

BFG25A/X

NPN 5 GHz wideband transistor

Rev. 04 — 27 November 2007

Product data sheet

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NXP Semiconductors

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FEATURES

- Low current consumption (100 μ A to 1 mA)
- Low noise figure
- Gold metallization ensures excellent reliability.

APPLICATIONS

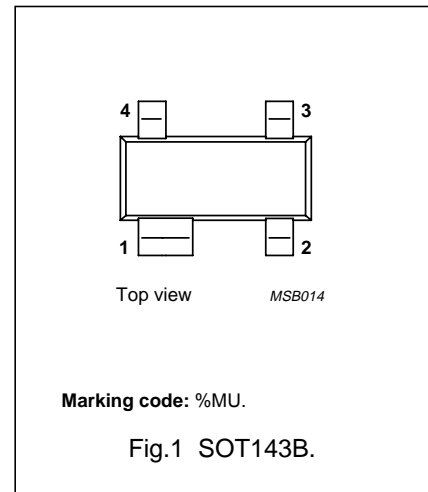
- RF low power amplifiers, such as pocket telephones, paging systems, with signal frequencies up to 2 GHz.

DESCRIPTION

NPN silicon wideband transistor in a four-lead dual emitter SOT143B plastic package (cross emitter).

PINNING

PIN	DESCRIPTION
1	collector
2	emitter
3	base
4	emitter



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage		–	–	8	V
V_{CEO}	collector-emitter voltage		–	–	5	V
I_C	collector current (DC)		–	–	6.5	mA
P_{tot}	total power dissipation	$T_s \leq 165 \text{ }^\circ\text{C}$	–	–	32	mW
h_{FE}	DC current gain	$I_C = 0.5 \text{ mA}; V_{CE} = 1 \text{ V}$	50	80	200	
f_T	transition frequency	$I_C = 1 \text{ mA}; V_{CE} = 1 \text{ V}; f = 500 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	3.5	5	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = 0.5 \text{ mA}; V_{CE} = 1 \text{ V}; f = 1 \text{ GHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	–	18	–	dB
F	noise figure	$I_C = 0.5 \text{ mA}; V_{CE} = 1 \text{ V}; f = 1 \text{ GHz}; \Gamma = \Gamma_{opt}; T_{amb} = 25 \text{ }^\circ\text{C}$	–	1.8	–	dB
		$I_C = 1 \text{ mA}; V_{CE} = 1 \text{ V}; f = 1 \text{ GHz}; \Gamma = \Gamma_{opt}; T_{amb} = 25 \text{ }^\circ\text{C}$	–	2	–	dB

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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	–	8	V
V _{CEO}	collector-emitter voltage	open base	–	5	V
V _{EBO}	emitter-base voltage	open collector	–	2	V
I _C	collector current (DC)		–	6.5	mA
P _{tot}	total power dissipation	T _s ≤ 165 °C; note 1	–	32	mW
T _{stg}	storage temperature		–65	150	°C
T _j	junction temperature		–	175	°C

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-s}	thermal resistance from junction to soldering point	note 1	320	K/W

Note

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

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

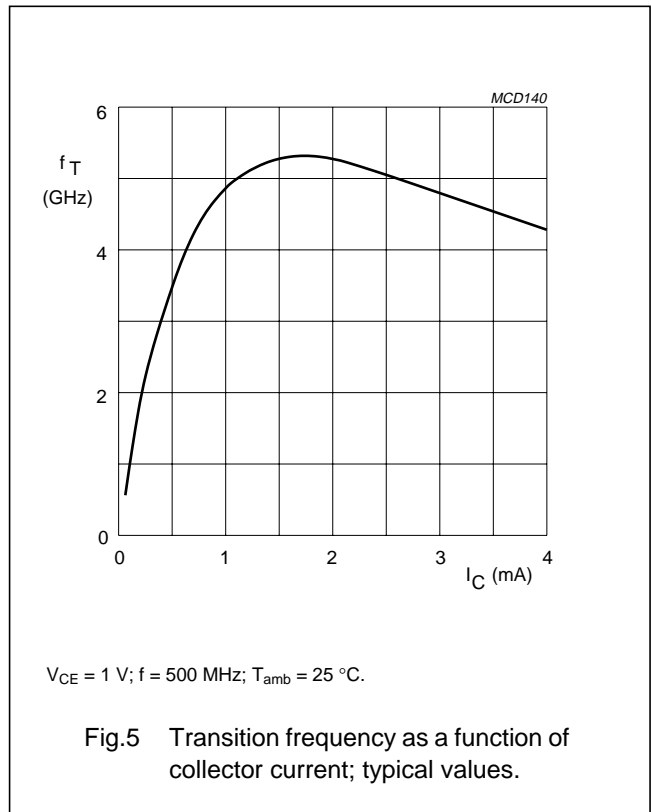
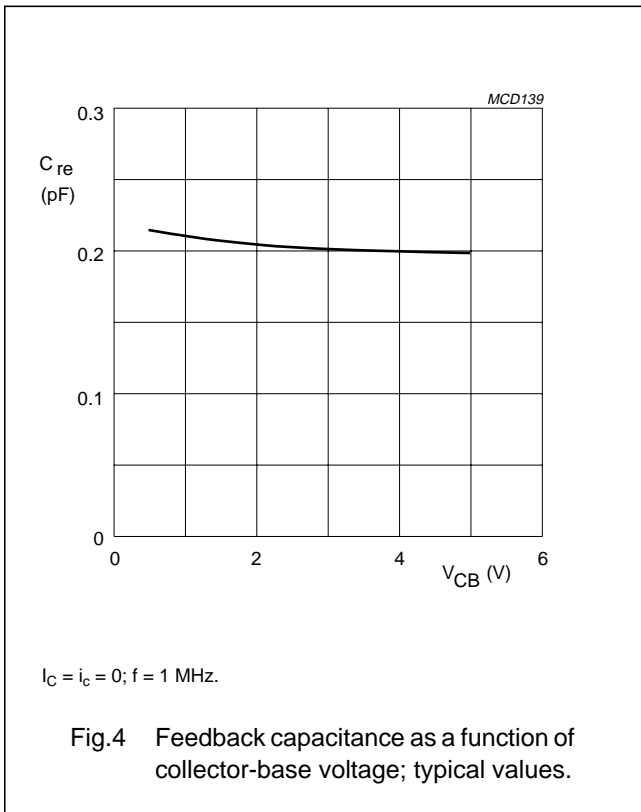
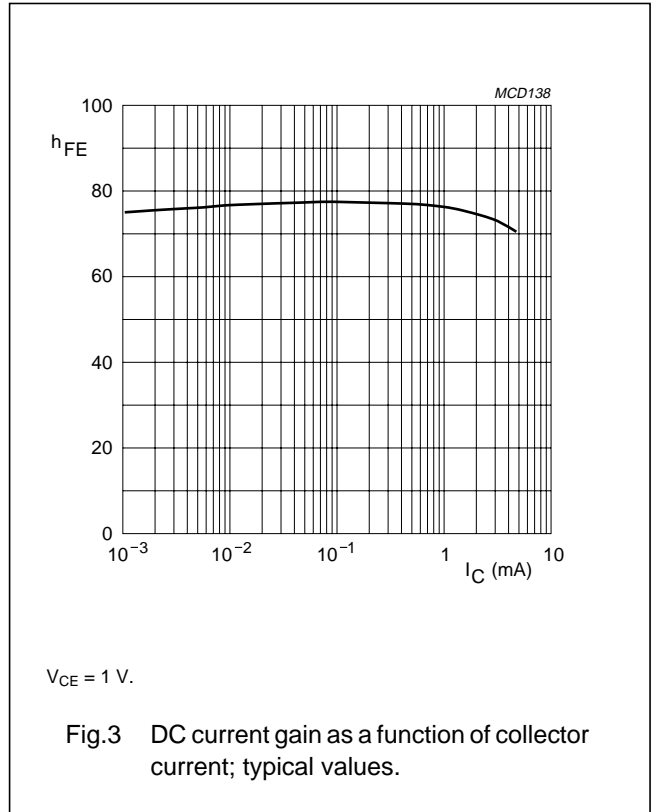
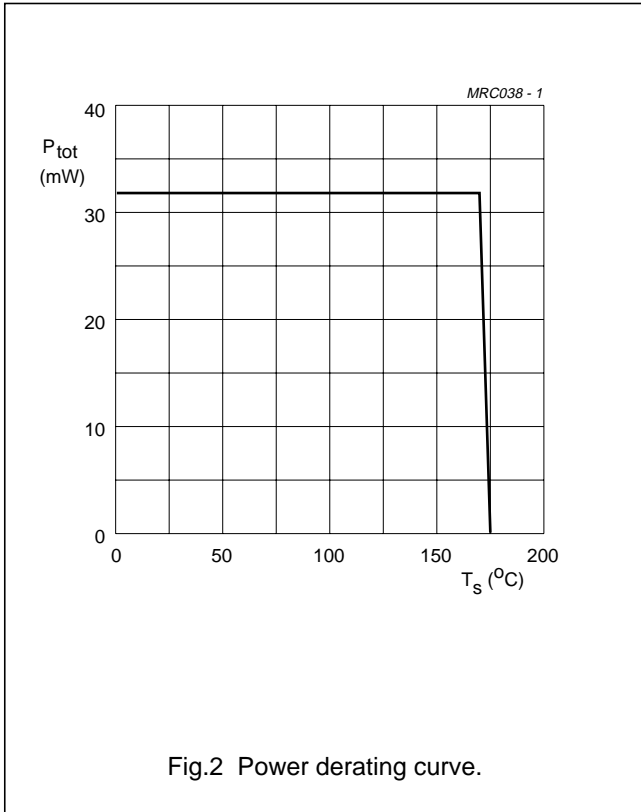
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector leakage current	I _E = 0; V _{CB} = 5 V	–	–	50	μA
h _{FE}	DC current gain	I _C = 0.5 mA; V _{CE} = 1 V	50	80	200	
C _{re}	feedback capacitance	I _C = i _c = 0; V _{CB} = 1 V; f = 1 MHz	–	0.21	0.3	pF
f _T	transition frequency	I _C = 1 mA; V _{CE} = 1 V; T _{amb} = 25 °C; f = 500 MHz	3.5	5	–	GHz
G _{UM}	maximum unilateral power gain (note 1)	I _C = 0.5 mA; V _{CE} = 1 V; f = 1 GHz; T _{amb} = 25 °C	–	18	–	dB
F	noise figure	I _C = 0.5 mA; V _{CE} = 1 V; f = 1 GHz; Γ = Γ _{opt} ; T _{amb} = 25 °C	–	1.8	–	dB
		I _C = 1 mA; V _{CE} = 1 V; f = 1 GHz; Γ = Γ _{opt} ; T _{amb} = 25 °C	–	2	–	dB

Note

1. G_{UM} is the maximum unilateral power gain, assuming S₁₂ is zero and $G_{UM} = 10 \log \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)}$ dB

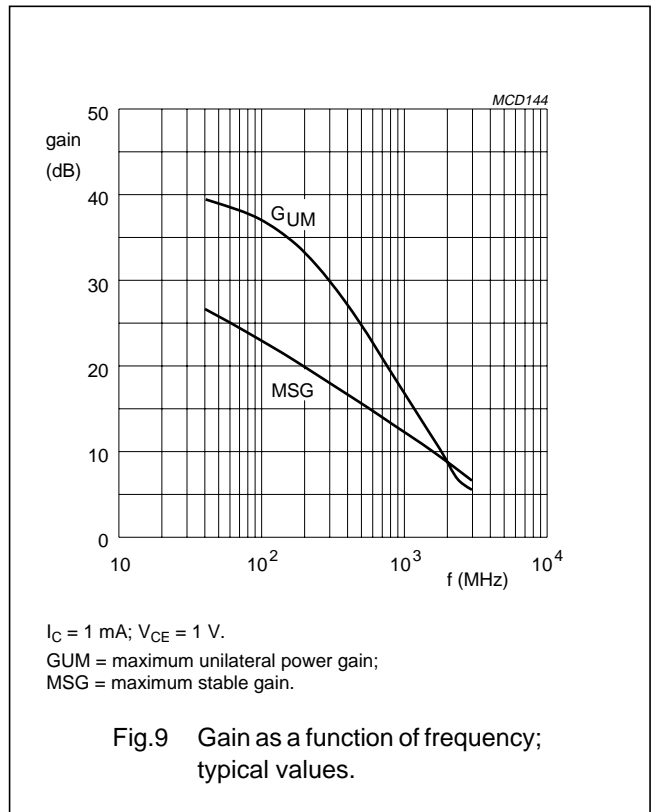
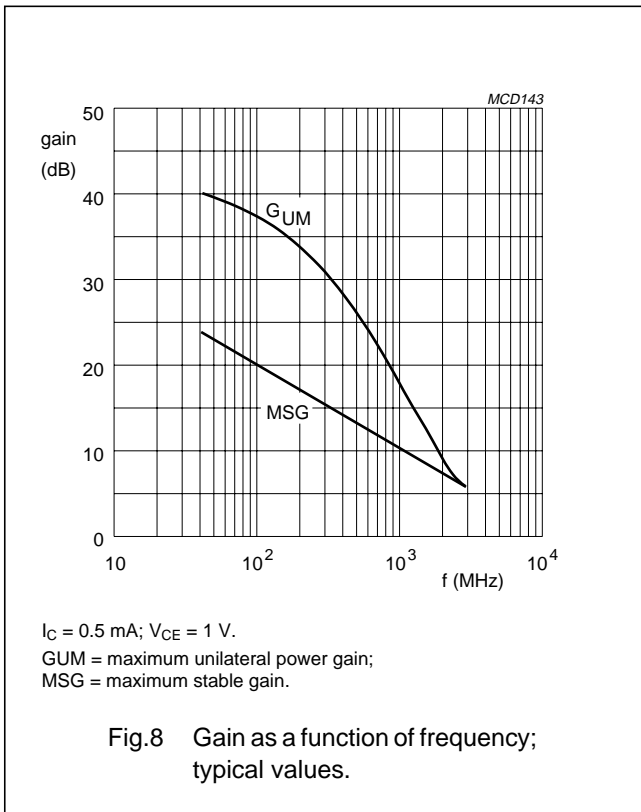
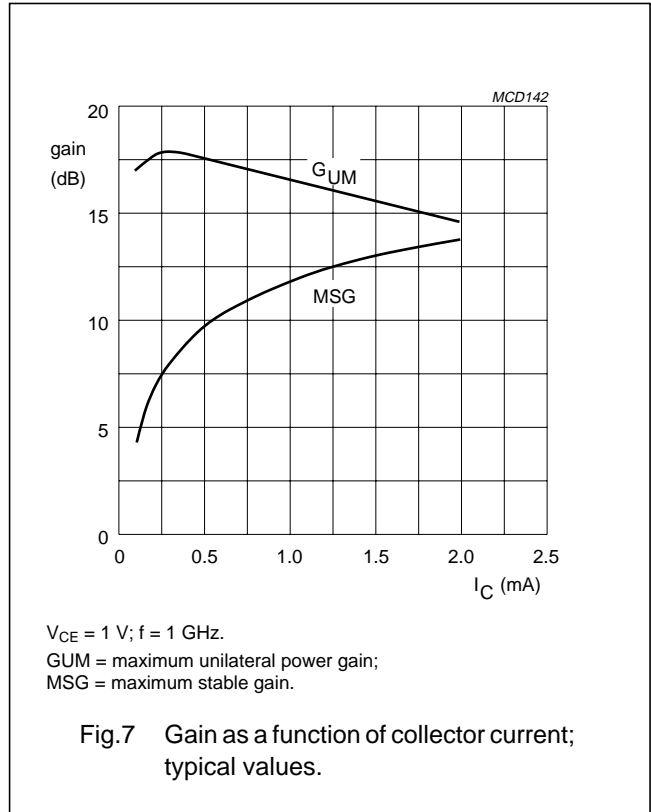
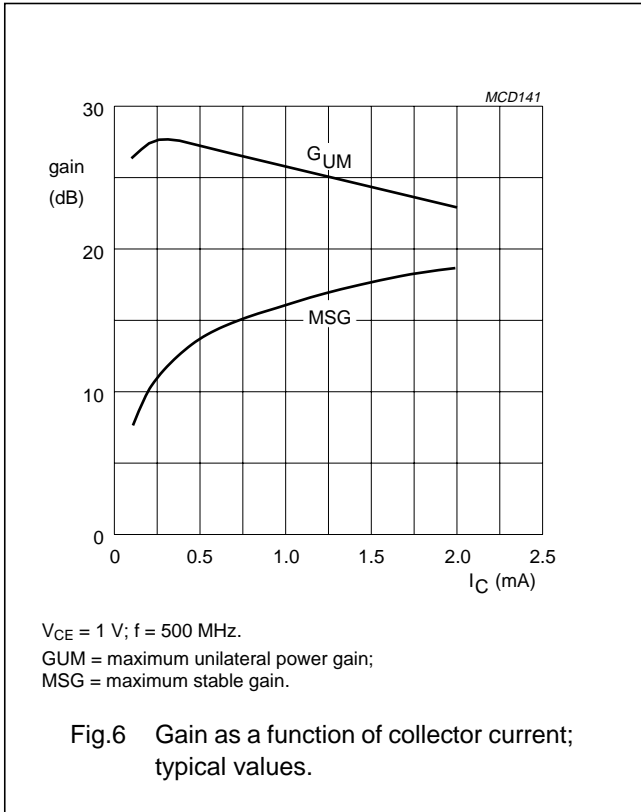
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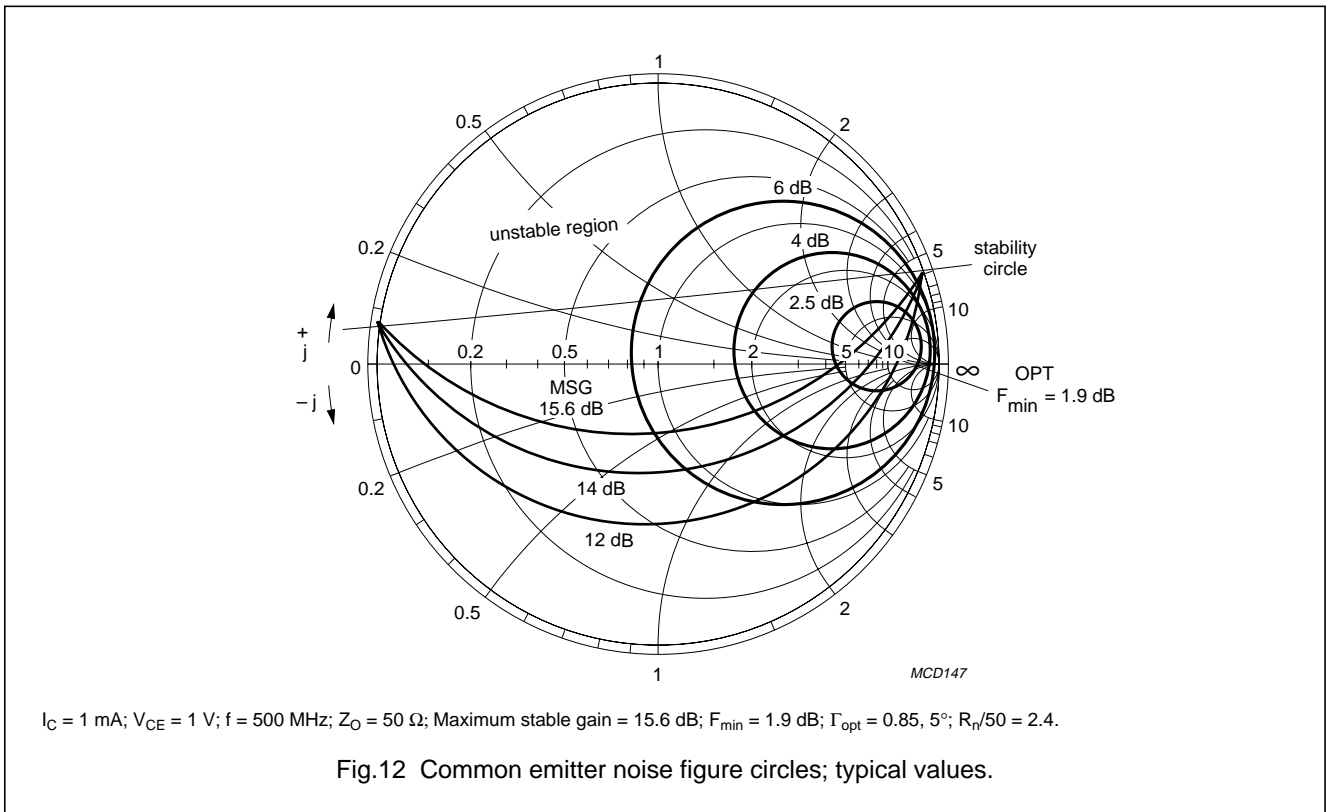
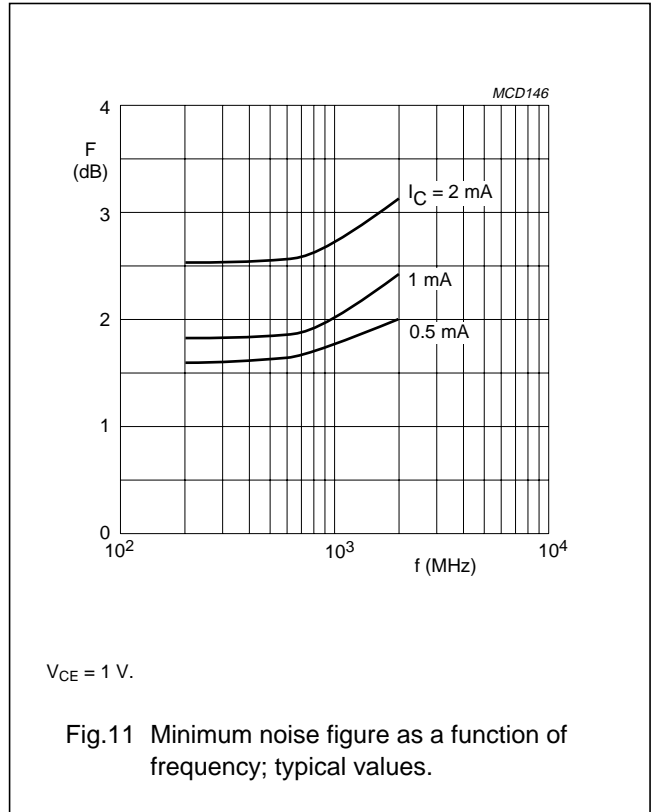
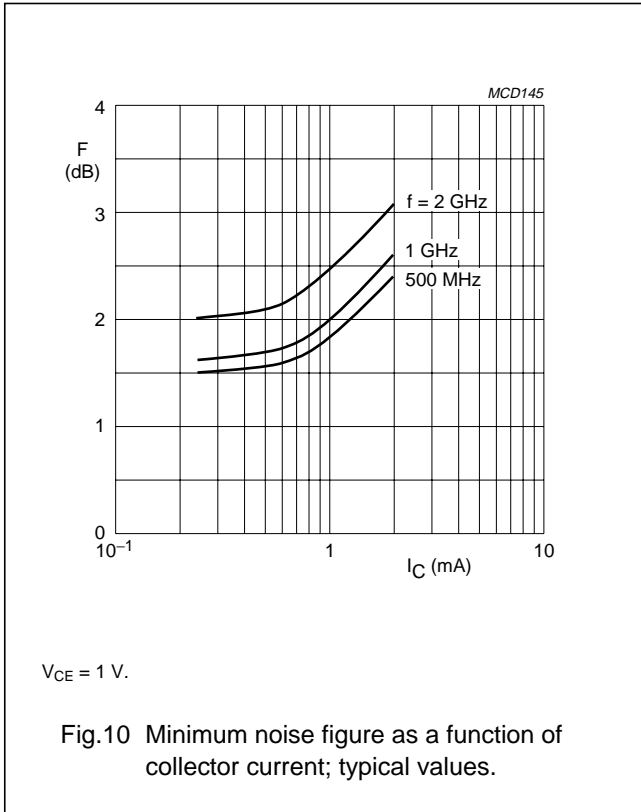
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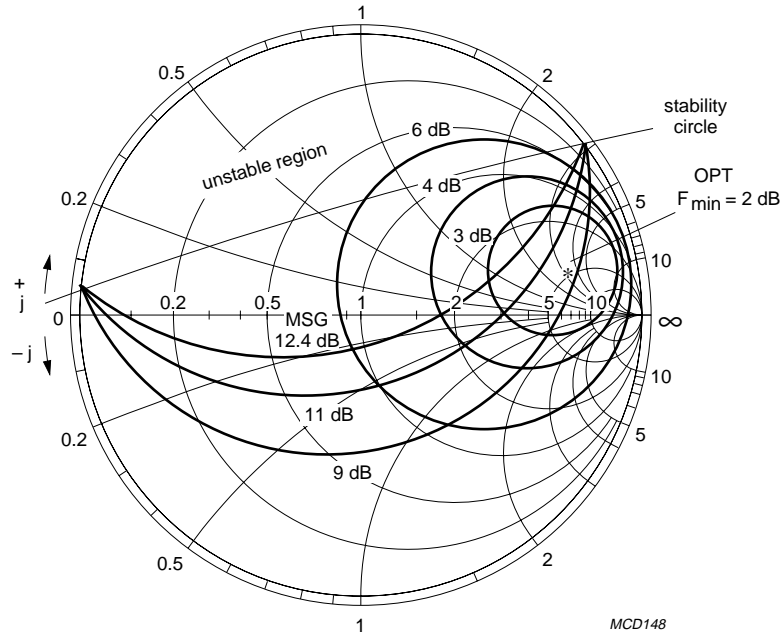
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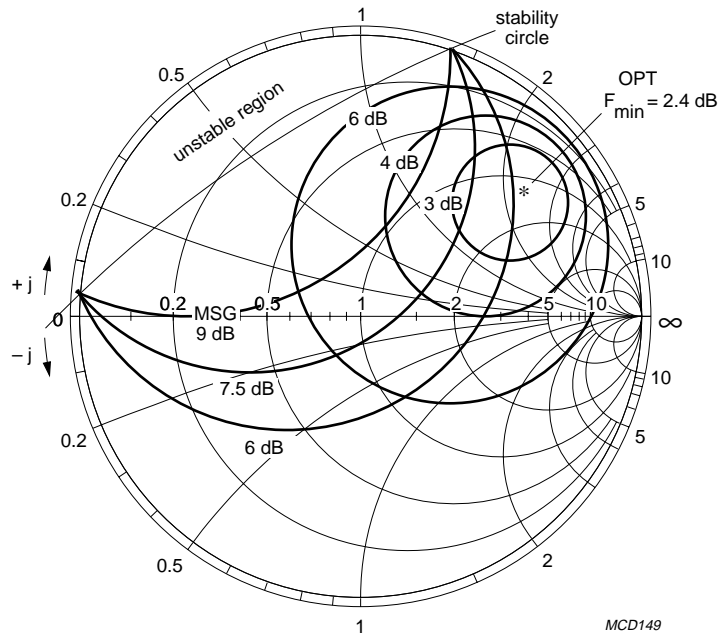
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$I_C = 1$ mA; $V_{CE} = 1$ V; $f = 1000$ MHz; $Z_O = 50 \Omega$; Maximum stable gain = 12.4 dB; $F_{min} = 2$ dB; $\Gamma_{opt} = 0.78, 14^\circ$; $R_n/50 = 2.6$.

Fig.13 Common emitter noise figure circles; typical values.

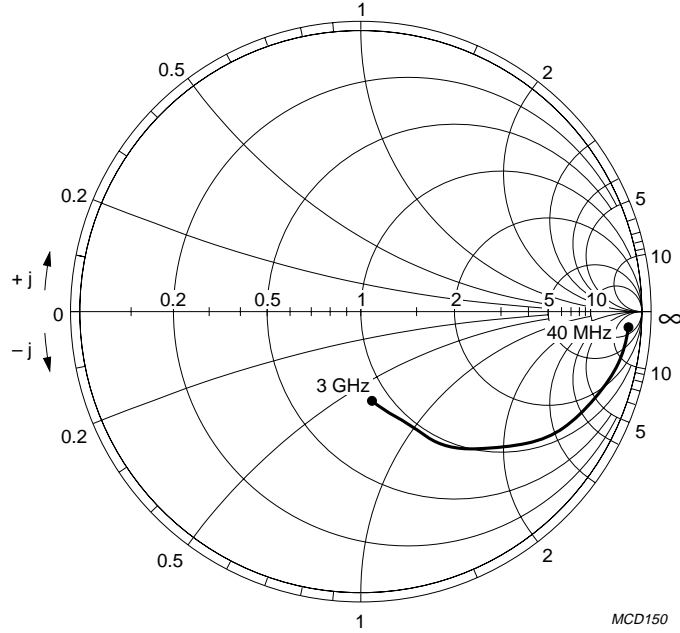


$I_C = 1$ mA; $V_{CE} = 1$ V; $f = 2000$ MHz; $Z_O = 50 \Omega$; Maximum stable gain = 8.9 dB; $F_{min} = 2.4$ dB; $\Gamma_{opt} = 0.72, 38^\circ$; $R_n/50 = 1.9$.

Fig.14 Common emitter noise figure circles; typical values.

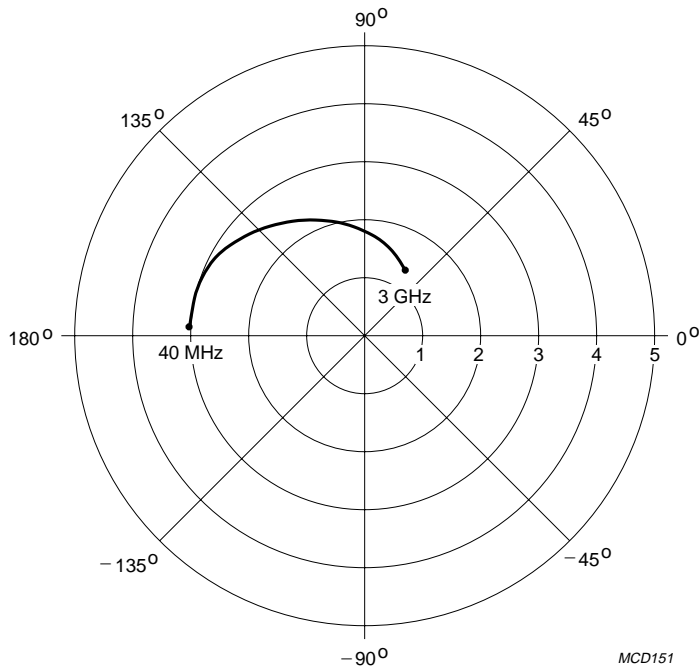
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$I_C = 1 \text{ mA}$; $V_{CE} = 1 \text{ V}$; $Z_0 = 50 \Omega$.

Fig.15 Common emitter input reflection coefficient (S_{11}); typical values.



$I_C = 1 \text{ mA}$; $V_{CE} = 1 \text{ V}$.

Fig.16 Common emitter forward transmission coefficient (S_{21}); typical values.

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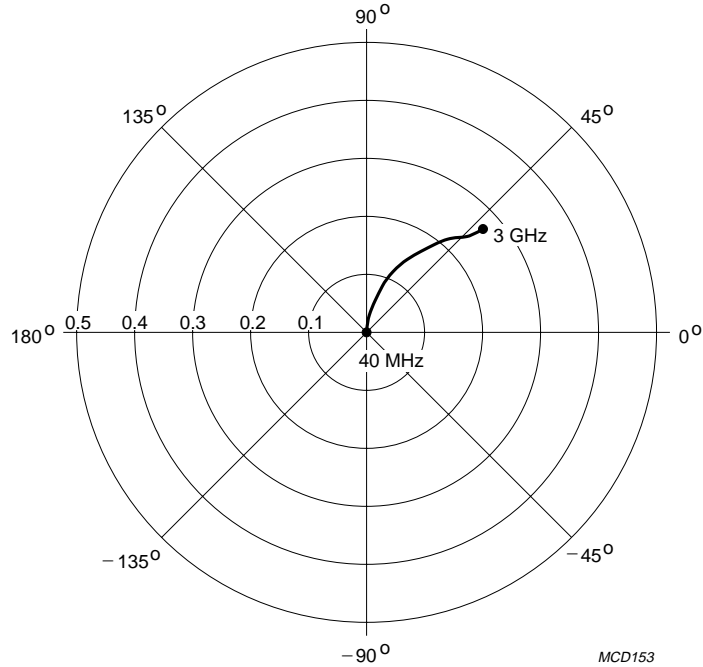


Fig.17 Common emitter reverse transmission coefficient (S_{12}); typical values.

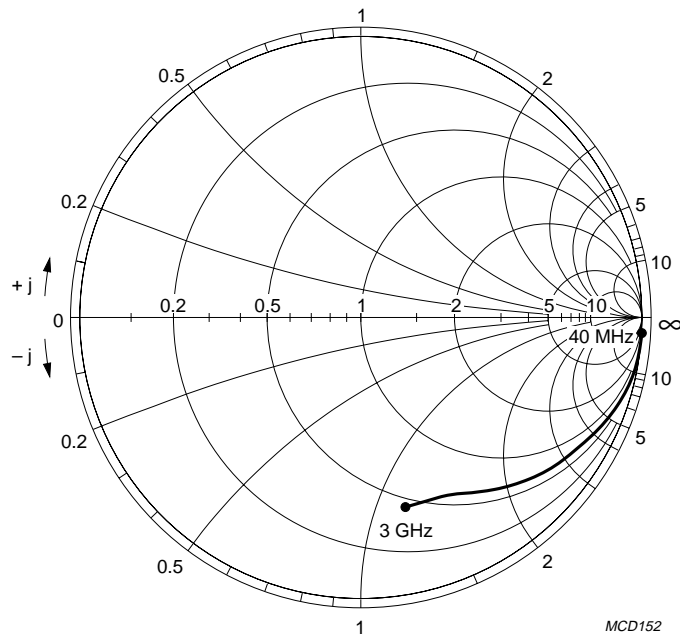


Fig.18 Common emitter output reflection coefficient (S_{22}); typical values.

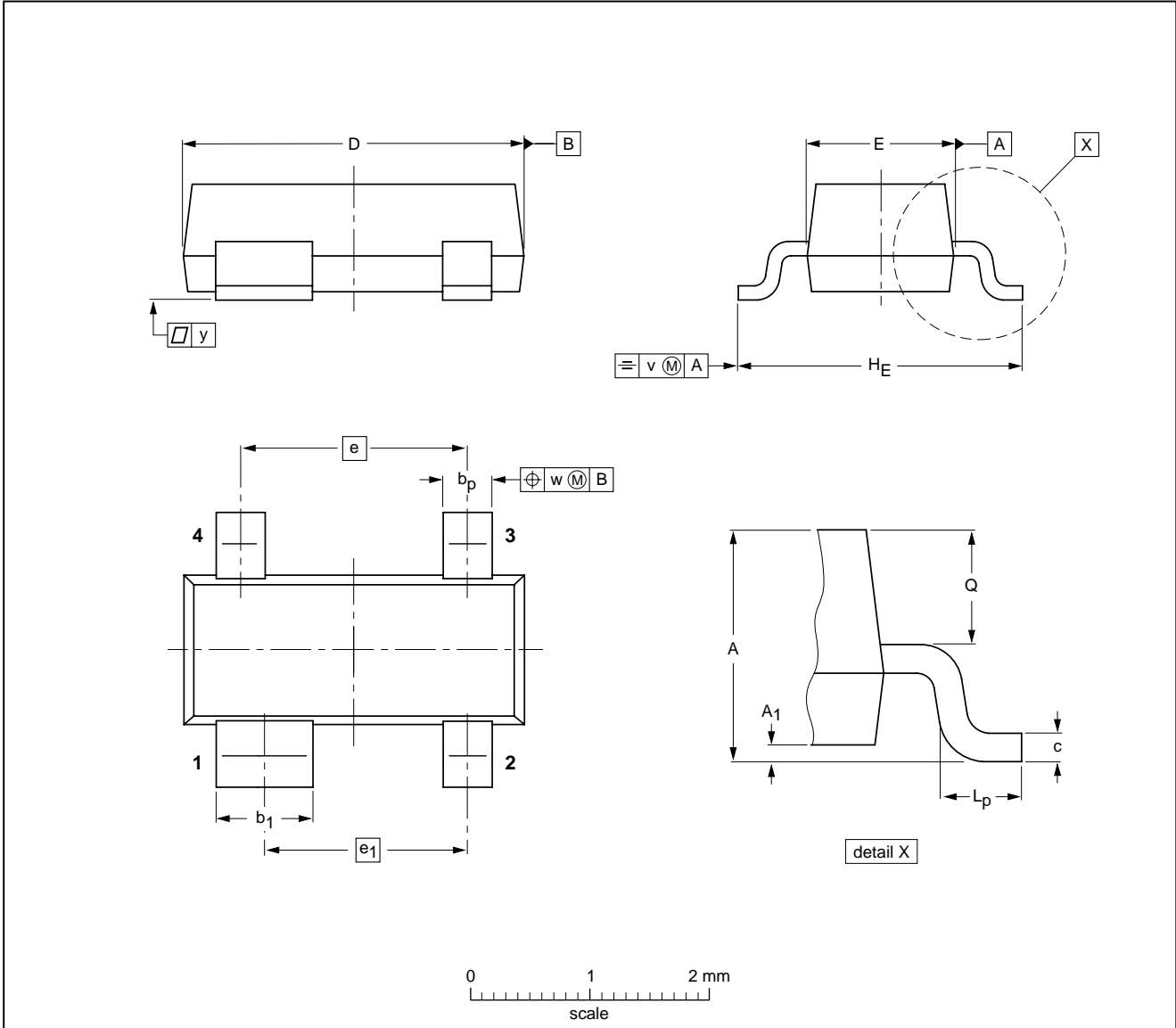
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PACKAGE OUTLINE

Plastic surface mounted package; 4 leads

SOT143B



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	b ₁	c	D	E	e	e ₁	H _E	L _p	Q	v	w	y
mm	1.1 0.9	0.1	0.48 0.38	0.88 0.78	0.15 0.09	3.0 2.8	1.4 1.2	1.9	1.7	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

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Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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Revision history

Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BFG25AX_N_4	20071127	Product data sheet	-	BFG25AX_3
Modifications:	• Fig. 1 on page 2; Figure note changed			
BFG25AX_3 (9397 750 02767)	19971029	Product specification	-	BFG25AX_2
BFG25AX_2	19950901	Product specification	-	BFG25AX_1
BFG25AX_1	19921101	Product specification	-	-

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