NPN 8 GHz wideband transistor BFQ67

FEATURES

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

APPLICATIONS

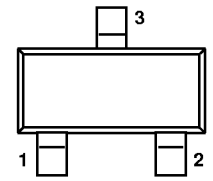
Satellite TV tuners and RF portable communications equipment up to 2 GHz.

DESCRIPTION

Silicon NPN wideband transistor in a plastic SOT23 package.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



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 $G_{UM} = 10 \log \frac{|S_{21}|^2}{\left(1-|S_{11}|^2\right)\left(1-|S_{22}|^2\right)}$ dB.

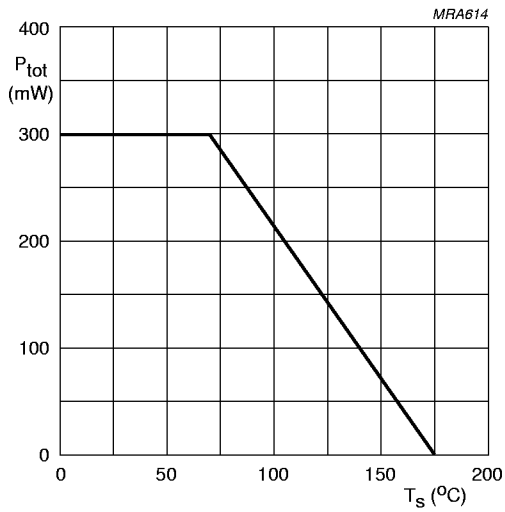
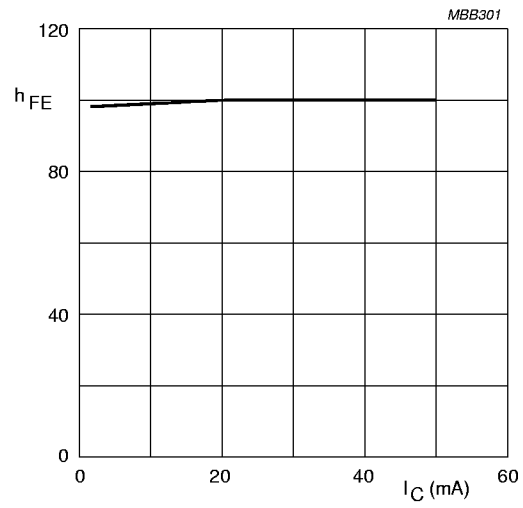
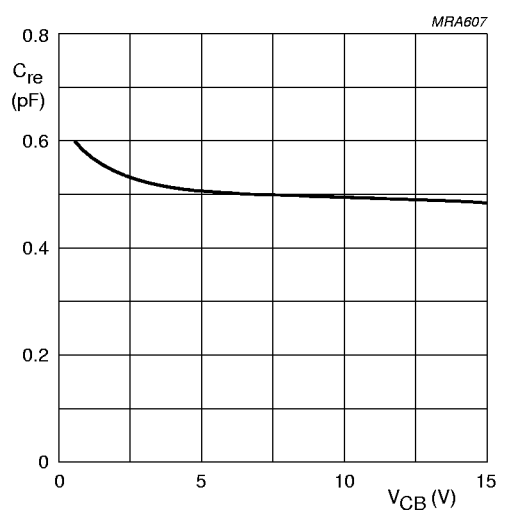


Fig.2 Power derating curve.



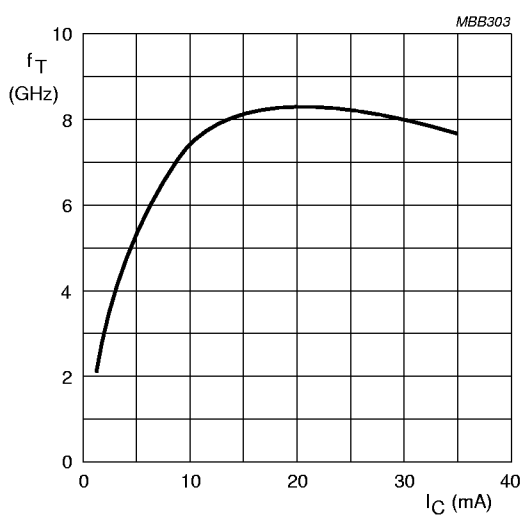
V_{CE} = 5 V.

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



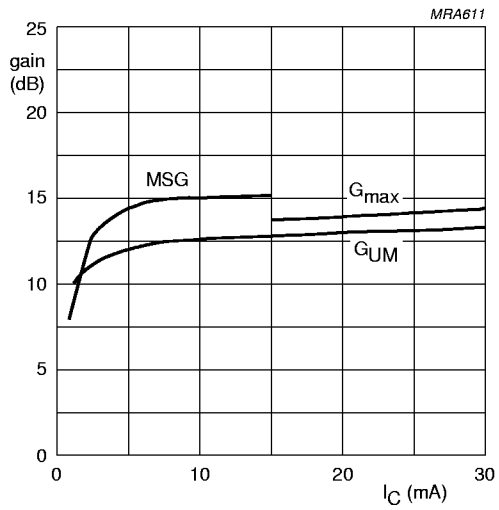
$I_C = i_c = 0$; f = 1 MHz.

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



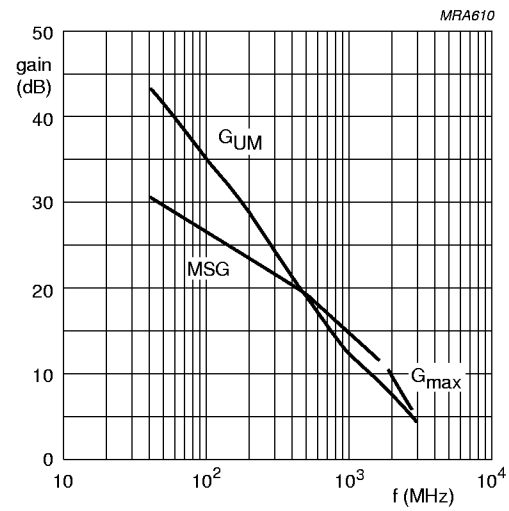
V_{CE} = 8 V; T_{amb} = 25 °C; f = 2 GHz.

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



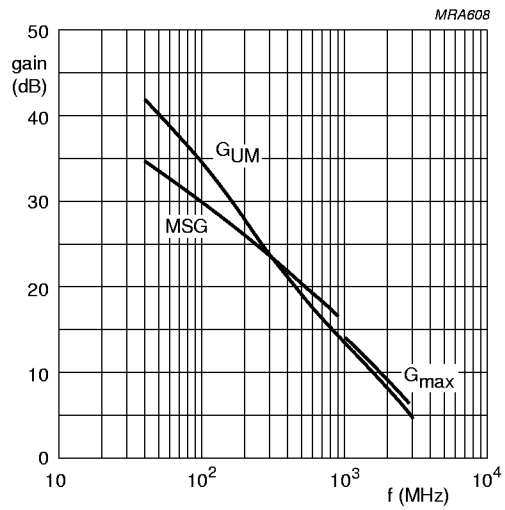
V_{CE} = 8 V; f = 1 GHz.

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



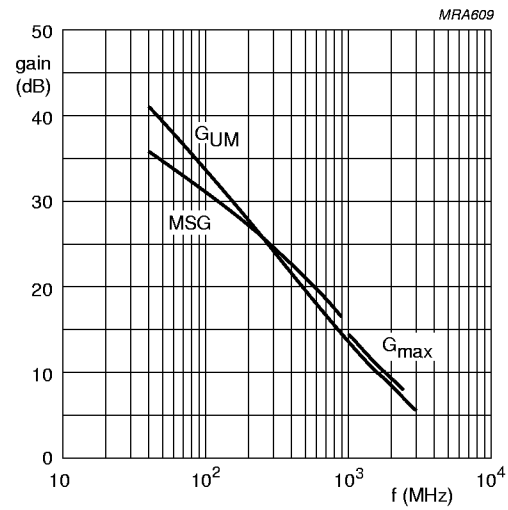
V_{CE} = 8 V; I_C = 5 mA.

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



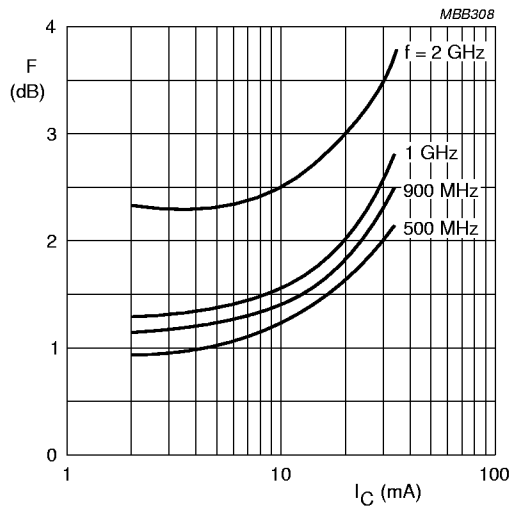
V_{CE} = 8 V; I_C = 15 mA.

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



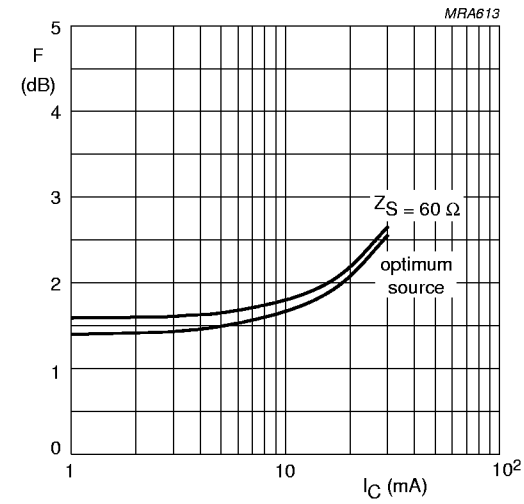
V_{CE} = 8 V; I_C = 30 mA.

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



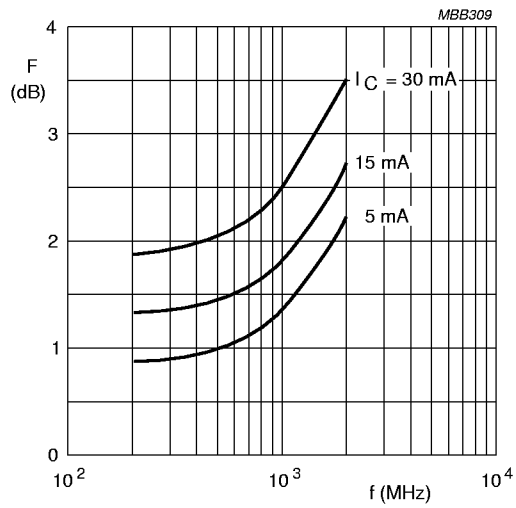
V_{CE} = 8 V.

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



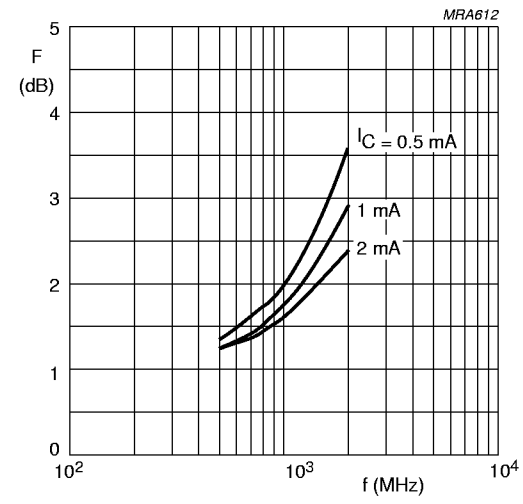
V_{CE} = 6 V; f = 900 MHz.

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



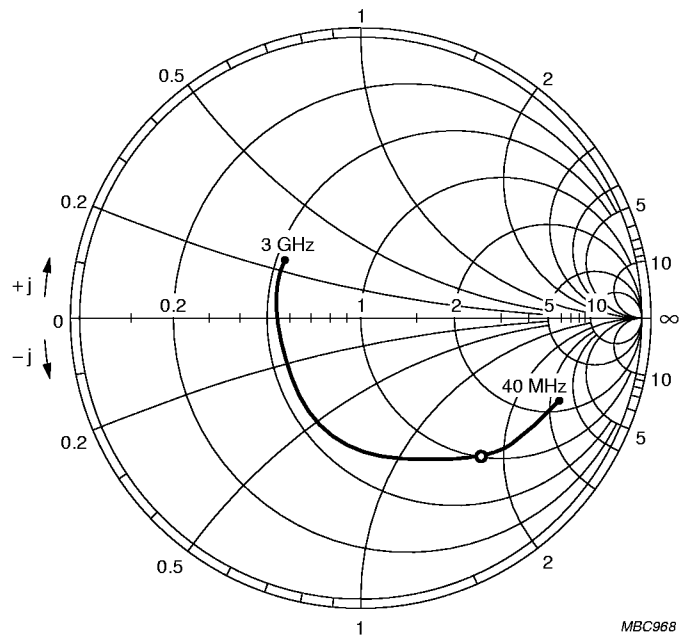
V_{CE} = 8 V.

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



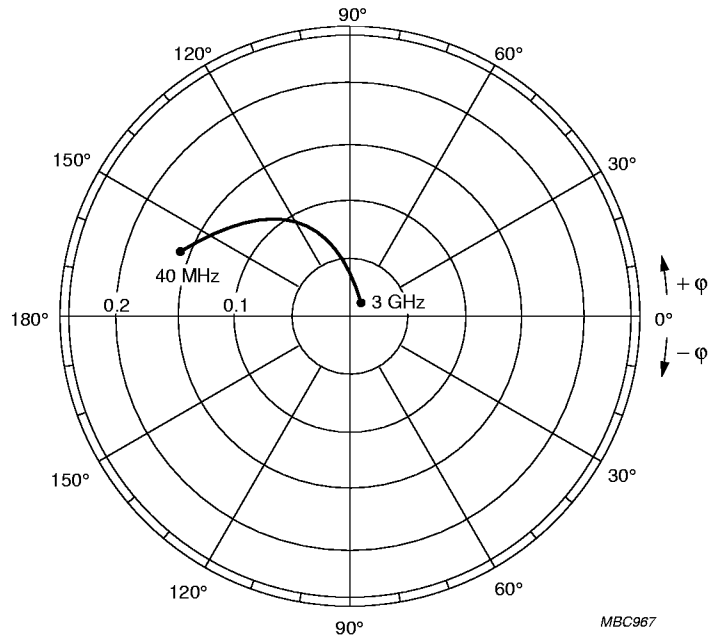
V_{CE} = 1 V.

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



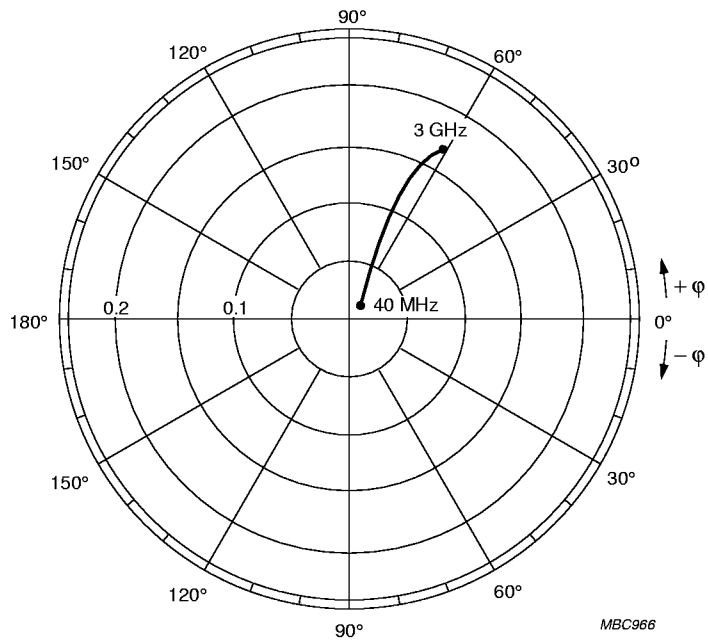
V_{CE} = 8 V; I_C = 15 mA; Z_o = 50 Ω.

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



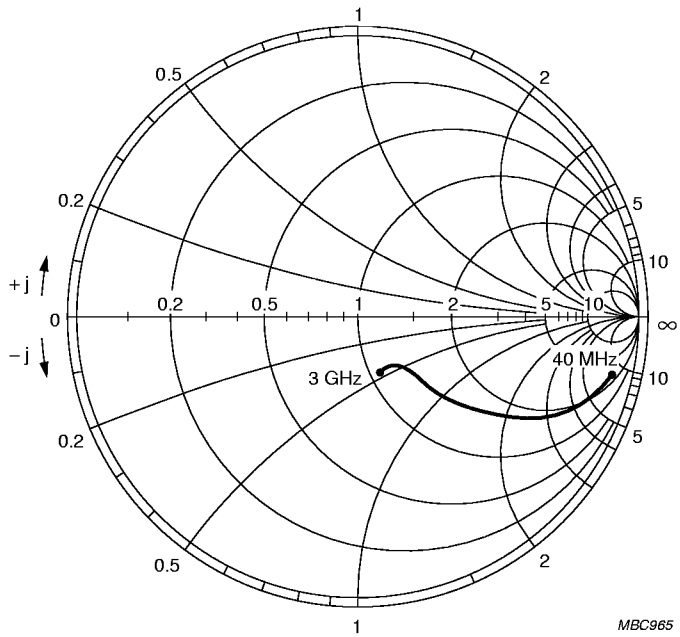
V_{CE} = 8 V; I_C = 15 mA.

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.

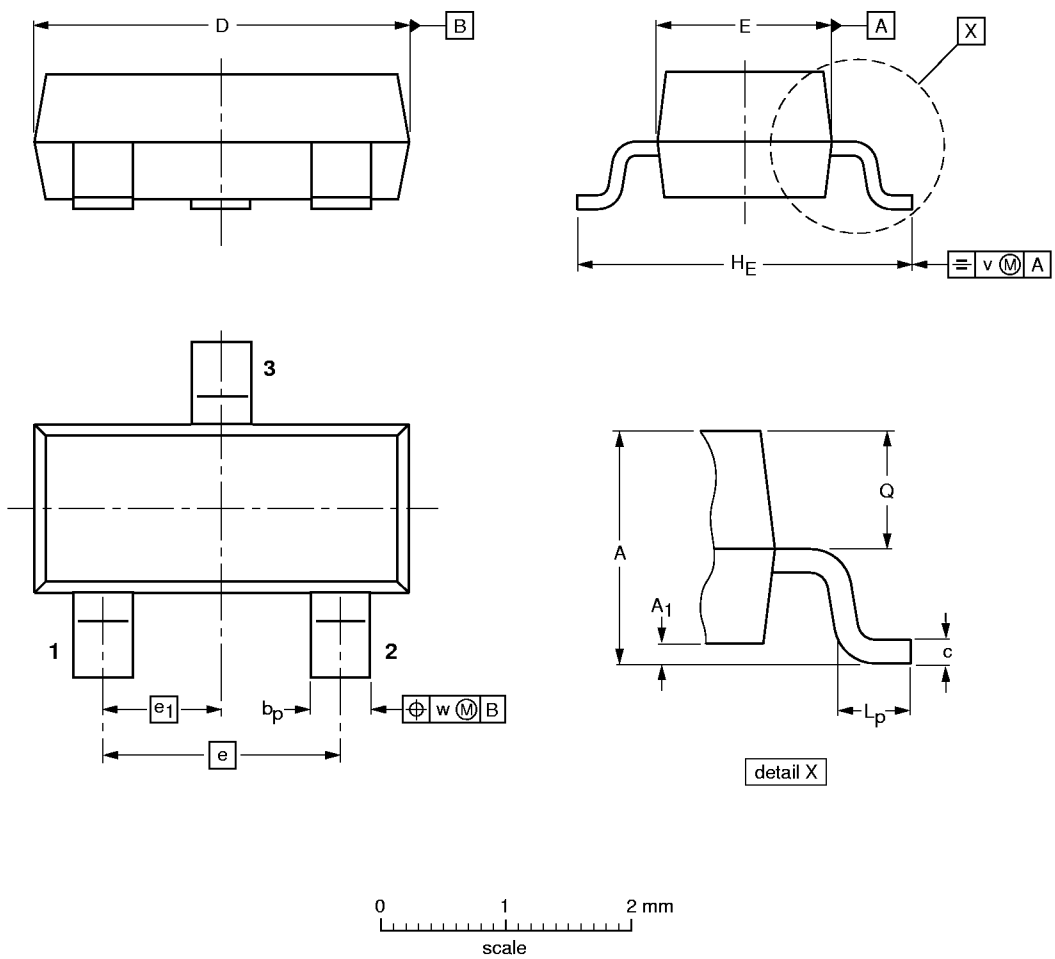


V_{CE} = 8 V; I_C = 15 mA; Z_o = 50 Ω.

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	EIAJ			
SOT23						97-02-28