



# BF556A; BF556B; BF556C

N-channel silicon junction field-effect transistors

Rev. 4 — 15 September 2011

Product data sheet

## 1. Product profile

### 1.1 General description

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

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

- Low leakage level (typ. 500 fA)
- High gain
- Low cut-off voltage.

### 1.3 Applications

- Impedance converters in e.g. electret microphones and infrared detectors
- VHF amplifiers in oscillators and mixers.

### 1.4 Quick reference data

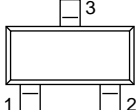

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DS}$	drain-source voltage (DC)		-	-	$\pm 30$	V
$V_{GSoff}$	gate-source cut-off voltage	$I_D = 200 \mu A$ ; $V_{DS} = 15 V$	-0.5	-	-7.5	V
$I_{DSS}$	drain current	$V_{GS} = 0 V$ ; $V_{DS} = 15 V$				
		BF556A	3	-	7	mA
		BF556B	6	-	13	mA
		BF556C	11	-	18	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 ^\circ C$	-	-	250	mW
$ y_{fs} $	forward transfer admittance	$V_{GS} = 0 V$ ; $V_{DS} = 15 V$	4.5	-	-	mS



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	source (s)		 sym054
2	drain (d)		
3	gate (g)		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BF556A	-	plastic surface mounted package; 3 leads	SOT23
BF556B			
BF556C			

## 4. Marking

Table 4. Marking

Type number	Marking code <sup>[1]</sup>
BF556A	24*
BF556B	25*
BF556C	26*

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

\* = t: made in Malaysia.

\* = W: made in China.

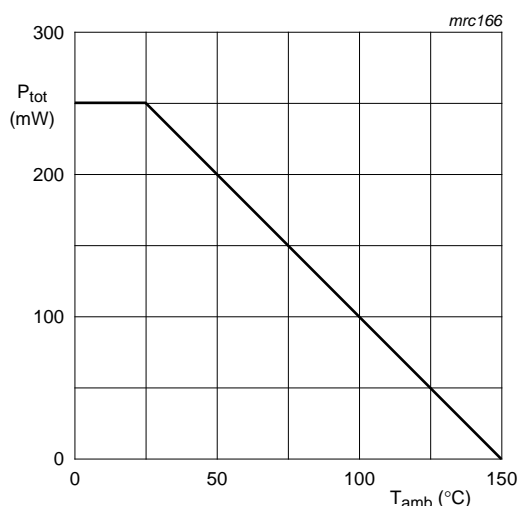
## 5. Limiting values

**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)		-	$\pm 30$	V
$V_{GSO}$	gate-source voltage	open drain	-	-30	V
$V_{GDO}$	gate-drain voltage (DC)	open source	-	-30	V
$I_G$	forward gate current (DC)		-	10	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	250	mW
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	150	°C

[1] Device mounted on an FR4 printed-circuit board, maximum lead length 4 mm; mounting pad for the drain lead 10 mm<sup>2</sup>.



**Fig 1. Power derating curve.**

## 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, maximum lead length 4 mm; mounting pad for the drain lead 10 mm<sup>2</sup>.

## 7. Static characteristics

**Table 7. Static characteristics**

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

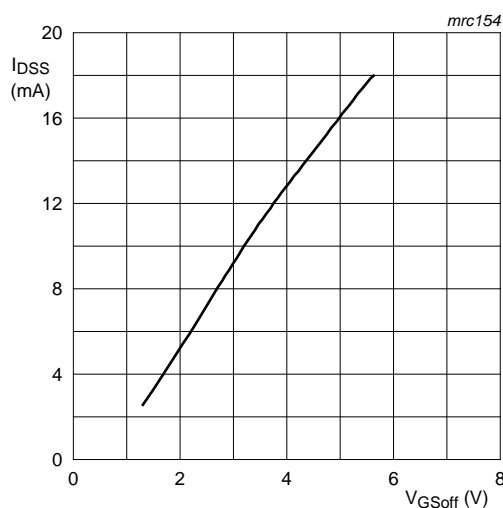
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$ ; $V_{DS} = 0\text{ V}$	-30	-	-	V
$V_{GSoff}$	gate-source cut-off voltage	$I_D = 200\text{ }\mu\text{A}$ ; $V_{DS} = 15\text{ V}$	-0.5	-	-7.5	V
$I_{DSS}$	drain current	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 15\text{ V}$				
		BF556A	3	-	7	mA
		BF556B	6	-	13	mA
		BF556C	11	-	18	mA
$I_{GSS}$	gate-source leakage current	$V_{GS} = -20\text{ V}$ ; $V_{DS} = 0\text{ V}$	-	-0.5	-5000	pA
$ y_{fs} $	forward transfer admittance	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 15\text{ V}$	4.5	-	-	mS
$ y_{os} $	common source output admittance	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 15\text{ V}$	-	40	-	$\mu\text{S}$

## 8. Dynamic characteristics

**Table 8. Dynamic characteristics**

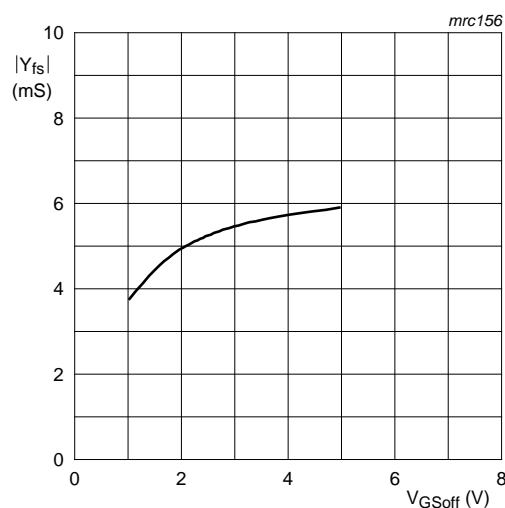
$T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$C_{iss}$	input capacitance	$V_{DS} = 15\text{ V}; f = 1\text{ MHz}$				
		$V_{GS} = -10\text{ V}$	-	1.7	-	pF
		$V_{GS} = 0\text{ V}$	-	3	-	pF
$C_{rss}$	reverse transfer capacitance	$V_{DS} = 15\text{ V}; f = 1\text{ MHz}$				
		$V_{GS} = -10\text{ V}$	-	0.8	-	pF
		$V_{GS} = 0\text{ V}$	-	0.9	-	pF
$g_{is}$	common source input conductance	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}$				
		$f = 100\text{ MHz}$	-	15	-	$\mu\text{S}$
		$f = 450\text{ MHz}$	-	300	-	$\mu\text{S}$
$g_{fs}$	common source transfer conductance	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}$				
		$f = 100\text{ MHz}$	-	2	-	mS
		$f = 450\text{ MHz}$	-	1.8	-	mS
$g_{rs}$	common source reverse conductance	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}$				
		$f = 100\text{ MHz}$	-	-6	-	$\mu\text{S}$
		$f = 450\text{ MHz}$	-	-40	-	$\mu\text{S}$
$g_{os}$	common source output conductance	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}$				
		$f = 100\text{ MHz}$	-	30	-	$\mu\text{S}$
		$f = 450\text{ MHz}$	-	60	-	$\mu\text{S}$
$V_n$	equivalent input noise voltage	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA};$ $f = 100\text{ Hz}$	-	40	-	nV/ $\sqrt{\text{Hz}}$



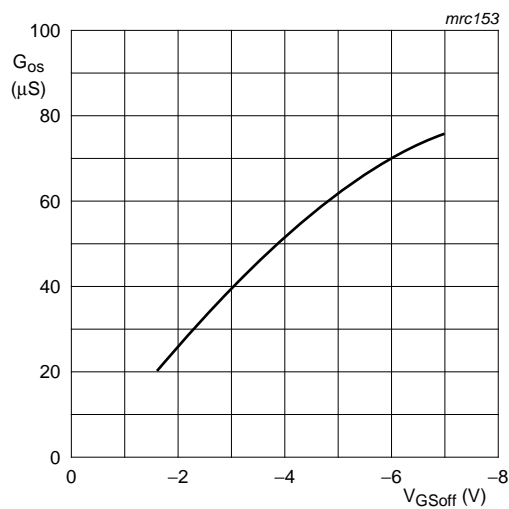
$V_{DS} = 15\text{ V}.$

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



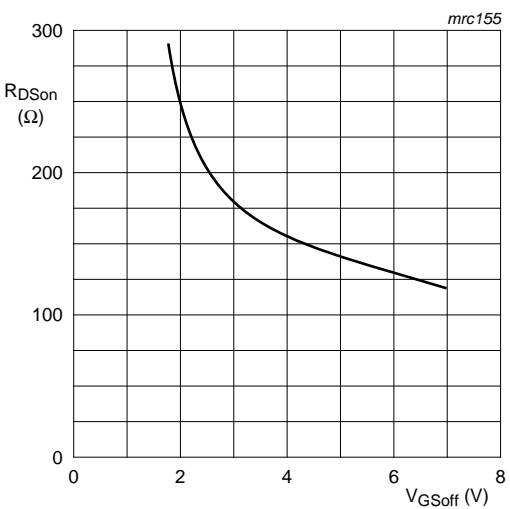
$V_{DS} = 15\text{ V}; I_D = 1\text{ }\mu\text{A}.$

**Fig. 3. Forward transfer admittance as a function of gate-source cut-off voltage; typical values.**



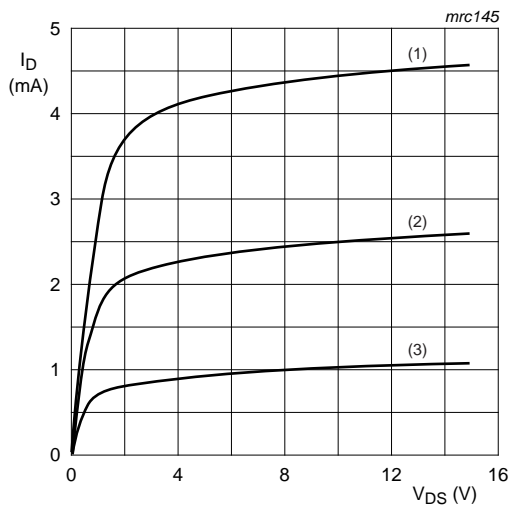
$V_{DS} = 15$  V.

Fig 4. Common-source output conductance as a function of gate-source cut-off voltage; typical values.



$V_{DS} = 100$  mV;  $V_{GS} = 0$  V.

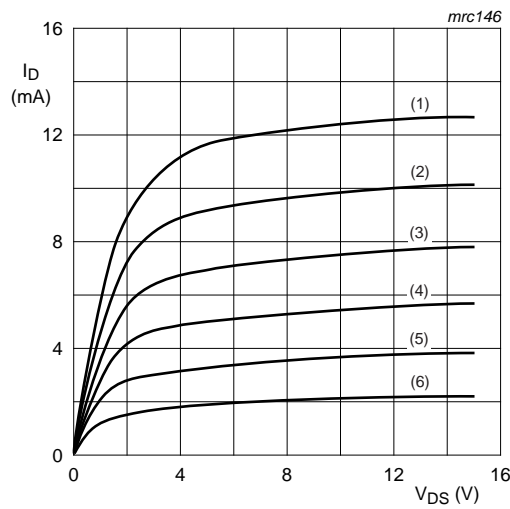
Fig 5. Drain-source on-state resistance as a function of gate-source cut-off voltage; typical values.



**BF556A**

- (1)  $V_{GS} = 0$  V.
- (2)  $V_{GS} = -0.5$  V.
- (3)  $V_{GS} = -1.0$  V.

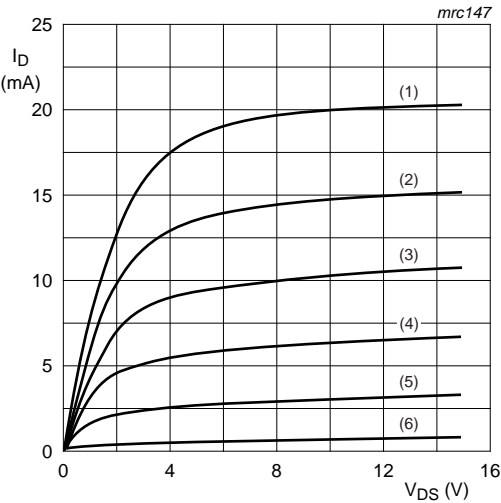
Fig 6. Typical output characteristics.



**BF556B**

- (1)  $V_{GS} = 0$  V.
- (2)  $V_{GS} = -0.5$  V.
- (3)  $V_{GS} = -1.0$  V.
- (4)  $V_{GS} = -1.5$  V.
- (5)  $V_{GS} = -2.0$  V.
- (6)  $V_{GS} = -2.5$  V.

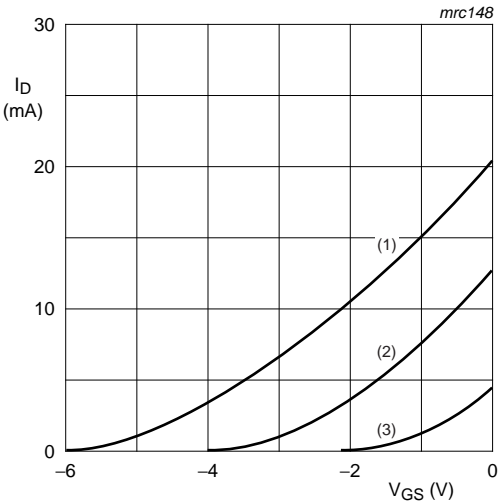
Fig 7. Typical output characteristics.



**BF556C**

- (1)  $V_{GS} = 0\text{ V}$ .
- (2)  $V_{GS} = -1.0\text{ V}$ .
- (3)  $V_{GS} = -2.0\text{ V}$ .
- (4)  $V_{GS} = -3.0\text{ V}$ .
- (5)  $V_{GS} = -4.0\text{ V}$ .
- (6)  $V_{GS} = -5.0\text{ V}$ .

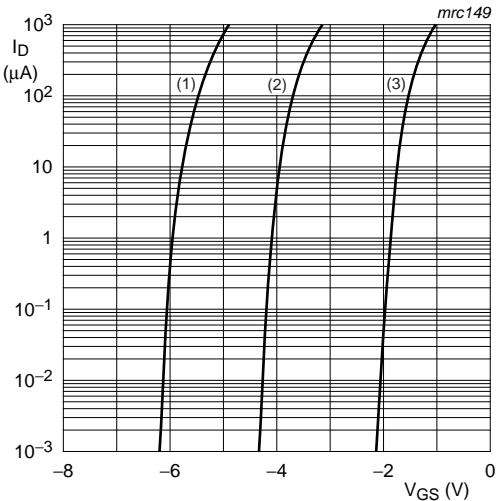
Fig 8. Typical output characteristics.



$V_{DS} = 15\text{ V}$ .

- (1) BF556C.
- (2) BF556B.
- (3) BF556A.

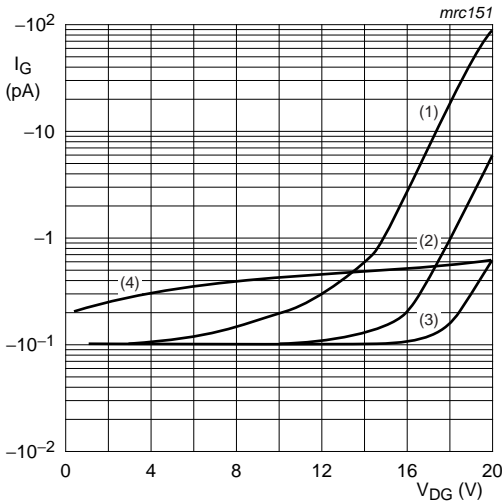
Fig 9. Typical input characteristics.



$V_{DS} = 15\text{ V}$ .

- (1) BF556C.
- (2) BF556B.
- (3) BF556A.

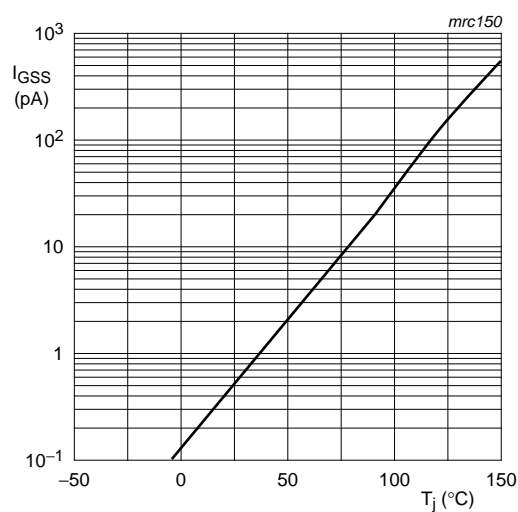
Fig 10. Drain current as a function of gate-source voltage; typical values.



$I_D = 10\text{ mA}$  only for BF556B and BF556C.

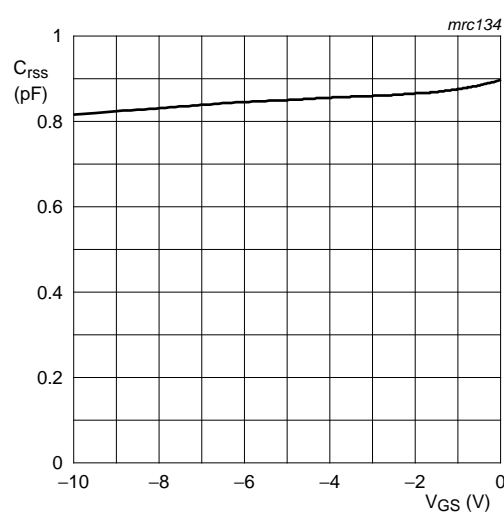
- (1)  $I_D = 10\text{ mA}$ .
- (2)  $I_D = 1\text{ mA}$ .
- (3)  $I_D = 0.1\text{ mA}$ .
- (4)  $I_{GSS}$ .

Fig 11. Gate current as a function of drain-gate voltage; typical values.



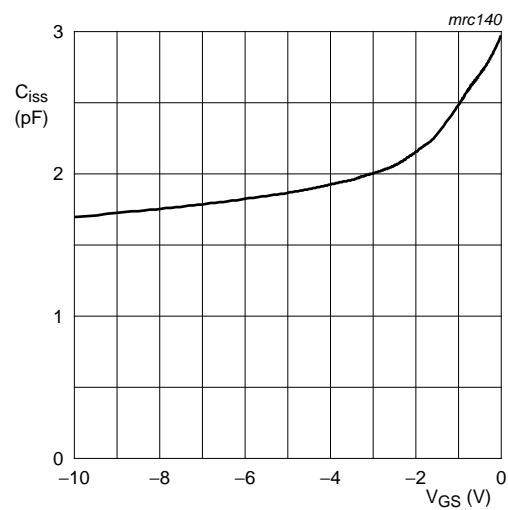
$V_{DS} = 0\text{ V}$ ;  $V_{GS} = -20\text{ V}$ .

Fig 12. Gate current as a function of junction temperature; typical values.



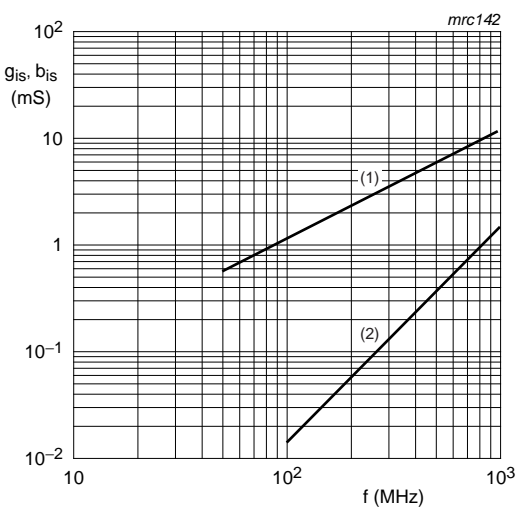
$V_{DS} = 15\text{ V}$ .

Fig 13. Reverse transfer capacitance; typical values.



$V_{DS} = 15\text{ V}$ .

Fig 14. Input capacitance; typical values.

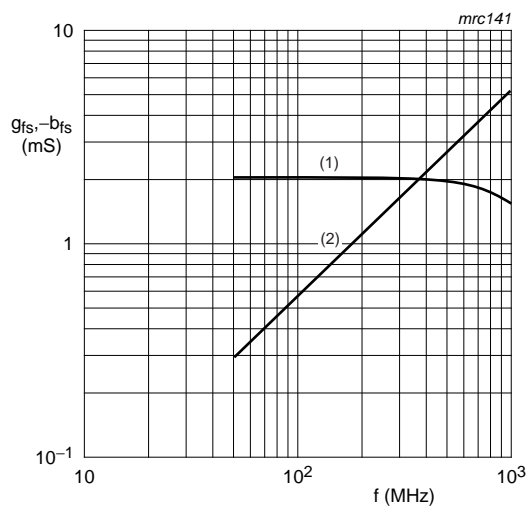


$V_{DS} = 10\text{ V}$ ;  $I_D = 1\text{ mA}$ ;  $T_{amb} = 25\text{ °C}$ .

- (1)  $b_{is}$ .
- (2)  $g_{is}$ .

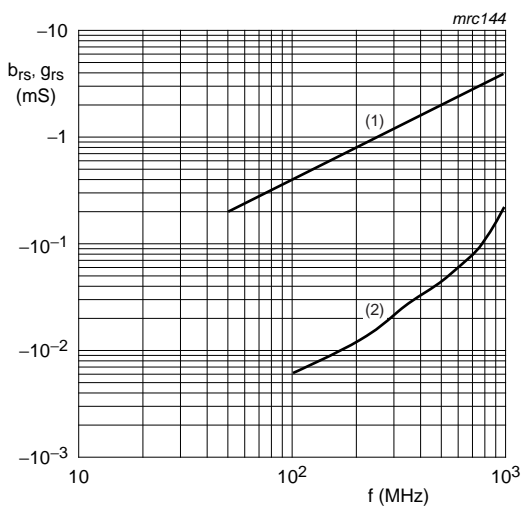
Fig 15. Common-source input admittance; typical values.





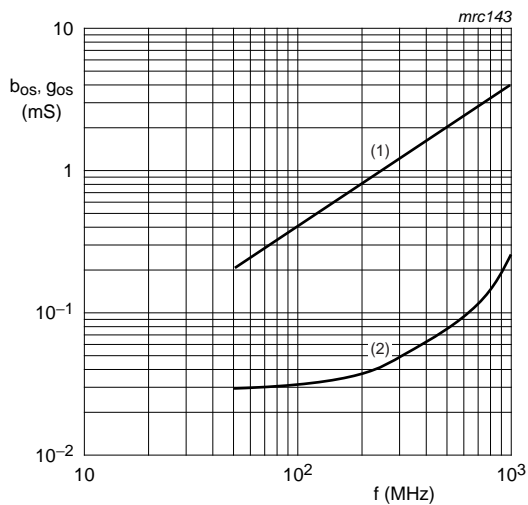
$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}.$   
(1)  $g_{fs}$ .  
(2)  $-b_{fs}$ .

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



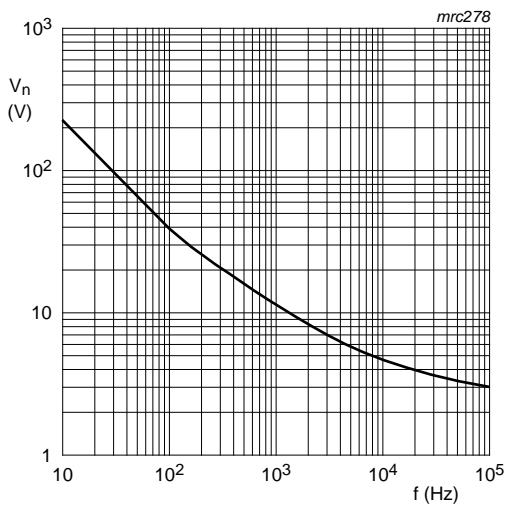
$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}.$   
(1)  $b_{rs}$ .  
(2)  $g_{rs}$ .

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



$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}.$   
(1)  $b_{os}$ .  
(2)  $g_{os}$ .

Fig 18. Common-source output admittance; typical values.



$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}.$

Fig 19. Equivalent noise voltage as a function of frequency.

9. Package outline

Plastic surface-mounted package; 3 leadsSOT23

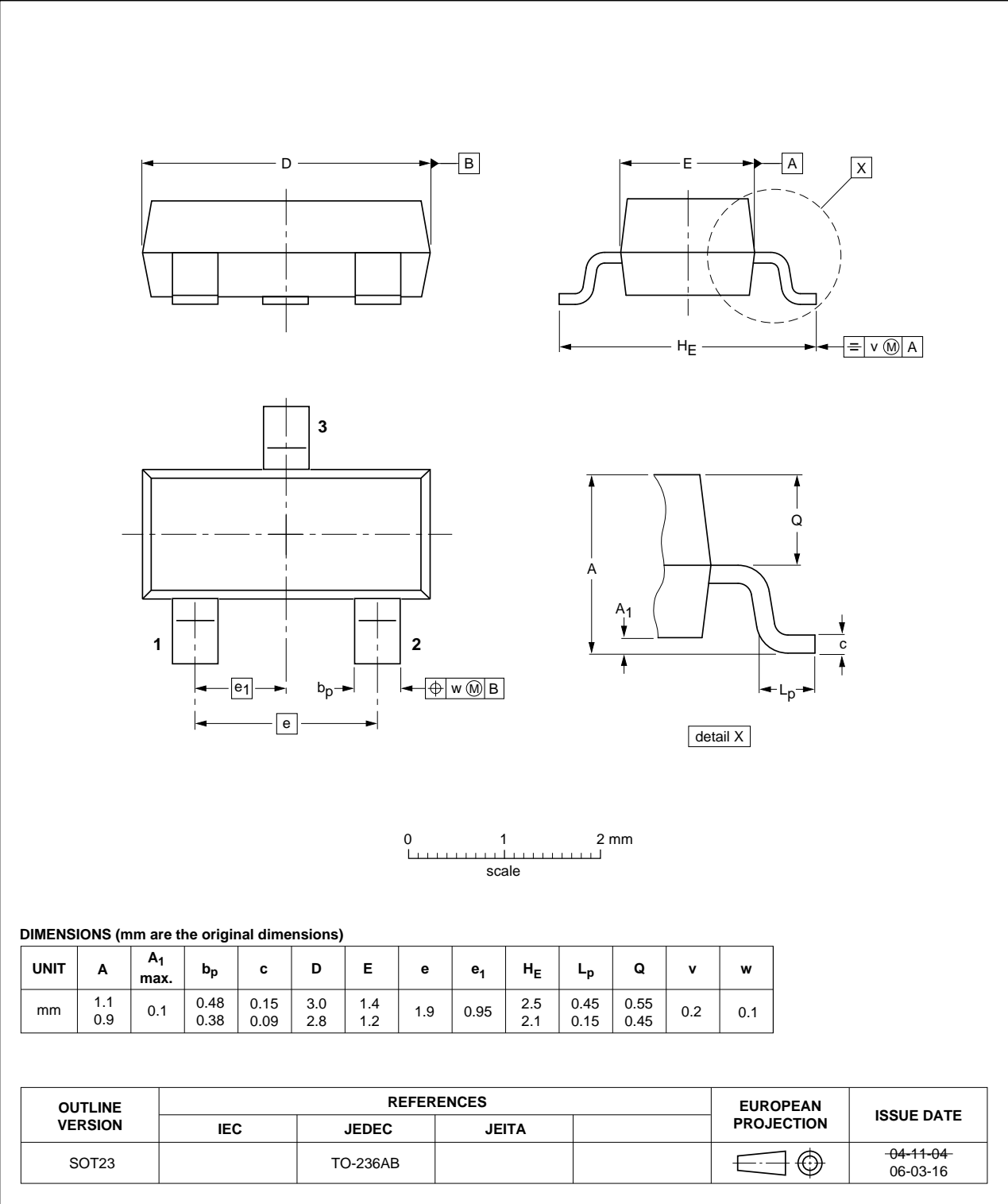


Fig 20. Package outline.

## 10. Revision history

**Table 9.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BF556A_BF556B_BF556C v.4	20110915	Product data sheet	-	BF556A_BF556B_BF556C v.3
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>			
BF556A_BF556B_BF556C v.3 (9397 750 13393)	20040805	Product data sheet	-	BF556A-B-C v.2
BF556A-B-C v.2	19960729	Product data sheet	-	-

## 11. Legal information

### 11.1 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.

[1] Please consult the most recently issued document before initiating or completing a design.

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

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Document identifier: BF556A\_BF556B\_BF556C



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- Гарантия качества поставляемой продукции
- Широкий ассортимент
- Минимальные сроки поставок
- Техническая поддержка
- Подбор комплектации
- Индивидуальный подход
- Гибкое ценообразование
- Работаем по 275 ФЗ