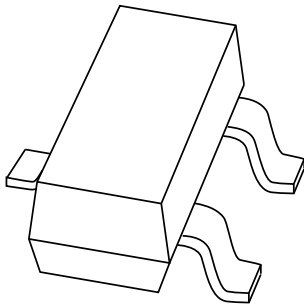


DATA SHEET



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

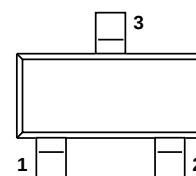
Satellite TV tuners and RF portable communications equipment up to 2 GHz.

DESCRIPTION

Silicon NPN wideband transistor in a plastic SOT23 package.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



Top view MSB003

Marking code: V2p.

Fig.1 SOT23.

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.

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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	$I_E = I_C = 0$; $V_{CB} = 8\text{ V}$; $f = 1\text{ MHz}$	—	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
		$I_C = 5\text{ mA}$; $V_{CE} = 8\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 2\text{ GHz}$; $Z_S = 60\text{ }\Omega$	—	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
		$I_C = 15\text{ mA}$; $V_{CE} = 8\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 2\text{ GHz}$; $Z_S = 60\text{ }\Omega$	—	3	—	dB

Note

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

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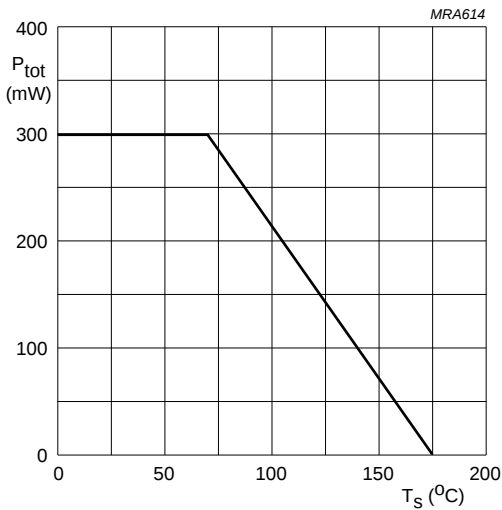
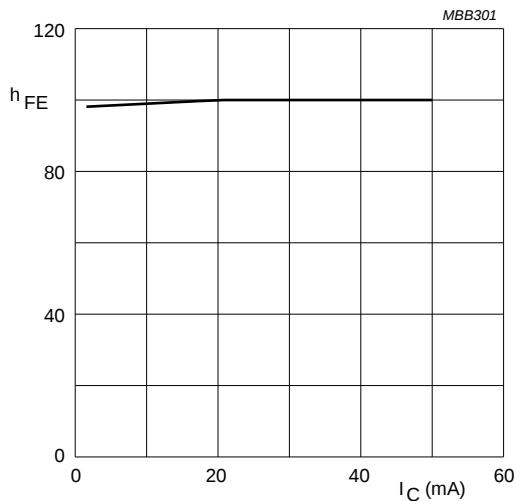
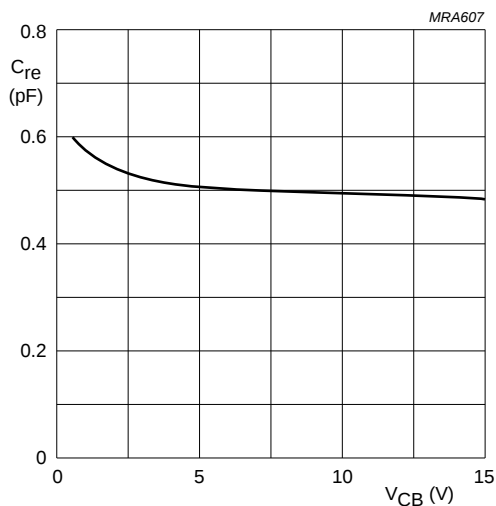


Fig.2 Power derating curve.



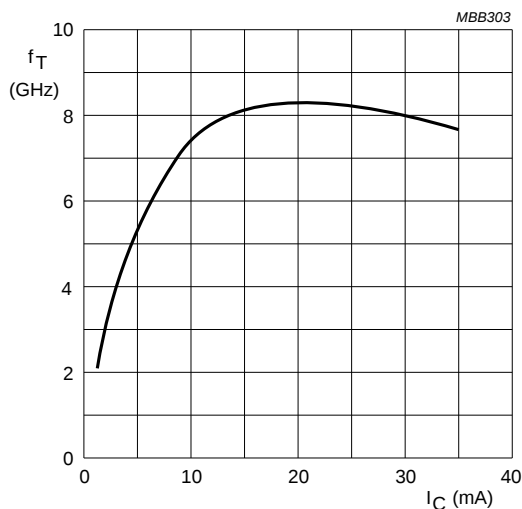
$V_{CE} = 5\text{ V}$.

Fig.3 DC current gain as a function of collector current, typical values.



$I_C = i_c = 0$; $f = 1\text{ MHz}$.

Fig.4 Feedback capacitance as a function of collector-base voltage, typical values.

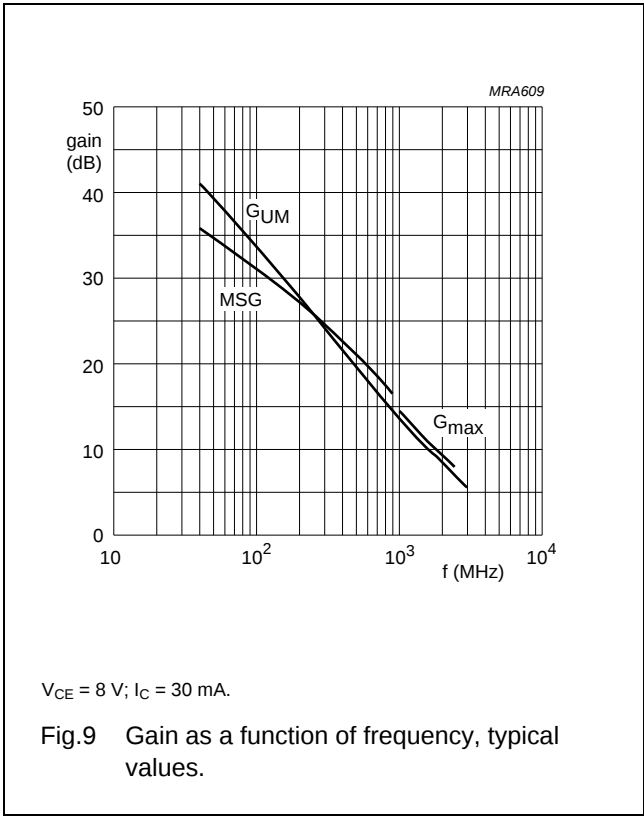
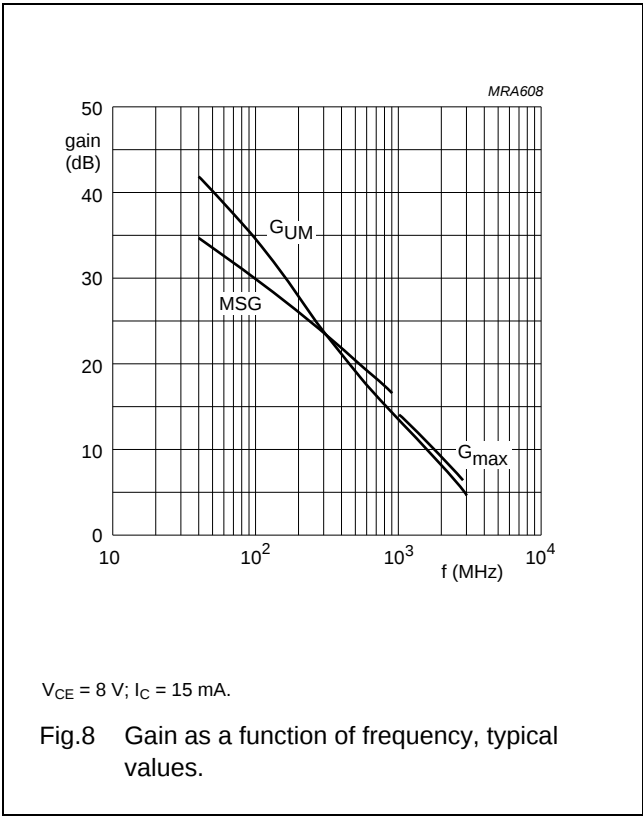
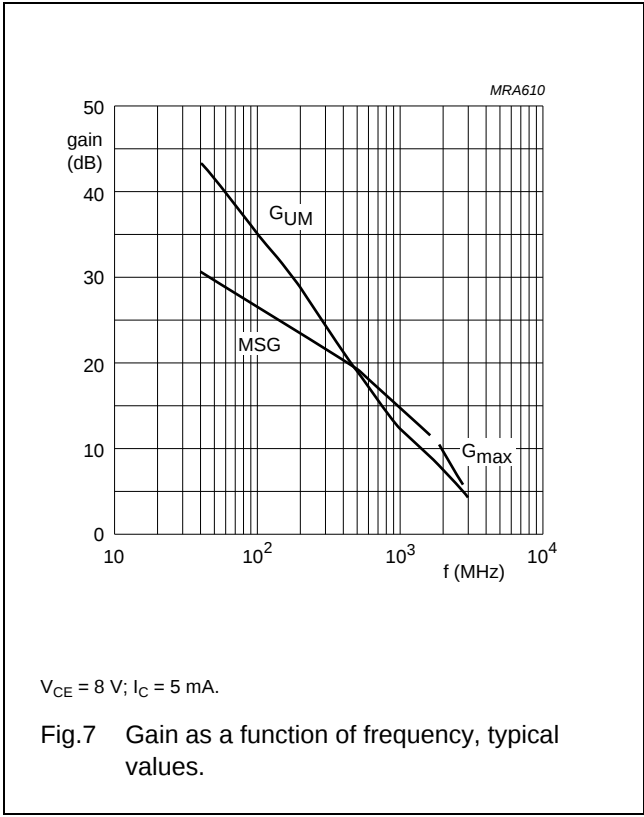
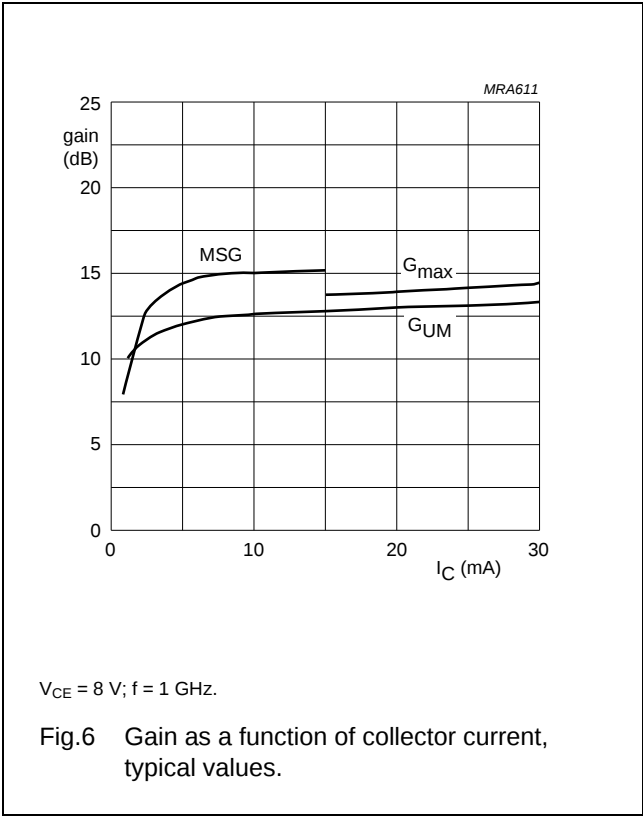


$V_{CE} = 8\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 2\text{ GHz}$.

Fig.5 Transition frequency as a function of collector current, typical values.

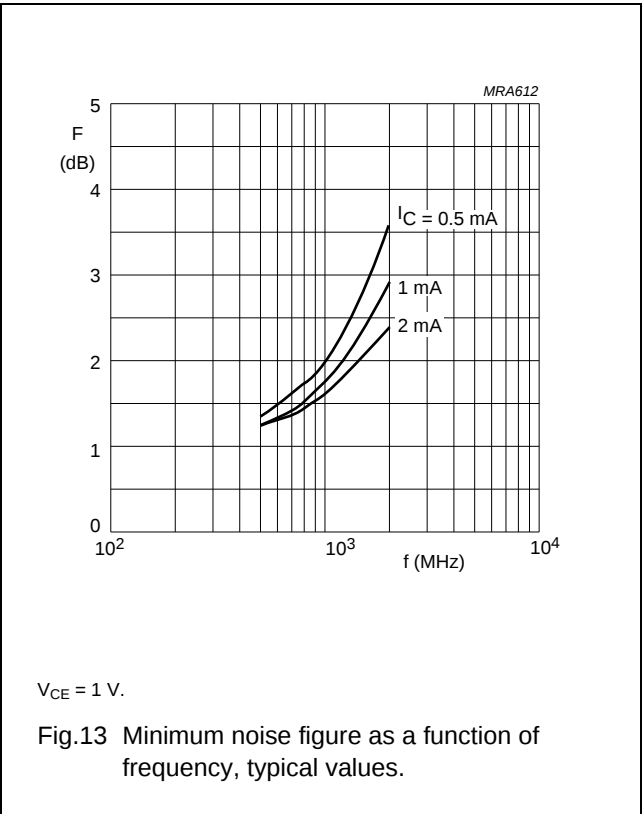
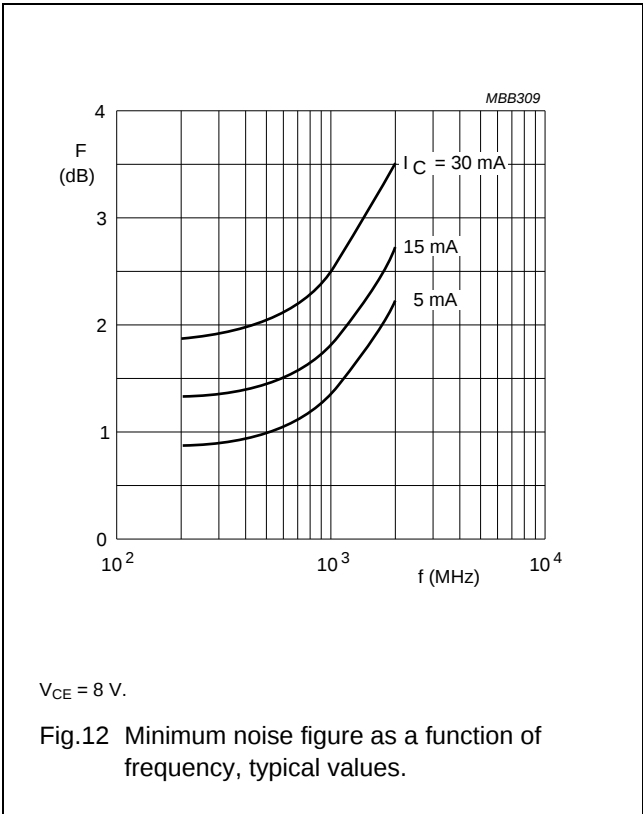
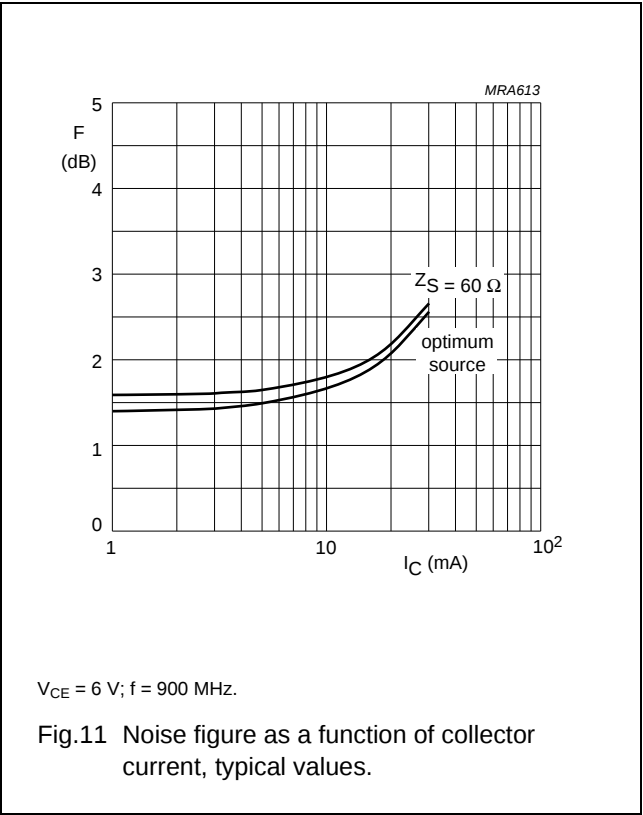
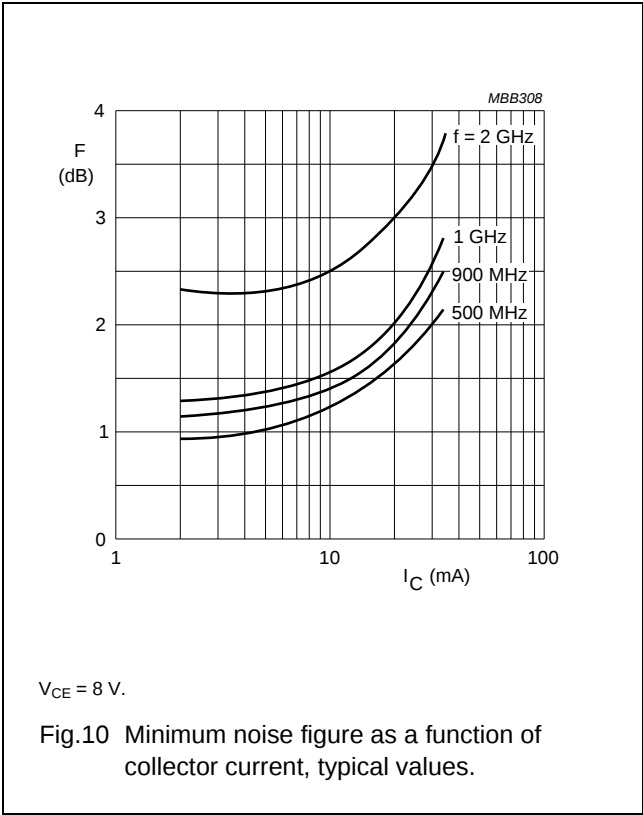
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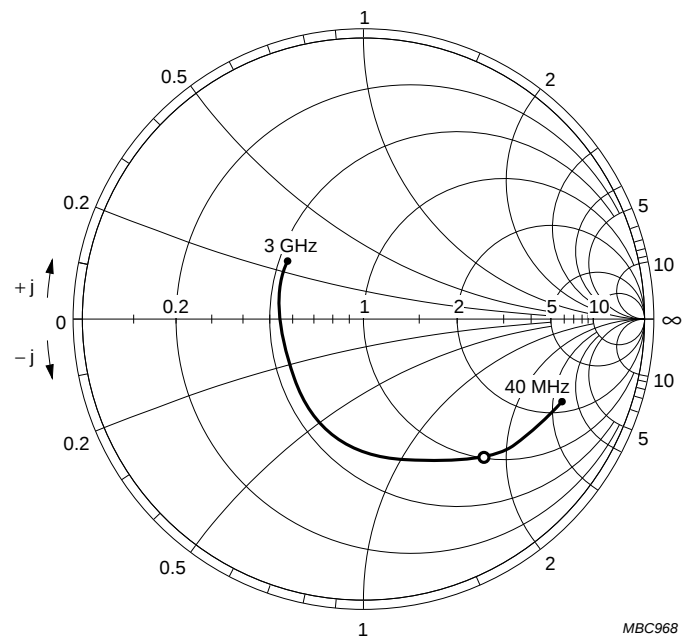
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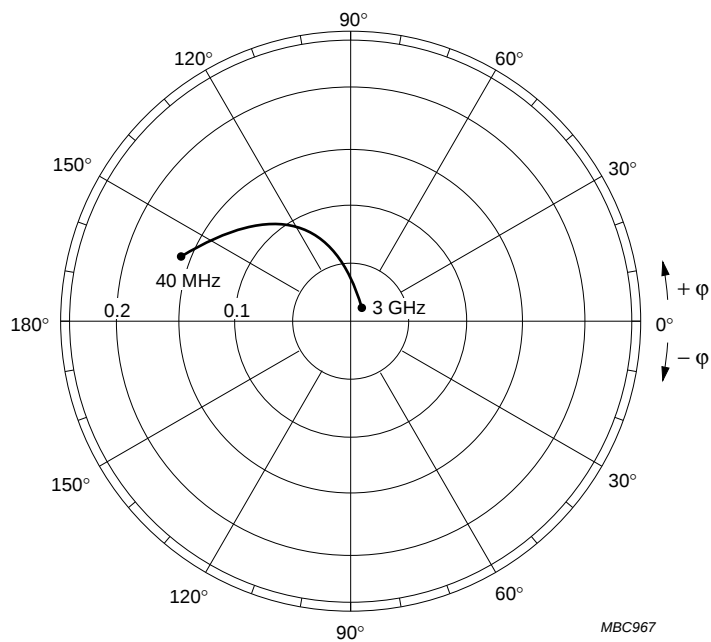
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$V_{CE} = 8\text{ V}$; $I_C = 15\text{ mA}$; $Z_0 = 50\ \Omega$.

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

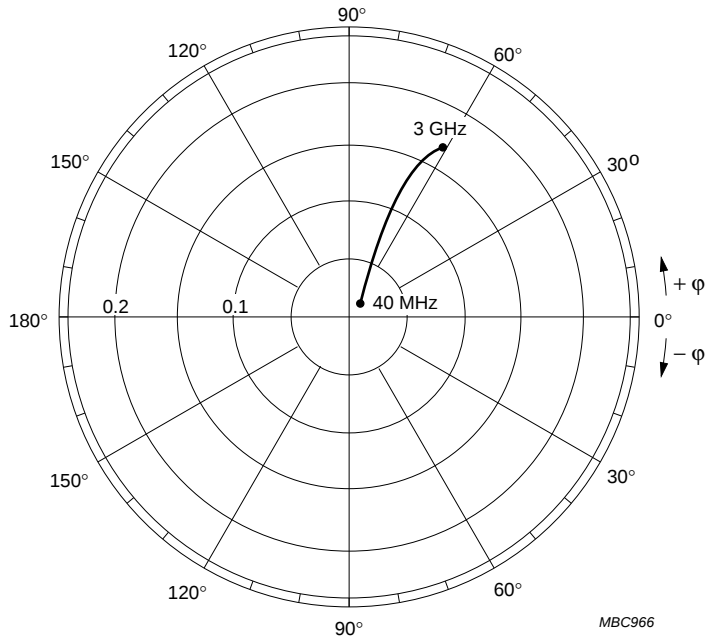


$V_{CE} = 8\text{ V}$; $I_C = 15\text{ mA}$.

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

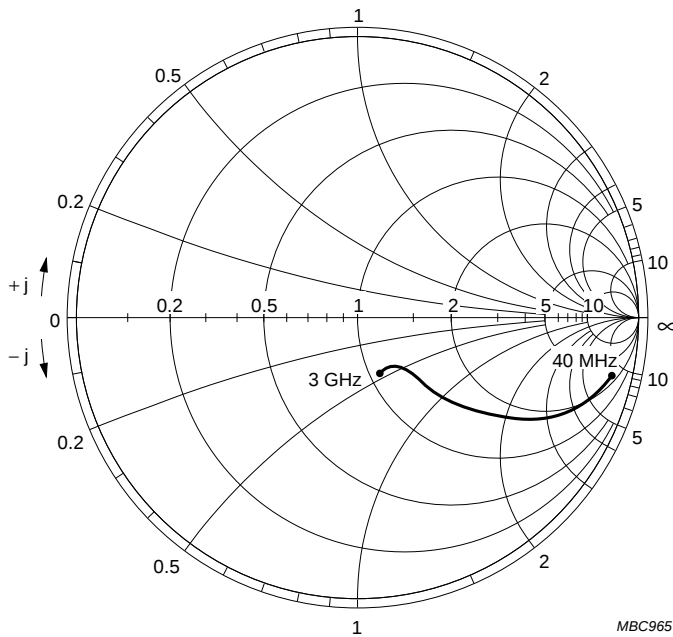
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$V_{CE} = 8\text{ V}$; $I_C = 15\text{ mA}$.

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.

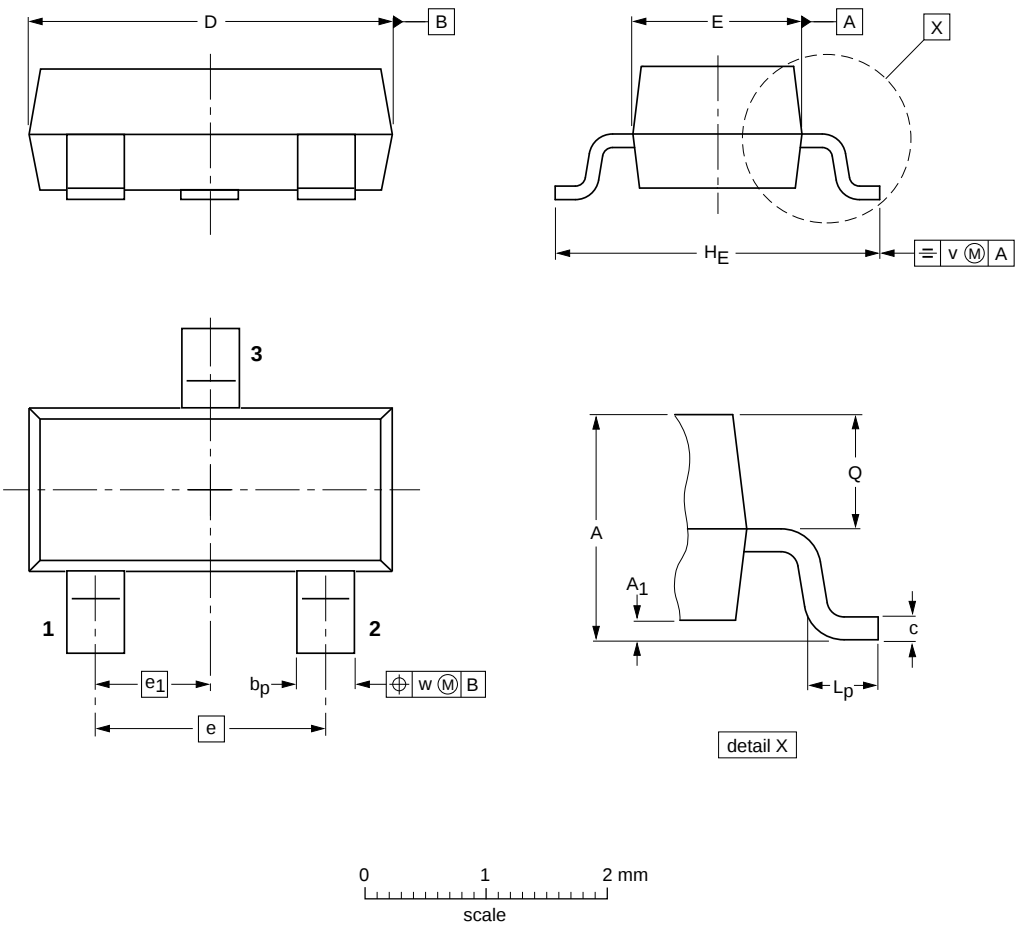
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max.	b _p	c	D	E	e	e ₁	H _E	L _p	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	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16

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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	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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Contact information

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