

BFG67; BFG67/X; BFG67/XR

NPN 8 GHz wideband transistors

Rev. 05 — 23 November 2007

Product data sheet

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NXP Semiconductors

NPN 8 GHz wideband transistors

BFG67; BFG67/X; BFG67/XR

FEATURES

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

APPLICATIONS

Wideband applications in the GHz range, such as satellite TV tuners and portable RF communications equipment.

DESCRIPTION

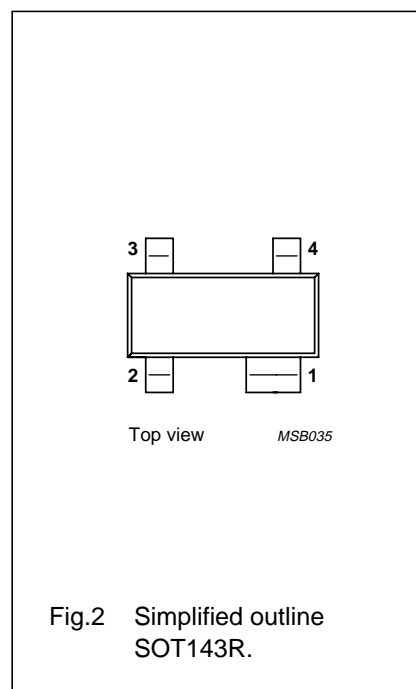
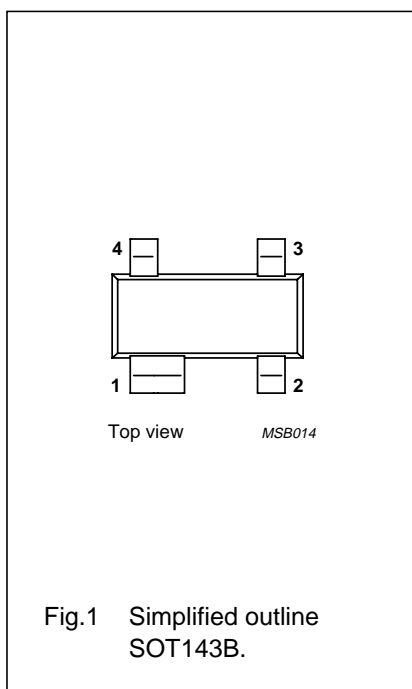
NPN silicon transistor in a 4-pin, dual-emitter SOT143B plastic package. Available with in-line emitter pinning (BFG67) and cross emitter pinning (BFG67/X). Version with reverse pinning (BFG67/XR) also available on request.

MARKING

TYPE NUMBER	CODE
BFG67 (Fig.1)	V3%
BFG67/X (Fig.1)	%MV
BFG67/XR (Fig.2)	V26

PINNING

PIN	DESCRIPTION		
	BFG67	BFG67/X	BFG67/XR
1	collector	collector	collector
2	base	emitter	emitter
3	emitter	base	base
4	emitter	emitter	emitter



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CE0}	collector-emitter voltage	open base	–	10	V
I_C	collector current (DC)		–	50	mA
P_{tot}	total power dissipation	$T_s \leq 65\text{ }^\circ\text{C}$	–	300	mW
C_{re}	feedback capacitance	$I_C = i_c = 0; V_{CB} = 8\text{ V}; f = 1\text{ MHz}$	0.5	–	pF
f_T	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; f = 500\text{ MHz}$	8	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}; f = 1\text{ GHz}$	17	–	dB
F	noise figure	$\Gamma_s = \Gamma_{opt}; I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}; f = 1\text{ GHz}$	1.3	–	dB
		$\Gamma_s = \Gamma_{opt}; I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}; f = 2\text{ GHz}$	2.2	–	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	–	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 ≤ 65 °C; see Fig.3; note 1	–	380	mW
T _{stg}	storage temperature range		–65	150	°C
T _j	junction temperature		–	175	°C

Note

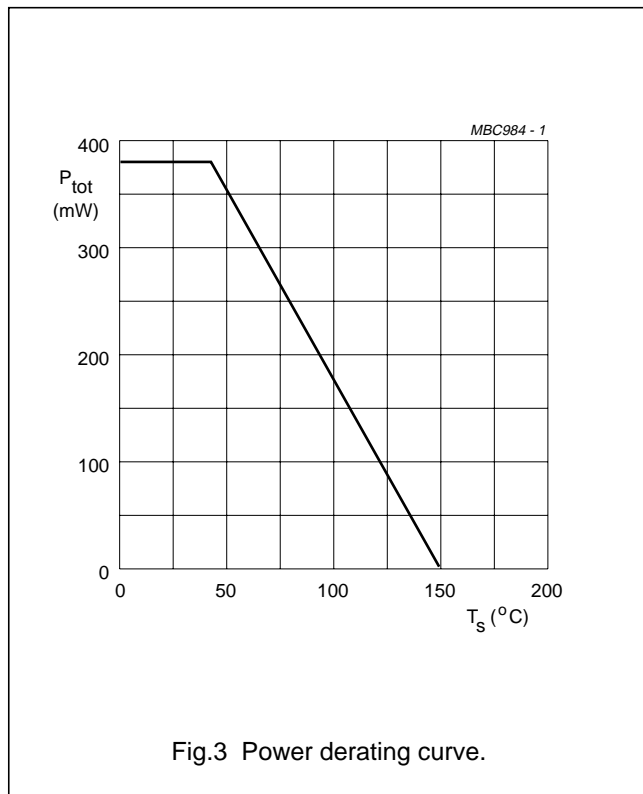
1. T_s is the temperature at the soldering point of the collector pin.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-s}	thermal resistance from junction to soldering point	note 1	290	K/W

Note

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



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CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise specified.

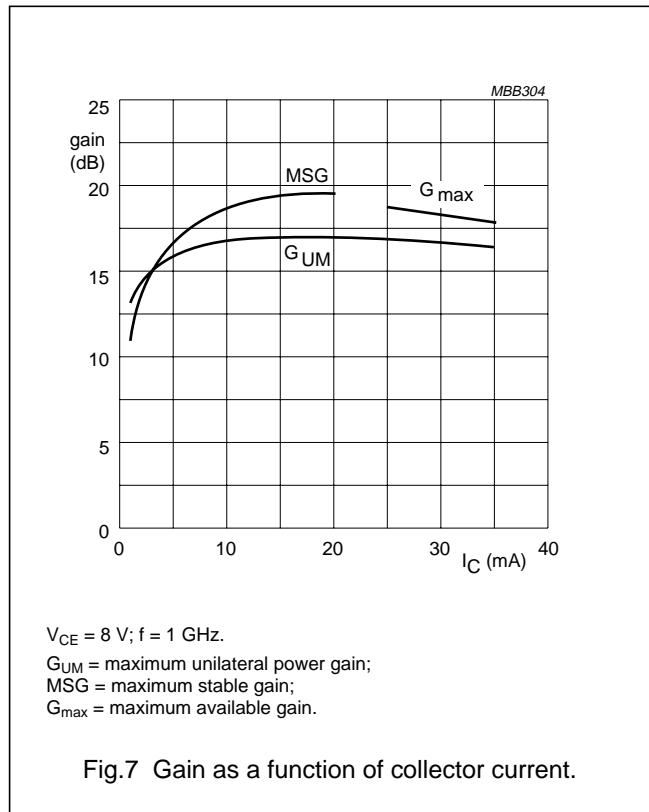
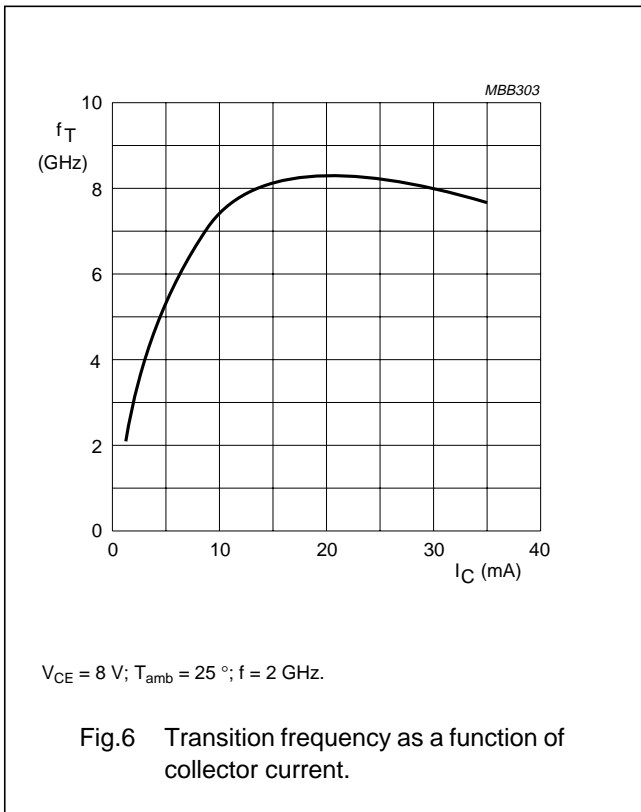
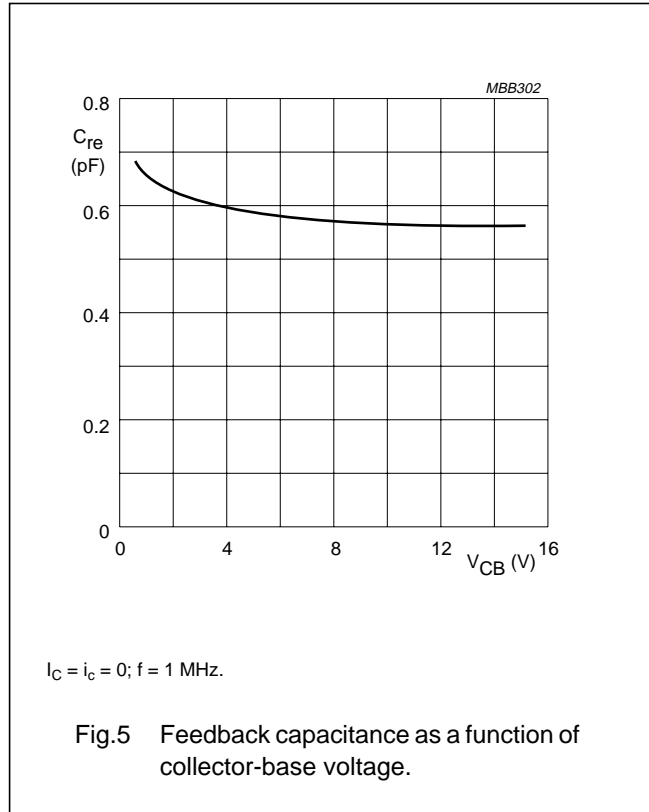
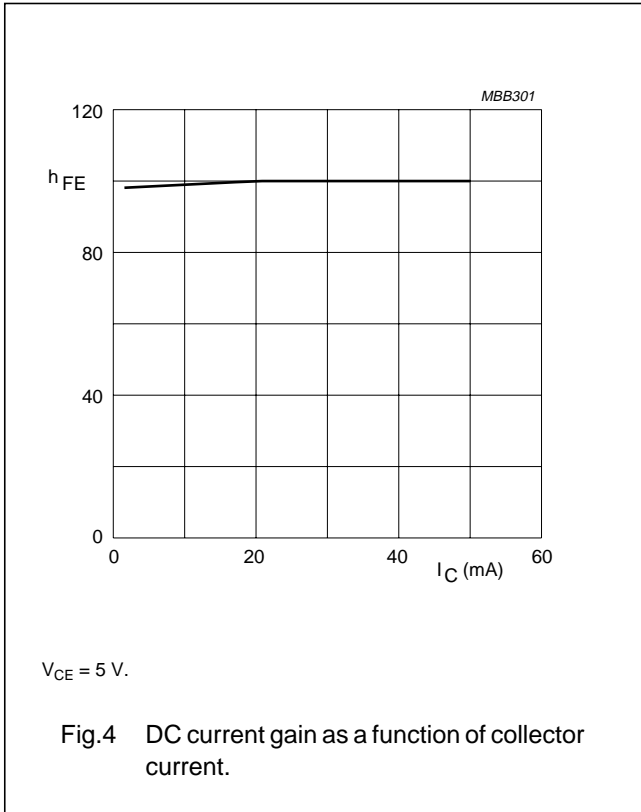
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector leakage current	$V_{CB} = 5\text{ V}; I_E = 0$	–	–	50	nA
h_{FE}	DC current gain	$I_C = 15\text{ mA}; V_{CE} = 5\text{ V}$	60	100	–	
f_T	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; f = 500\text{ MHz}$	–	8	–	GHz
C_c	collector 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	$I_C = i_c = 0; V_{CB} = 8\text{ V}; f = 1\text{ MHz}$	–	0.5	–	pF
G_{UM}	maximum unilateral power gain; note 1	$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 1\text{ GHz}$	–	17	–	dB
		$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}$	–	10	–	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
		$I_C = 5\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}; Z_S = 60\ \Omega$	–	2.5	–	dB
		$I_C = 15\text{ mA}; V_{CE} = 8\text{ V}; T_{amb} = 25\text{ °C}; f = 2\text{ GHz}; Z_S = 60\ \Omega$	–	3	–	dB

Note

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.

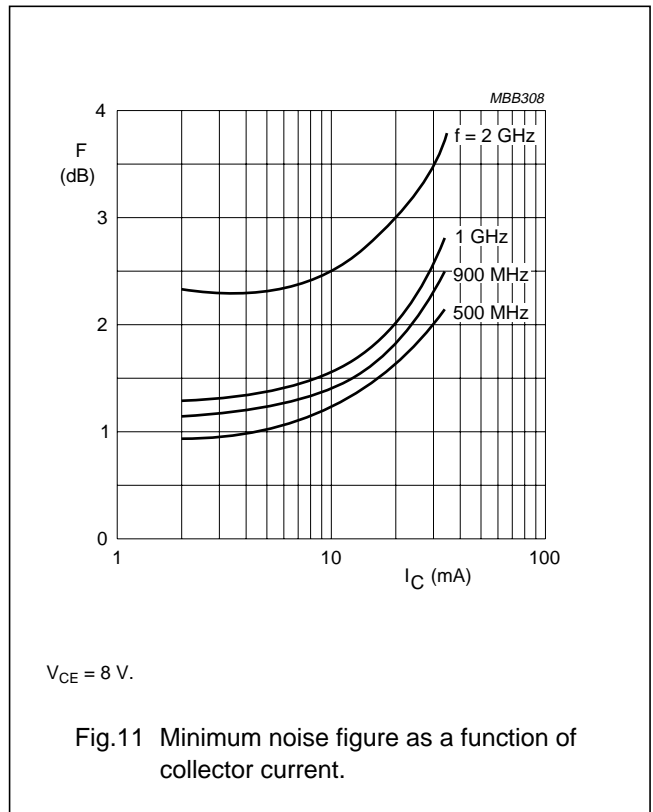
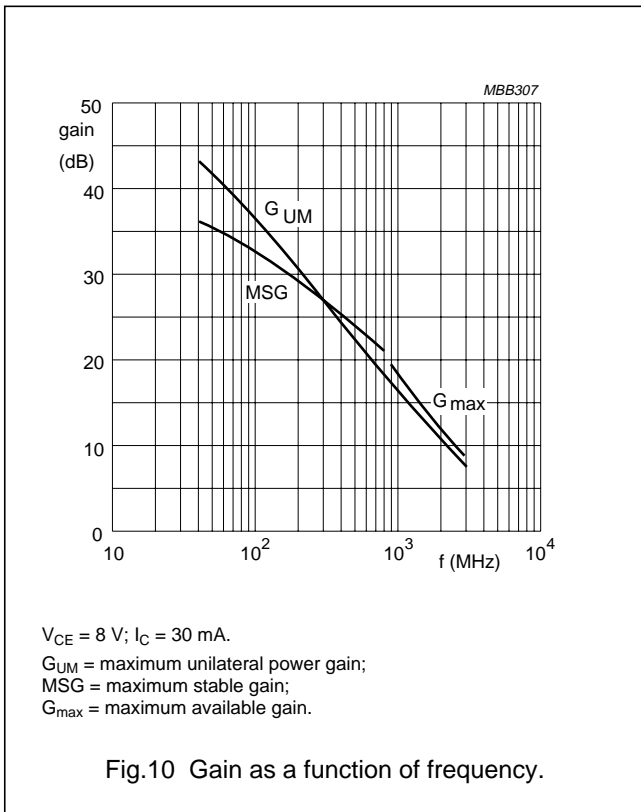
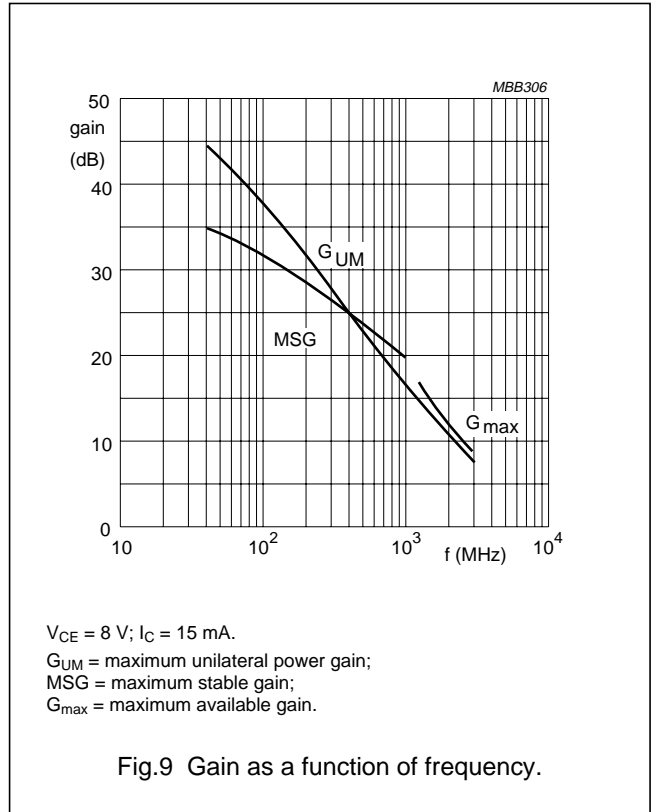
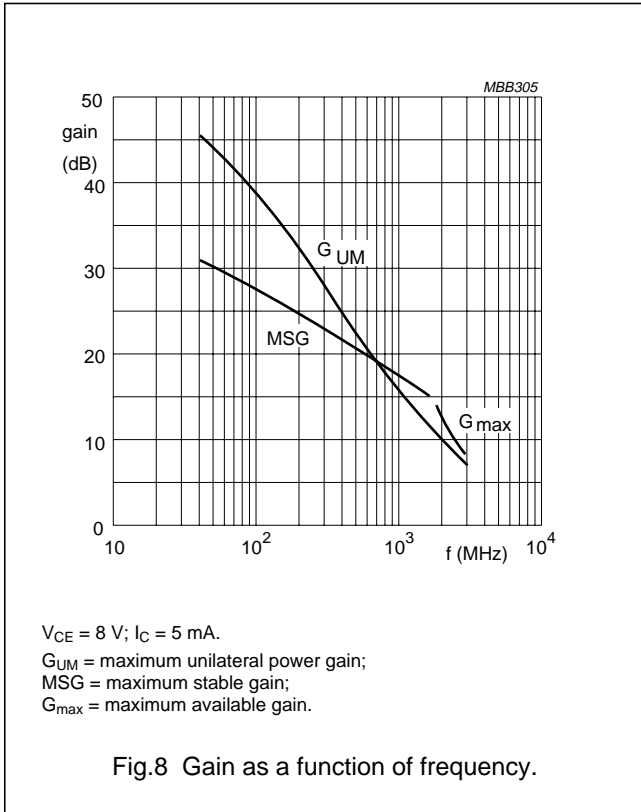
NPN 8 GHz wideband transistors

BFG67; BFG67/X; BFG67/XR



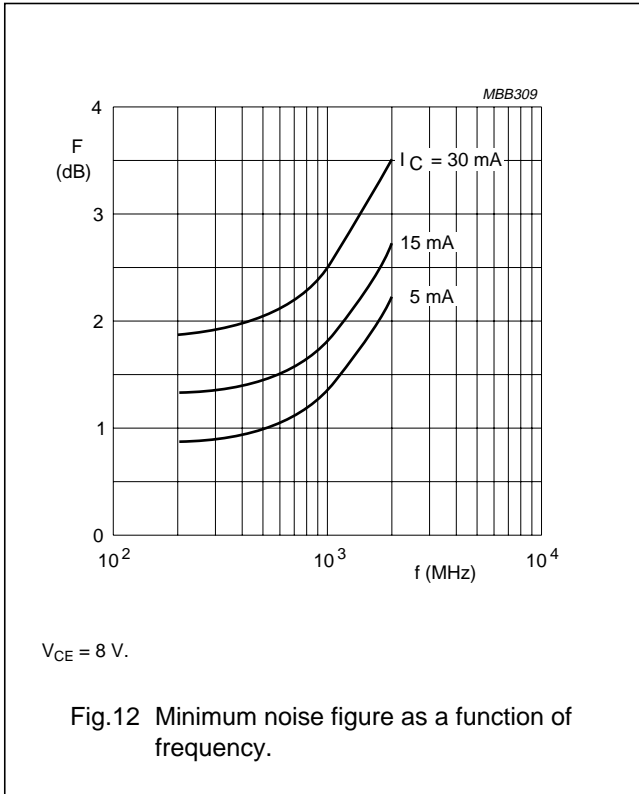
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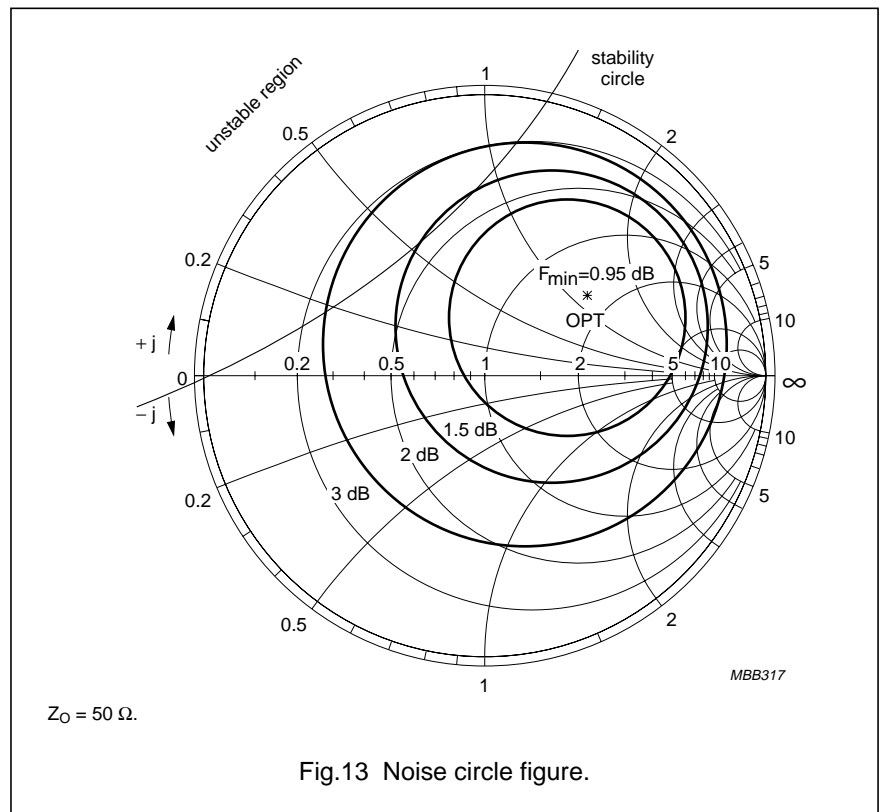


BFG67/X

f (MHz)	V _{CE} (V)	I _C (mA)
500	8	5

Noise Parameters

F _{min} (dB)	Gamma (opt)		R _n /50
	(mag)	(ang)	
0.95	0.455	33.8	0.288



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BFG67/X

f (MHz)	V _{CE} (V)	I _C (mA)
1000	8	5

Noise Parameters

F _{min} (dB)	Gamma (opt)		R _n /50
	(mag)	(ang)	
1.3	0.375	65.9	0.304

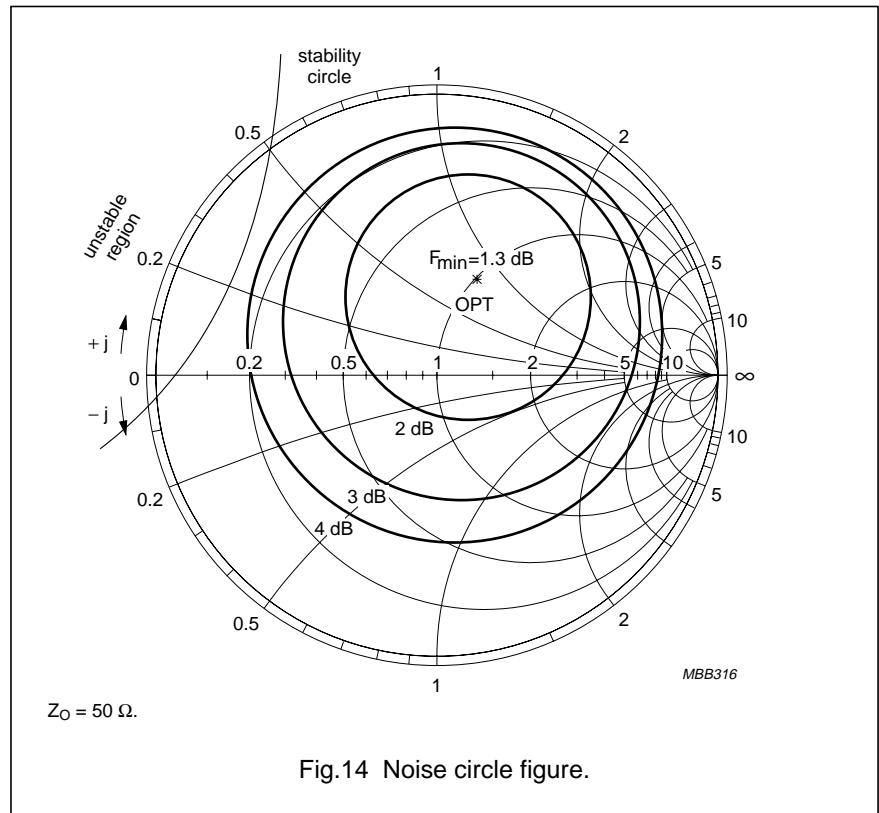


Fig.14 Noise circle figure.

BFG67/X

f (MHz)	V _{CE} (V)	I _C (mA)
2000	8	5

Noise Parameters

F _{min} (dB)	Gamma (opt)		R _n /50
	(mag)	(ang)	
2.2	0.391	136.5	0.184

Average Gain Parameters

G _{MAX} (dB)	Gamma (max)	
	(mag)	(ang)
12	0.839	-170

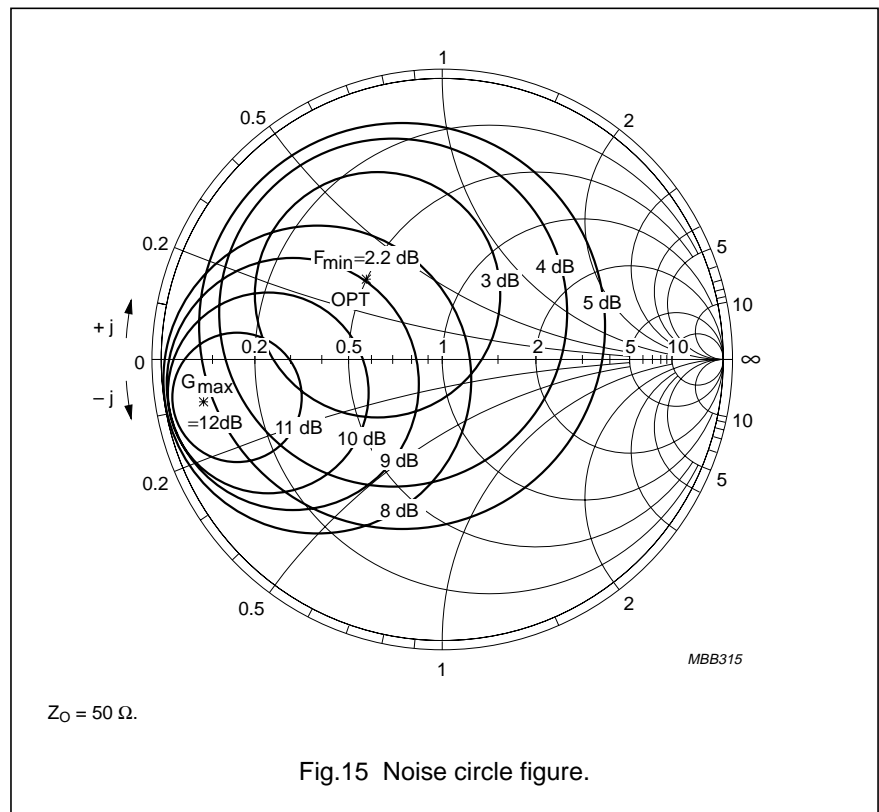
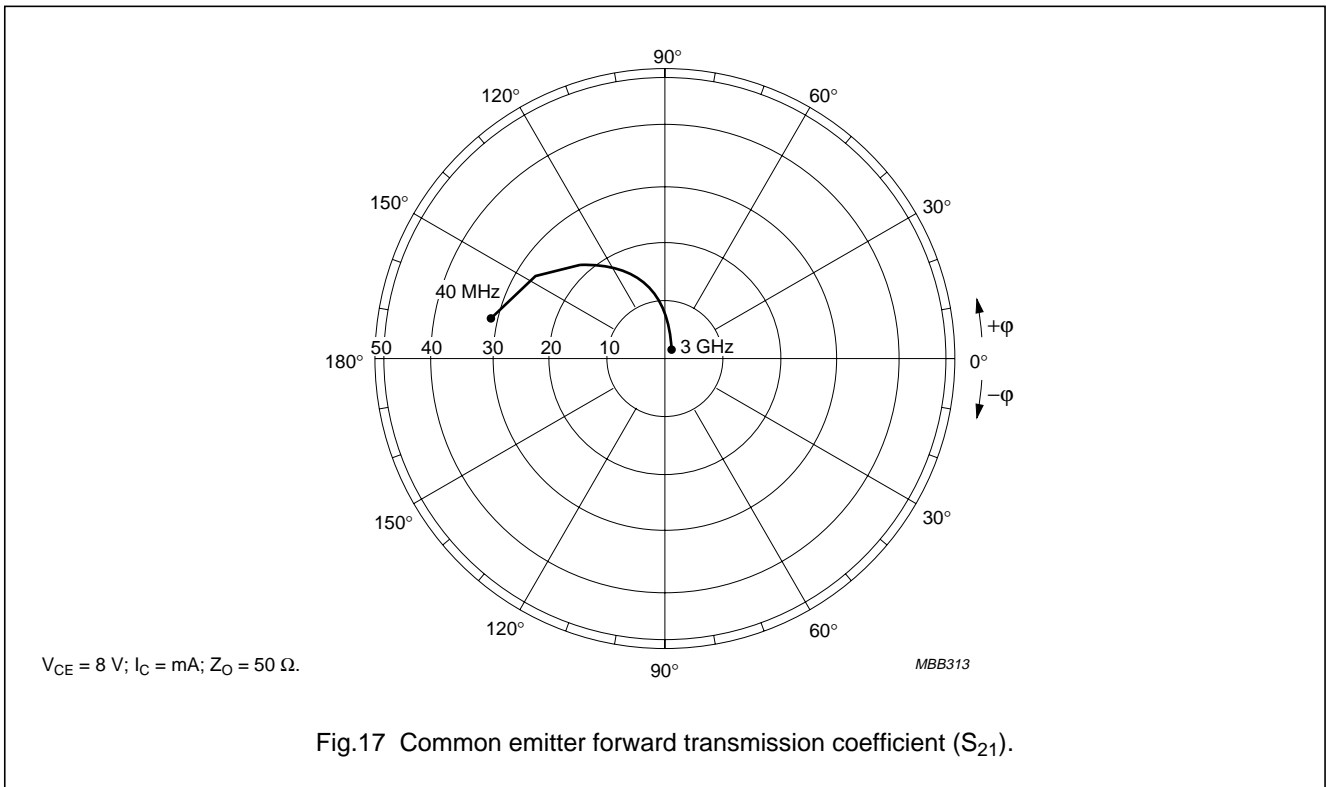
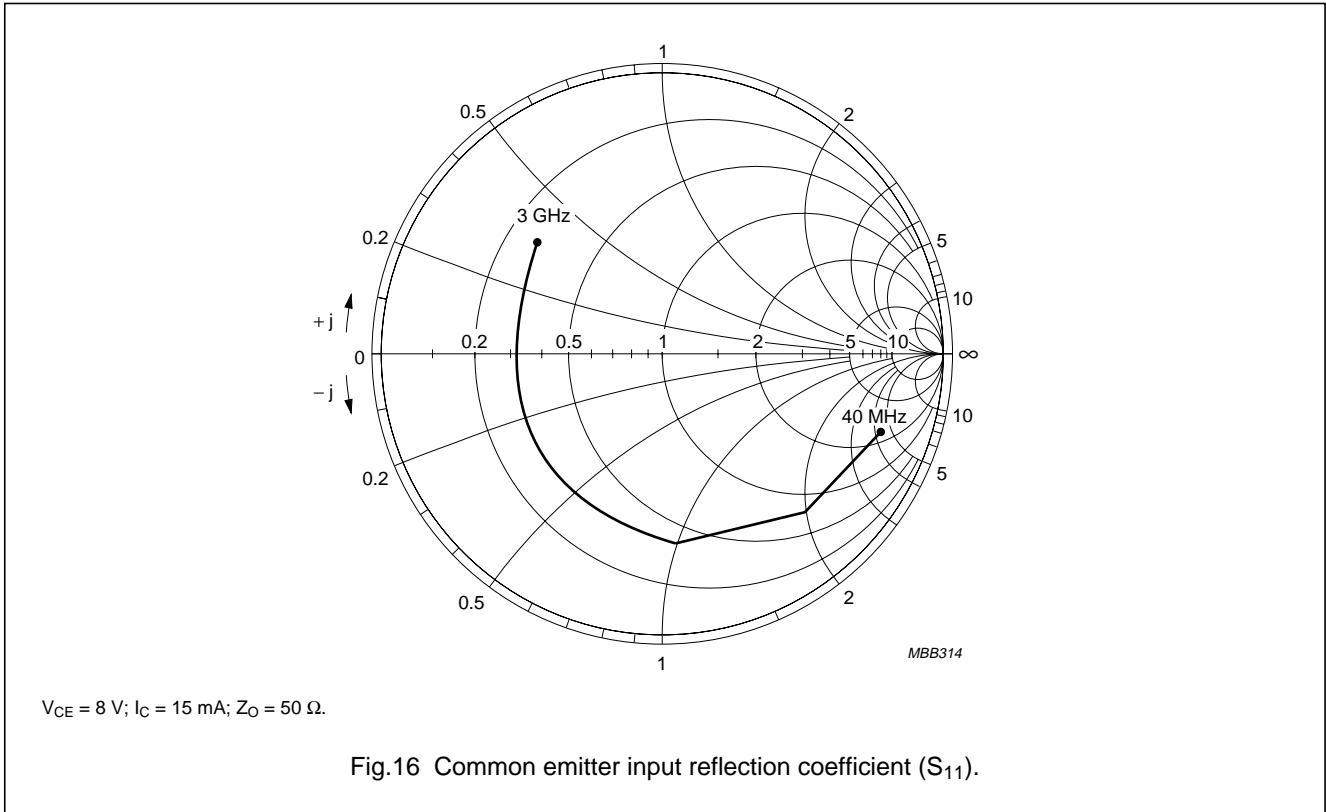


Fig.15 Noise circle figure.

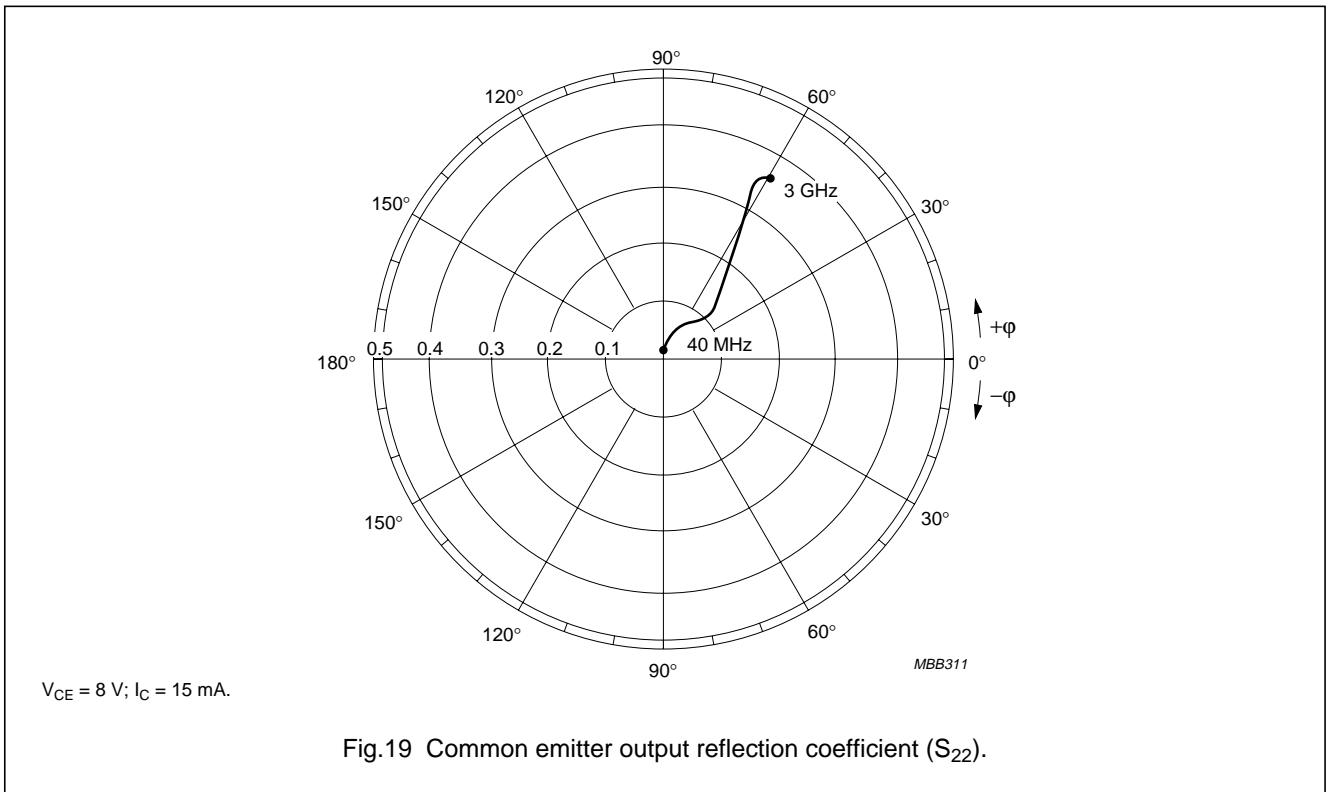
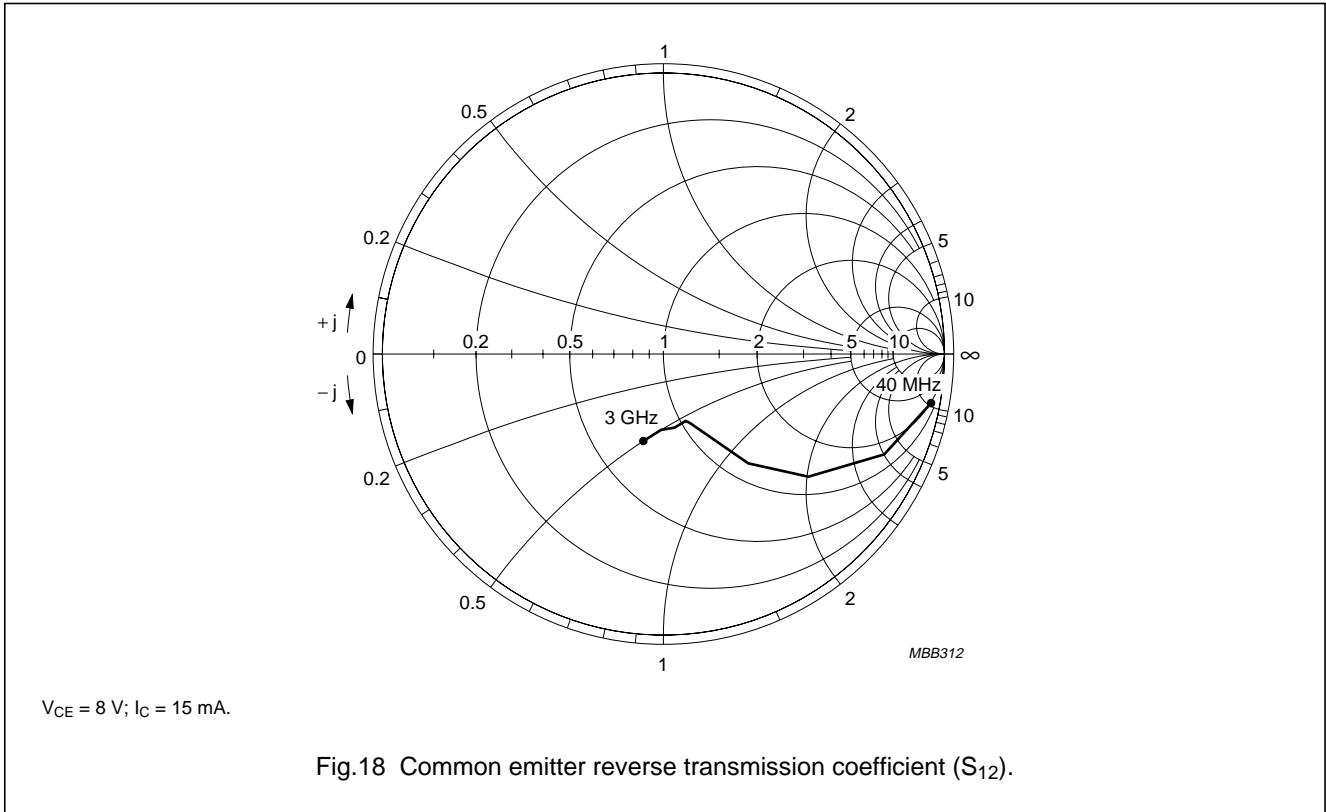
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BFG67; BFG67/X; BFG67/XR



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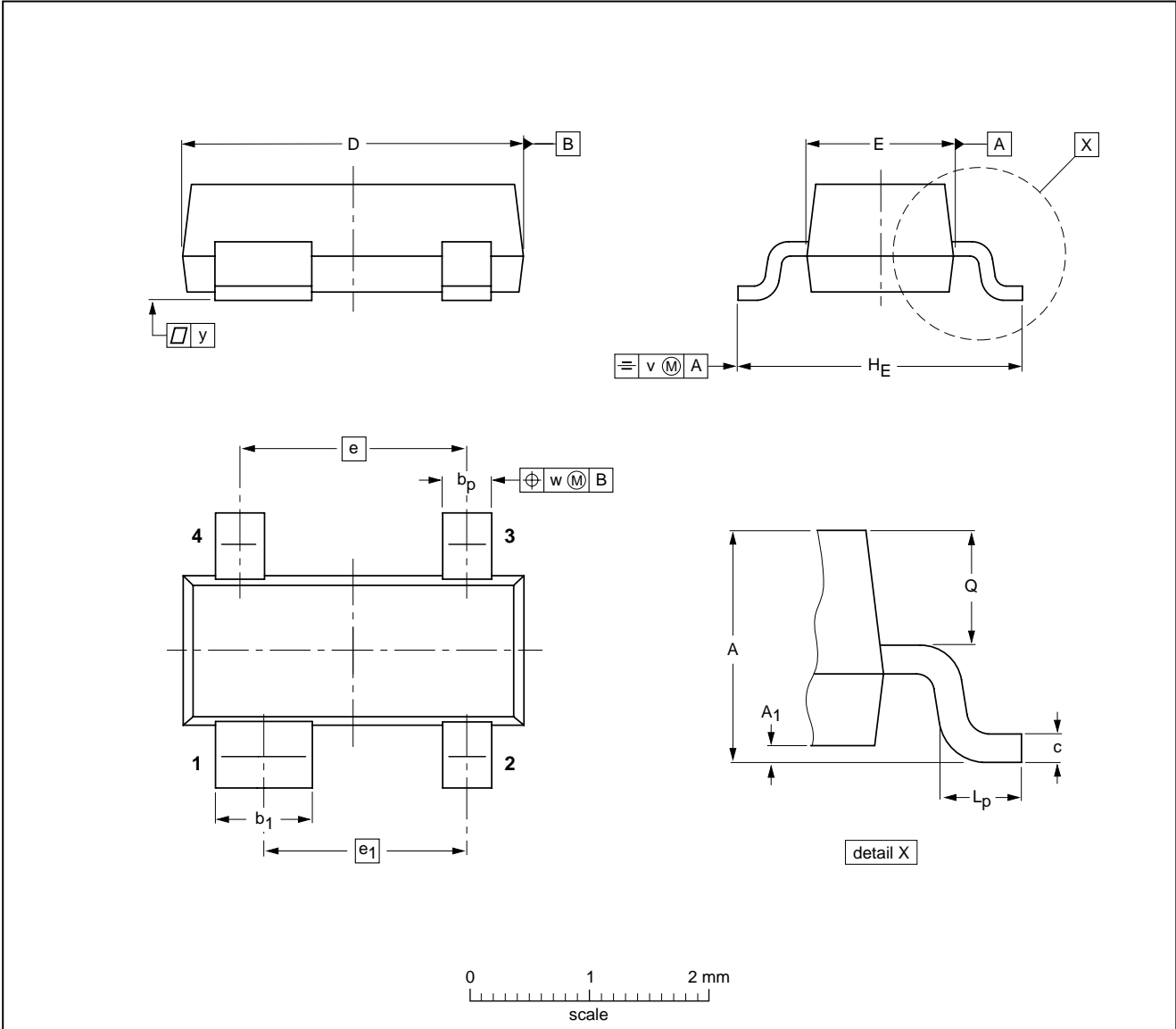
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PACKAGE OUTLINES

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

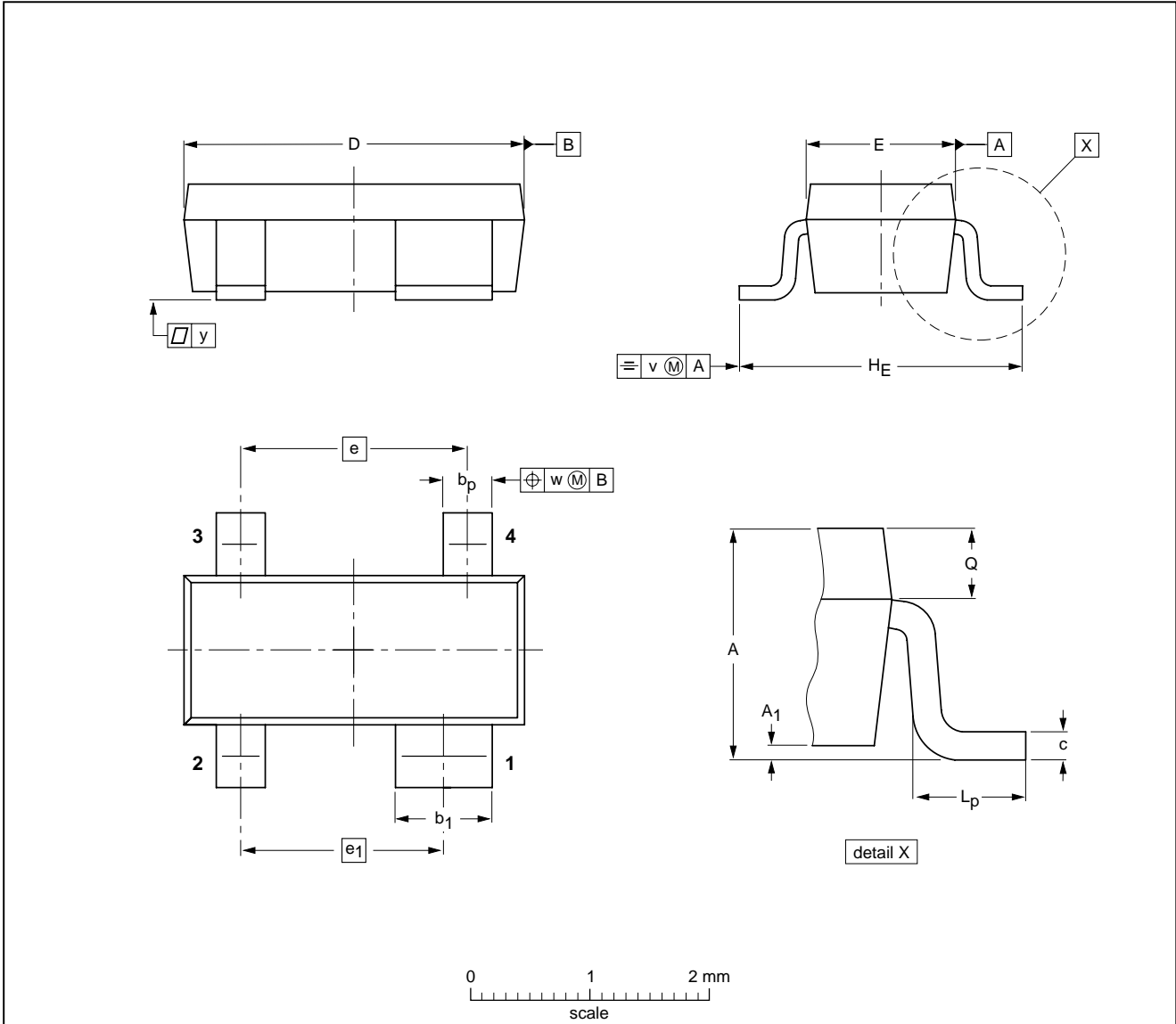
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

NPN 8 GHz wideband transistors

BFG67; BFG67/X; BFG67/XR

Plastic surface mounted package; reverse pinning; 4 leads

SOT143R



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	0.55 0.25	0.45 0.25	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143R						97-03-10

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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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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Revision history

Table 1. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BFG67_X_XR_N_5	20071123	Product data sheet	-	BFG67_X_XR_4
Modifications:	<ul style="list-style-type: none"> Page 2; Table Marking code; row 1 and 2 code changed 			
BFG67_X_XR_4 (9397 750 04349)	19981002	Product specification	-	BFG67_SERIES_3
BFG67_SERIES_3	19950901	Product specification	-	BFG67_SERIES_2
BFG67_SERIES_2	-	Product specification	-	BFG67_SERIES_1
BFG67_SERIES_1	-	-	-	-

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