



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

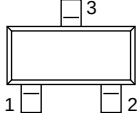
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage (DC)		-	-	± 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)		
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 ^[1]
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)		-	± 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 mm².

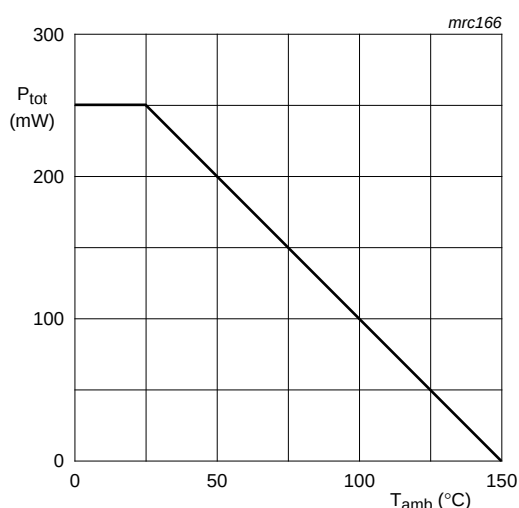


Fig 1. Power derating curve.

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 mm².

7. Static characteristics

Table 7. Static characteristics

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

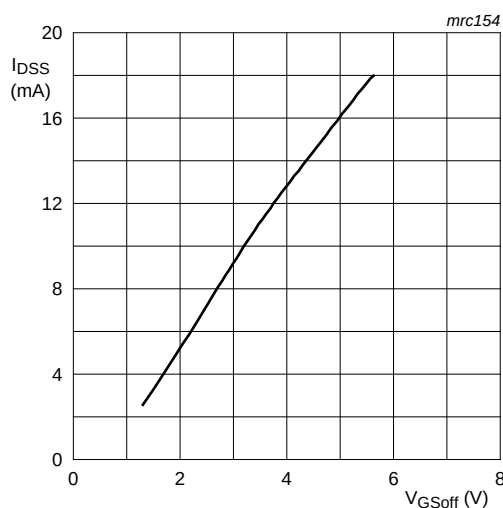
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = -1\text{ }\mu\text{A}$; $V_{DS} = 0\text{ V}$	-30	-	-	V
V_{GSoff}	gate-source cut-off voltage	$I_D = 200\text{ }\mu\text{A}$; $V_{DS} = 15\text{ V}$	-0.5	-	-7.5	V
I_{DSS}	drain current	$V_{GS} = 0\text{ V}$; $V_{DS} = 15\text{ V}$				
		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	-	μS

8. Dynamic characteristics

Table 8. Dynamic characteristics

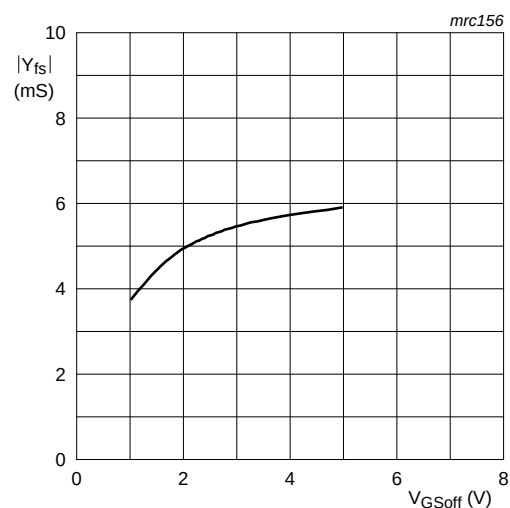
$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

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	-	μS
		$f = 450\text{ MHz}$	-	300	-	μS
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	-	μS
		$f = 450\text{ MHz}$	-	-40	-	μS
g_{os}	common source output conductance	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA}$				
		$f = 100\text{ MHz}$	-	30	-	μS
		$f = 450\text{ MHz}$	-	60	-	μS
V_n	equivalent input noise voltage	$V_{DS} = 10\text{ V}; I_D = 1\text{ mA};$ $f = 100\text{ Hz}$	-	40	-	nV/ $\sqrt{\text{Hz}}$



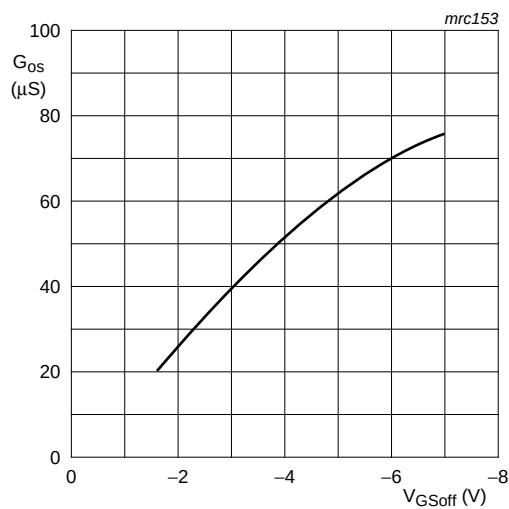
$V_{DS} = 15\text{ V}.$

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



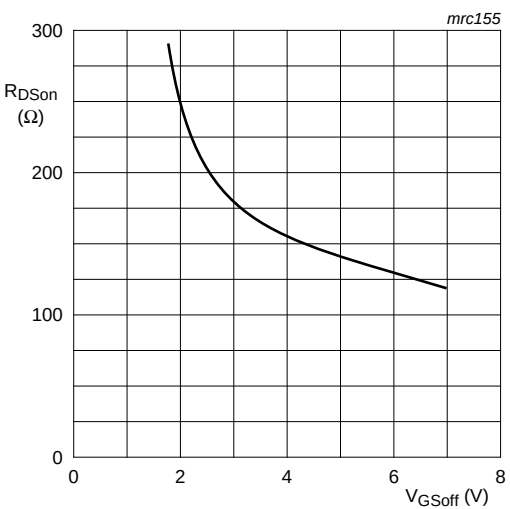
$V_{DS} = 15\text{ V}; I_D = 1\text{ }\mu\text{A}.$

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



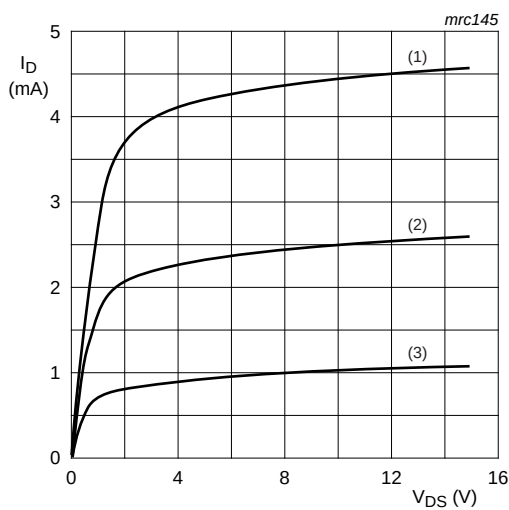
$V_{DS} = 15\text{ V}$.

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



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

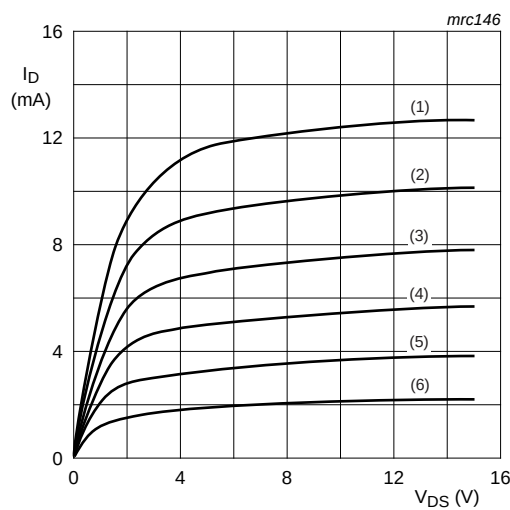
Fig 5. Drain-source on-state resistance as a function of gate-source cut-off voltage; typical values.



BF556A

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

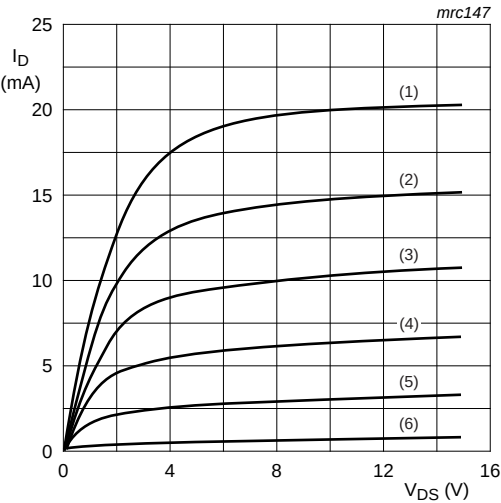
Fig 6. Typical output characteristics.



BF556B

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

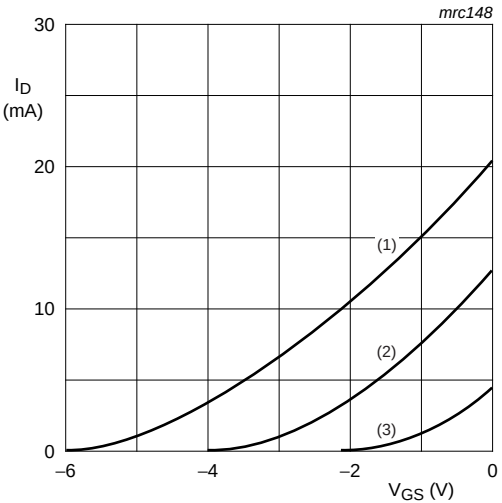
Fig 7. Typical output characteristics.



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) $V_{GS} = -5.0\text{ V}$.

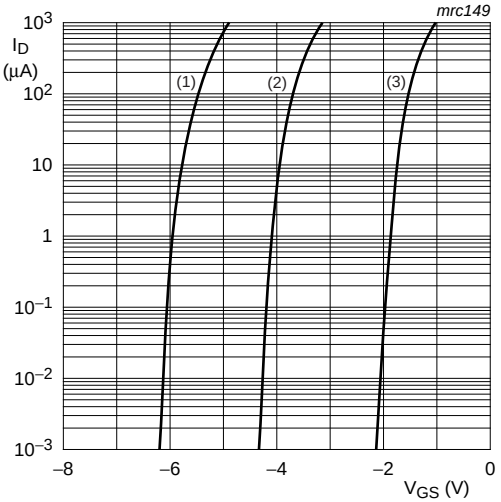
Fig 8. Typical output characteristics.



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

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

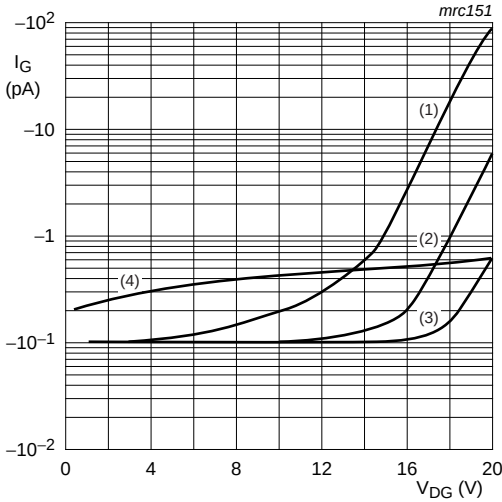
Fig 9. Typical input characteristics.



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

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

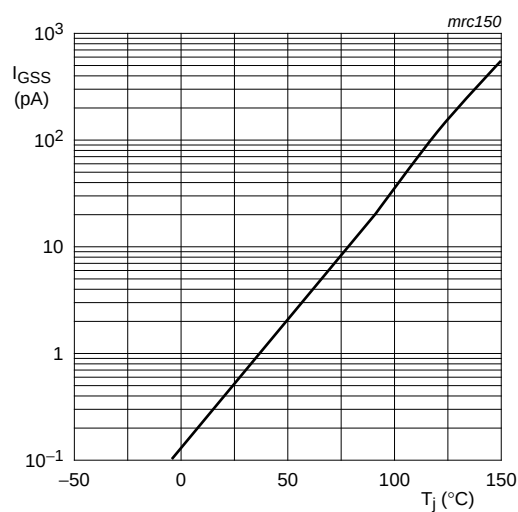
Fig 10. Drain current as a function of gate-source voltage; typical values.



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

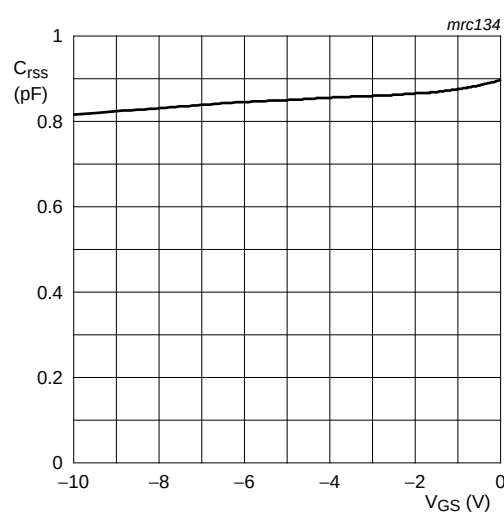
- (1) $I_D = 10\text{ mA}$.
- (2) $I_D = 1\text{ mA}$.
- (3) $I_D = 0.1\text{ mA}$.
- (4) I_{GSS} .

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



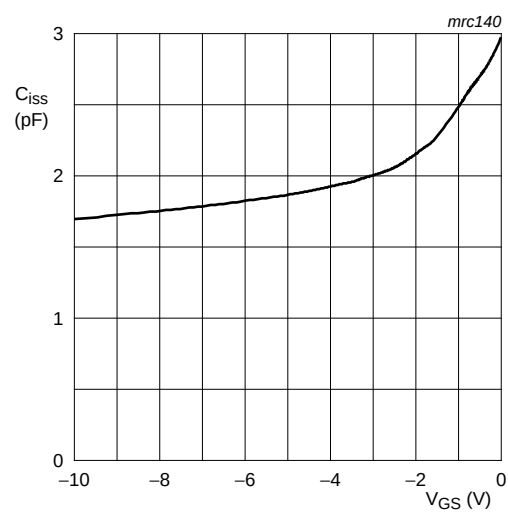
$V_{DS} = 0\text{ V}$; $V_{GS} = -20\text{ V}$.

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



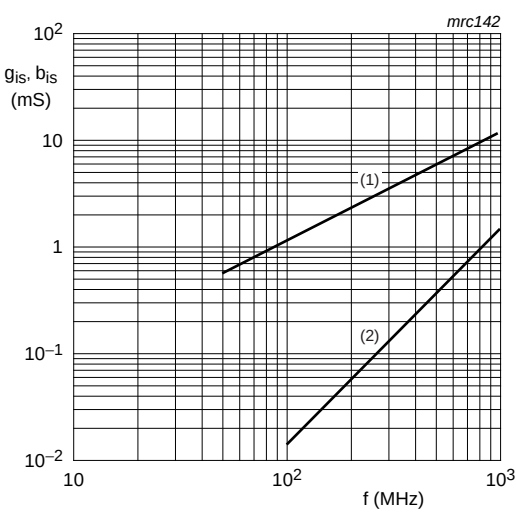
$V_{DS} = 15\text{ V}$.

Fig 13. Reverse transfer capacitance; typical values.



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

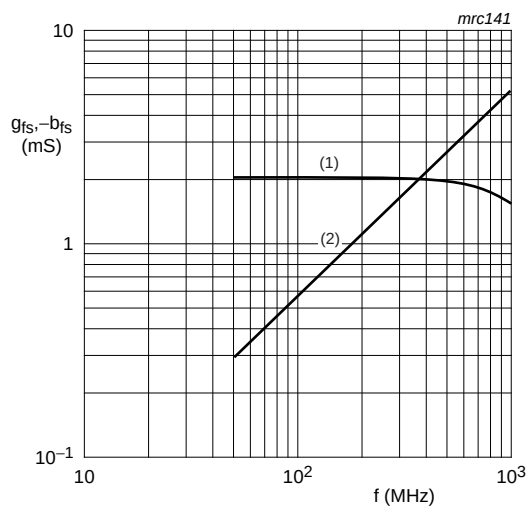
Fig 14. Input capacitance; typical values.



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

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

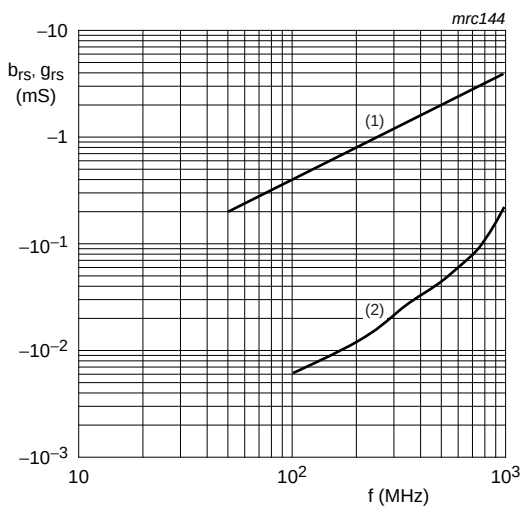
Fig 15. Common-source input admittance; typical values.



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

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

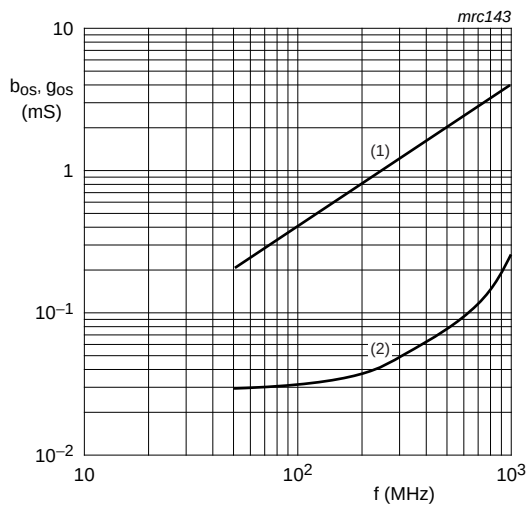
Fig 16. Common-source transfer admittance; typical values.



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

- (1) b_{rs} .
- (2) g_{rs} .

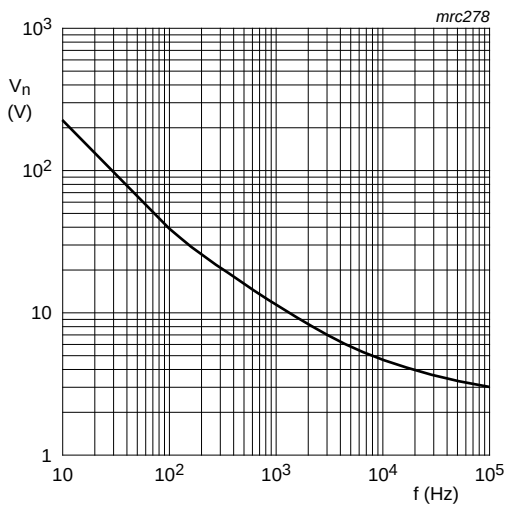
Fig 17. Common-source reverse admittance; typical values.



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

- (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

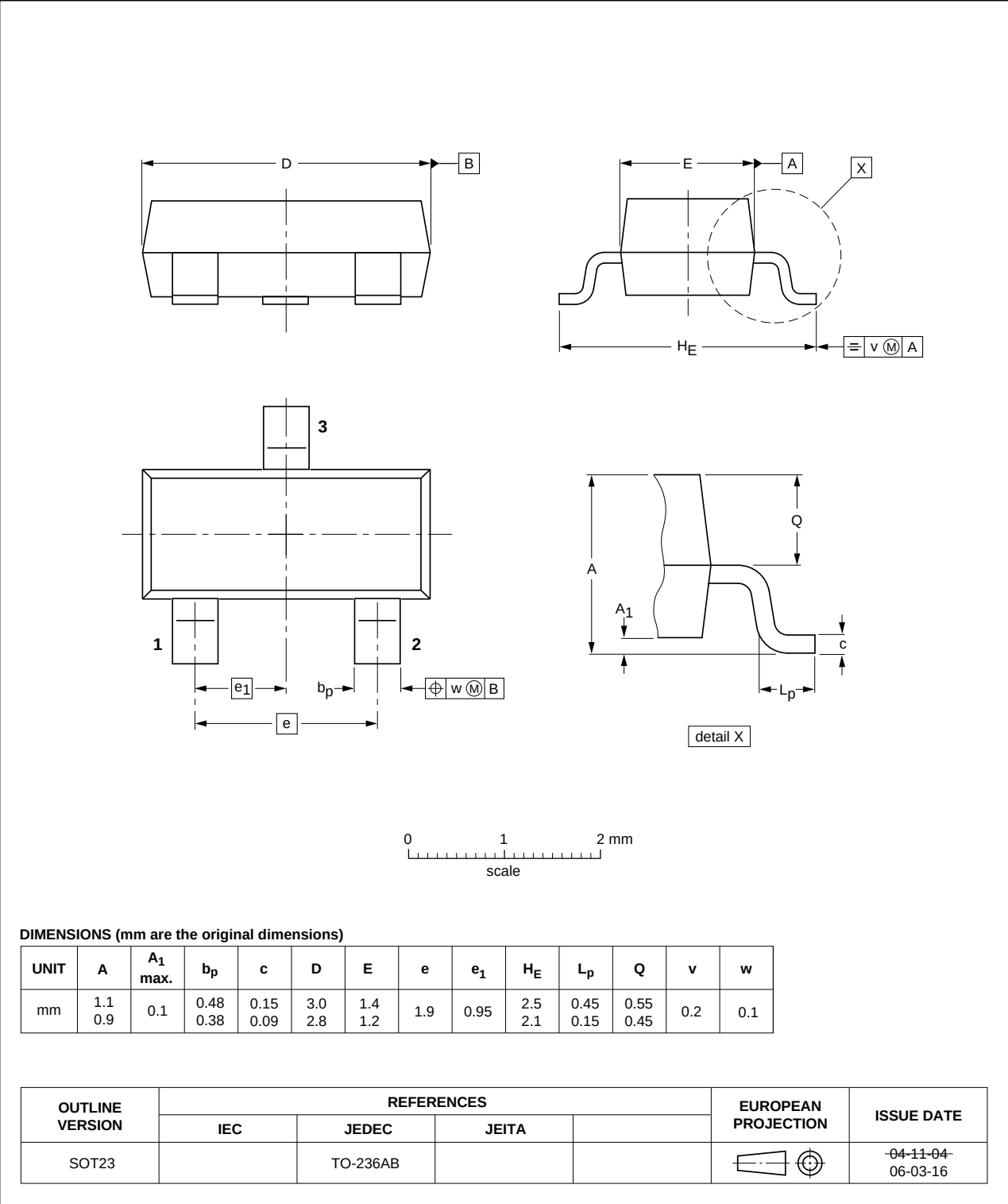


Fig 20. Package outline.

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:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Package outline drawings have been updated to the latest version.			
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 ^{[1][2]}	Product status ^[3]	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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