



# BF861A; BF861B; BF861C

N-channel junction FETs

Rev. 5 — 15 September 2011

Product data sheet

## 1. Product profile

### 1.1 General description

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

#### CAUTION



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

### 1.2 Features and benefits

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

### 1.3 Applications

- Preamplifiers for AM tuners in car radios.

### 1.4 Quick reference data

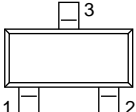

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DS}$	drain-source voltage (DC)		-	-	25	V
$I_{DSS}$	drain current					
	BF861A	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	2	-	6.5	mA
	BF861B	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	6	-	15	mA
	BF861C	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	12	-	25	mA
$P_{tot}$	total power dissipation	up to $T_{amb} = 25\text{ °C}$	-	-	250	mW
$ y_{fs} $	forward transfer admittance;					
	BF861A	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	12	-	20	mS
	BF861B	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	16	-	25	mS
	BF861C	$V_{GS} = 0\text{ V}; V_{DS} = 8\text{ V}$	20	-	30	mS
$C_{iss}$	input capacitance	$f = 1\text{ MHz}$	-	-	10	pF
$C_{rss}$	reverse transfer capacitance	$f = 1\text{ MHz}$	-	-	2.7	pF



## 2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Symbol
1	source		 sym053
2	drain		
3	gate		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BF861A	-	plastic surface mounted package; 3 leads	SOT23
BF861B	-	plastic surface mounted package; 3 leads	SOT23
BF861C	-	plastic surface mounted package; 3 leads	SOT23

## 4. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
BF861A	28*
BF861B	29*
BF861C	30*

[1] \* = p: Made in Hong Kong.

\* = t: Made in Malaysia.

\* = W: Made in China.

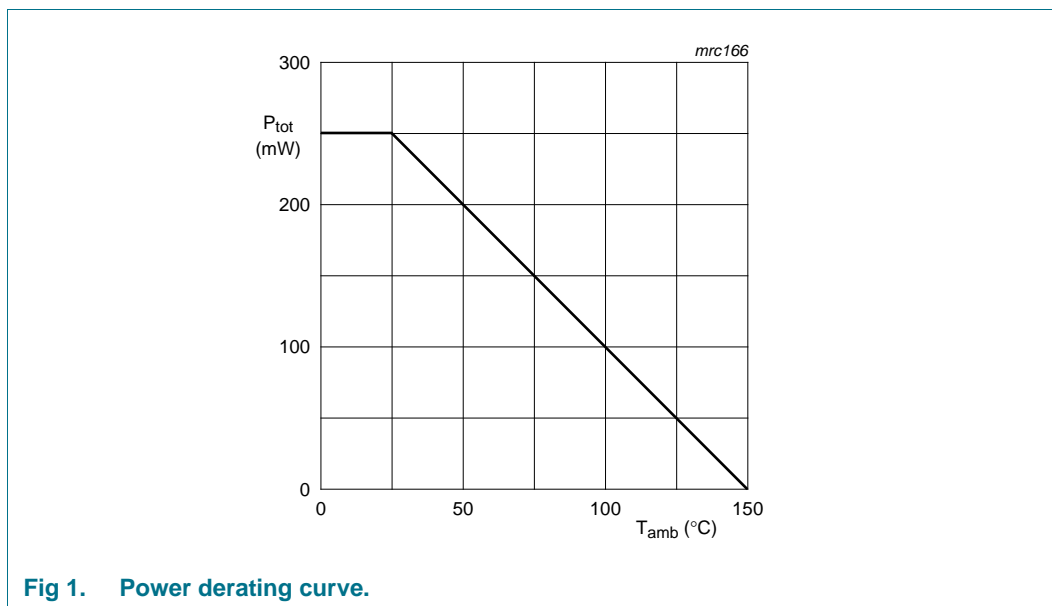
## 5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

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 $T_{amb} = 25\text{ °C}$ [1]	-	250	mW
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	operating junction temperature		-	150	°C

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



## 6. Thermal characteristics

**Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1] 500	K/W

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

## 7. Characteristics

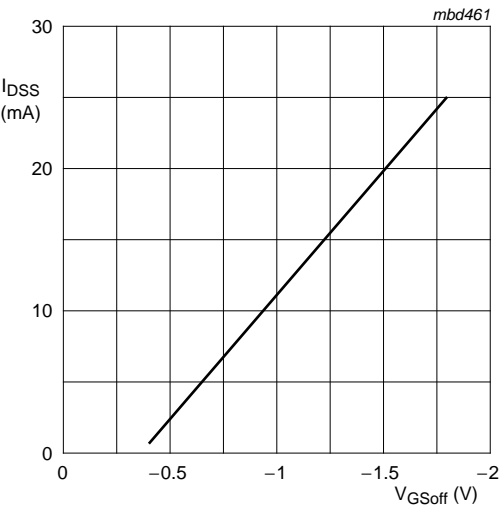
**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$	-25	-	-	V
$V_{GSoff}$	gate-source cut-off voltage					
	BF861A	$I_D = 1\text{ }\mu\text{A}$	-0.2	-	-1	V
	BF861B	$I_D = 1\text{ }\mu\text{A}$	-0.5	-	-1.5	V
	BF861C	$I_D = 1\text{ }\mu\text{A}$	-0.8	-	-2	V
$V_{GSS}$	gate-source forward voltage	$V_{DS} = 0\text{ V}$ ; $I_G = 1\text{ mA}$	-	-	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	$V_{GS} = -20\text{ V}$ ; $V_{DS} = 0\text{ V}$	-	-	-1	nA

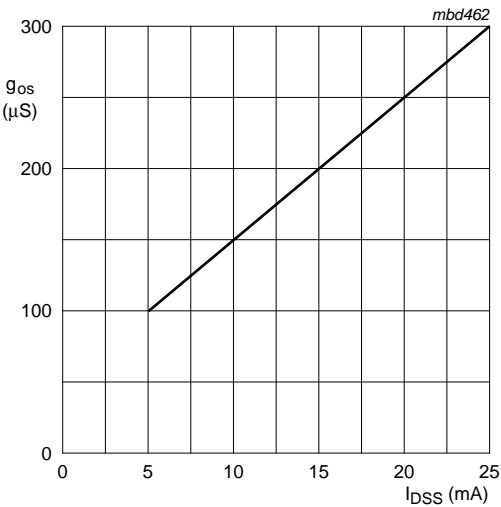
**Table 7. Characteristics ...continued**  
*T<sub>j</sub> = 25 °C; V<sub>DS</sub> = 8 V; V<sub>GS</sub> = 0 V unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
y <sub>fs</sub>	forward transfer admittance					
	BF861A		12	-	20	mS
	BF861B		16	-	25	mS
	BF861C		20	-	30	mS
g <sub>os</sub>	common source output conductance					
	BF861A		-	-	200	μS
	BF861B		-	-	250	μS
	BF861C		-	-	300	μS
C <sub>iss</sub>	input capacitance	f = 1 MHz	-	-	10	pF
C <sub>rss</sub>	reverse transfer capacitance	f = 1 MHz	-	2.1	2.7	pF
V <sub>n</sub> /√B	equivalent input noise voltage	V <sub>GS</sub> = 0 V; f = 1 MHz	-	1.5	-	nV/√Hz



V<sub>DS</sub> = 8 V.

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



V<sub>DS</sub> = 8 V.

V<sub>GS</sub> = 0 V.

**Fig 3. Common-source output conductance as a function of drain current; typical values.**

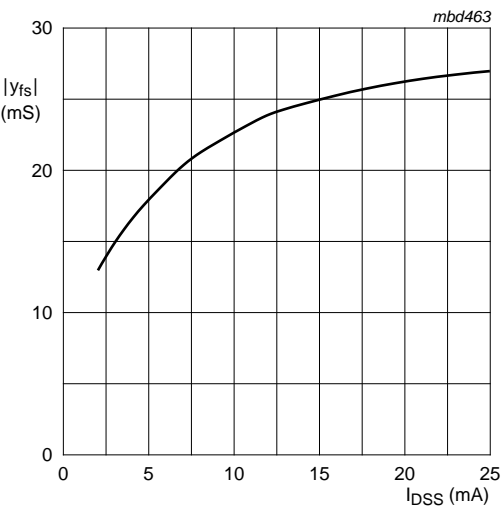


Fig 4. Forward transfer admittance as a function of drain current; typical values.

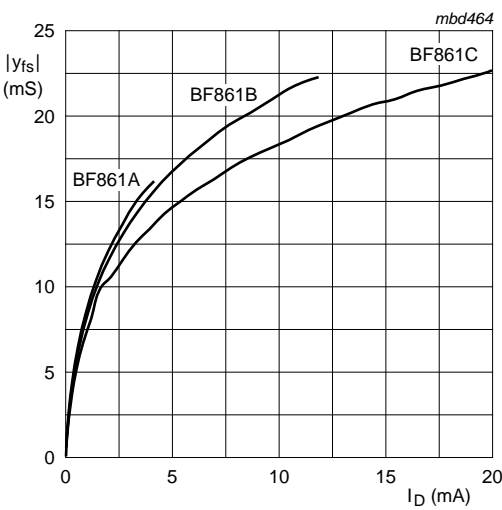


Fig 5. Forward transfer admittance as a function of drain current; typical values.

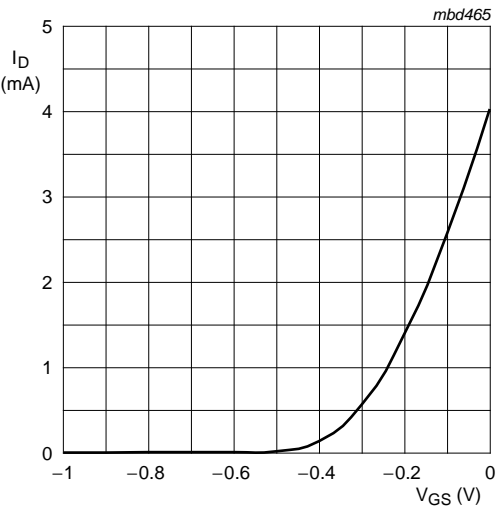


Fig 6. Typical input characteristics; BF861A.

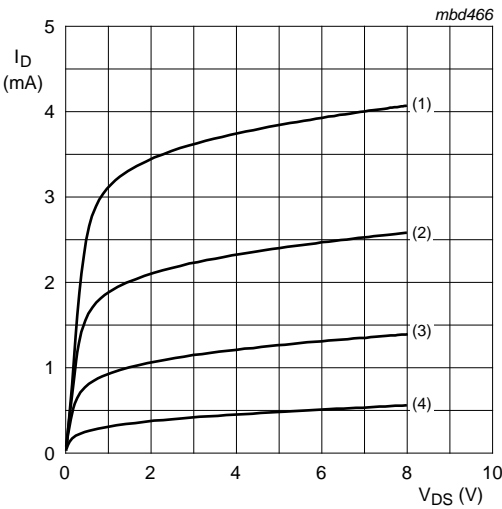
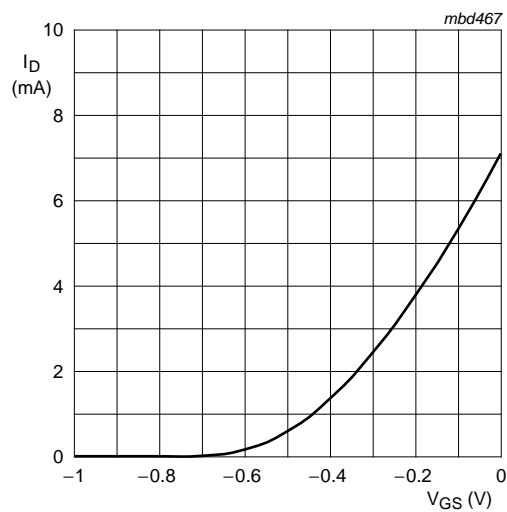
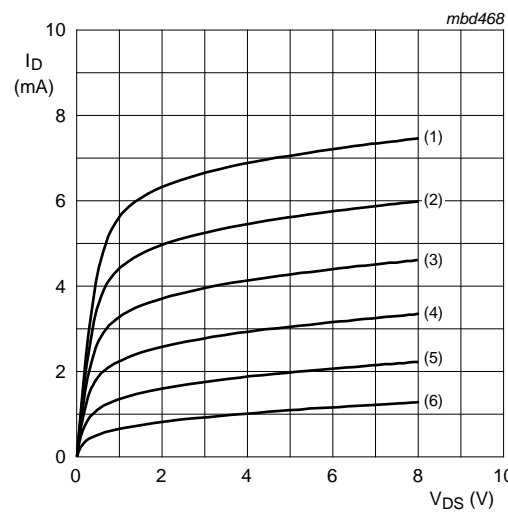


Fig 7. Typical output characteristics: BF861A.



$V_{DS} = 8\text{ V.}$

Fig 8. Typical input characteristics; BF861B.



$V_{DS} = 8\text{ V.}$

- (1)  $V_{GS} = 0\text{ V.}$
- (2)  $V_{GS} = -100\text{ mV.}$
- (3)  $V_{GS} = -200\text{ mV.}$
- (4)  $V_{GS} = -300\text{ mV.}$
- (5)  $V_{GS} = -400\text{ mV.}$
- (6)  $V_{GS} = -500\text{ mV.}$

Fig 9. Typical output characteristics; BF861B.

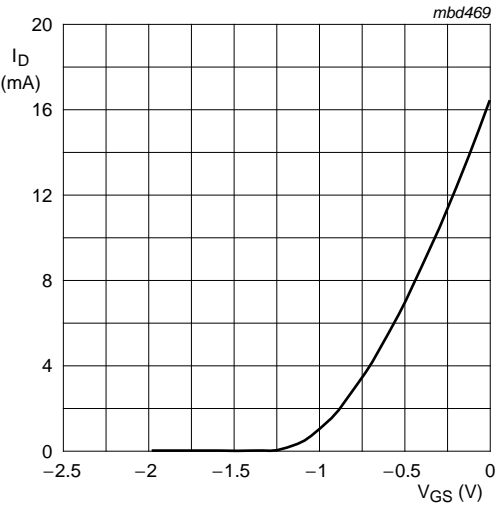


Fig 10. Typical input characteristics; BF861C.

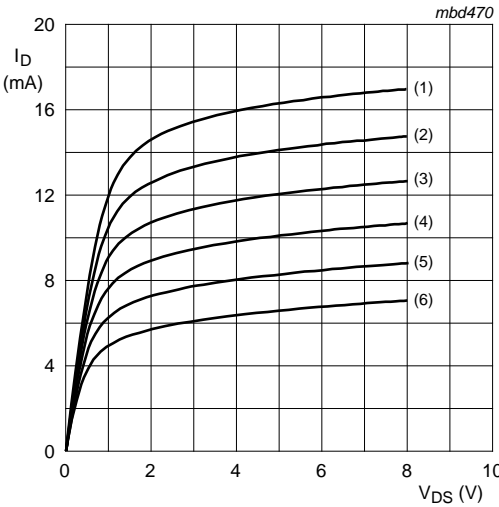


Fig 11. Typical output characteristics; BF861C.

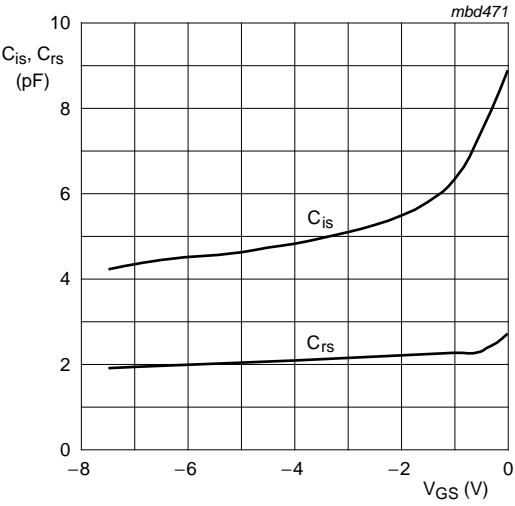


Fig 12. Input and reverse transfer capacitance as functions of gate-source voltage; typical values.

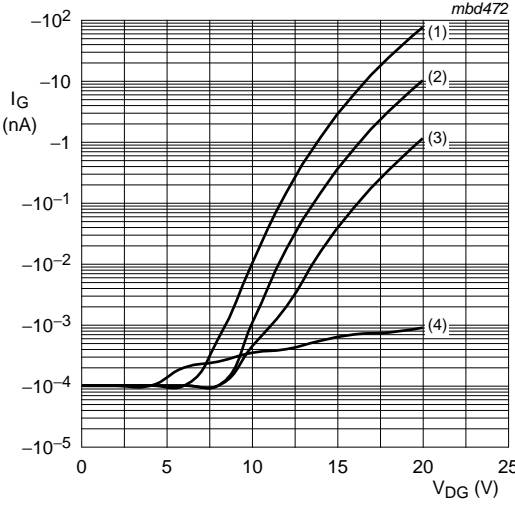
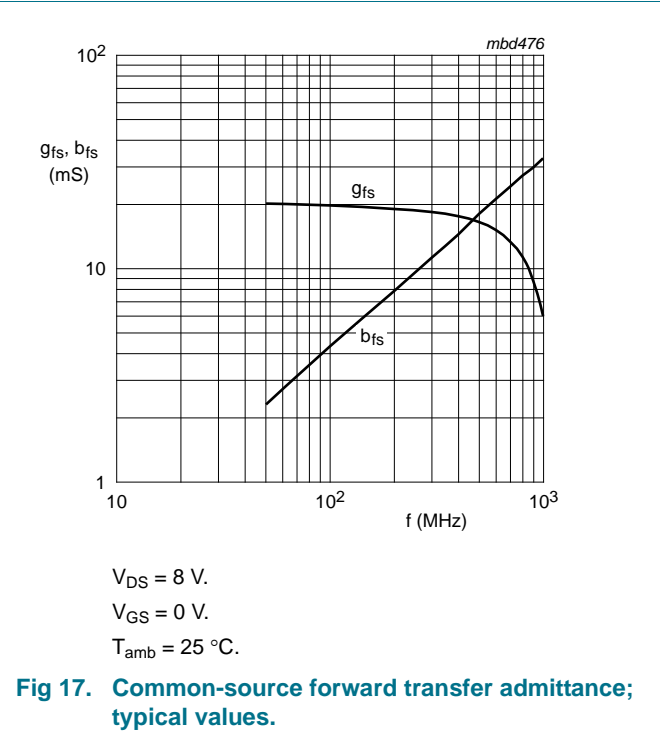
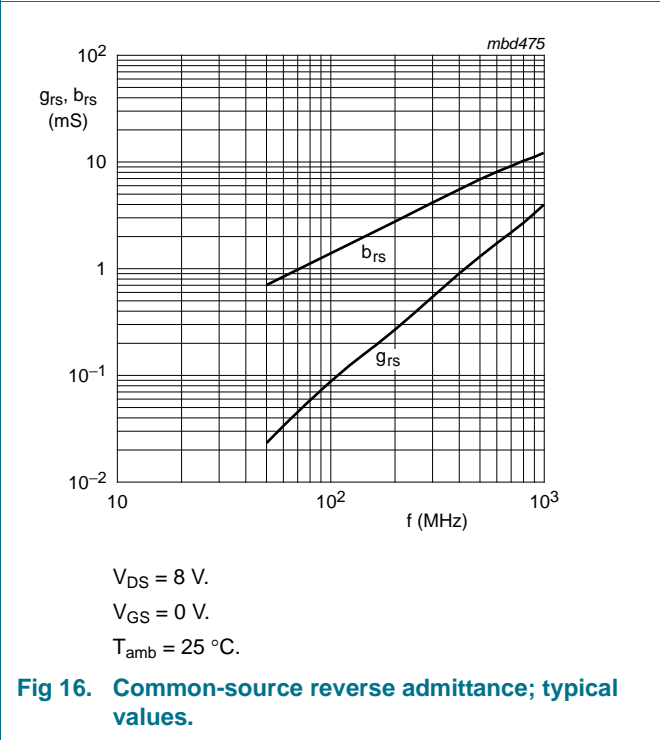
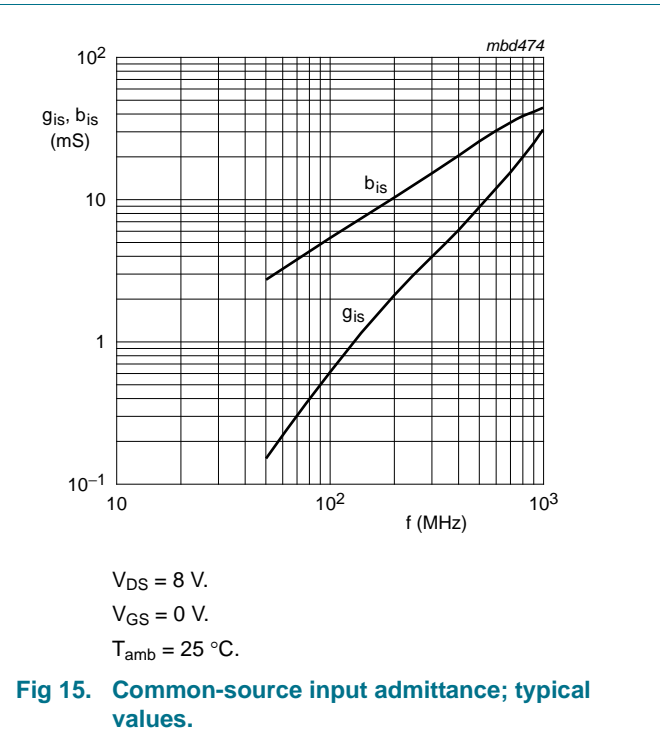
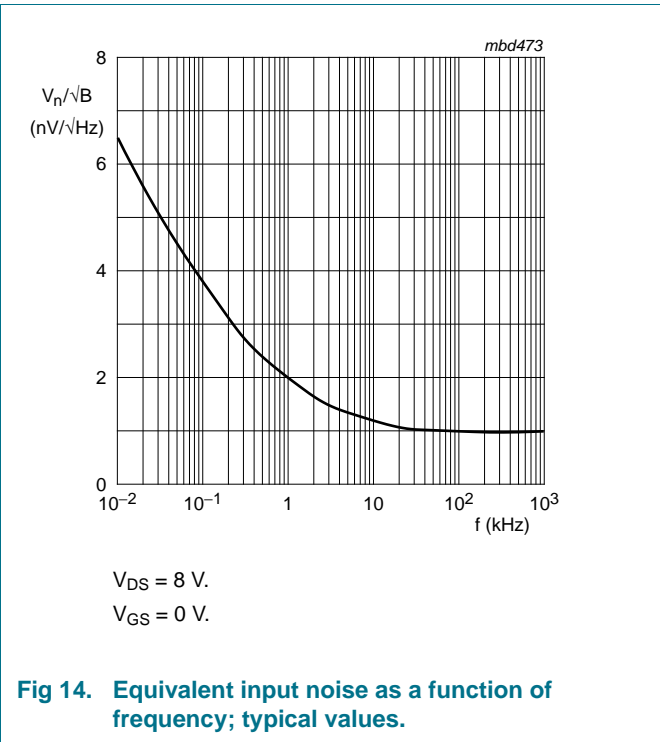
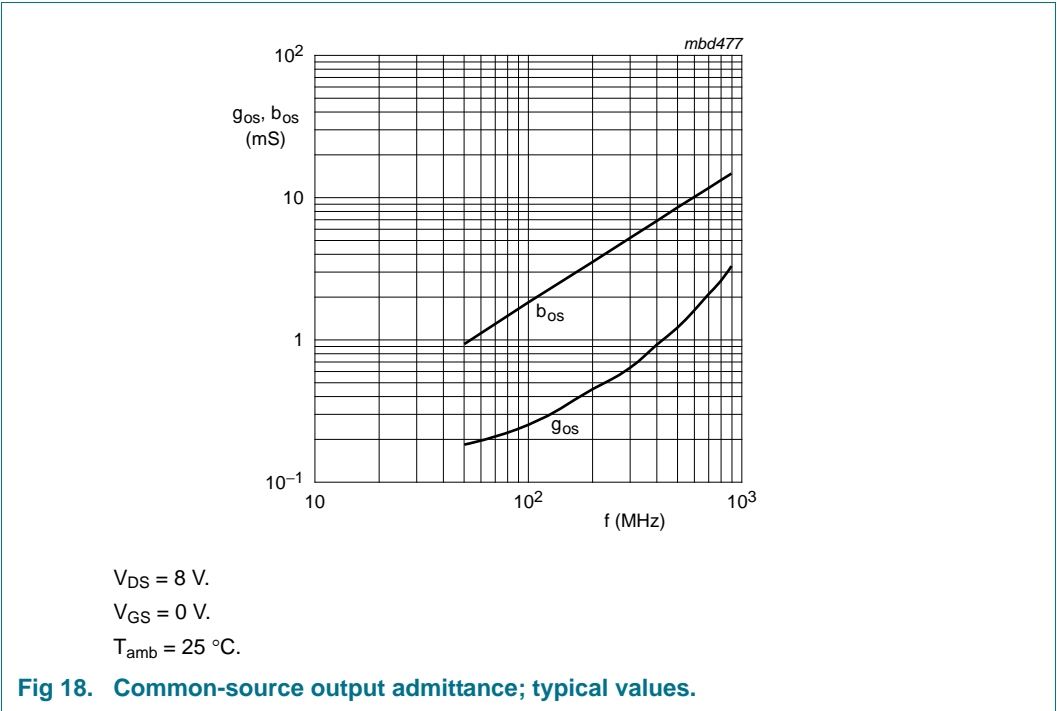


Fig 13. Gate current as a function of drain-gate voltage; typical values.





8. Package outline

Plastic surface-mounted package; 3 leadsSOT23

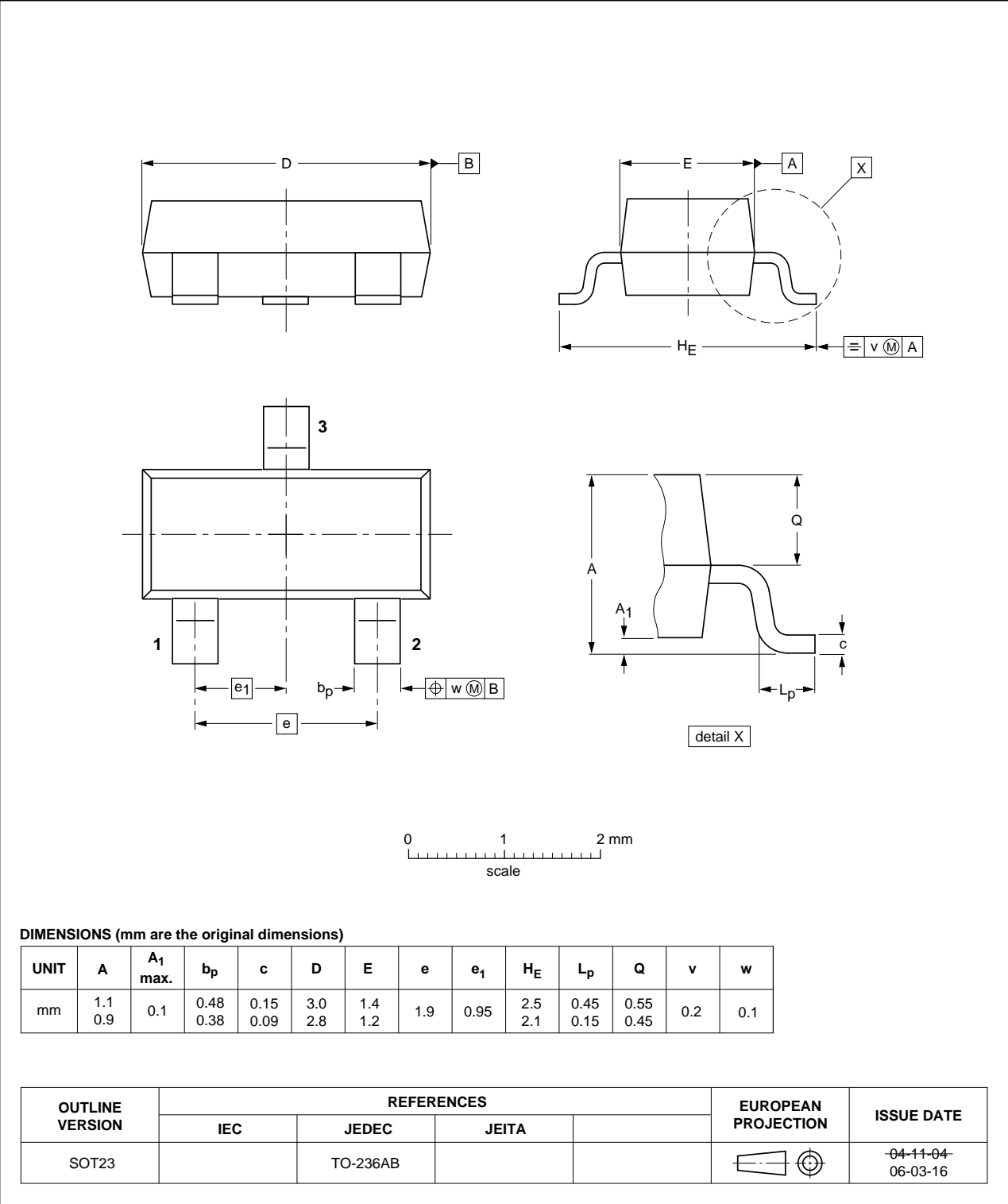


Fig 19. Package outline

## 9. Revision history

**Table 8.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BF861A_BF861B_BF861C v.5	20110915	Product data sheet	-	BF861A_BF861B_BF861C v.4
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Package outline drawings have been updated to the latest version.</li></ul>			
BF861A_BF861B_BF861C v.4 (9397 750 13395)	20040924	Product data sheet	-	BF861 v.3
BF861 v.3 (9397 750 02667)	19970904	Product specification	-	BF861 v.2
BF861 v.2	19950414	-	-	BF861 v.1
BF861 v.1	19940829	-	-	-

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### 10.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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