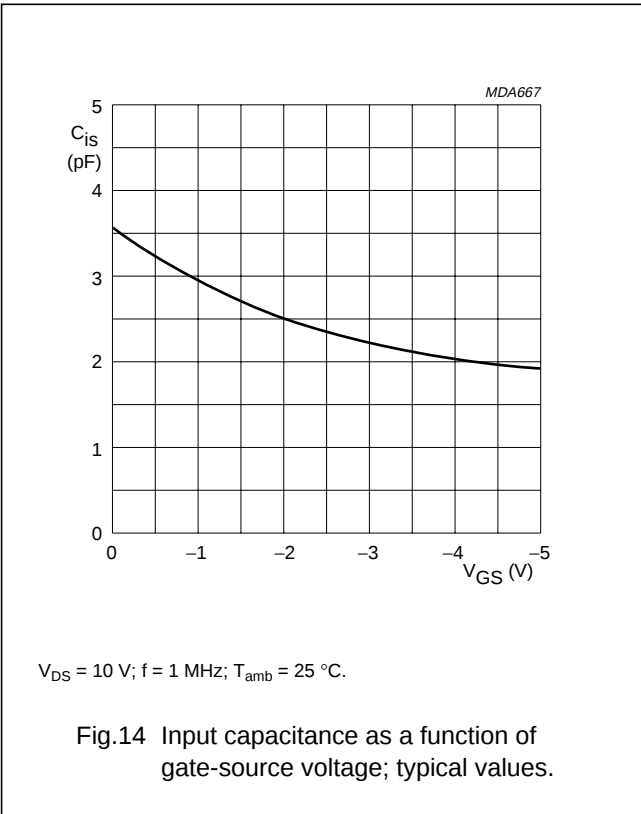
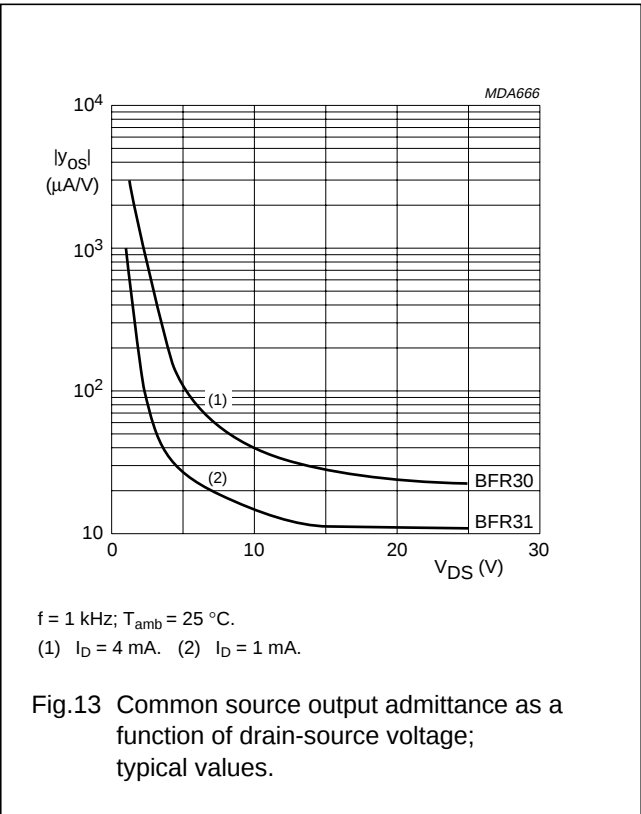
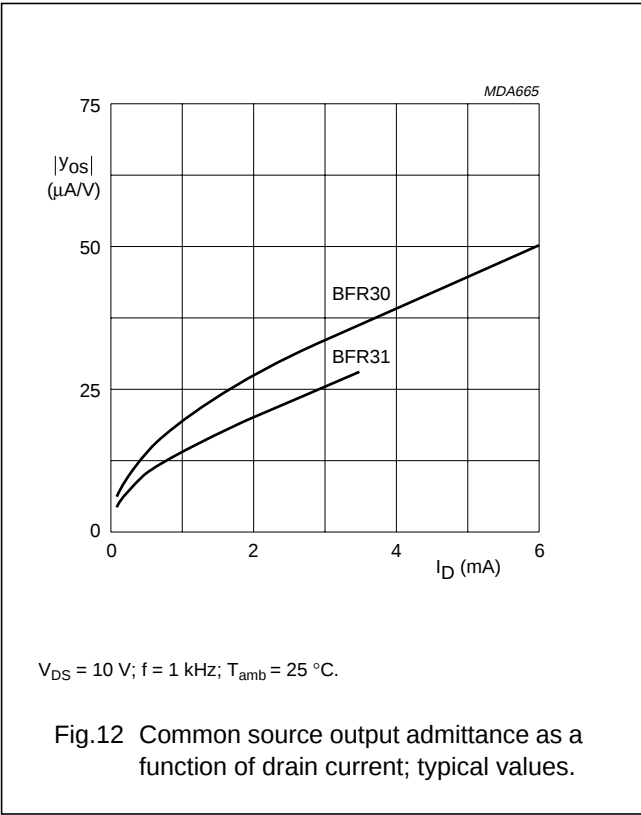
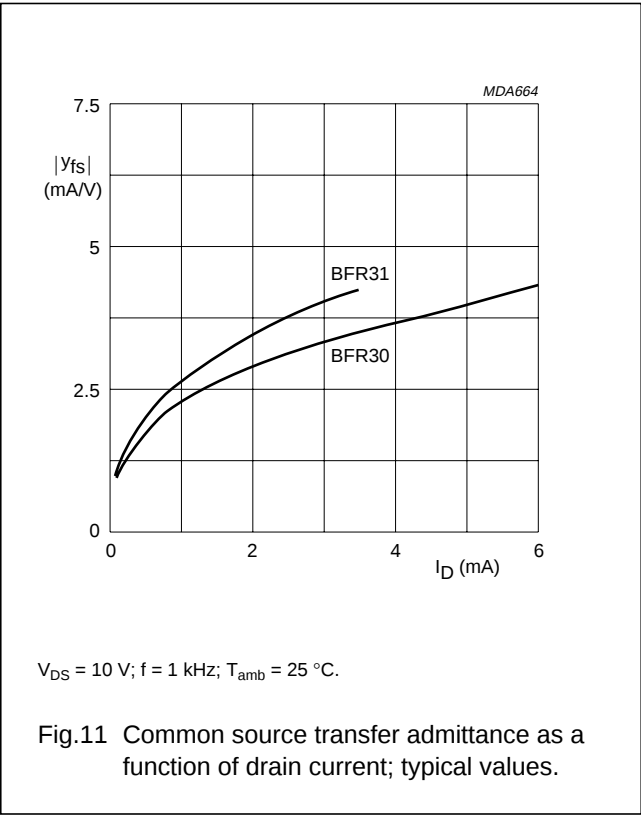


$I_D = 0.5\text{ nA}; V_{DS} = 10\text{ V}; V_{GS} = 0; T_j = 25\text{ }^{\circ}\text{C}.$

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

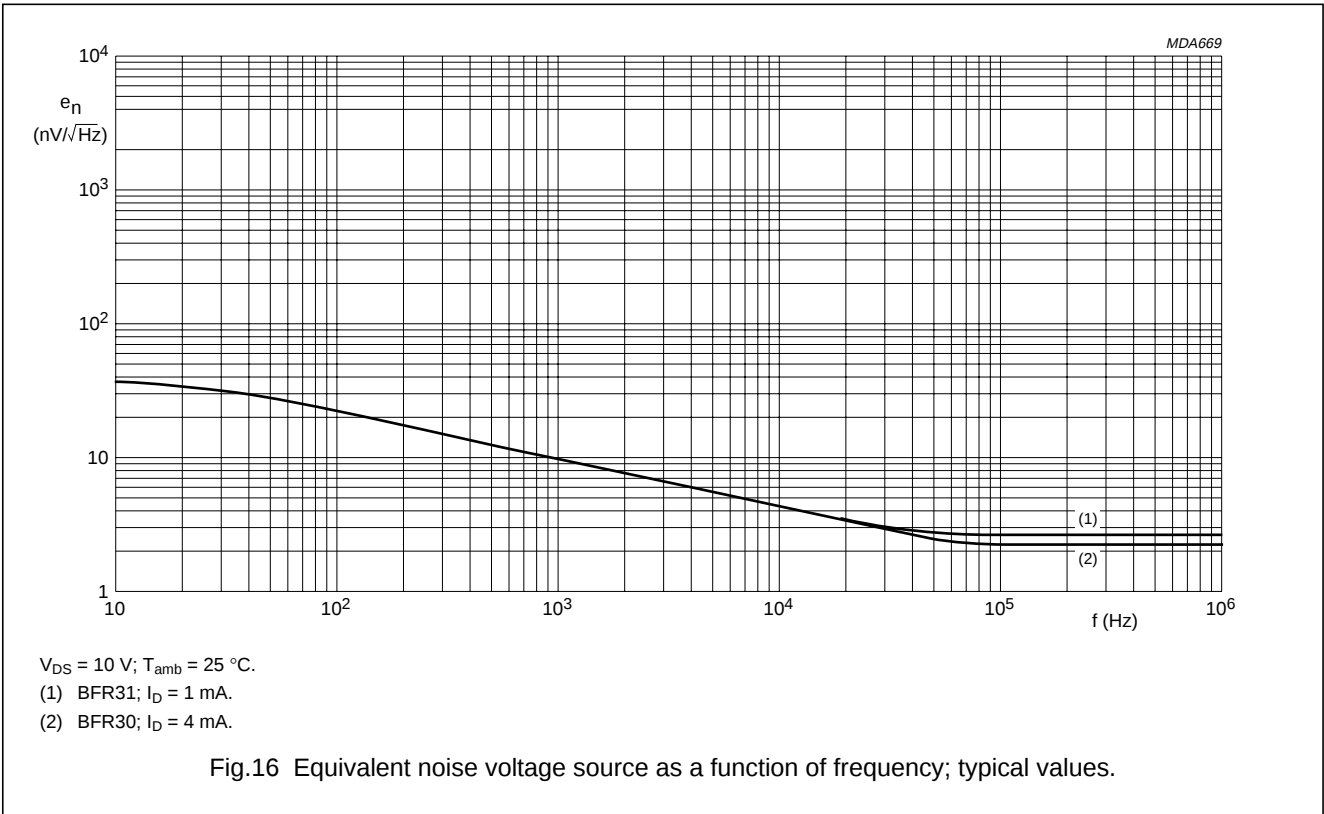
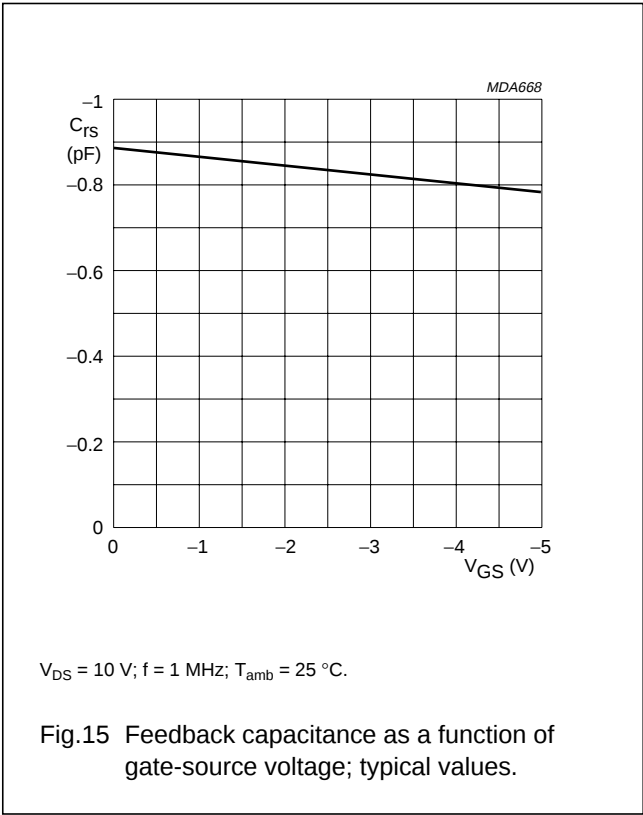
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BFR30; BFR31



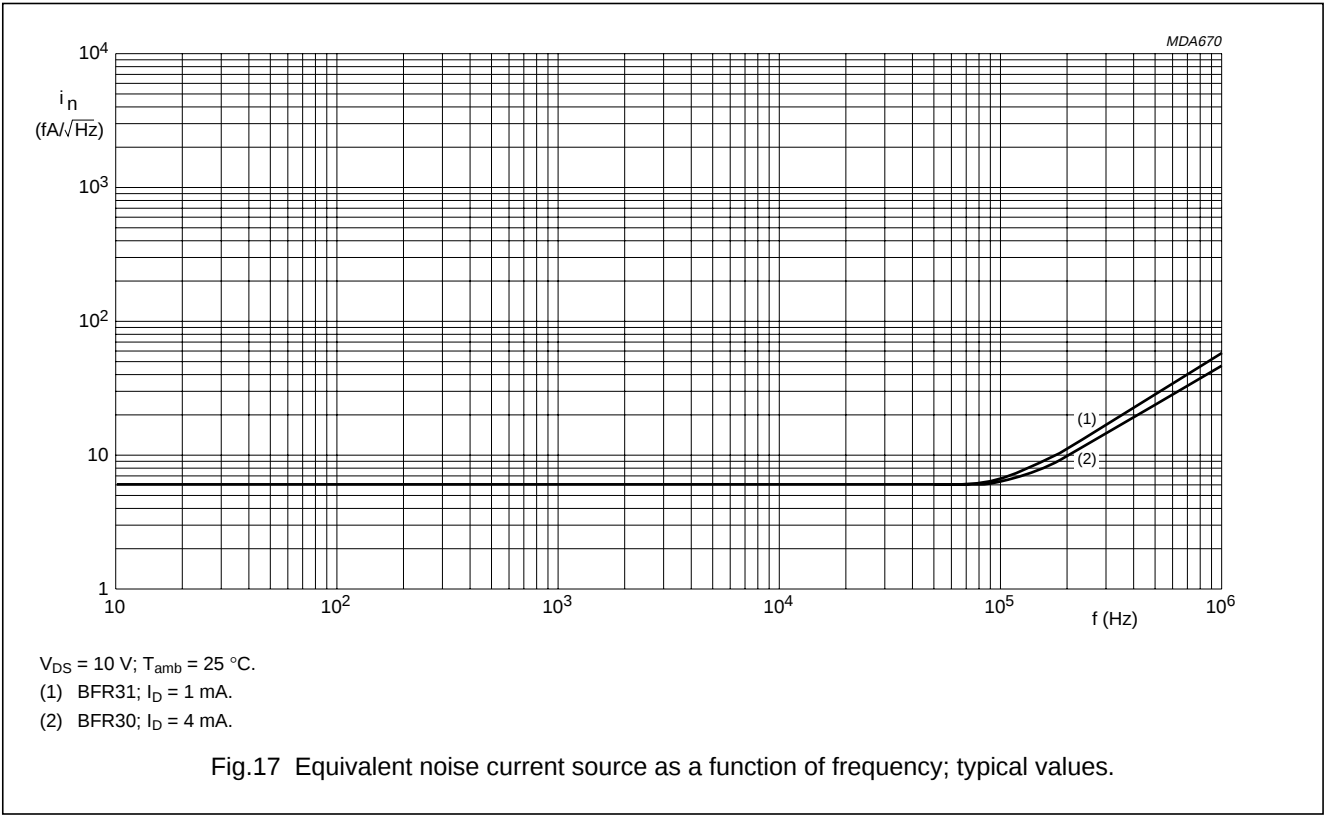
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BFR30; BFR31



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BFR30; BFR31



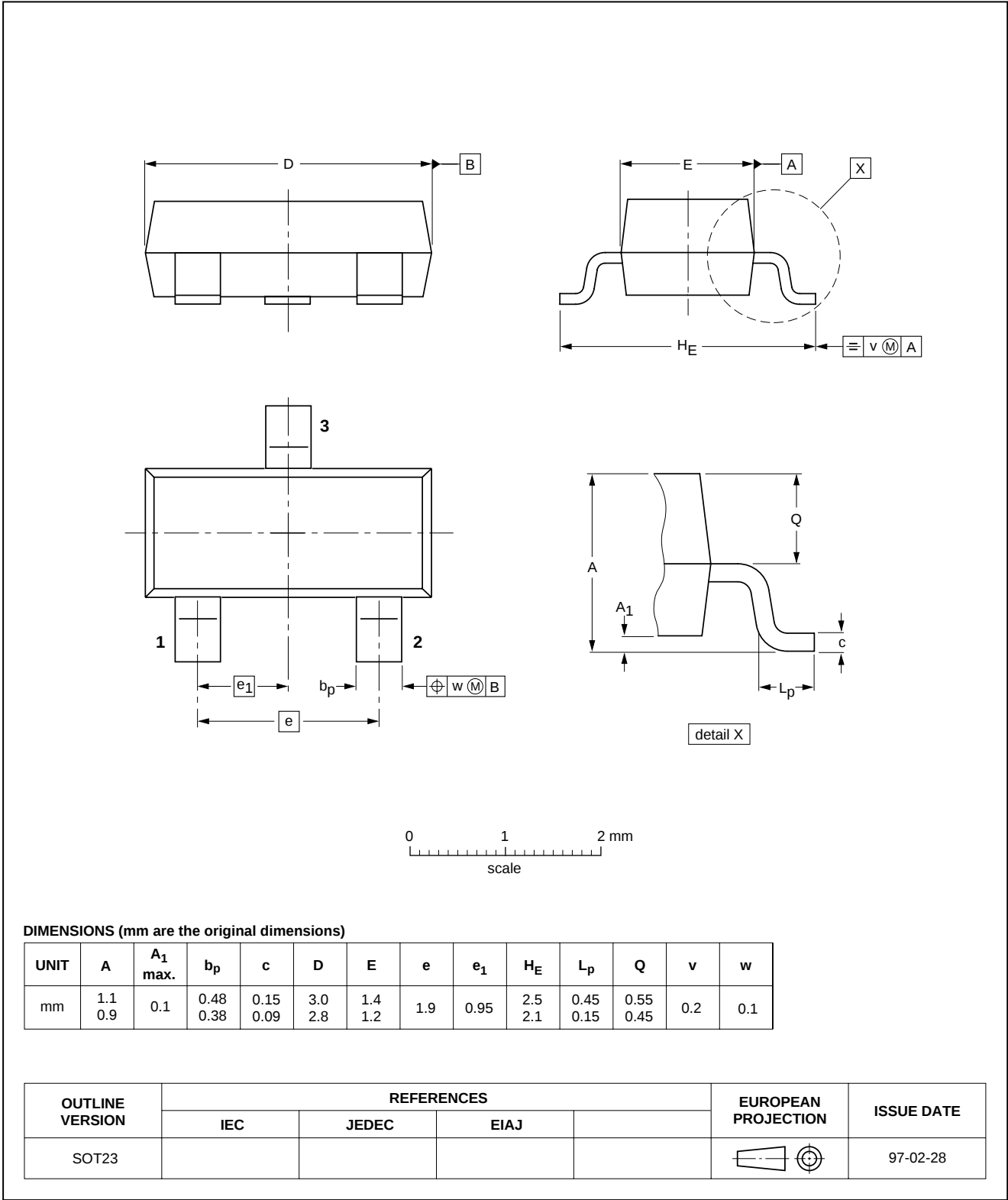
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



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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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SCA56

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