**NPN Silicon Germanium RF Transistor**

Target data sheet

- High gain ultra low noise RF transistor
  for low current operation

- Provides outstanding performance for
  a wide range of wireless applications
  up to 10 GHz and more

- Optimum gain and noise figure
  at low current operation

- Ideal for WLAN applications

- Outstanding noise figure F = 0.5 dB at 1.8 GHz
  Outstanding noise figure F = 0.75 dB at 6 GHz

- High maximum stable and available gain
  G_{ms} = 26 dB at 1.8 GHz, G_{ma} = 20.5 dB at 6 GHz

- 150 GHz f_T-Silicon Germanium technology

- Pb-free (RoHS compliant) package
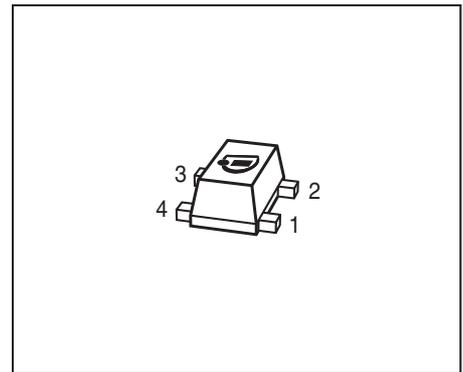
ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration					Package
BFP720F	R9s	1 = B	2 = E	3 = C	4 = E	-	-	TSFP-4

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Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
$T_A > 0\ °C$		4	
$T_A \le 0\ °C$		3.5	
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_C	20	mA
Base current	I_B	2	
Total power dissipation[1)] $T_S \le tbd$	P_{tot}	80	mW
Operating junction temperature range	T_{jo}	-65 ... 150	°C
Storage junction temperature range	T_{jstg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	$\le tbd$	K/W

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	4	4.7	-	V
Collector-emitter cutoff current V_{CE} = 13 V, V_{BE} = 0	I_{CES}	-	-	30	µA
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 0.5 V, I_C = 0	I_{EBO}	-	-	2	µA
DC current gain- I_C = 13 mA, V_{CE} = 3 V, pulse measured	h_{FE}	160	250	400	-

[1] T_S is measured on the collector lead at the soldering point to the pcb
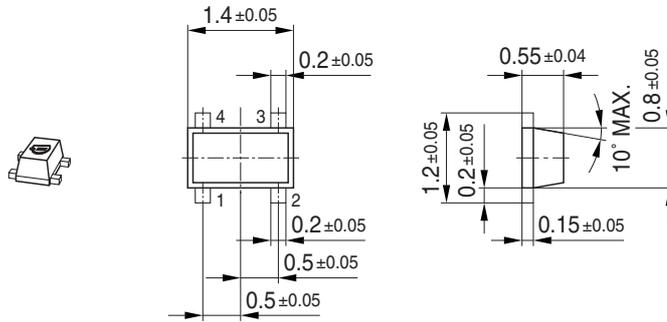[2] For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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Electrical Characteristics at T_A = 25°C, unless otherwise specified

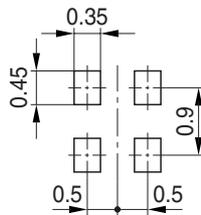| Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 13 mA, V_{CE} = 3 V, f = 1 GHz	f_T	-	45	-	GHz
Collector-base capacitance V_{CB} = 3 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.06	-	pF
Collector emitter capacitance V_{CE} = 3 V, f = 1 MHz, V_{BE} = 0 , based grounded	C_{ce}	-	0.3	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	0.3	-	
Noise figure I_C = 5 mA, V_{CE} = 3 V, f = 1.8 GHz, Z_S = Z_{Sopt} I_C = 5 mA, V_{CE} = 3 V, f = 6 GHz, Z_S = Z_{Sopt}	NF	- -	0.5 0.75	- -	dB
Power gain[1] I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 1.8 GHz	G_{ms}	-	26	-	dB
Power gain, maximum available[1] I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 6 GHz	G_{ma}	-	20.5	-	dB
Transducer gain I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_L = 50 Ω, f = 1.8 GHz f = 6 GHz	$\|S_{21e}\|^2$	 - -	 24.5 16	 - -	dB
Third order intercept point at output[2] V_{CE} = 3 V, I_C = 10 mA, Z_S=Z_L=50 Ω, f = 1.8 GHz	IP_3	-	20.5	-	dBm
1dB Compression point I_C = 13 mA, V_{CE} = 3 V, Z_S=Z_L=50 Ω, f = 1.8 GHz	P_{-1dB}	-	6	-	

[1]G_{ma} = $|S_{21e} / S_{12e}|$ (k-(k²-1)$^{1/2}$), G_{ms} = $|S_{21e} / S_{12e}|$

[2]IP3 value depends on termination of all intermodulation frequency components.
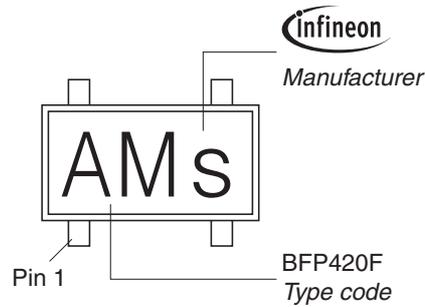Termination used for this measurement is 50 Ω from 0.1 MHz to 6 GHz
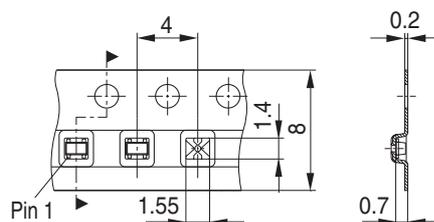
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Package Outline

1.4 ±0.05
0.2 ±0.05
0.2 ±0.05
0.5 ±0.05
0.5 ±0.05
0.55 ±0.04
1.2 ±0.05
0.2 ±0.05
10° MAX.
0.8 ±0.05
0.15 ±0.05

Foot Print

0.35
0.45
0.9
0.5   0.5

Marking Layout (Example)

Manufacturer

AMs

Pin 1

BFP420F
Type code

Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel

4
1.4
8
0.2
Pin 1   1.55   0.7

Attention please!

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