DATA SHEET

BF861A; BF861B; BF861C
N-channel junction FETs

Product specification
Supersedes data of 1995 Apr 14
File under Discrete Semiconductors, SC07

1997 Sep 04

Philips Semiconductors

PHILIPS

N-channel junction FETs BF861A; BF861B; BF861C

FEATURES

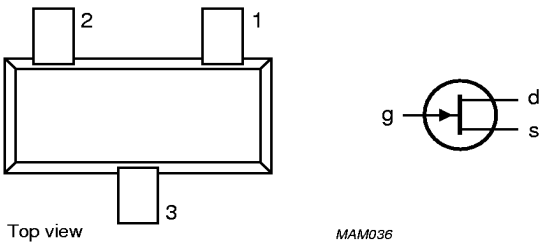
- High transfer admittance
- Low input capacitance
- Low feedback capacitance
- Low noise.

APPLICATIONS

- Preamplifiers for AM tuners in car radios.

DESCRIPTION

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



Marking codes:
BF861A: M33.
BF861B: M34.
BF861C: M35.

Fig.1 Simplified outline and symbol.

PINNING - SOT23

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

CAUTION
The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	25	V
I_{DSS}	drain current	V_{GS} = 0; V_{DS} = 8 V			
	BF861A		2	6.5	mA
	BF861B		6	15	mA
	BF861C		12	25	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	250	mW
$\lvert y_{fs} \rvert$	forward transfer admittance	V_{GS} = 0; V_{DS} = 8 V			
	BF861A		12	20	mS
	BF861B		16	25	mS
	BF861C		20	30	mS
C_{iss}	input capacitance	f = 1 MHz	–	10	pF
C_{rss}	reverse transfer capacitance	f = 1 MHz	–	2.7	pF

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	25	V
V_{GSO}	gate-source voltage	open drain	–	25	V
V_{DGO}	drain-gate voltage (DC)	open source	–	25	V
I_G	forward gate current (DC)		–	10	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C; note 1	–	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.

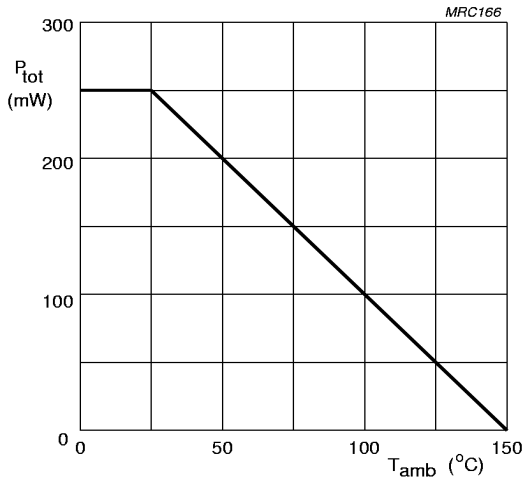


Fig.2 Power derating curve.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient; note 1	500	K/W

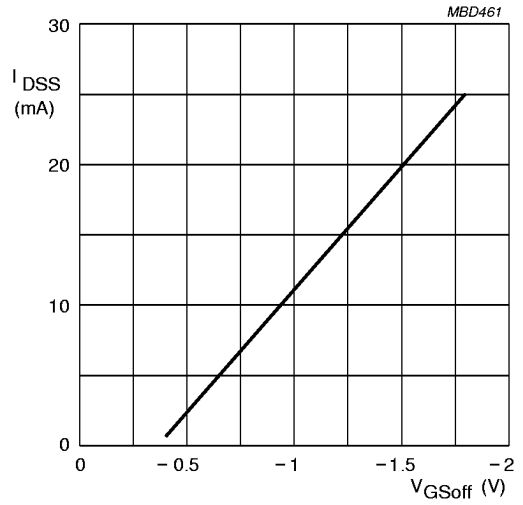
Note

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

CHARACTERISTICS

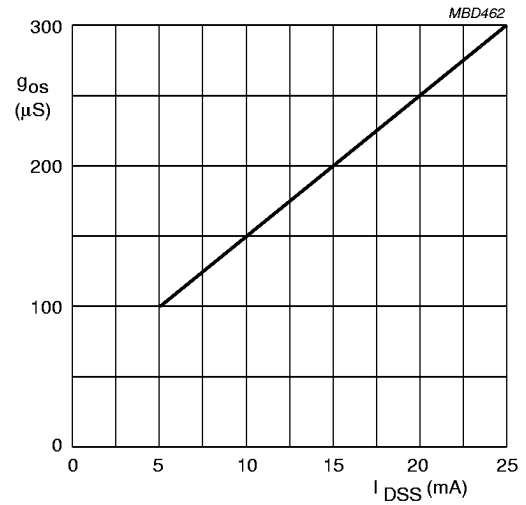
T_j = 25 °C; V_{DS} = 8 V; V_{GS} = 0; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)GSS}$	gate-source breakdown voltage	I_G = −1 μA	−25	–	–	V
V_{GSoff}	gate-source cut-off voltage	I_D = 1 μA				
	BF861A		−0.2	–	−1	V
	BF861B		−0.5	–	−1.5	V
	BF861C		−0.8	–	−2	V
V_{GSS}	gate-source forward voltage	V_{DS} = 0; I_G = 1 mA	–	–	1	V
I_{DSS}	drain current					
	BF861A		2	–	6.5	mA
	BF861B		6	–	15	mA
	BF861C		12	–	25	mA
I_{GSS}	gate cut-off current	V_{GS} = −20 V; V_{DS} = 0	–	–	−1	nA
$\lvert y_{fs} \rvert$	forward transfer admittance					
	BF861A		12	–	20	mS
	BF861B		16	–	25	mS
	BF861C		20	–	30	mS
g_{os}	common source output conductance					
	BF861A		–	–	200	μS
	BF861B		–	–	250	μS
	BF861C		–	–	300	μS
C_{iss}	input capacitance	f = 1 MHz	–	–	10	pF
C_{rss}	reverse transfer capacitance	f = 1 MHz	–	2.1	2.7	pF
$V_n/\sqrt{B}$	equivalent input noise voltage	V_{GS} = 0; f = 1 MHz	–	1.5	–	nV/√Hz



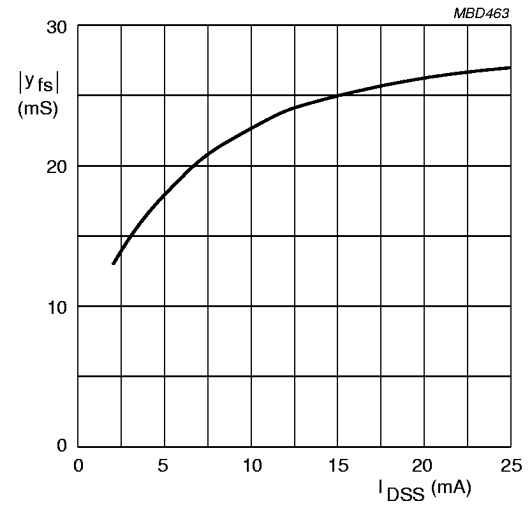
V_{DS} = 8 V.

Fig.3 Drain current as a function of gate-source cut-off voltage; typical values.



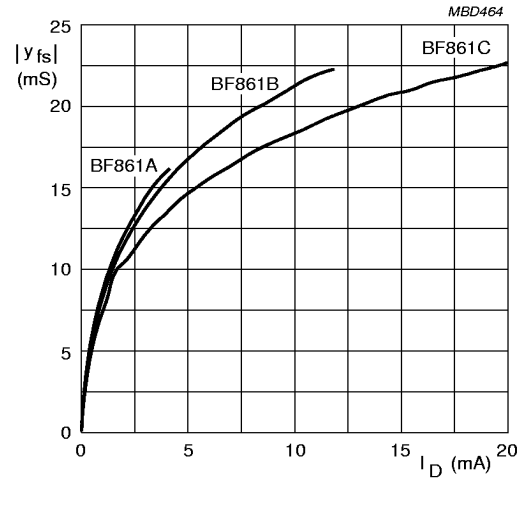
V_{DS} = 8 V.
V_{GS} = 0.

Fig.4 Common-source output conductance as a function of drain current; typical values.



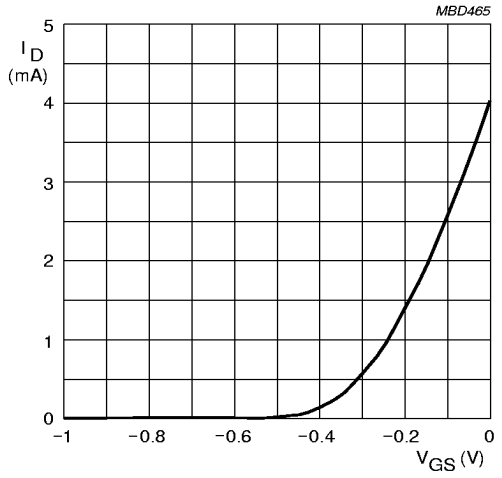
V_{DS} = 8 V.
V_{GS} = 0.

Fig.5 Forward transfer admittance as a function of drain current; typical values.



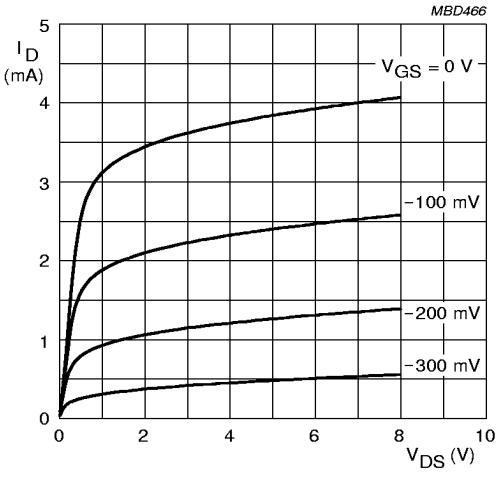
V_{DS} = 8 V.

Fig.6 Forward transfer admittance as a function of drain current; typical values.



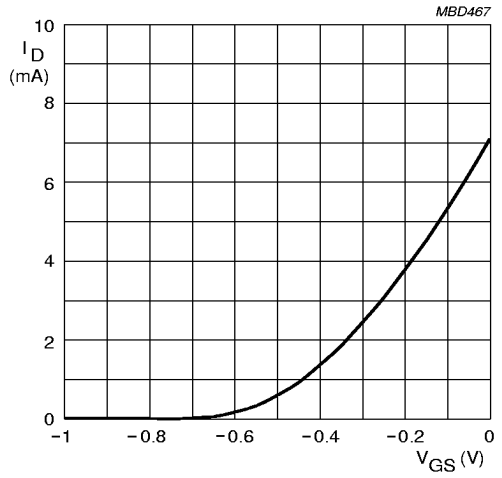
BF861A
V_{DS} = 8 V.

Fig.7 Typical input characteristics.



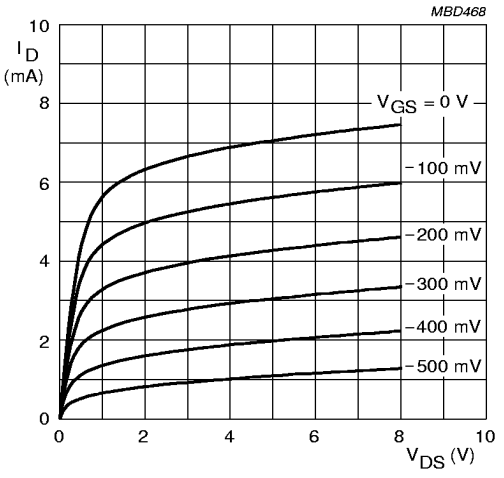
BF861A
V_{DS} = 8 V.

Fig.8 Typical output characteristics.



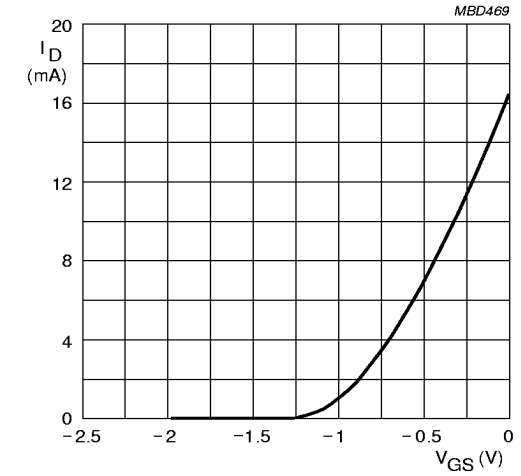
BF861B
V_{DS} = 8 V.

Fig.9 Typical input characteristics.



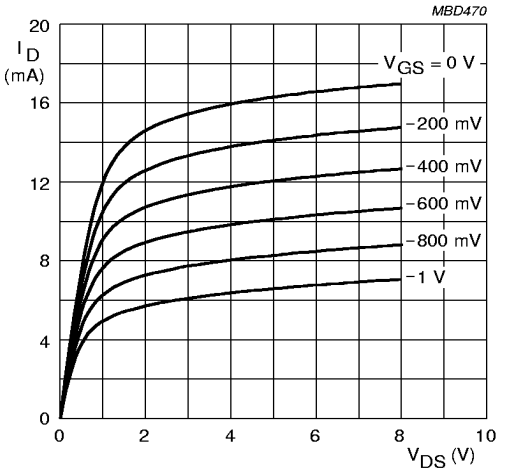
BF861B
V_{DS} = 8 V.

Fig.10 Typical output characteristics.



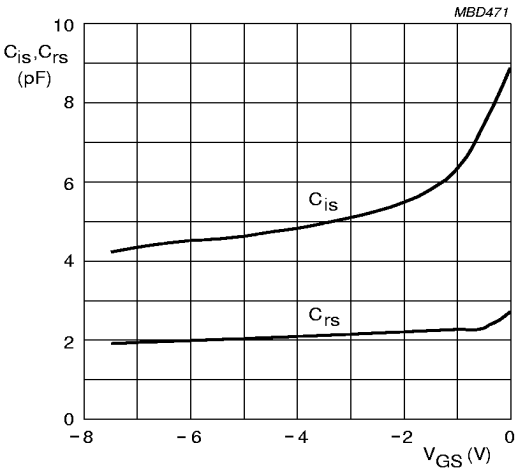
BF861C
V_{DS} = 8 V.

Fig.11 Typical input characteristics.



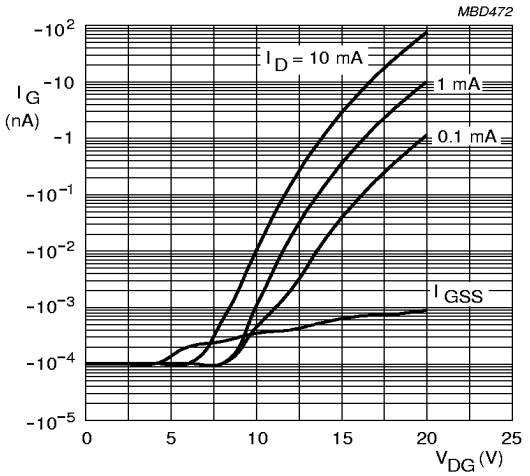
BF861C
V_{DS} = 8 V.

Fig.12 Typical output characteristics.



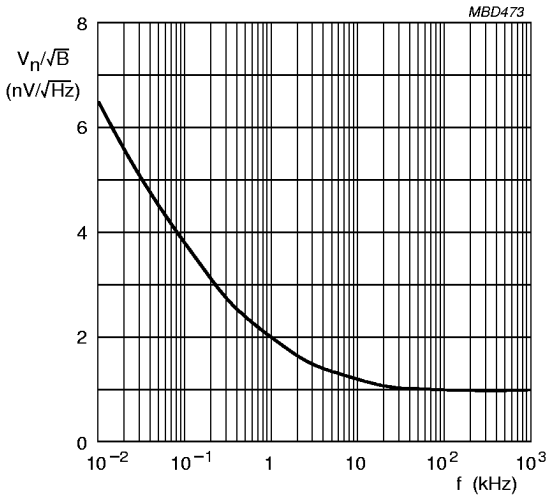
V_{DS} = 8 V.
f = 1 MHz.

Fig.13 Input and reverse transfer capacitance as functions of gate-source voltage; typical values.



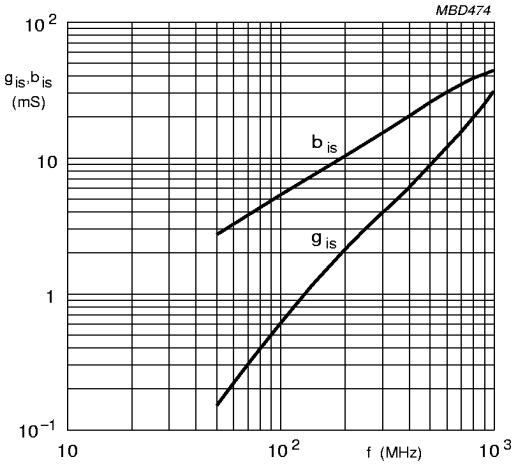
V_{DS} = 8 V.

Fig.14 Gate current as a function of drain-gate voltage; typical values.



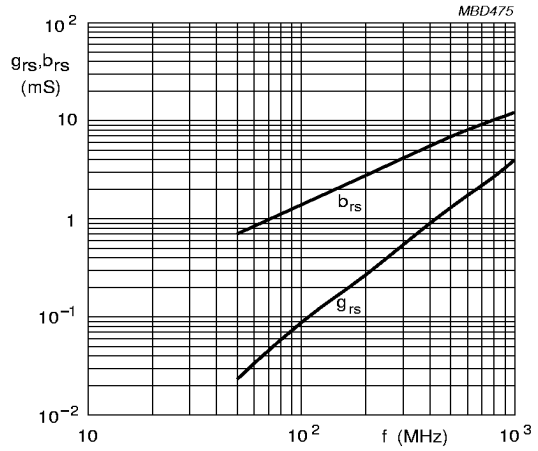
V_{DS} = 8 V.
V_{GS} = 0.

Fig.15 Equivalent input noise as a function of frequency; typical values.



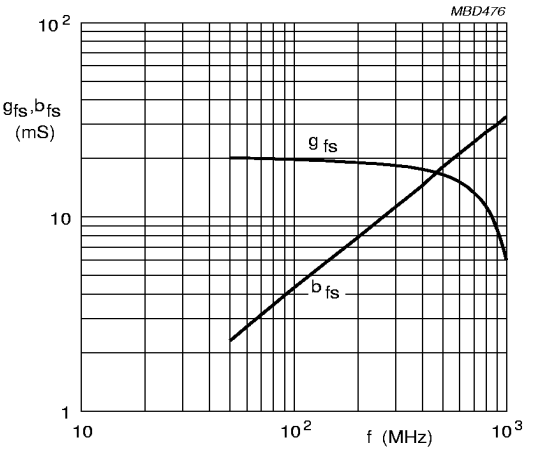
V_{DS} = 8 V.
V_{GS} = 0.
T_{amb} = 25 °C.

Fig.16 Common-source input admittance; typical values.



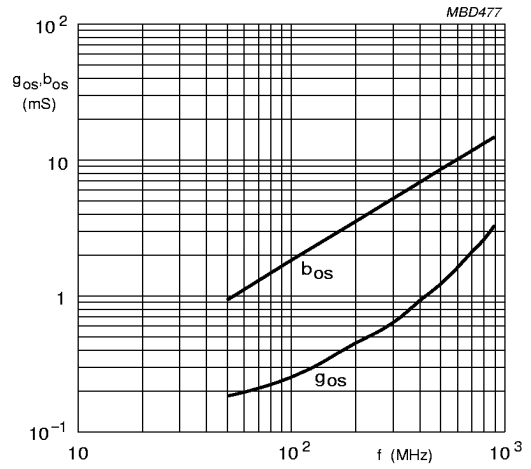
V_{DS} = 8 V.
V_{GS} = 0.
T_{amb} = 25 °C.

Fig.17 Common-source reverse admittance; typical values.



V_{DS} = 8 V.
V_{GS} = 0.
T_{amb} = 25 °C.

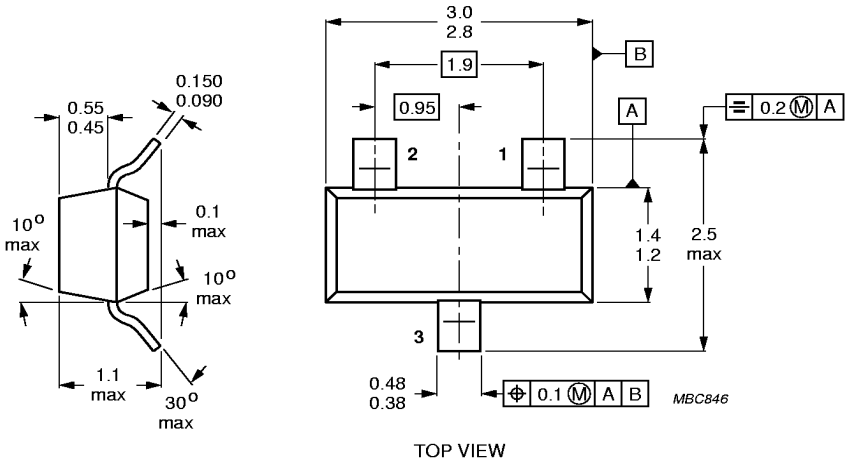
Fig.18 Common-source forward transfer admittance; typical values.



V_{DS} = 8 V.
V_{GS} = 0.
T_{amb} = 25 °C.

Fig.19 Common-source output admittance; typical values.

PACKAGE OUTLINE



Dimensions in mm.

Fig.20 SOT23.