



BFT25A

NPN 5 GHz wideband transistor

Rev. 5 — 12 September 2011

Product data sheet

1. Product profile

1.1 General description

The BFT25A is a silicon NPN transistor, primarily intended for use in RF low power amplifiers, such as pocket telephones and paging systems with signal frequencies up to 2 GHz.

The transistor is encapsulated in a 3-pin plastic SOT23 envelope.

1.2 Features and benefits

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

1.3 Quick reference data

Table 1. Quick reference data

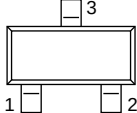
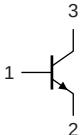
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	-	8	V
V_{CEO}	collector-emitter voltage	open base	-	-	5	V
I_C	DC collector current		-	-	6.5	mA
P_{tot}	total power dissipation	up to $T_s = 165\text{ }^{\circ}\text{C}$	[1] -	-	32	mW
h_{FE}	DC current gain	$I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$	50	80	200	
f_T	transition frequency	$I_C = 1\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $f = 500\text{ MHz}$	3.5	5	-	GHz
G_{UM}	maximum unilateral power gain	$I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $f = 1\text{ GHz}$	-	15	-	dB
F	noise figure	$\Gamma = \Gamma_{opt}$; $I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $f = 1\text{ GHz}$	-	1.8	-	dB
		$\Gamma = \Gamma_{opt}$; $I_C = 1\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$; $f = 1\text{ GHz}$	-	2	-	dB

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



2. Pinning information

Table 2. Discrete pinning

Pin	Description	Simplified outline	Symbol
Code: V10			
1	base		
2	emitter		
3	collector		

sym021

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BFT25A	-	plastic surface mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking

Type number	Marking code ^[1]
BFT25A	34*

- [1] * = p : Made in Hong Kong.
 * = t : Made in Malaysia.
 * = W : Made in China.

5. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

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	DC collector current		-	6.5	mA
P_{tot}	total power dissipation	up to $T_s = 165\text{ °C}$ ^[1]	-	32	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	175	°C

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

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-s)}$	from junction to soldering point		[1] 260	K/W

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

7. Characteristics

Table 7. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector cut-off current	$I_E = 0\text{ A}$; $V_{CB} = 5\text{ V}$	-	-	50	nA
h_{FE}	DC current gain	$I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$	50	80	200	
f_T	transition frequency	$I_C = 1\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 500\text{ MHz}$	3.5	5	-	GHz
C_{re}	feedback capacitance	$I_C = I_c = 0\text{ A}$; $V_{CB} = 1\text{ V}$; $f = 1\text{ MHz}$	-	0.3	0.45	pF
G_{UM}	maximum unilateral power gain	$I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 1\text{ GHz}$	[1] -	15	-	dB
F	noise figure	$\Gamma = \Gamma_{opt}$; $I_C = 0.5\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 1\text{ GHz}$	-	1.8	-	dB
		$\Gamma = \Gamma_{opt}$; $I_C = 1\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 1\text{ GHz}$	-	2	-	dB

[1] G_{UM} is the maximum unilateral power gain, assuming S_{12} is zero and

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

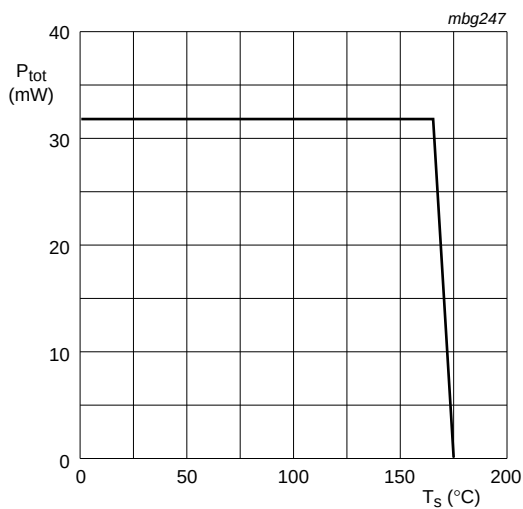
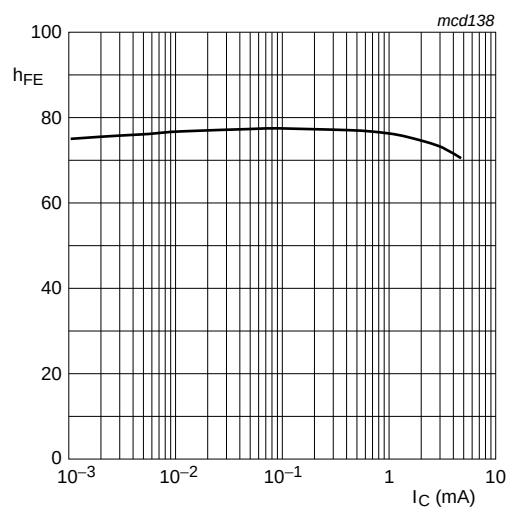
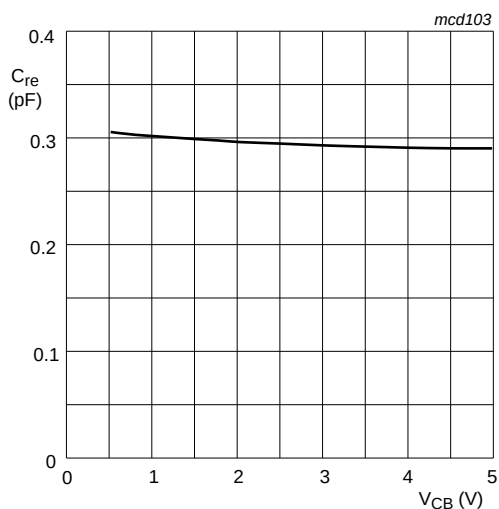


Fig 1. Power derating curve.



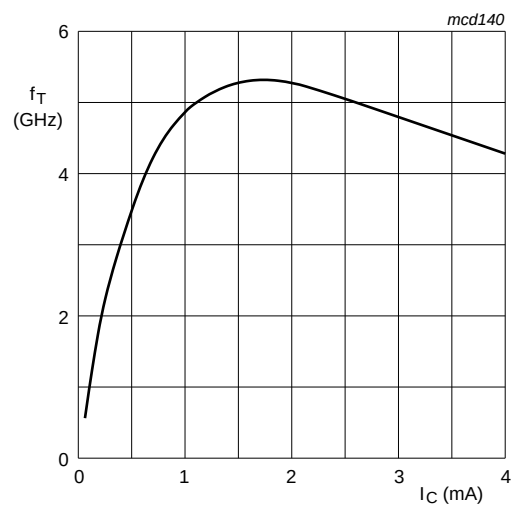
$V_{CE} = 1\text{ V}$.

Fig 2. DC current gain as a function of collector current.



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

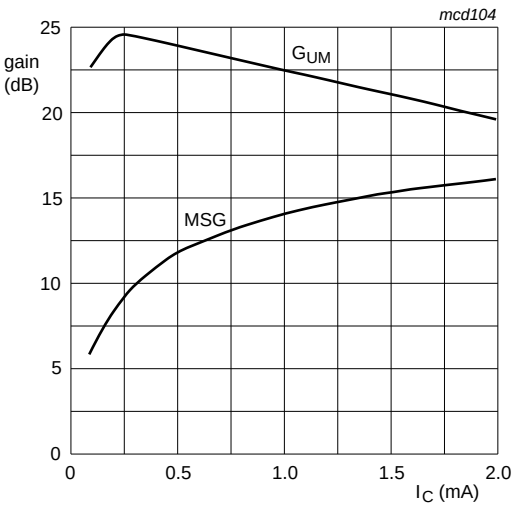
Fig 3. Feedback capacitance as a function of collector-base voltage.



$V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$; $f = 500\text{ MHz}$.

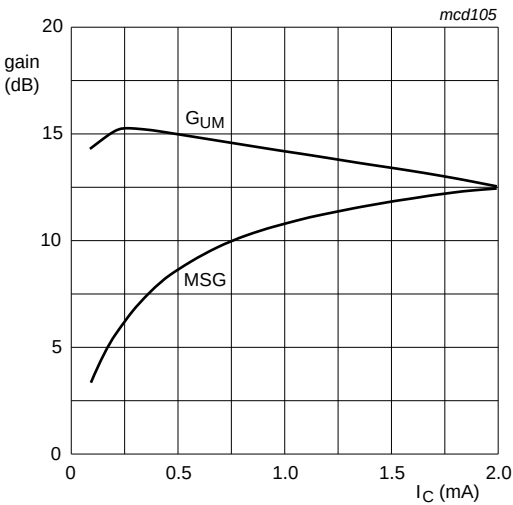
Fig 4. Transition frequency as a function of collector current.

Figure 5, 6, 7 and 8, G_{UM} = maximum unilateral power gain; MSG = maximum stable gain.



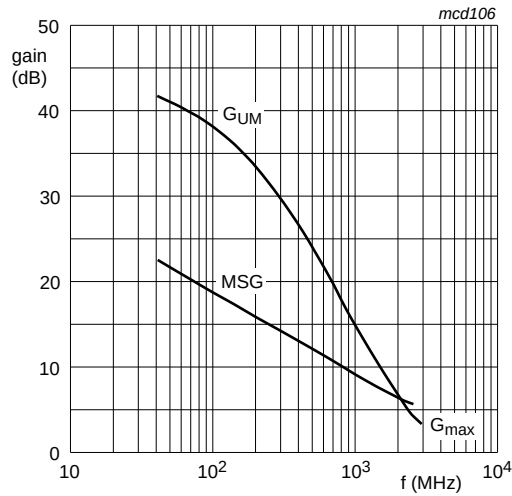
$V_{CE} = 1$ V; $f = 500$ MHz.

Fig 5. Gain as a function of collector current.



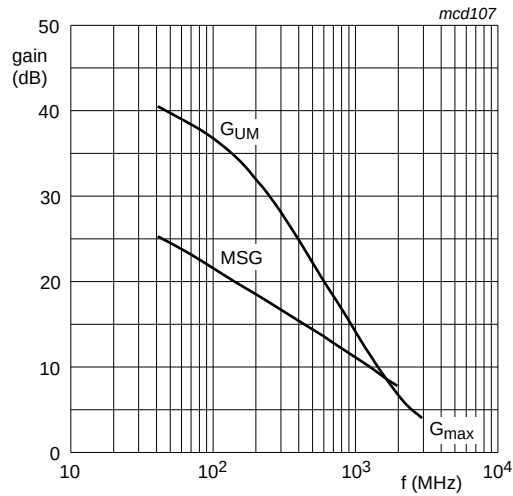
$V_{CE} = 1$ V; $f = 1$ GHz.

Fig 6. Gain as a function of collector current.



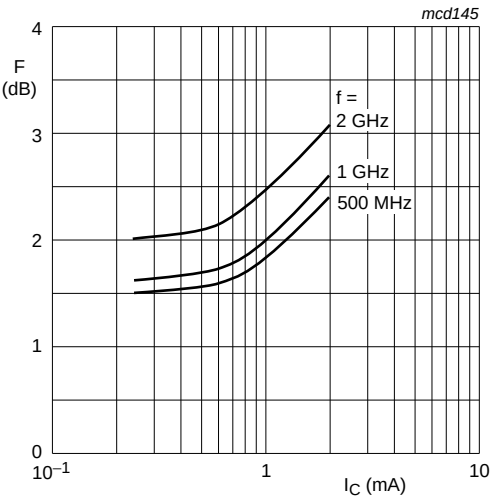
$V_{CE} = 1$ V; $I_C = 0.5$ mA.

Fig 7. Gain as a function of frequency.



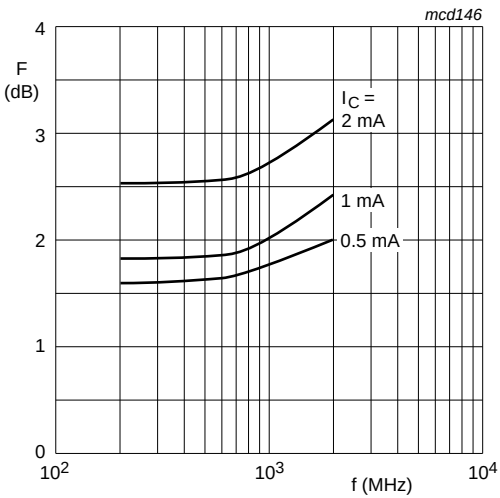
$V_{CE} = 1$ V; $I_C = 1$ mA.

Fig 8. Gain as a function of frequency.



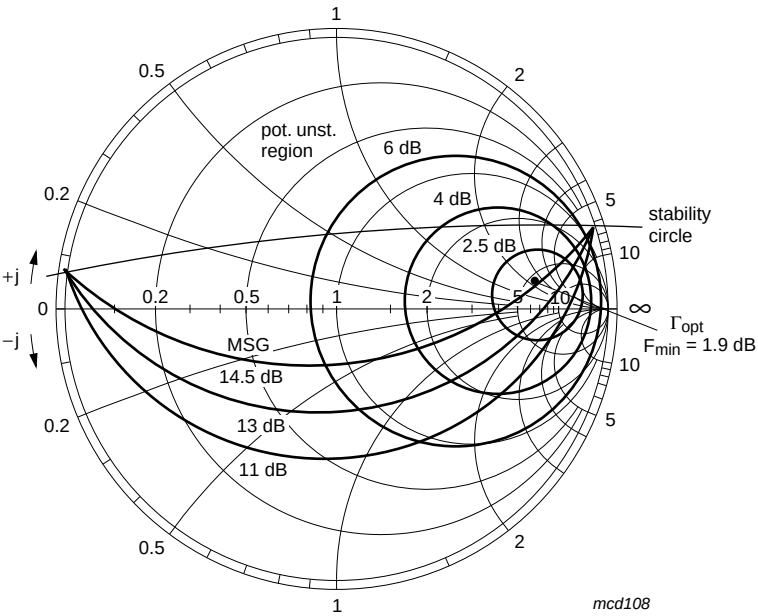
$V_{CE} = 1$ V.

Fig 9. Minimum noise figure as a function of collector current.



$V_{CE} = 1$ V.

Fig 10. Minimum noise figure as a function of frequency.



See [Table 8](#);
 $Z_o = 50 \Omega$.
Average gain parameter: MSG = 14.5 dB.

Fig 11. Noise circle figure.

Table 8. Noise parameters

f (MHz)	V _{CE} (V)	I _C (mA)	F _{min} (dB)	Γ _{opt}		R _n /50
				(mag)	(ang)	
500	1	1	1.9	0.79	4	2.5

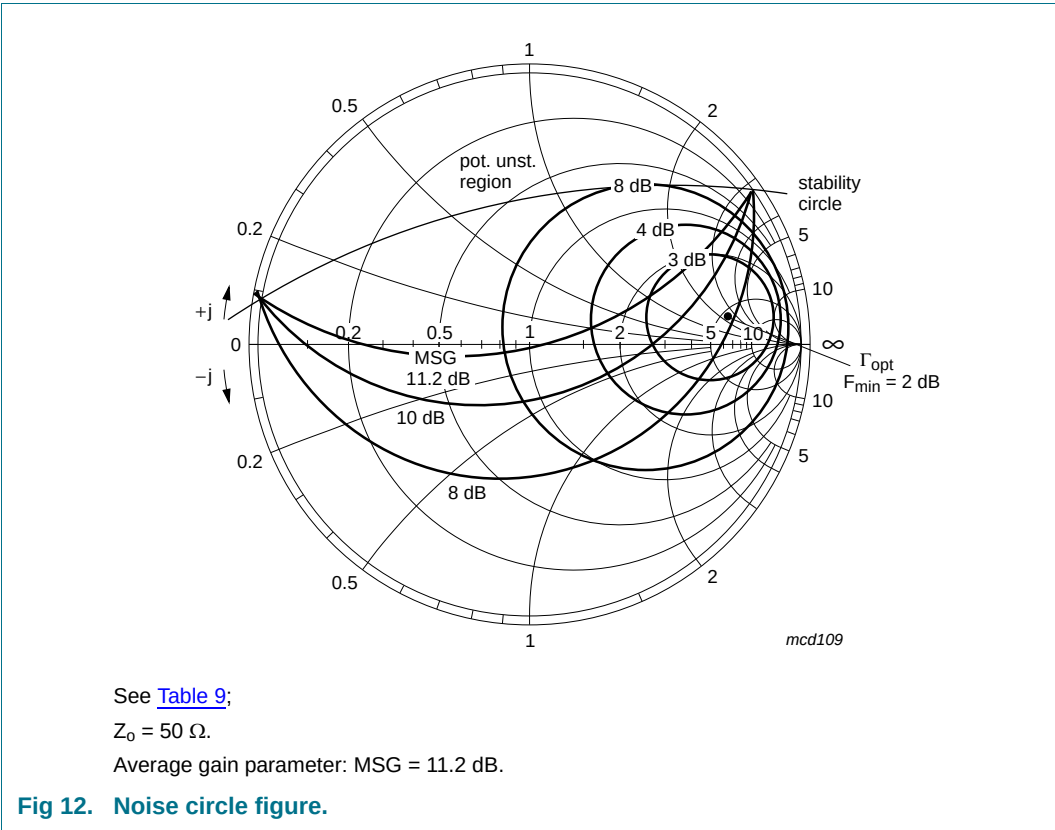


Table 9. Noise parameters

f (MHz)	V _{CE} (V)	I _C (mA)	F _{min} (dB)	Γ _{opt}		R _n /50
				(mag)	(ang)	
1000	1	1	2	0.74	8	2.6

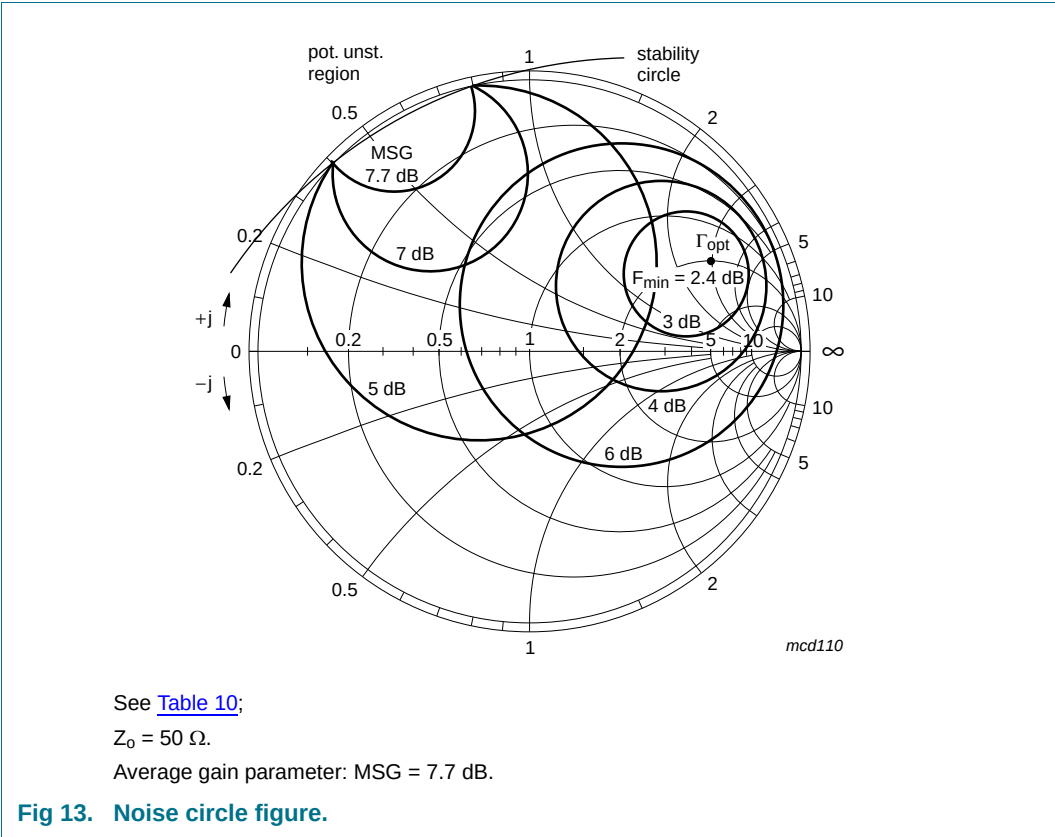
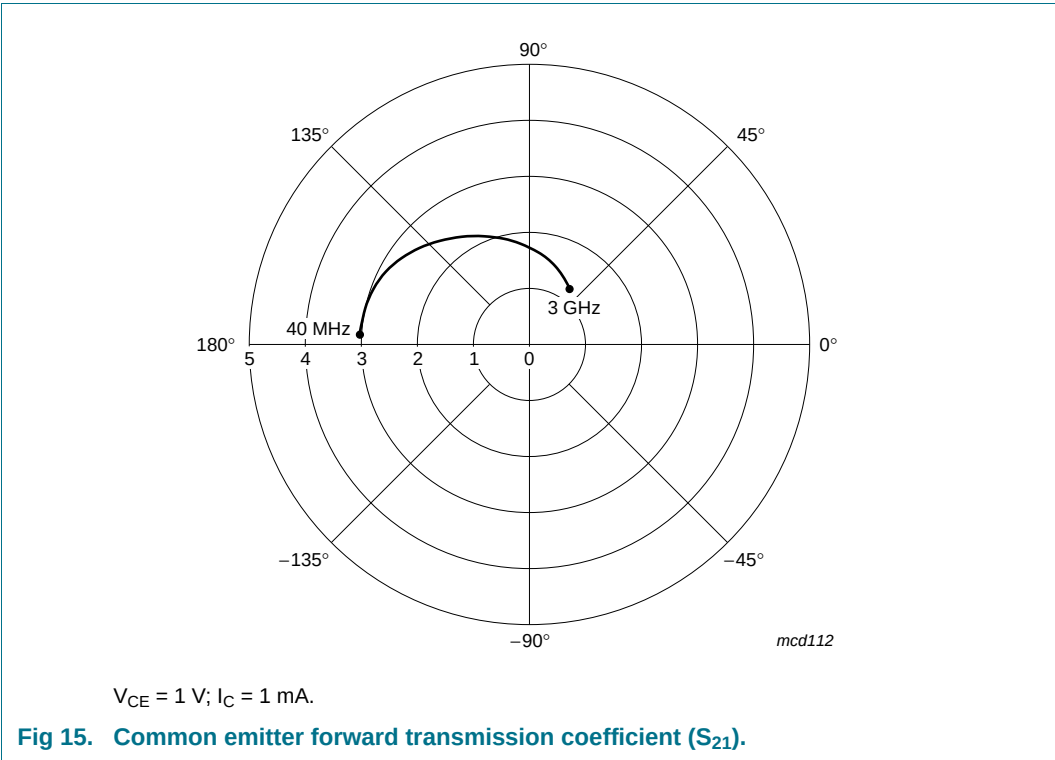
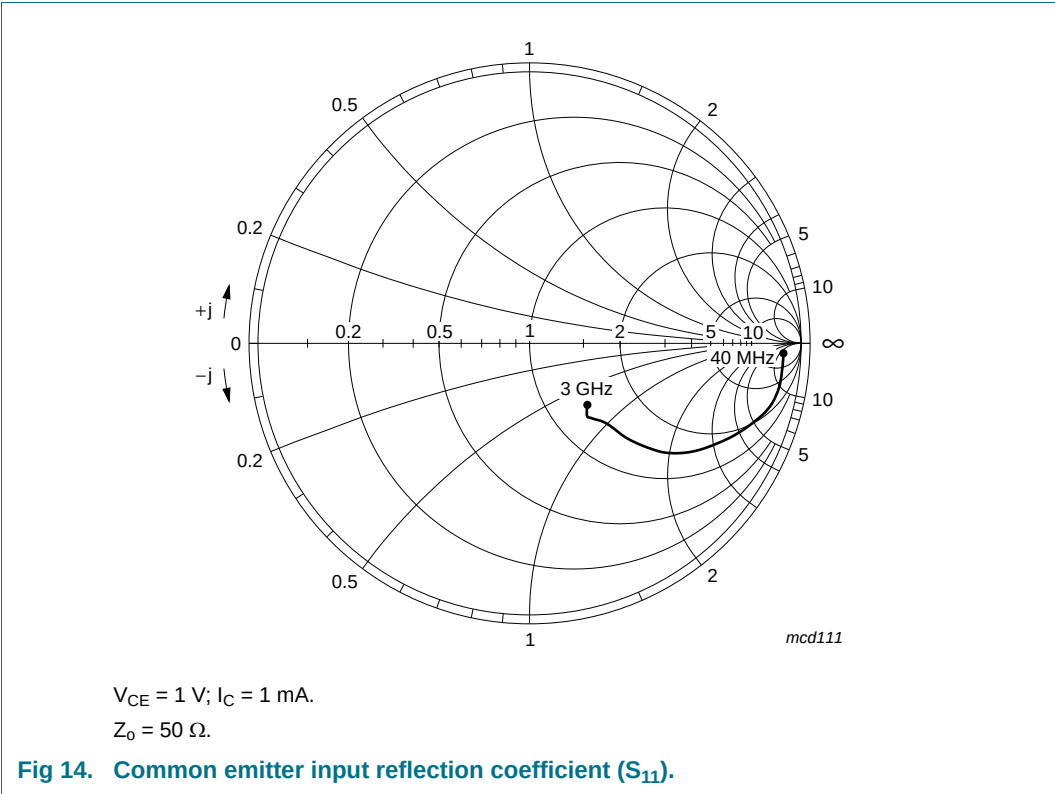
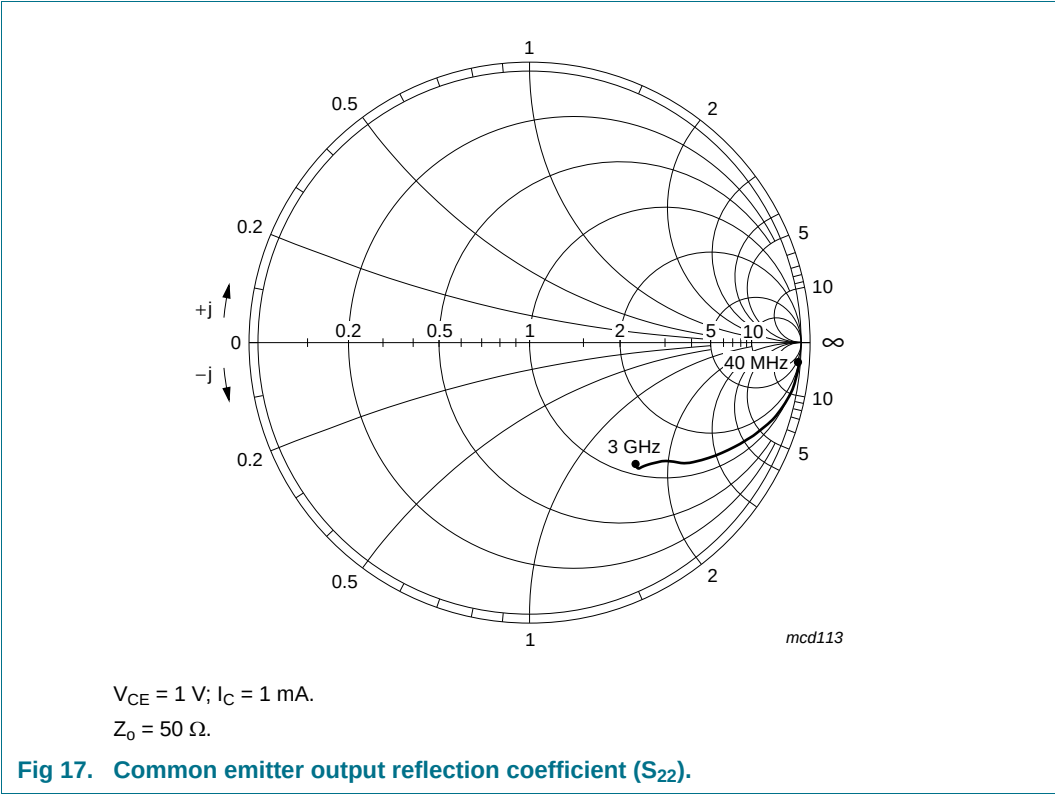
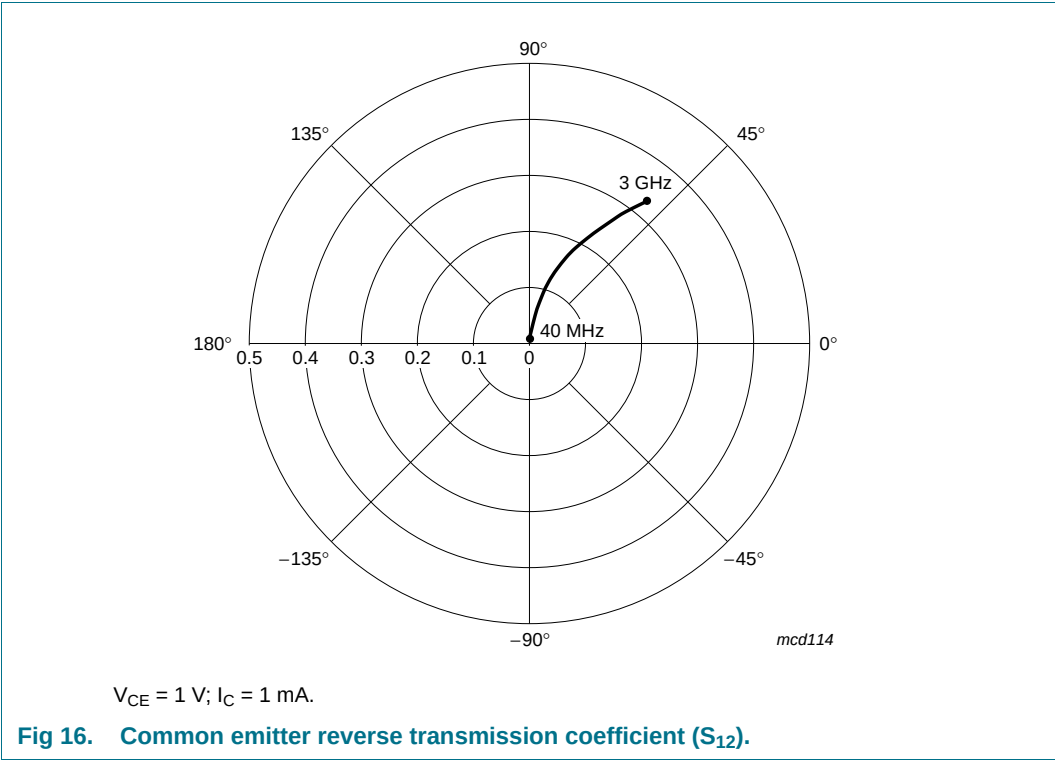


Table 10. Noise parameters

f (MHz)	V _{CE} (V)	I _C (mA)	F _{min} (dB)	Γ _{opt}		R _n /50
				(mag)	(ang)	
2000	1	1	2.4	0.72	26	1.7





8. Package outline

Plastic surface-mounted package; 3 leadsSOT23

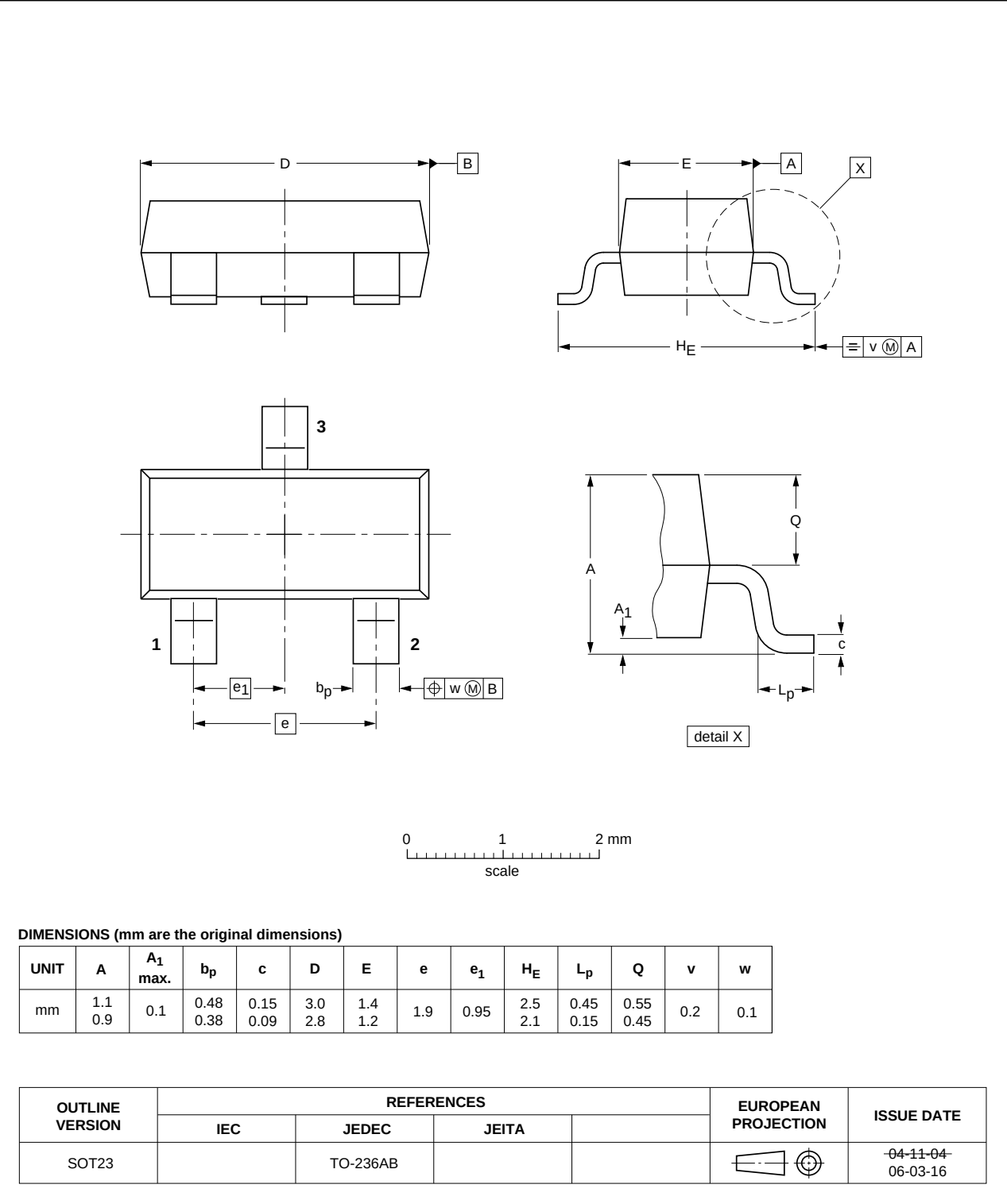


Fig 18. Package outline.

9. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BFT25A v.5	20110912	Product data sheet	-	BFT25A v.4
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Package outline drawings have been updated to the latest version.			
BFT25A v.4 (9397 750 13399)	20040706	Product data sheet	-	BFT25A_CNV v.3
BFT25A_CNV v.3	19971205	Product specification	-	-

10. Legal information

10.1 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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