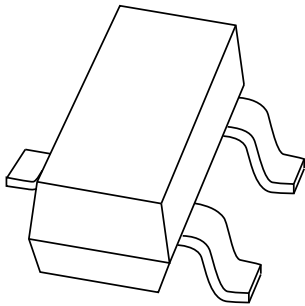


# DATA SHEET



**BFQ67**

**NPN 8 GHz wideband transistor**

Product specification  
Supersedes data of September 1995

1998 Aug 27



# NPN 8 GHz wideband transistor

**BFQ67**

## FEATURES

- High power gain
- Low noise figure
- High transition frequency
- Gold metallization ensures excellent reliability.

## APPLICATIONS

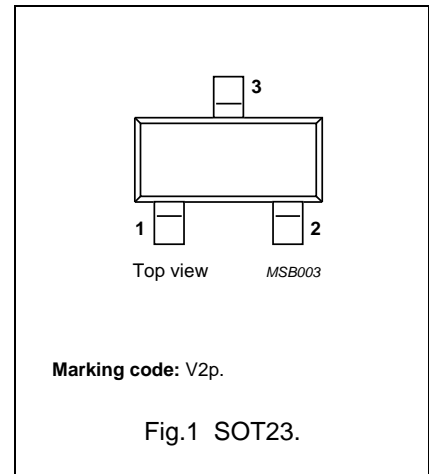
Satellite TV tuners and RF portable communications equipment up to 2 GHz.

## DESCRIPTION

Silicon NPN wideband transistor in a plastic SOT23 package.

## PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–	20	V
$V_{CEO}$	collector-emitter voltage	open base	–	–	10	V
$I_C$	collector current (DC)		–	–	50	mA
$P_{tot}$	total power dissipation	$T_s \leq 97\text{ }^\circ\text{C}$ ; note 1	–	–	300	mW
$h_{FE}$	DC current gain	$I_C = 15\text{ mA}$ ; $V_{CE} = 5\text{ V}$	60	100	–	
$f_T$	transition frequency	$I_C = 15\text{ mA}$ ; $V_{CE} = 8\text{ V}$	–	8	–	GHz
$G_{UM}$	maximum unilateral power gain	$I_C = 15\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 1\text{ GHz}$	–	14	–	dB
F	noise figure	$I_C = 5\text{ mA}$ ; $V_{CE} = 8\text{ V}$ ; $f = 1\text{ GHz}$	–	1.3	–	dB

### Note

1.  $T_s$  is the temperature at the soldering point of the collector tab.

## LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	20	V
$V_{CEO}$	collector-emitter voltage	open base	–	10	V
$V_{EBO}$	emitter-base voltage	open collector	–	2.5	V
$I_C$	collector current (DC)		–	50	mA
$P_{tot}$	total power dissipation	$T_s \leq 97\text{ }^\circ\text{C}$ ; note 1	–	300	mW
$T_{stg}$	storage temperature range		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	175	$^\circ\text{C}$

### Note

1.  $T_s$  is the temperature at the soldering point of the collector tab.

## NPN 8 GHz wideband transistor

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	note 1	260	K/W

## Note

- $T_s$  is the temperature at the soldering point of the collector lead.

## CHARACTERISTICS

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

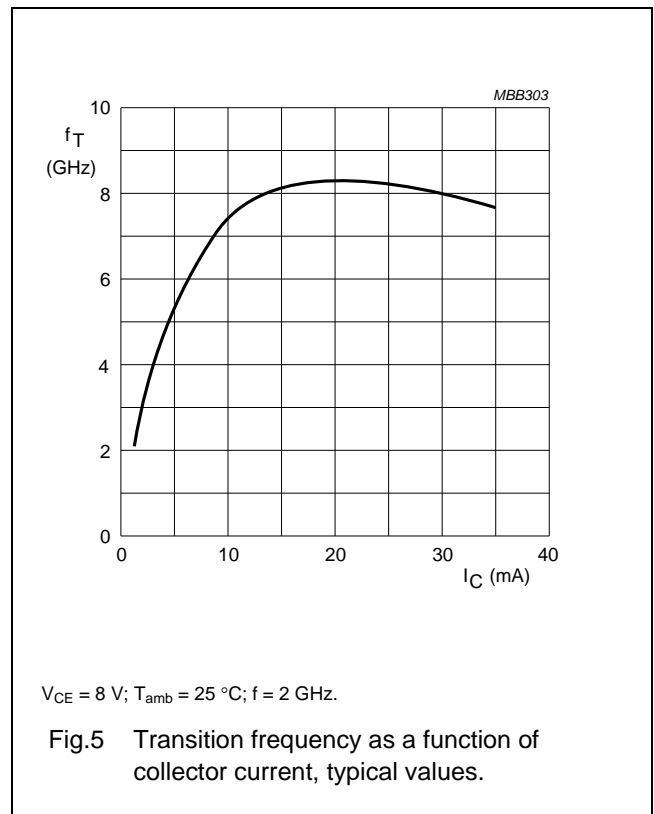
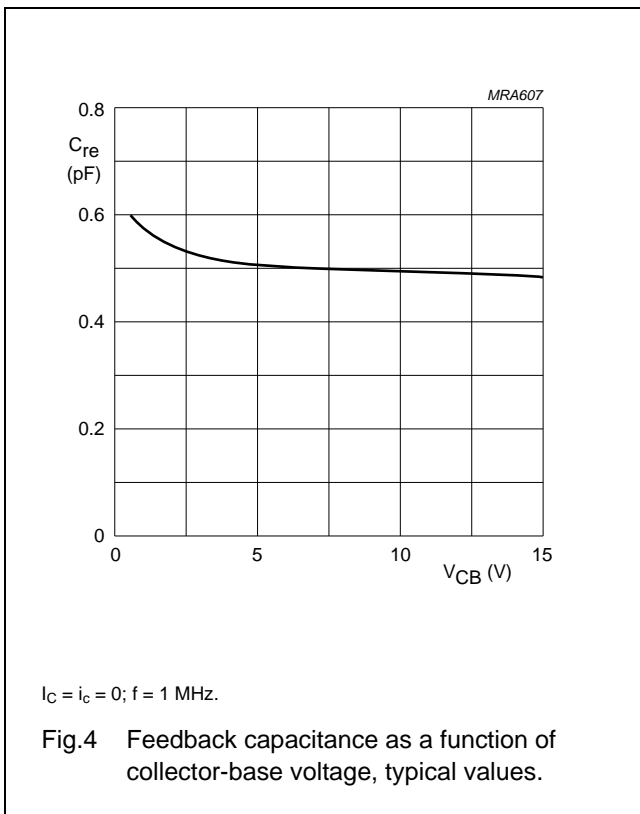
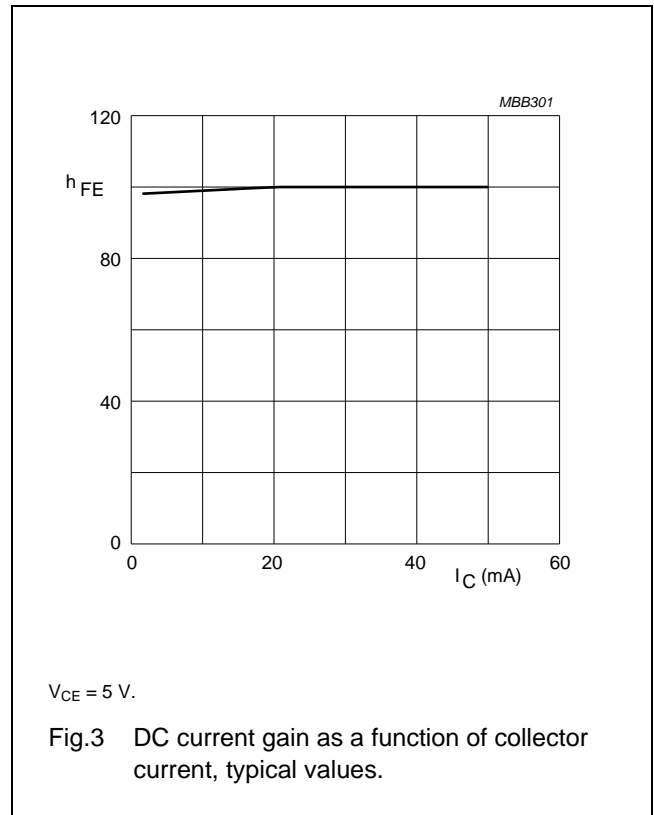
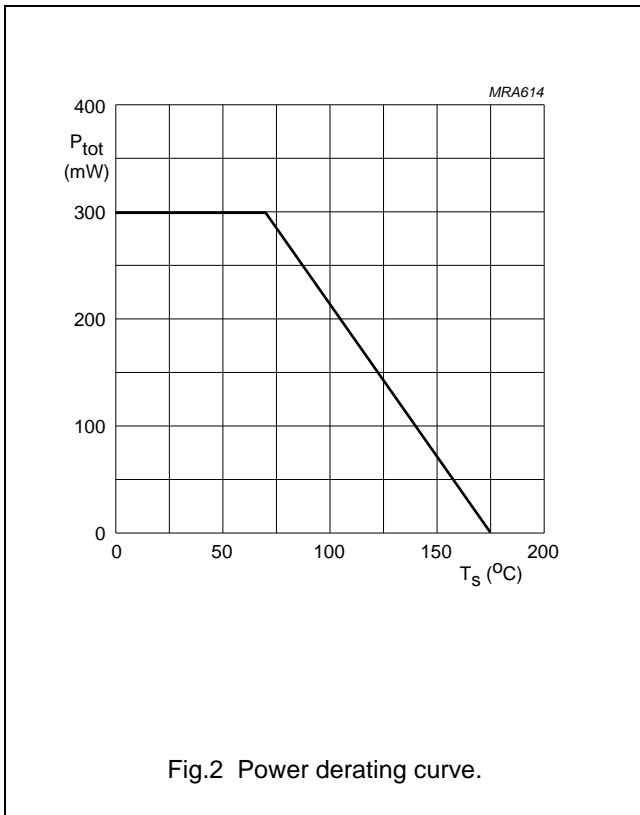
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 5\text{ V}$	–	–	50	nA
$h_{FE}$	DC current gain	$I_C = 15\text{ mA}; V_{CE} = 5\text{ V}$	60	100	–	
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 8\text{ V}; f = 1\text{ MHz}$	–	0.7	–	pF
$C_e$	emitter capacitance	$I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	1.3	–	pF
$C_{re}$	feedback capacitance	$I_C = 0; V_{CB} = 8\text{ V}; f = 1\text{ MHz}$	–	0.5	–	pF
$f_T$	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}$	–	8	–	GHz
$G_{UM}$	maximum unilateral power gain (note 1)	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 1\text{ GHz}$	–	14	–	dB
		$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; f = 2\text{ GHz}$	–	8	–	dB
F	noise figure	$\Gamma_s = \Gamma_{opt}; I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 1\text{ GHz}$	–	1.3	–	dB
		$\Gamma_s = \Gamma_{opt}; I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 1\text{ GHz}$	–	1.7	–	dB
		$\Gamma_s = \Gamma_{opt}; I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}$	–	2.2	–	dB
		$I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}; Z_s = 60\ \Omega$	–	2.5	–	dB
		$\Gamma_s = \Gamma_{opt}; I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}$	–	2.7	–	dB
		$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}; Z_s = 60\ \Omega$	–	3	–	dB

## Note

- $G_{UM}$  is the maximum unilateral power gain, assuming  $S_{12}$  is zero and  $G_{UM} = 10 \log \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)}$  dB .

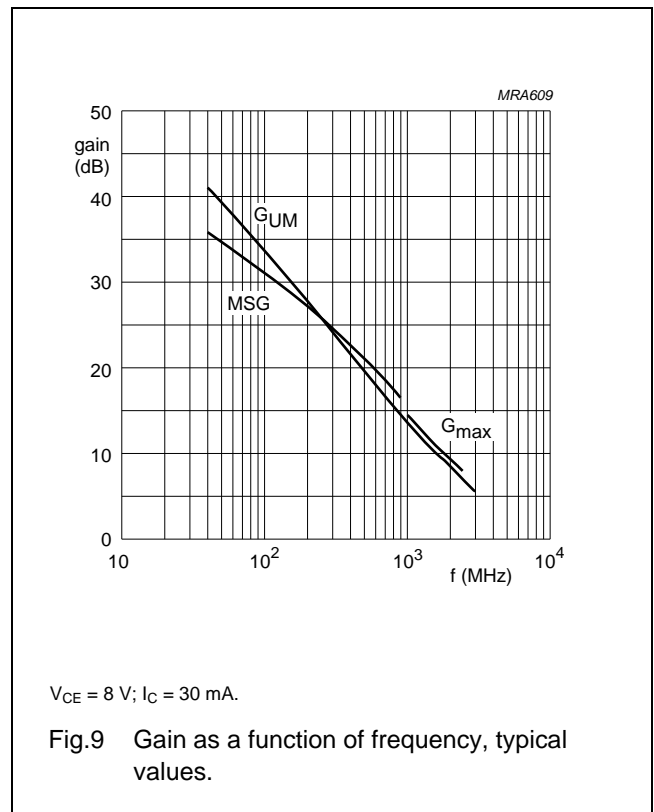
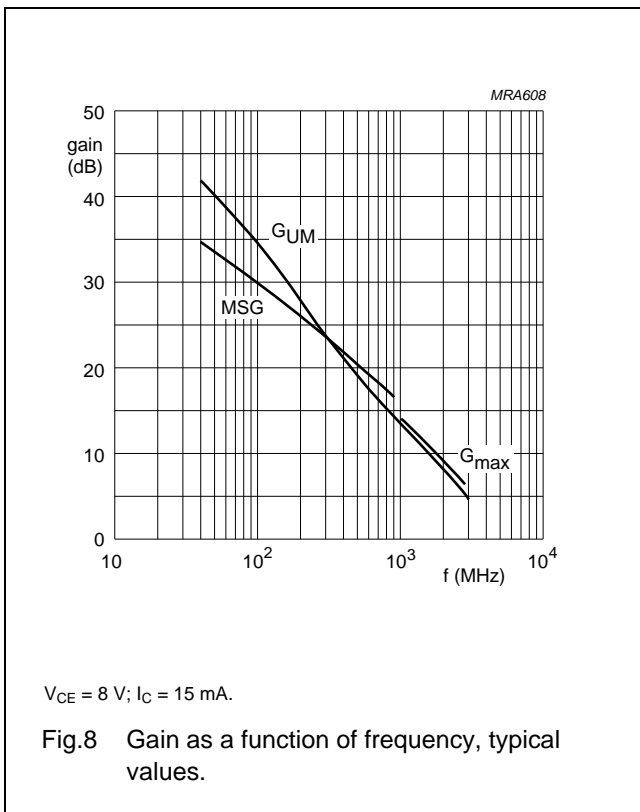
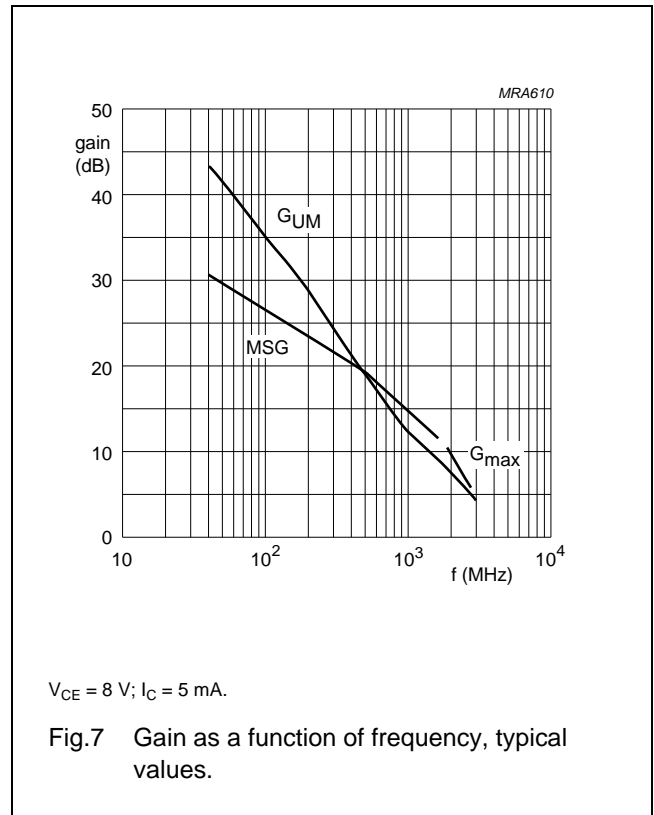
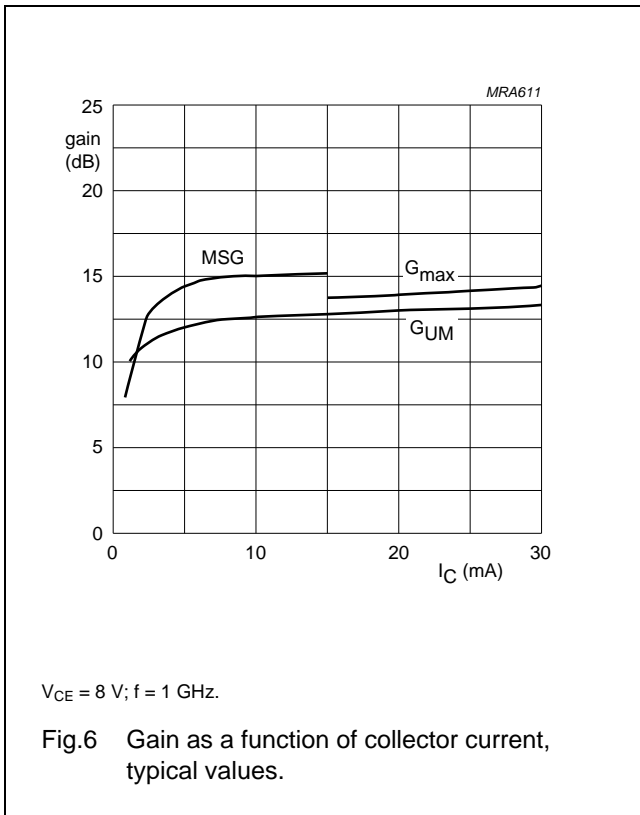
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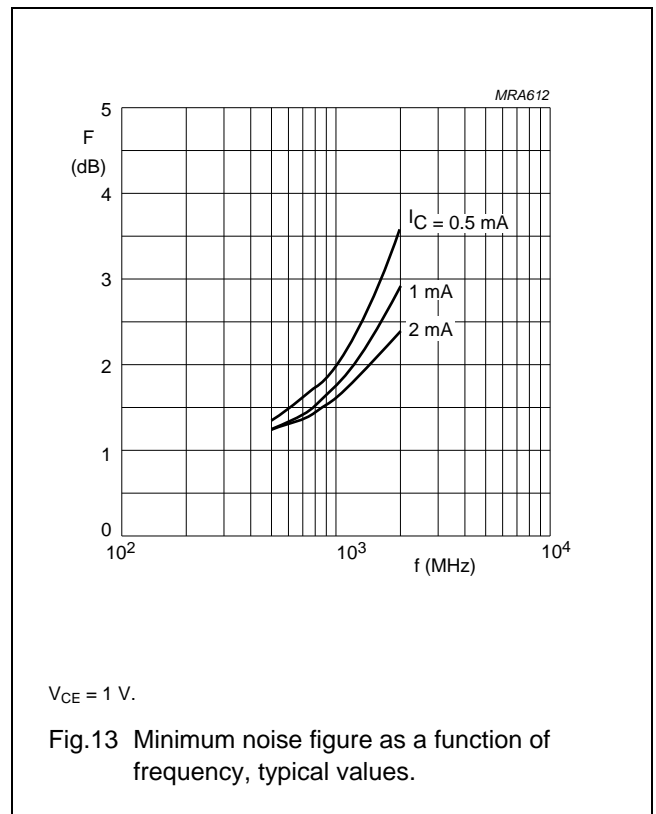
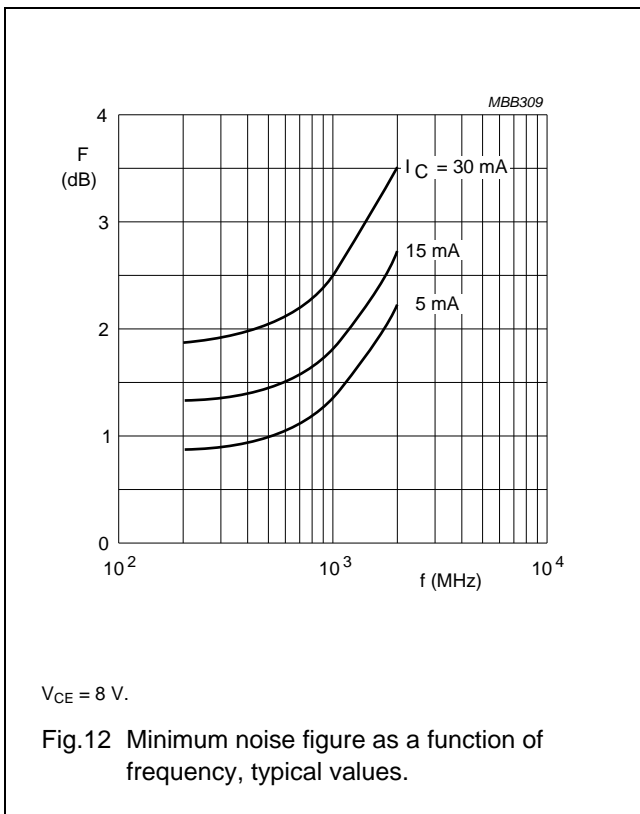
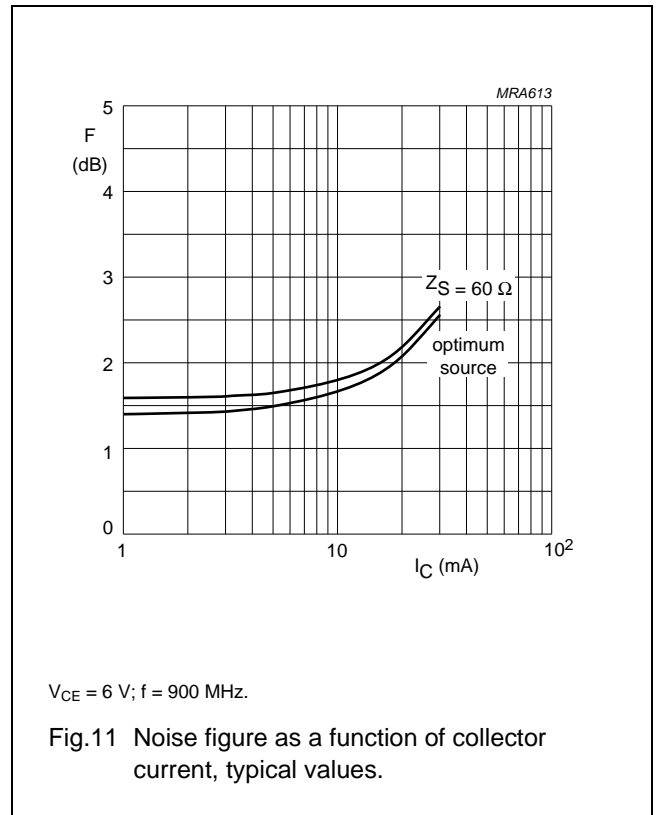
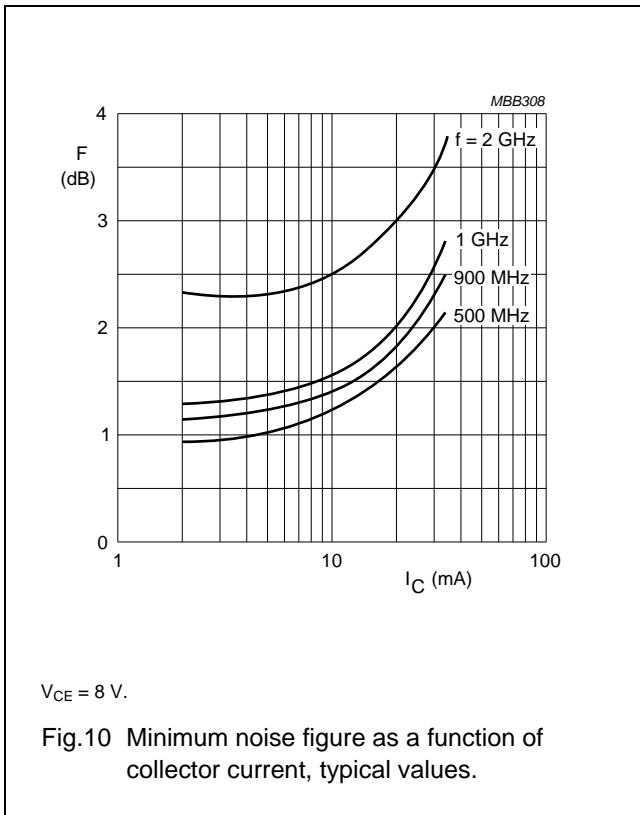
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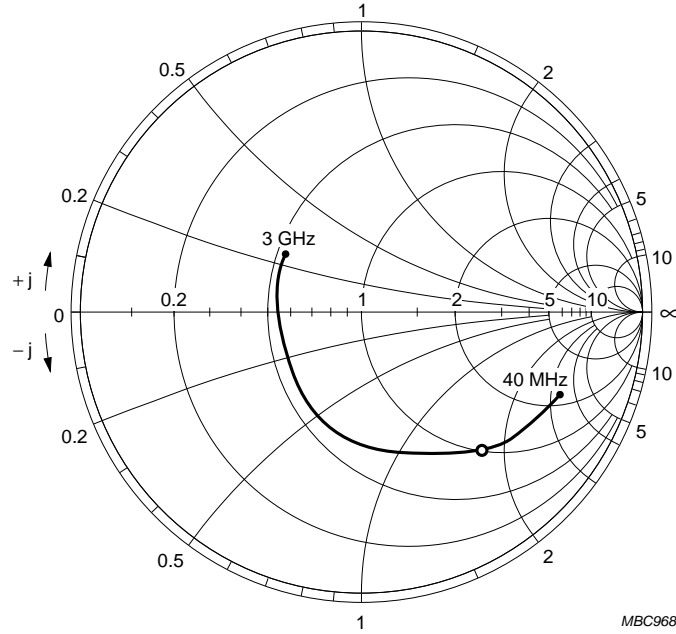
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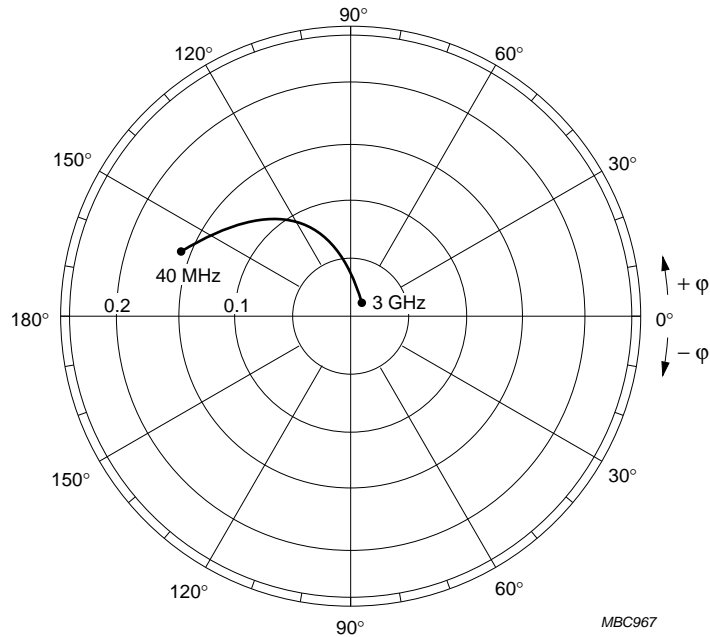
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$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}; Z_o = 50\ \Omega.$

MBC968

Fig.14 Common emitter input reflection coefficient ( $S_{11}$ ), typical values.



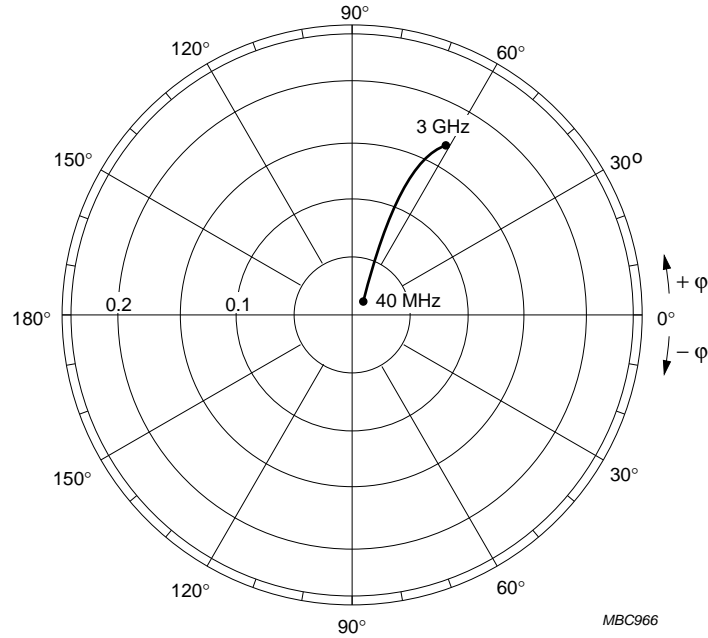
$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}.$

MBC967

Fig.15 Common emitter forward transmission coefficient ( $S_{21}$ ), typical values.

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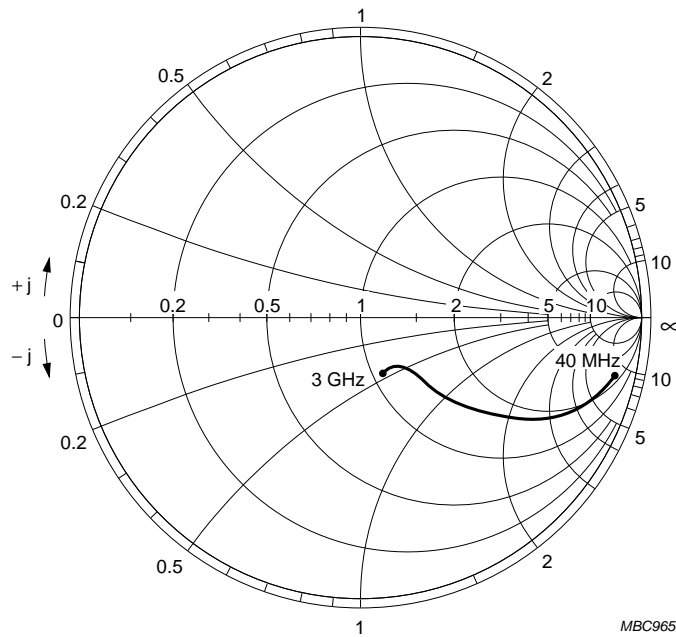
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$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}$ .

MBC966

Fig.16 Common emitter reverse transmission coefficient ( $S_{12}$ ), typical values.



$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}; Z_0 = 50\ \Omega$ .

MBC965

Fig.17 Common emitter output reflection coefficient ( $S_{22}$ ), typical values.



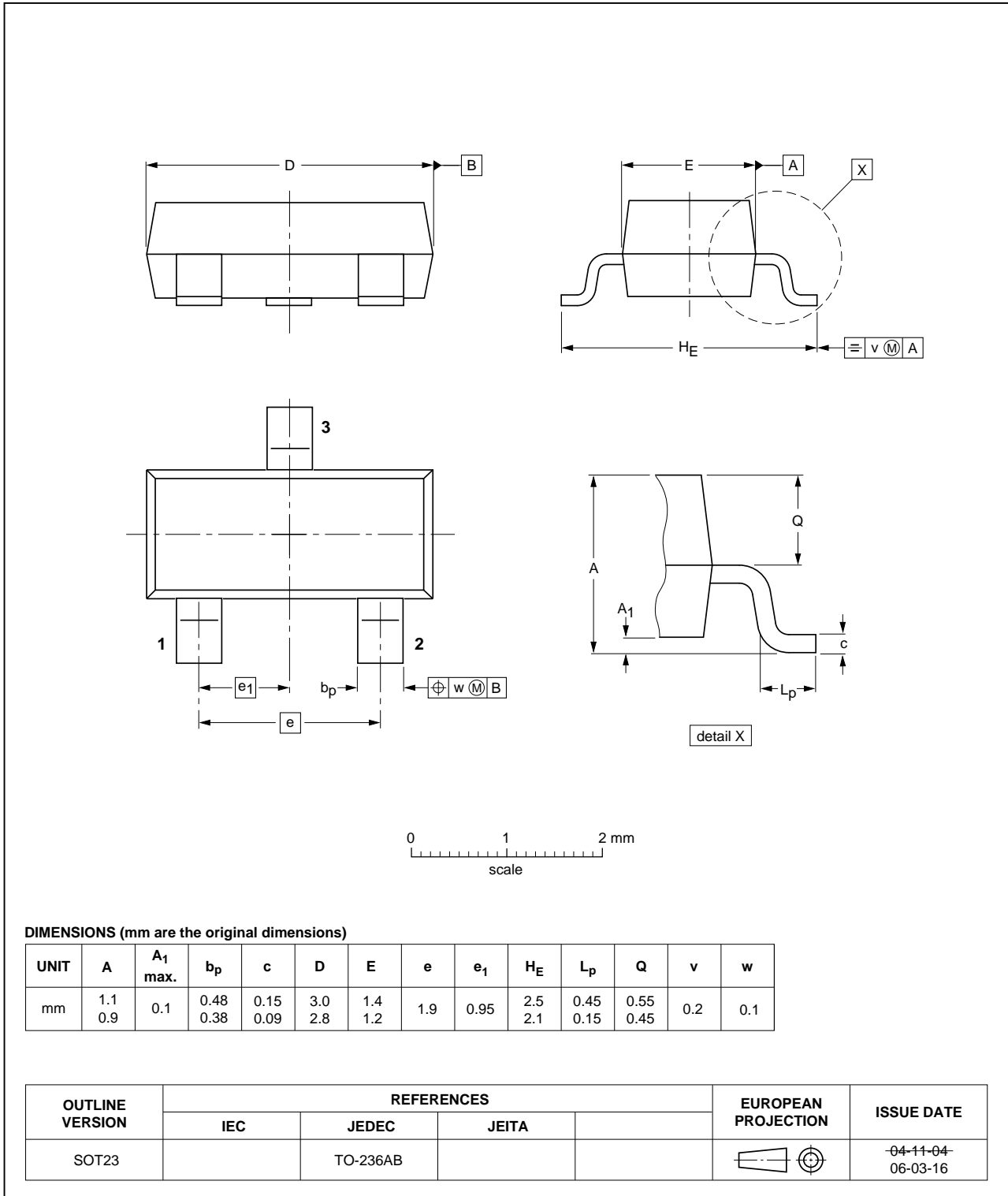
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



## NPN 8 GHz wideband transistor

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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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