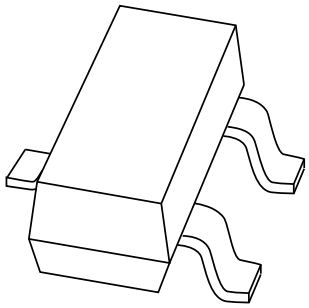
DATA SHEET



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

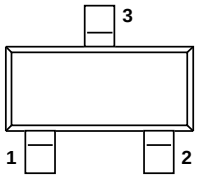
Satellite TV tuners and RF portable communications equipment up to 2 GHz.

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	$T_s \leq 97$ °C; note 1	–	–	300	mW
h_{FE}	DC current gain	I_C = 15 mA; V_{CE} = 5 V	60	100	–	
f_T	transition frequency	I_C = 15 mA; V_{CE} = 8 V	–	8	–	GHz
G_{UM}	maximum unilateral power gain	I_C = 15 mA; V_{CE} = 8 V; f = 1 GHz	–	14	–	dB
F	noise figure	I_C = 5 mA; V_{CE} = 8 V; f = 1 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	$T_s \leq 97$ °C; note 1	–	300	mW
T_{stg}	storage temperature range		–65	+150	°C
T_j	junction temperature		–	175	°C

Note

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

THERMAL CHARACTERISTICS

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

Note

1. T_s is the temperature at the soldering point of the collector lead.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

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

Note

1. 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 .

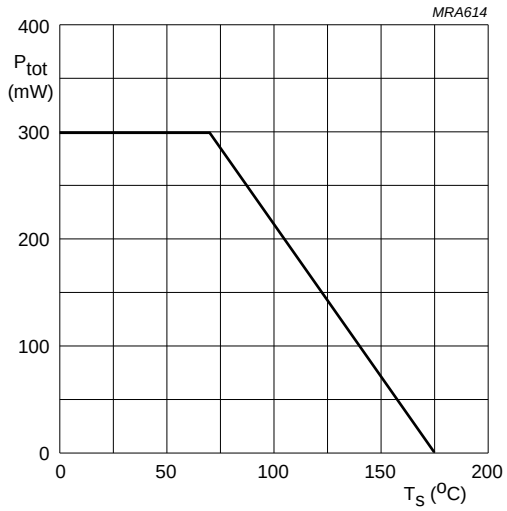
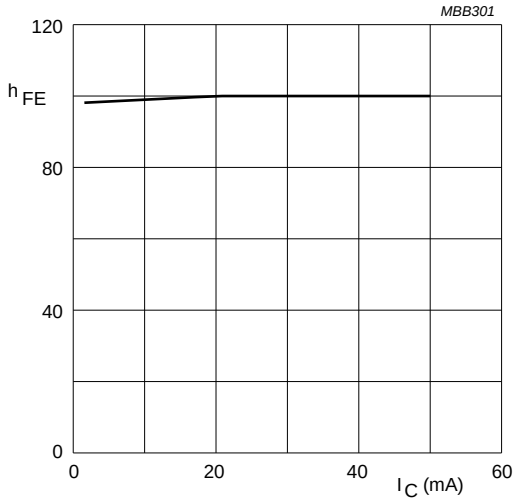
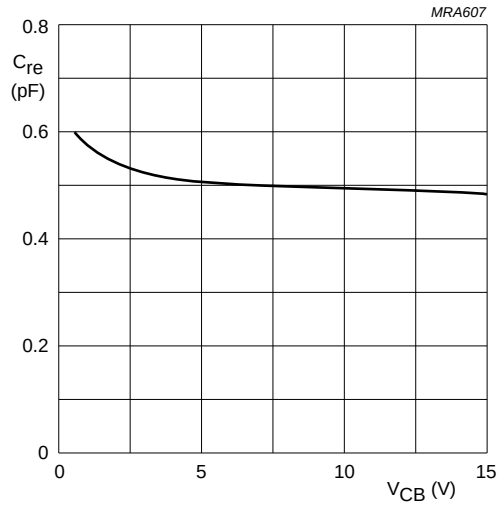


Fig.2 Power derating curve.



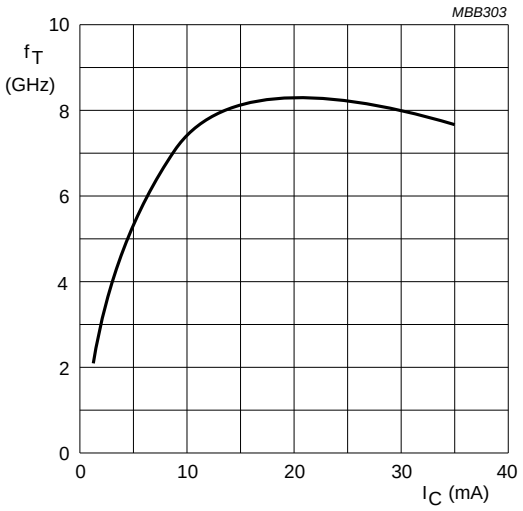
V_{CE} = 5 V.

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



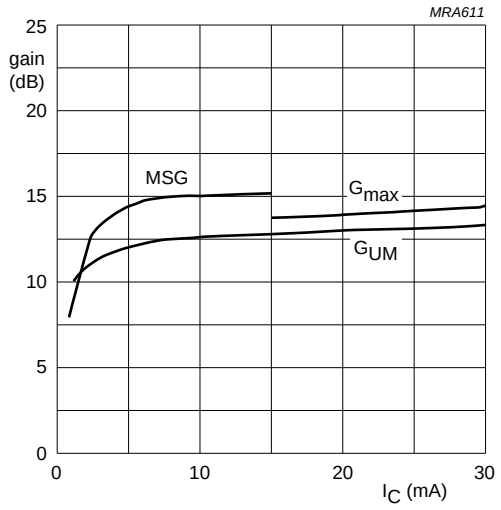
$I_C = i_c = 0$; f = 1 MHz.

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



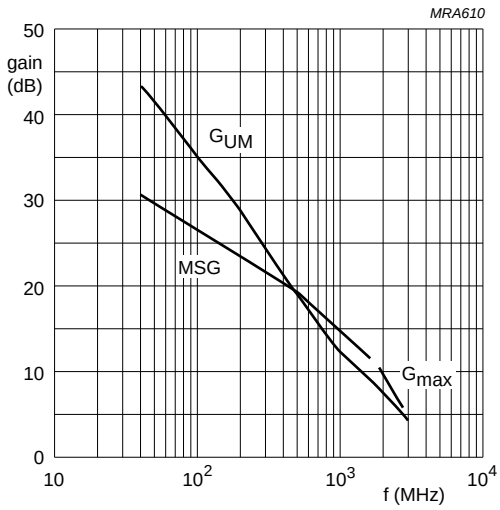
V_{CE} = 8 V; T_{amb} = 25 °C; f = 2 GHz.

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



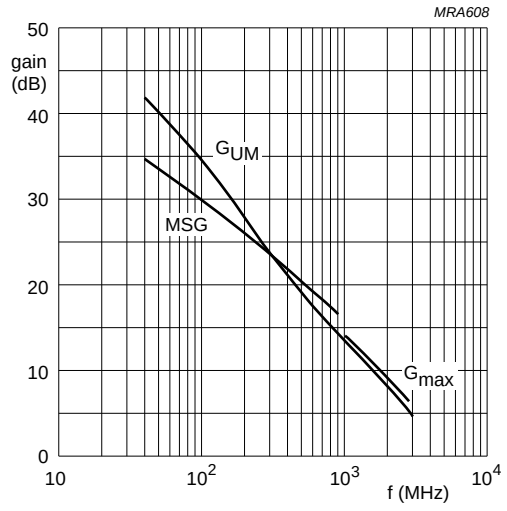
V_{CE} = 8 V; f = 1 GHz.

Fig.6 Gain as a function of collector current, typical values.



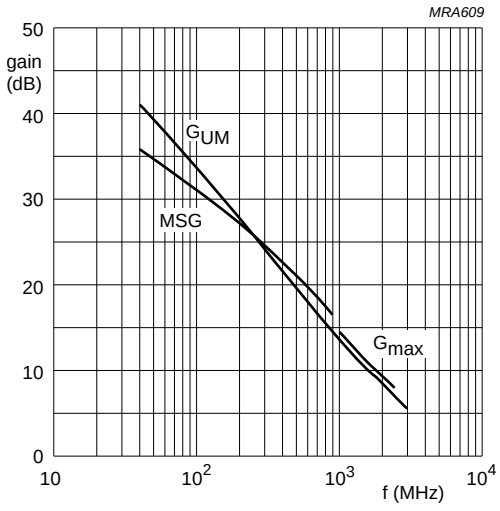
V_{CE} = 8 V; I_C = 5 mA.

Fig.7 Gain as a function of frequency, typical values.



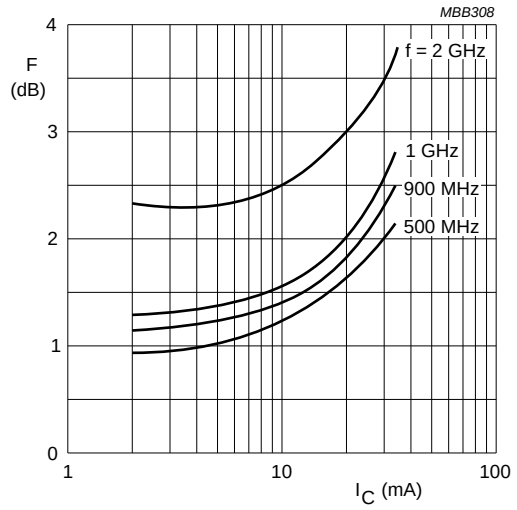
V_{CE} = 8 V; I_C = 15 mA.

Fig.8 Gain as a function of frequency, typical values.



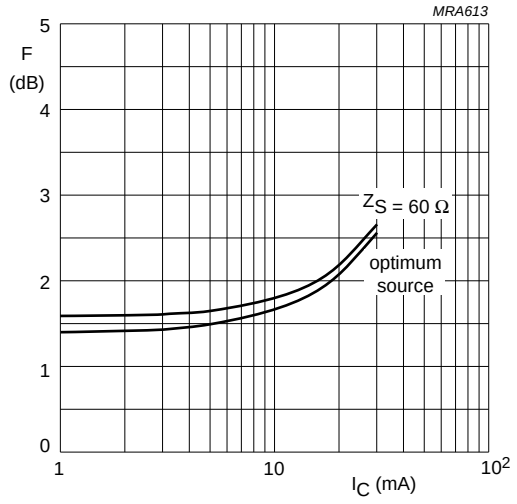
V_{CE} = 8 V; I_C = 30 mA.

Fig.9 Gain as a function of frequency, typical values.



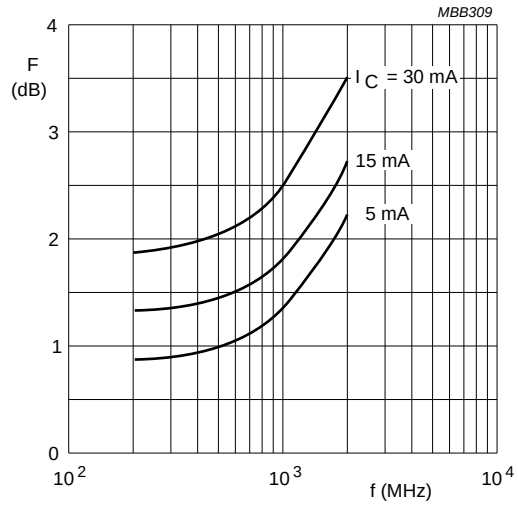
V_{CE} = 8 V.

Fig.10 Minimum noise figure as a function of collector current, typical values.



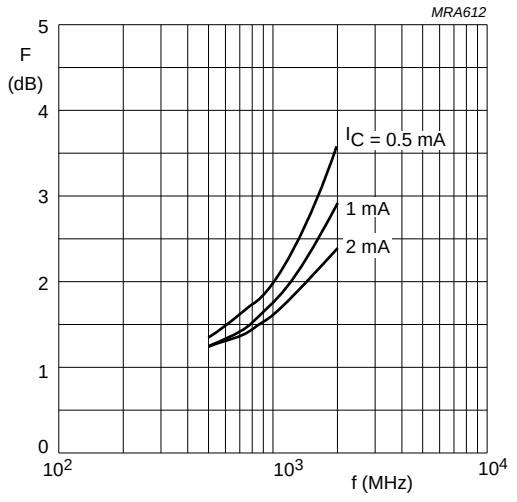
V_{CE} = 6 V; f = 900 MHz.

Fig.11 Noise figure as a function of collector current, typical values.



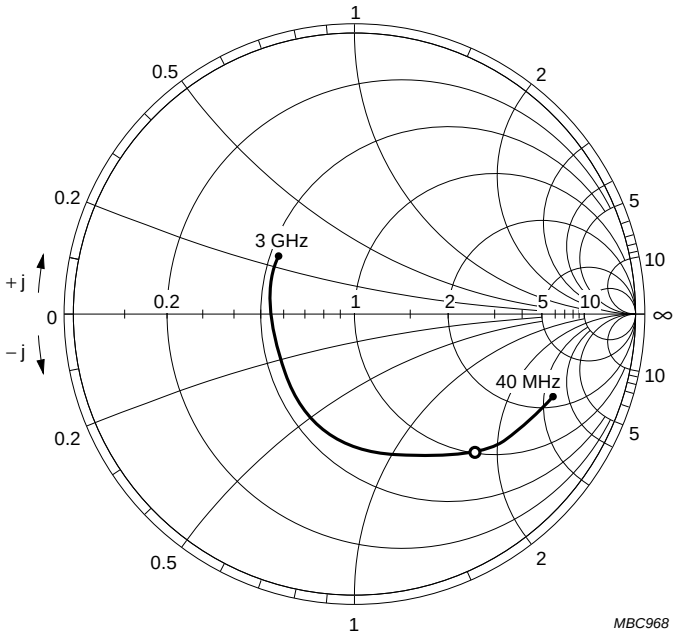
V_{CE} = 8 V.

Fig.12 Minimum noise figure as a function of frequency, typical values.



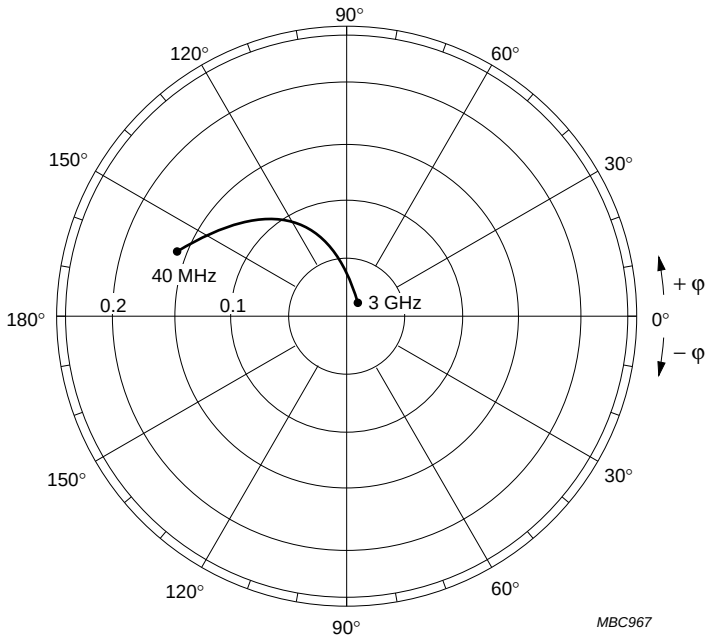
V_{CE} = 1 V.

Fig.13 Minimum noise figure as a function of frequency, typical values.



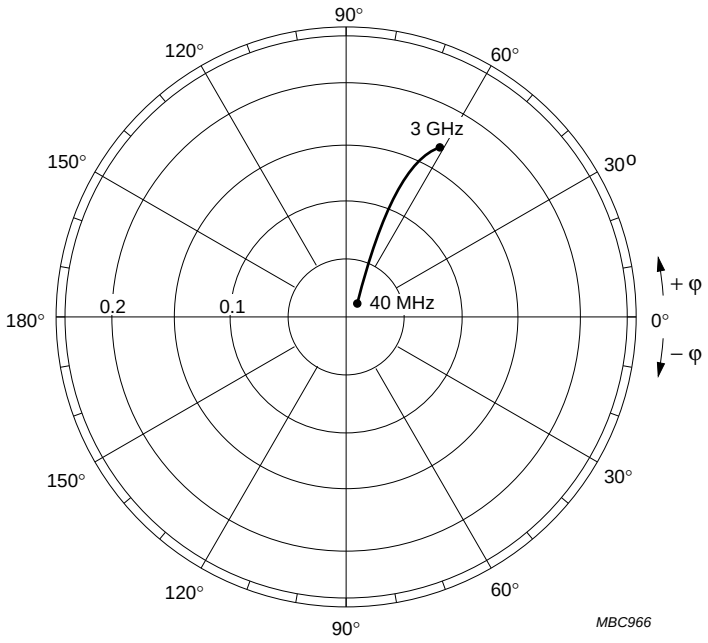
V_{CE} = 8 V; I_C = 15 mA; Z_o = 50 Ω.

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



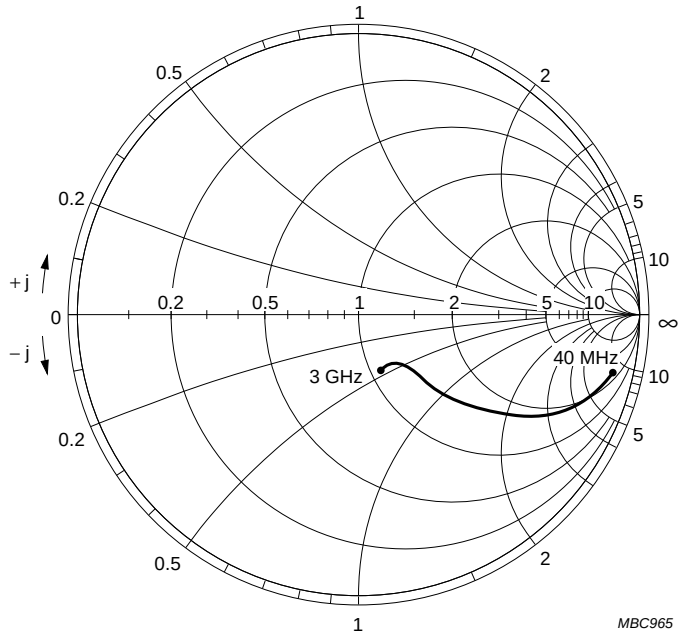
V_{CE} = 8 V; I_C = 15 mA.

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



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

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

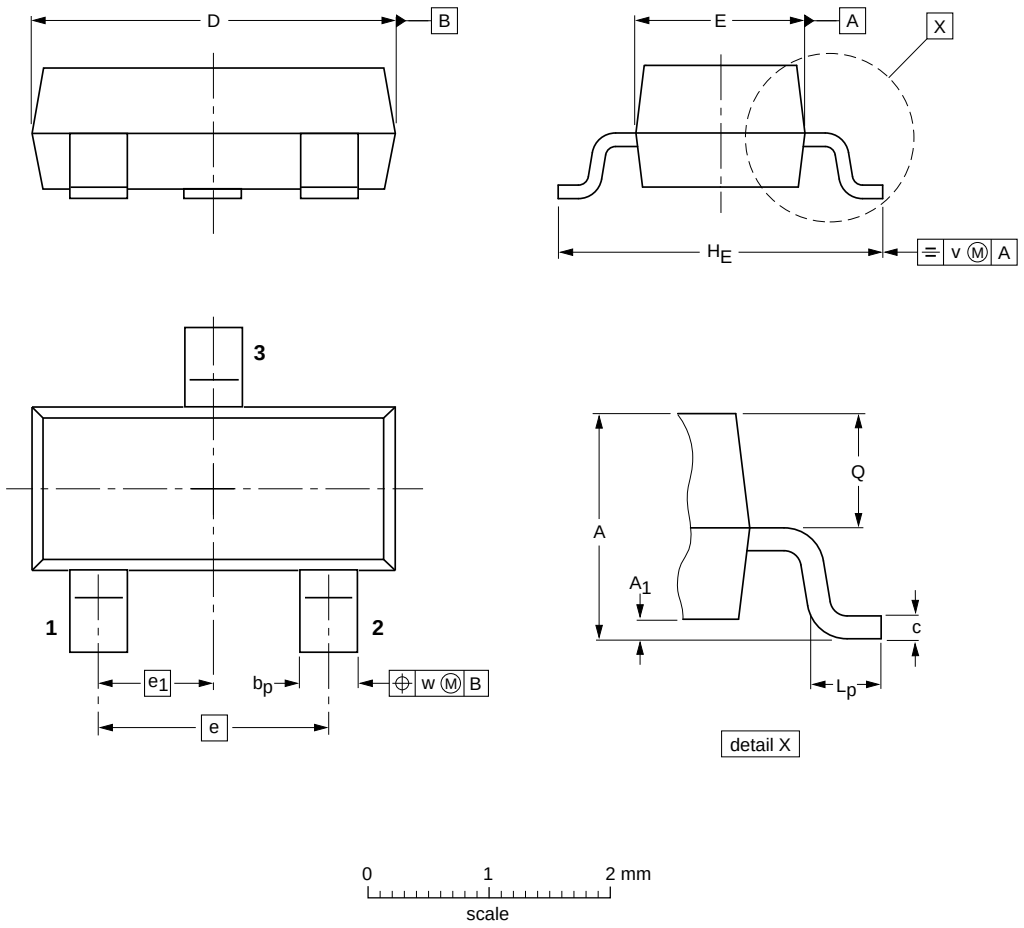


V_{CE} = 8 V; I_C = 15 mA; Z_o = 50 Ω.

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

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

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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Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

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