BFU610F

NPN wideband silicon germanium RF transistor

Rev. 01 — 17 June 2010 Objective data sheet

1. Product profile

1.1 General description

NPN silicon germanium microwave transistor for high speed, low noise applications in a plastic, 4-pin dual-emitter SOT343F package.

1.2 Features and benefits

- 40 GHz f_T silicon germanium technology
- High associated gain 12 dB at 12 GHz
- Low noise high gain microwave transistor
- Noise figure (NF) = 1.4 dB at 5.8 GHz

1.3 Applications

- 2nd LNA stage and mixer stage in DBS LNB's
- Analog/digital cordless applications
- Ka band oscillators DRO's
- Low noise amplifiers for microwave communications systems
- Satellite radio
- WLAN and CDMA applications

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
C_{CBS}	collector-base capacitance	V_{CB} = 2 V; f = 1 MHz; V_{BE} = [tbd] V		-	70	-	fF
f_T	transition frequency	V_{CE} = 2 V; I_C = 25 mA; f = 2 GHz; T_{amb} = 25 °C		-	40	-	GHz
$G_{p(max)}$	maximum power gain	f = 5.8 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	21	-	dB
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 10 mA; T_j = 25 °C		70	140	270	
I_C	collector current			-	-	10	mA
P_{tot}	total power dissipation	T_{sp} ≤ 90 °C; see Figure 1	[2]	-	-	50	mW
V_{CBO}	collector-base voltage	I_E = 0 A		-	-	10	V
V_{CEO}	collector-emitter voltage	I_B = 0 A		-	-	5	V
V_{EBO}	emitter-base voltage	I_C = 0 A		-	-	0.55	V

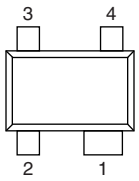
[1] $G_{p(max)}$ is the maximum power gain, if K > 1. If K < 1 then $G_{p(max)}$ = MSG.

[2] T_{sp} is the temperature at the solder point of the emitter lead.

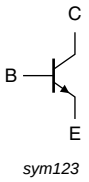
2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter		
2	B	base		
3	E	emitter		
4	C	collector		



SOT343F (DFP4)



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3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BFU610F	DFP4	Plastic surface-mounted flat pack package; 4 leads	SOT343F

4. Marking

Table 4. Marking codes

Type number	Marking code
BFU610F	D1

5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CBO}	collector-base voltage	I_E = 0 A		-	-	10	V
V_{CEO}	collector-emitter voltage	I_B = 0 A		-	-	5	V
V_{EBO}	emitter-base voltage	I_C = 0 A		-	-	0.55	V
I_C	collector current			-	-	10	mA
P_{tot}	total power dissipation	$T_{sp} \leq 90$ °C; see Figure 1	[1]	-	-	50	mW
T_{stg}	storage temperature			-65	-	150	°C
T_j	junction temperature			-	-	150	°C

[1] T_{sp} is the temperature at the solder point of the emitter lead.

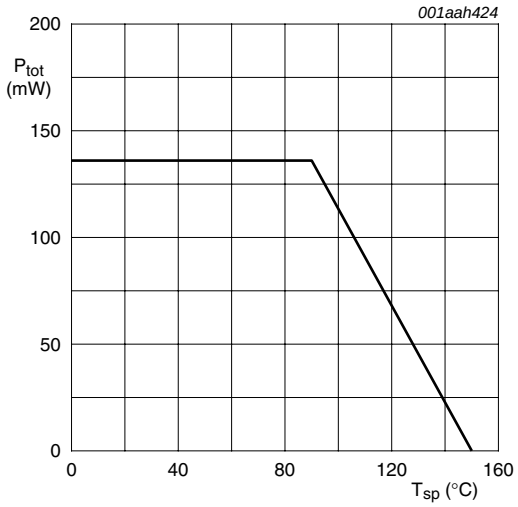


Fig 1. Power derating curve

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	440	-	K/W

7. Characteristics

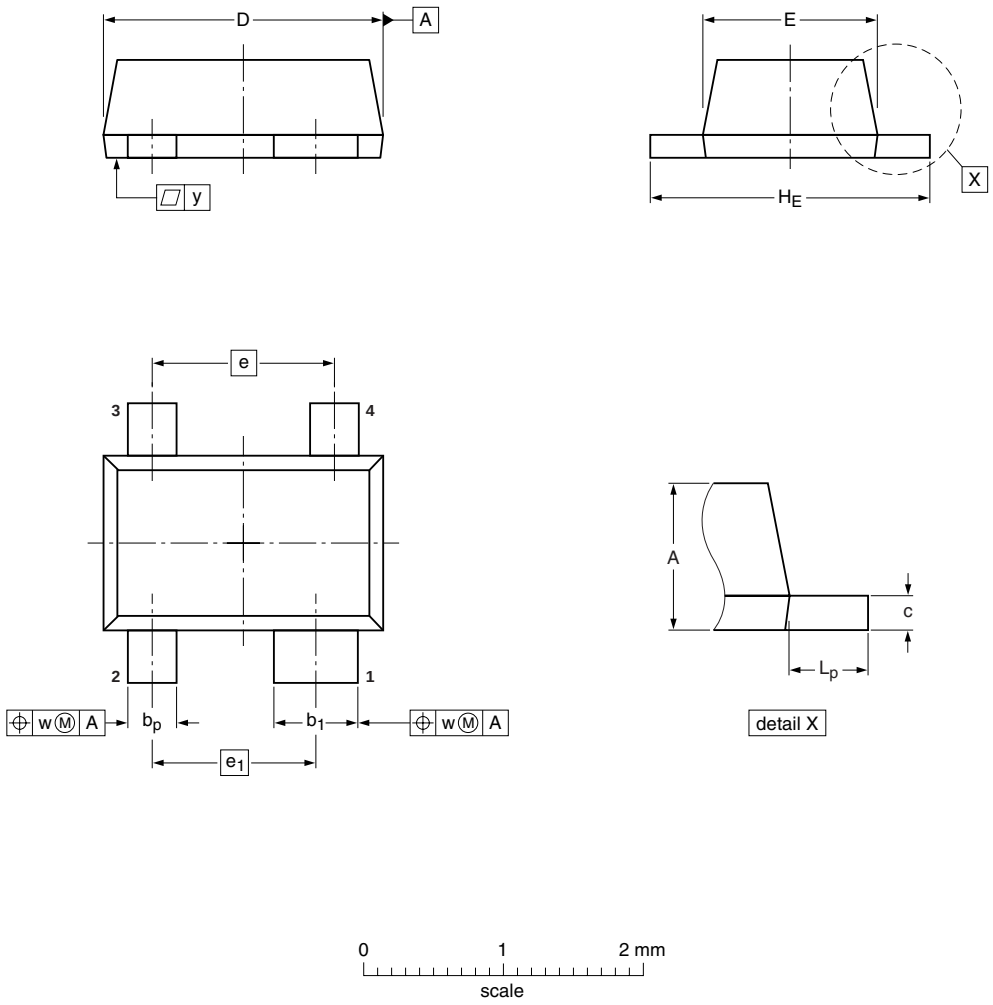
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I_E = 0 mA; I_C = 2.5 µA; T_j = 25 °C		10	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I_B = 0 mA; I_C = 1 mA; T_j = 25 °C		5	-	-	V
I_{CBO}	collector-base cut-off current	I_E = 0 mA; V_{CB} = 4.5 V; T_j = 25 °C		-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 2 V; I_C = 10 mA; T_j = 25 °C		70	140	270	
C_{CBS}	collector-base capacitance	V_{CB} = 2 V; f = 1 MHz; V_{BE} = [tbd] V		-	70	-	fF
f_T	transition frequency	V_{CE} = 2 V; I_C = 25 mA; f = 2 GHz; T_{amb} = 25 °C		-	40	-	GHz
$G_{p(max)}$	maximum power gain	f = 5.8 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	21	-	dB
		f = 1.8 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	29	-	dB
		f = 1.5 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	30.4	-	dB
		f = 2.4 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	28	-	dB
		f = 12 GHz; I_C = 8 mA; V_{CE} = 2 V; T_{amb} = 25 °C	[1]	-	14.3	-	dB
$\|s_{21}\|^2$	insertion power gain	I_C = 8 mA; V_{CE} = 2 V; f = 1.5 GHz; T_{amb} = 25 °C		-	19	-	dB
		I_C = 8 mA; V_{CE} = 2 V; f = 1.8 GHz; T_{amb} = 25 °C		-	18	-	dB
		I_C = 8 mA; V_{CE} = 2 V; f = 2.4 GHz; T_{amb} = 25 °C		-	17.5	-	dB
		I_C = 8 mA; V_{CE} = 2 V; f = 5.8 GHz; T_{amb} = 25 °C		-	13.4	-	dB
		I_C = 8 mA; V_{CE} = 2 V; f = 12 GHz; T_{amb} = 25 °C		-	7.7	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	V_{CE} = 2 V; f = 1.5 GHz; I_C = 25 mA; Z_L = 50 Ω; Z_S = 50 Ω		-	[tbd]	-	dBmW
		V_{CE} = 2 V; f = 2.4 GHz; I_C = 25 mA; Z_L = 50 Ω; Z_S = 50 Ω		-	[tbd]	-	dBmW
		V_{CE} = 2 V; f = 1.8 GHz; I_C = 25 mA; Z_L = 50 Ω; Z_S = 50 Ω		-	[tbd]	-	dBmW
		V_{CE} = 2 V; f = 5.8 GHz; I_C = 25 mA; Z_L = 50 Ω; Z_S = 50 Ω		-	[tbd]	-	dBmW

[1] $G_{p(max)}$ is the maximum power gain, if K > 1. If K < 1 then $G_{p(max)}$ = MSG.

8. Package outline

Plastic surface-mounted flat pack package; reverse pinning; 4 leads **SOT343F**



DIMENSIONS (mm are the original dimensions)

UNIT	A max	b_p	b_1	c	D	E	e	e_1	H_E	L_p	w	y
mm	0.75 0.65	0.4 0.3	0.7 0.5	0.25 0.10	2.2 1.8	1.35 1.15	1.3	1.15	2.2 2.0	0.48 0.38	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT343F						~~05-07-12~~ 06-03-16

Fig 2. Package outline SOT343F (DFP4)

9. Soldering

Footprint information for reflow soldering **SOT343F**

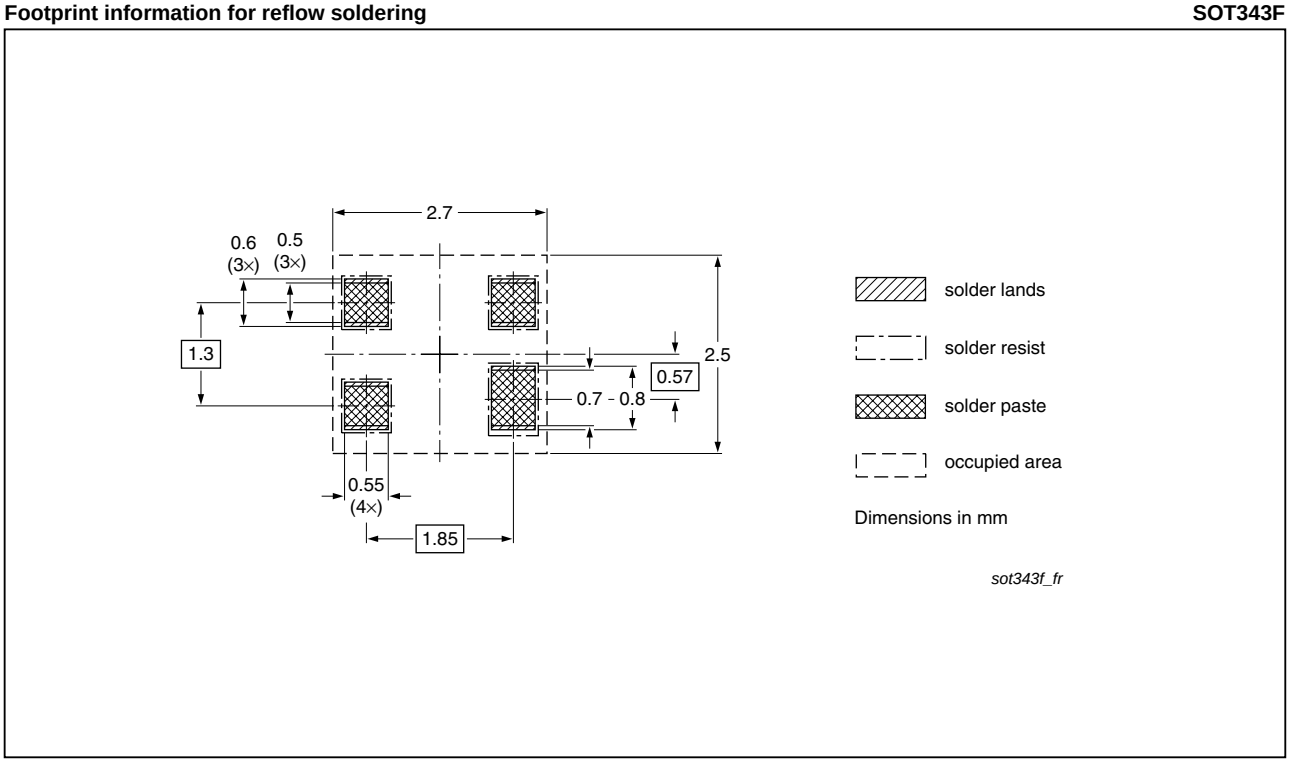


Fig 3. Reflow soldering footprint for SOT343F (DFP4)

Footprint information for wave soldering SOT343F

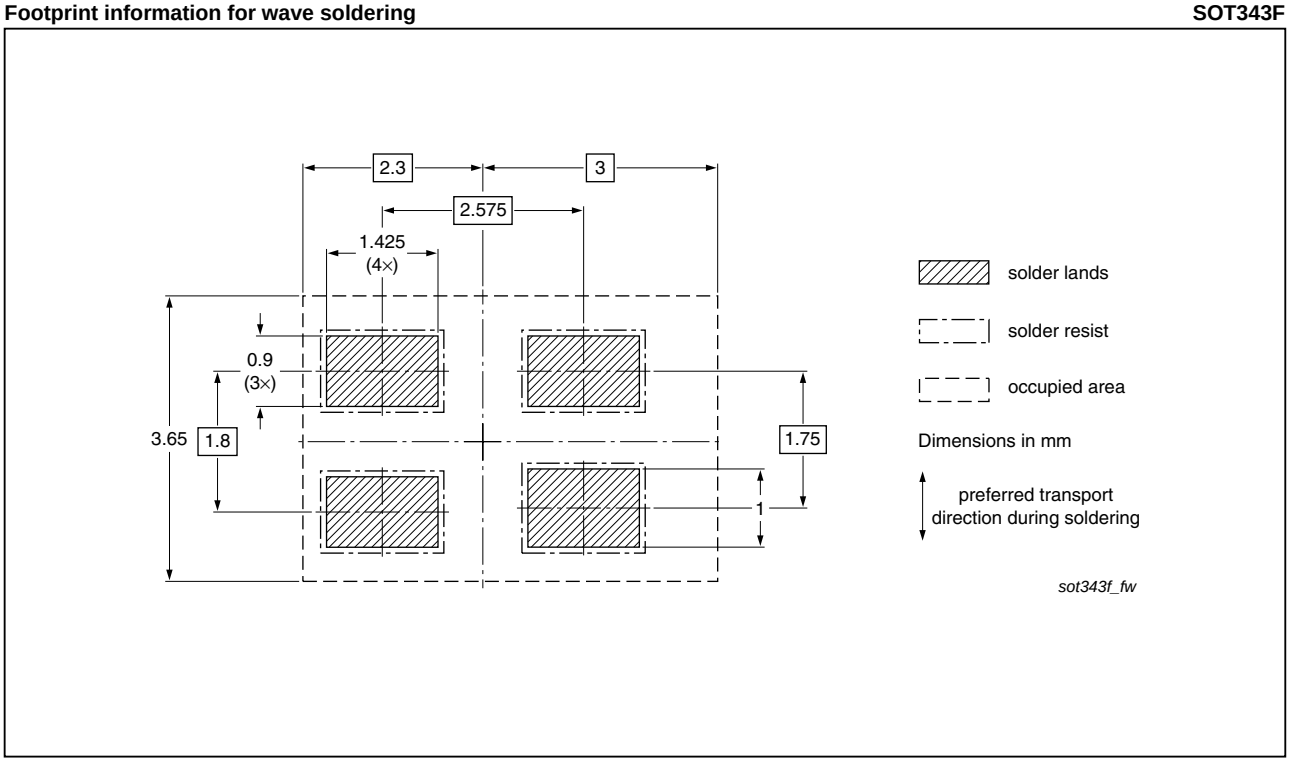


Fig 4. Wave soldering footprint for SOT343F (DFP4)

10. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BFU610F v.1	20100617	Objective data sheet	-	-

11. Legal information

11.1 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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13. Contents

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