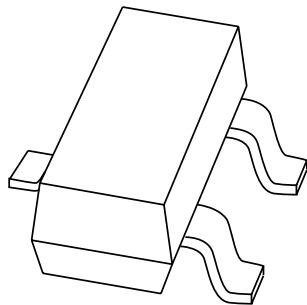


# DATA SHEET



**BFQ67**

**NPN 8 GHz wideband transistor**

Product specification  
Supersedes data of September 1995  
File under Discrete Semiconductors, SC14

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**

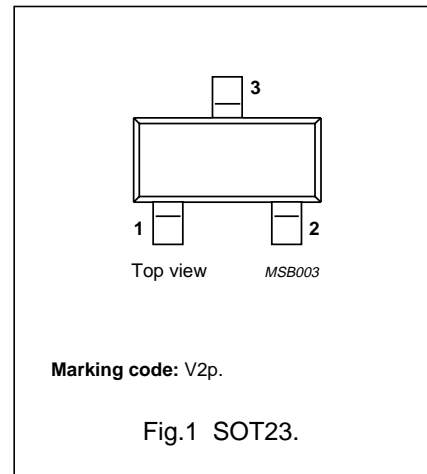
Satellite TV tuners and RF portable communications equipment up to 2 GHz.

**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
$V_{CB0}$	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	$T_s \leq 97^\circ\text{C}$ ; 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
$V_{CB0}$	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	$T_s \leq 97^\circ\text{C}$ ; 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

BFQ67

## 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.

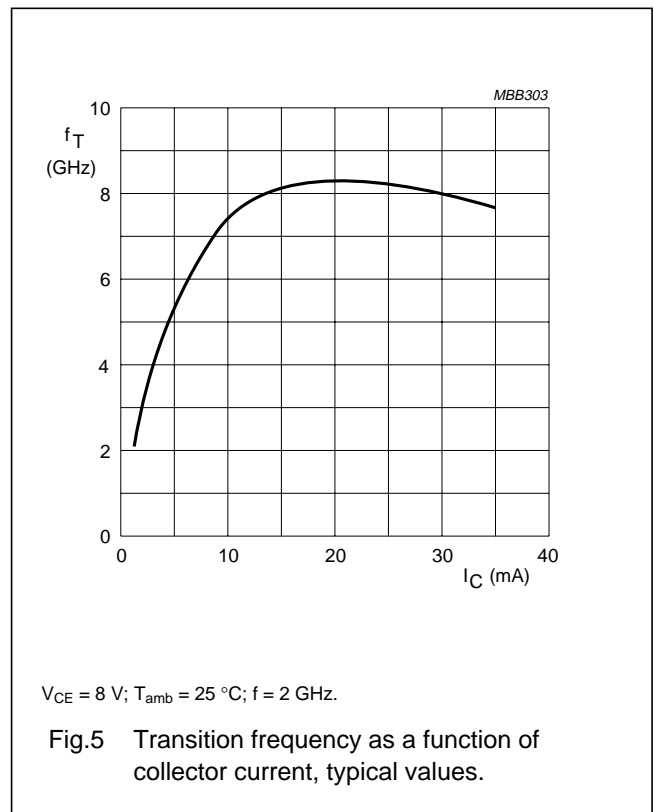
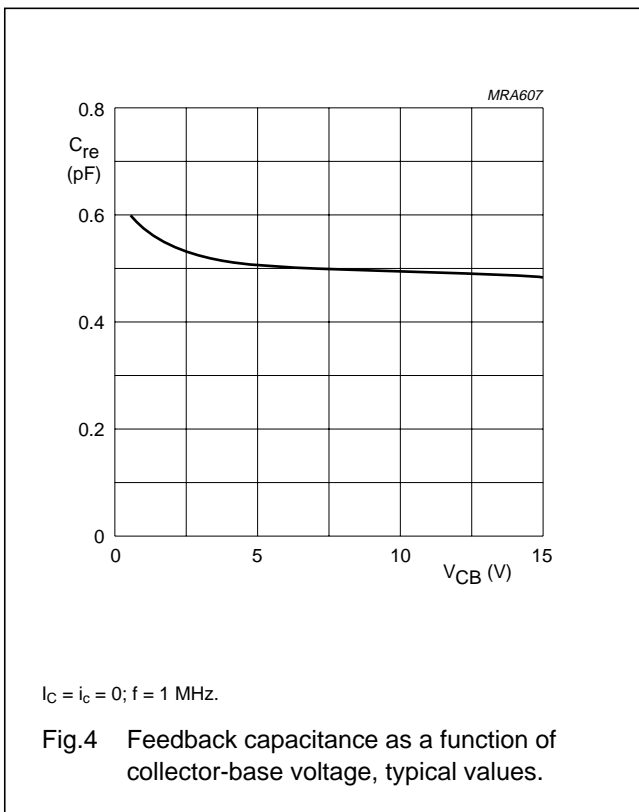
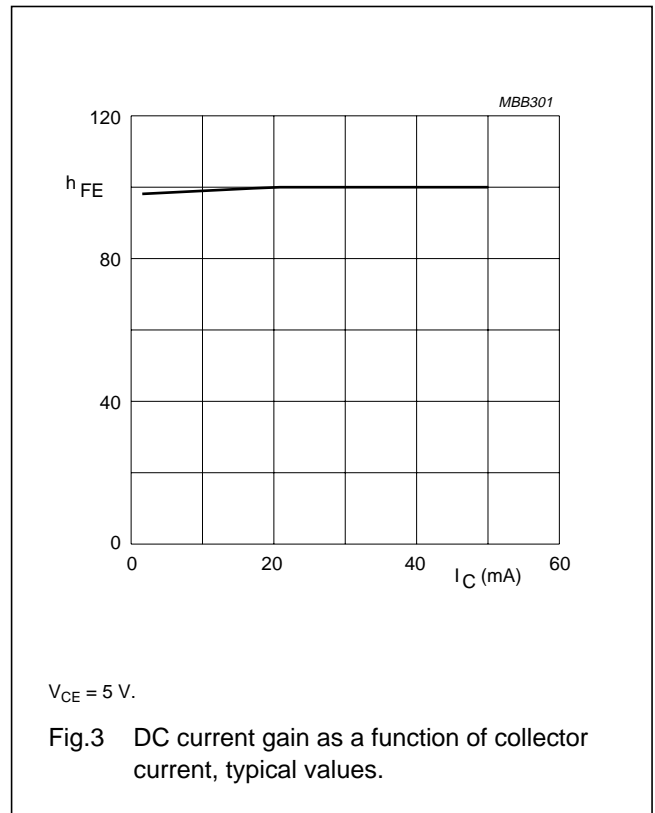
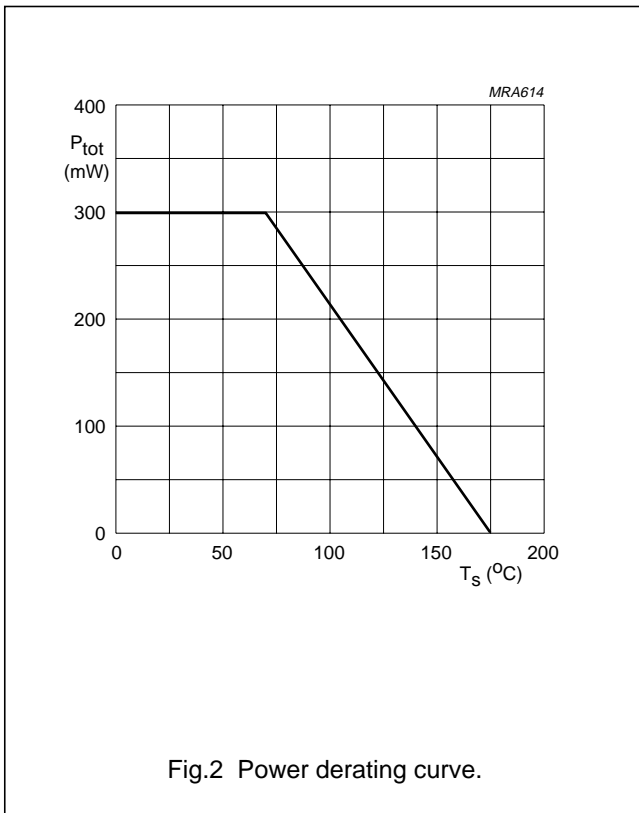
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 5\text{ V}$	–	–	50	nA
$h_{FE}$	DC current gain	$I_C = 15\text{ mA}; V_{CE} = 5\text{ V}$	60	100	–	
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 8\text{ V}; f = 1\text{ MHz}$	–	0.7	–	pF
$C_e$	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.

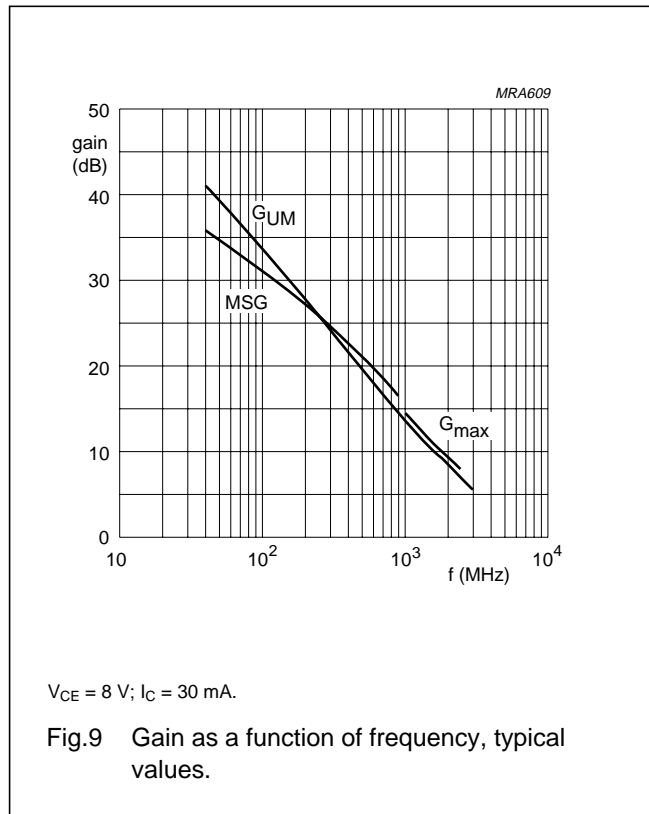
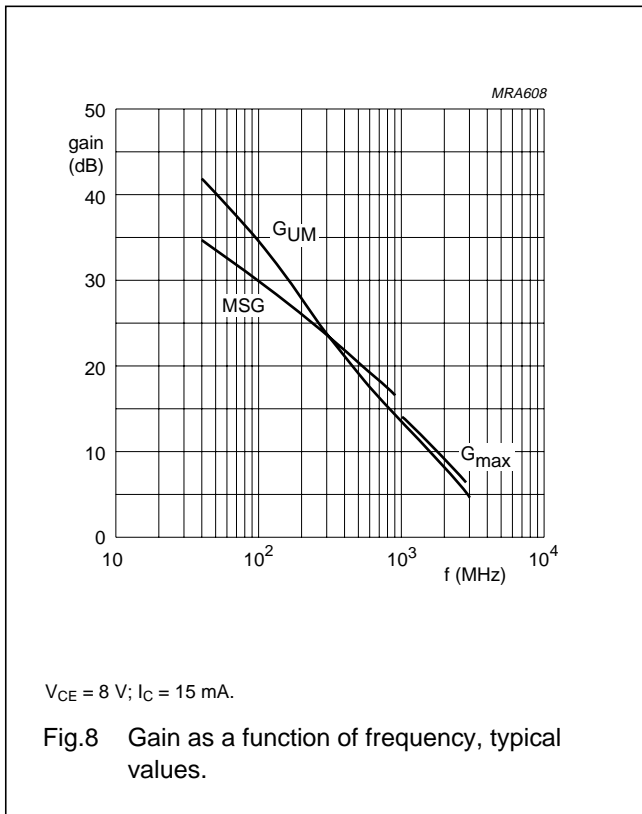
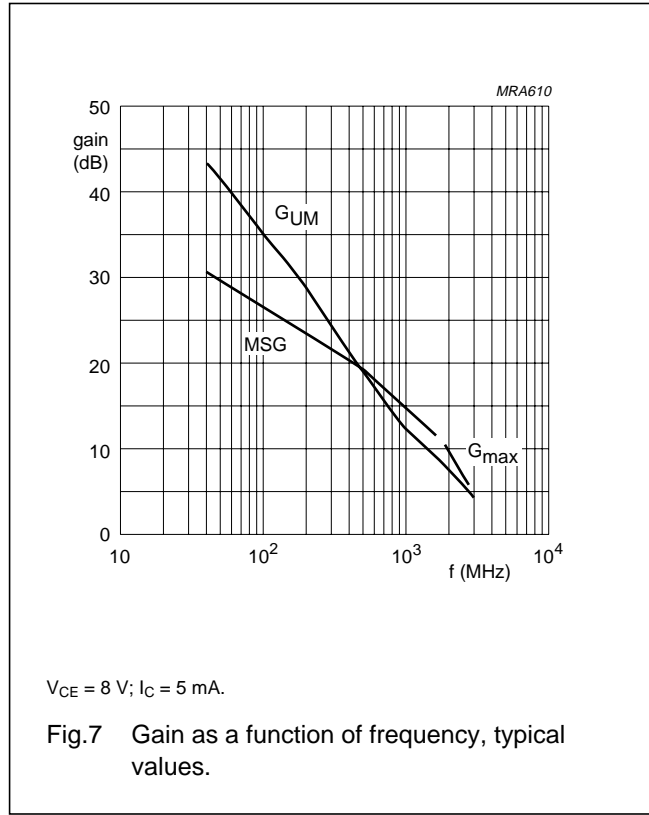
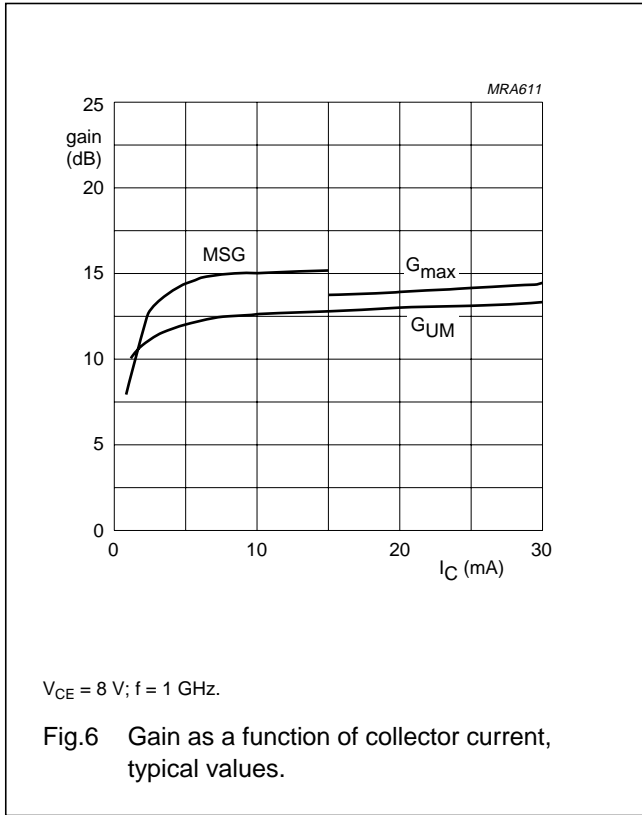
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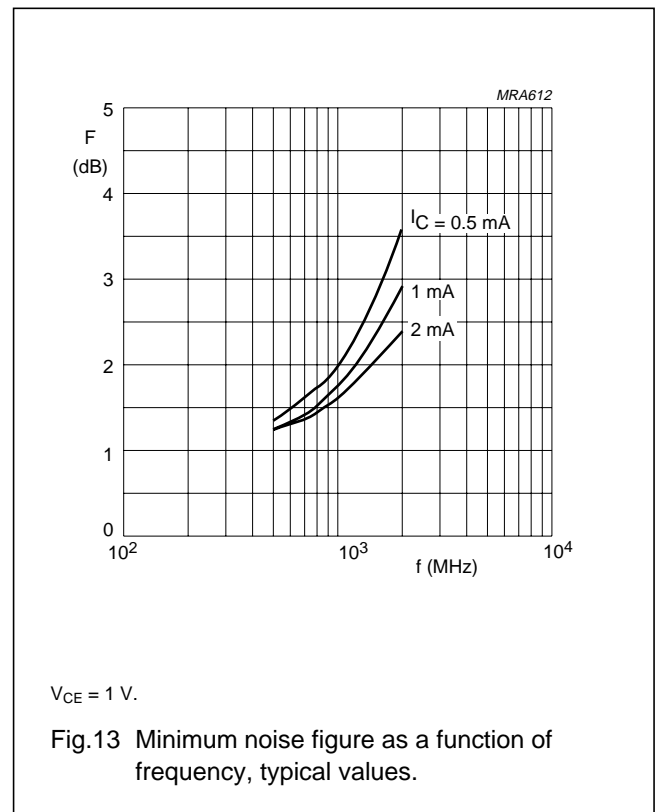
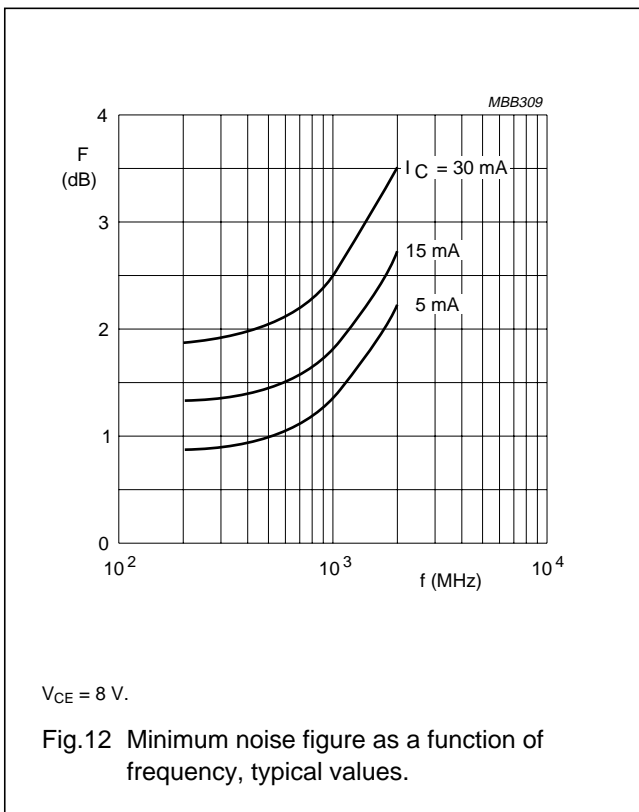
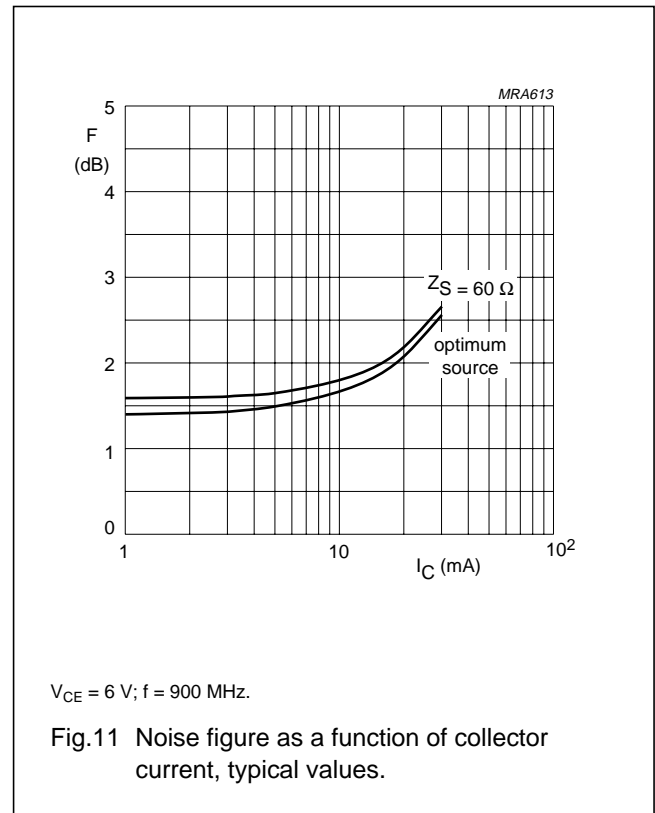
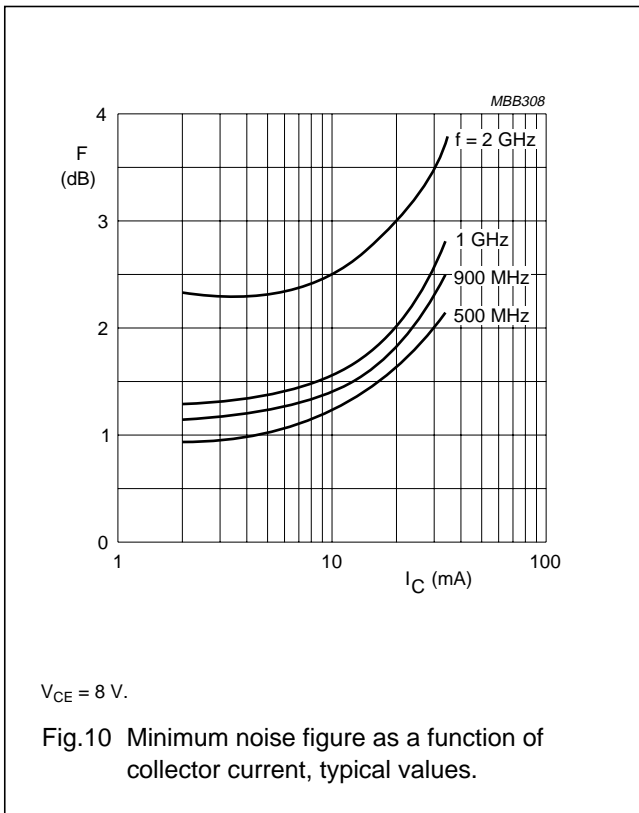
# NPN 8 GHz wideband transistor

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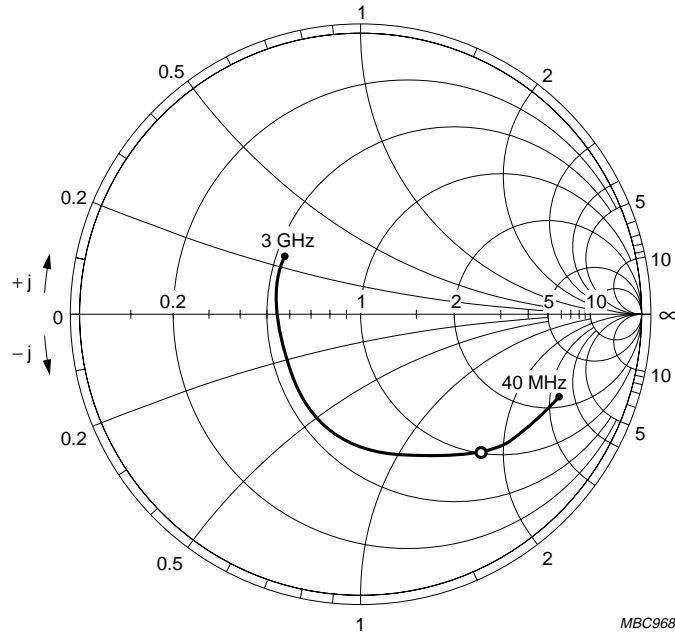
NPN 8 GHz wideband transistor

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NPN 8 GHz wideband transistor

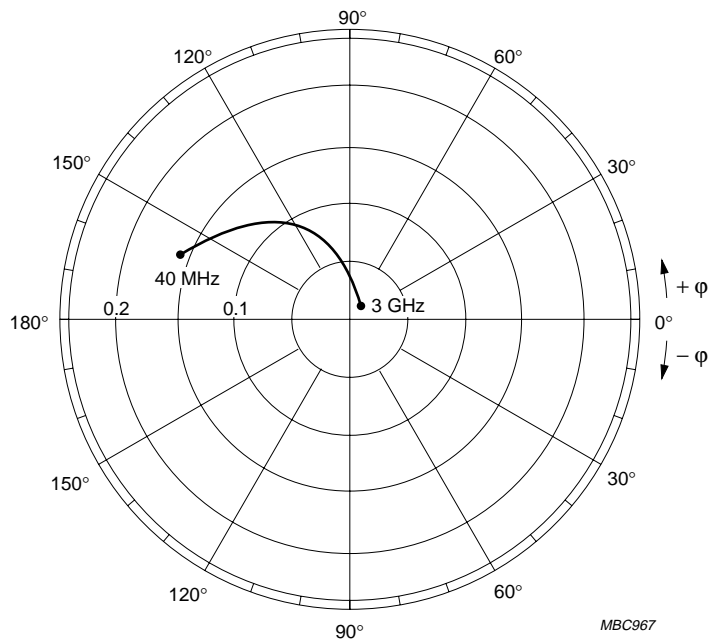
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$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}; Z_0 = 50\ \Omega.$

MBC968

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



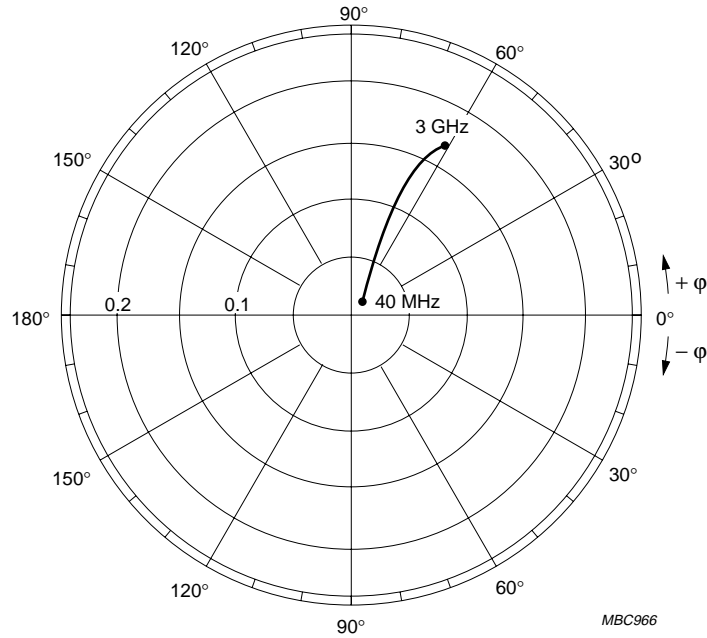
$V_{CE} = 8\text{ V}; I_C = 15\text{ mA}.$

MBC967

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

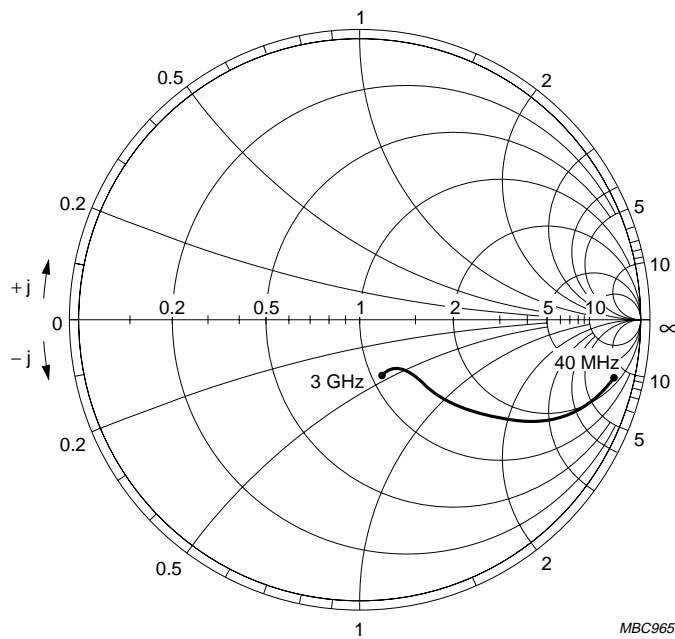
NPN 8 GHz wideband transistor

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

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



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

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



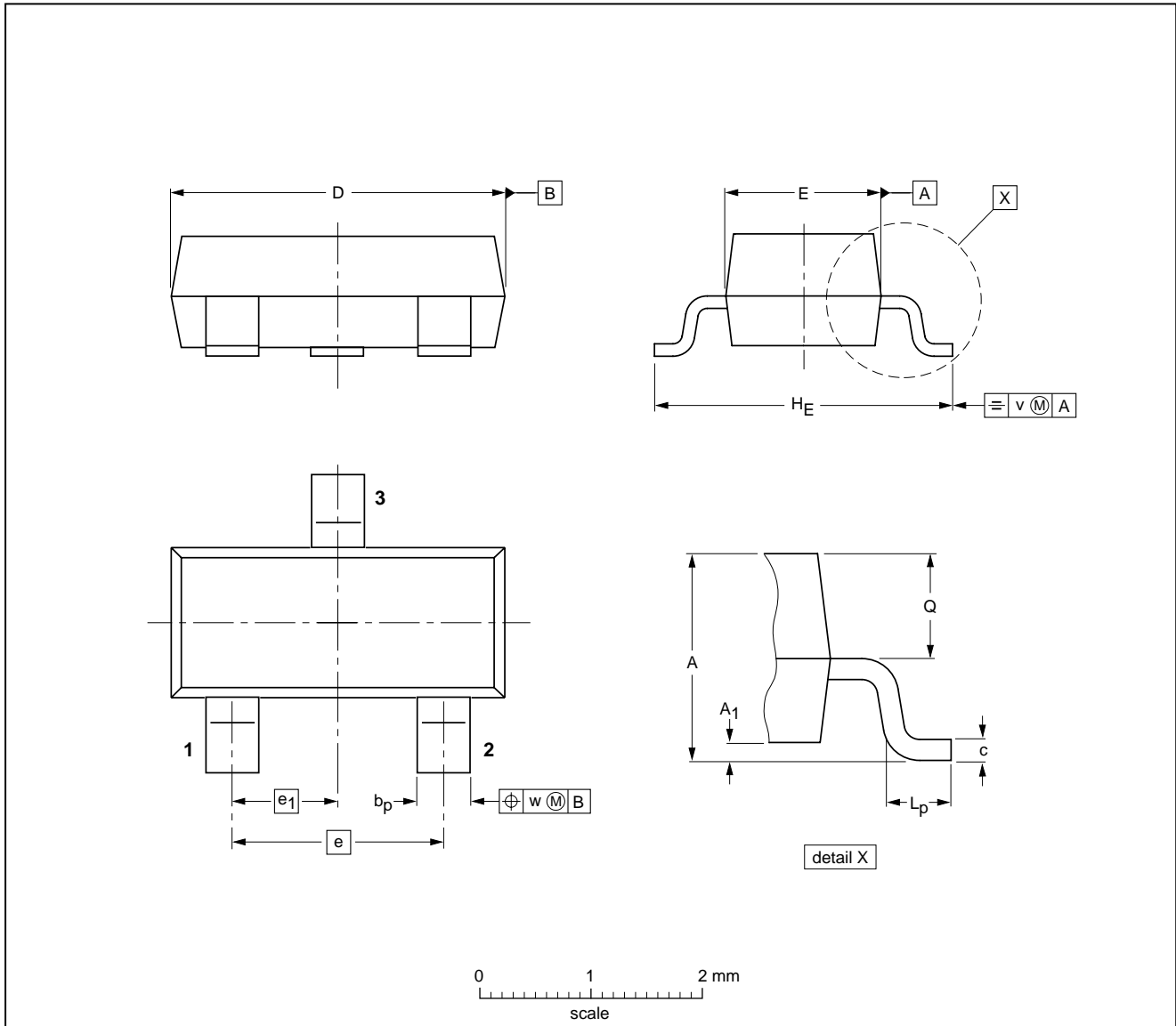
NPN 8 GHz wideband transistor

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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23						97-02-28

## NPN 8 GHz wideband transistor

BFQ67

**DEFINITIONS**

<b>Data Sheet Status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**LIFE SUPPORT APPLICATIONS**

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