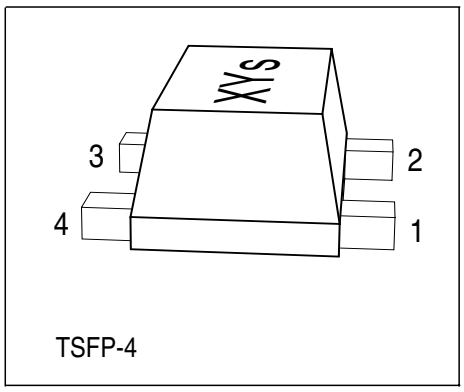
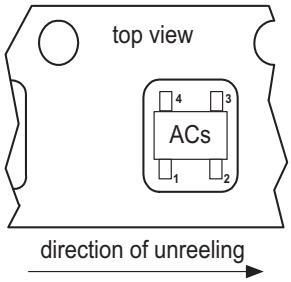
NPN Silicon Germanium RF Transistor

Preliminary data

- For high gain low noise amplifiers
- Smallest Package 1.4 x 0.8 x 0.59mm
- Noise figure F = 0.65 dB at 1.8 GHz
  outstanding G_{ms} = 21 dB at 1.8 GHz
- Gold metallization for extra high reliability





direction of unreeling

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration				Package
BFP620F_E6327	ACs	1 = B	2 = E	3 = C	4 = E	TSFP-4

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	2.3	V
Collector-base voltage	V_{CBO}	7.5	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_C	80	mA
Base current	I_B	3	
Total power dissipation $T_S \leq 98°C$ 1)	P_{tot}	185	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point2)	R_{thJS}	≤ 280	K/W

1 T_S is measured on the emitter lead at the soldering point to the pcb

2 For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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	$V_{(BR)CEO}$	2.3	2.8	-	V
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	200	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	10	µA
DC current gain I_C = 20 mA, V_{CE} = 1.5 V	h_{FE}	100	180	250	-
AC characteristics (verified by random sampling)					
Transition frequency I_C = 60 mA, V_{CE} = 1.5 V, f = 1 GHz	f_T	-	65	-	GHz
Collector-base capacitance V_{CB} = 2 V, f = 1 MHz	C_{cb}	-	0.12	0.2	pF
Collector-emitter capacitance V_{CE} = 2 V, f = 1 MHz	C_{ce}	-	0.2	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	0.45	-	
Noise figure I_C = 5 mA, V_{CE} = 2 V, Z_S = Z_{Sopt} , f = 1.8 GHz	F	-	0.7	-	dB
Power gain, maximum stable [1)] I_C = 20 mA, V_{CE} = 2 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 1.8 GHz	G_{ms}	-	21.5	-	
Insertion power gain I_C = 20 mA, V_{CE} = 2 V, f = 1.8 GHz, Z_S = Z_L = 50Ω	$\lvert S_{21}\rvert^2$	-	19	-	dB
Third order intercept point at output[2)] V_{CE} = 2 V, f = 1.8 GHz, Z_S=Z_L=50Ω, I_C = 20 mA	IP_3	-	24.5	-	dBm
1dB compression point at output[3)] V_{CE} = 2 V, f = 1.8 GHz, Z_S=Z_L=50Ω, I_C = 20 mA	P_{-1dB}	-	11.5	-	

[1] $G_{ms} = |S_{21} / S_{12}|$

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

[3] DC current at no input power

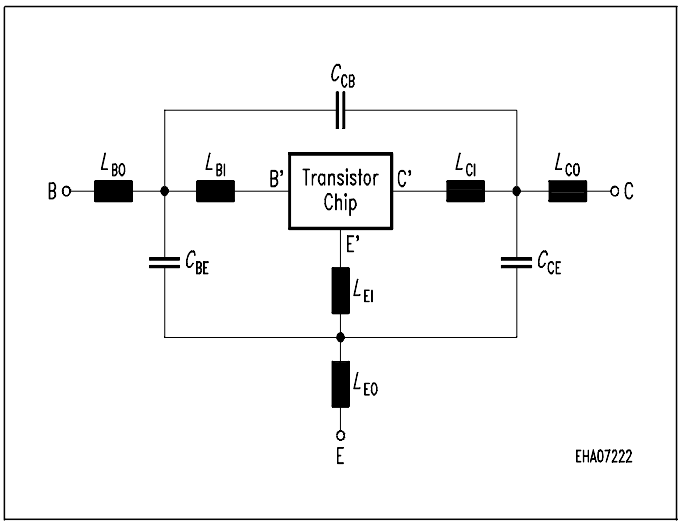
SPICE Parameters (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax) :

Transistor Chip Data

IS =	354	aA	BF =	557.1	-	NF =	1.021	-
VAF =	1000	V	IKF =	2.262	A	ISE =	2.978	pA
NE =	3.355	-	BR =	100	-	NR =	1	-
VAR =	1.2	V	IKR =	6.31	mA	ISC =	19.23	fA
NC =	2.179	-	RB =	2.674	Ω	IRB =	18	µA
RBM =	2.506	Ω	RE =	0.472		RC =	2.105	Ω
CJE =	371.6	fF	VJE =	0.898	V	MJE =	0.315	-
TF =	1.306	ps	XTF =	2.71	-	VTF =	0.492	V
ITF =	2.444	A	PTF =	0	deg	CJC =	225.6	fF
VJC =	0.739	V	MJC =	0.3926	-	XCJC =	1	-
TR =	0.3884	ns	CJS =	60	fF	VJS =	0.5	V
MJS =	0.5	-	XTB =	-0.9	-	EG =	1.114	eV
XTI =	3.43	-	FC =	0.821	-	TNOM	298	K

All parameters are ready to use, no scaling is necessary

Package Equivalent Circuit:



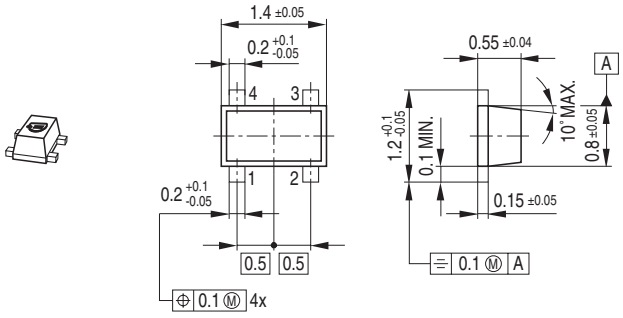
L_{BO} =	0.22	nH	L_{BI} =	0.42	nH
L_{EO} =	0.28	nH	R_{LBI} =	0.15	Ω
L_{CO} =	0.22	nH	L_{EI} =	0.26	nH
K_{BO-EO} =	0.10	-	R_{LEI} =	0.11	Ω
K_{BO-CO} =	0.01	-	L_{CI} =	0.35	nH
K_{EO-CO} =	0.11	-	R_{LCI} =	0.13	Ω
C_{BE} =	34	fF	K_{CI-EI} =	-0.05	-
C_{BC} =	2	fF	K_{BI-CI} =	-0.08	-
C_{CE} =	33	fF	K_{BI-EI} =	0.20	-

Valid up to 6GHz

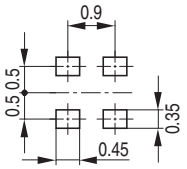
The TSFP-4 package has two emitter leads. To avoid high complexity of the package equivalent circuit, both leads are combined in one electrical connection.
R_{LxI} are series resistors for the inductances L_{xI} and K_{xa-yb} are the coupling coefficients between the inductances L_{xa} and L_{yb}. The referencepins for the coupled ports are B, E, C, B`, E`, C`.

For examples and ready to use parameters please contact your local Infineon Technologies distributor or sales office to obtain a Infineon Technologies CD-ROM or see Internet: http://www.infineon.com/silicondiscretes

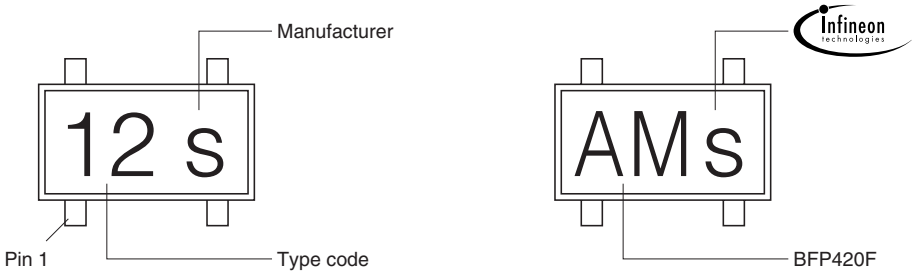
Package Outline



Foot Print



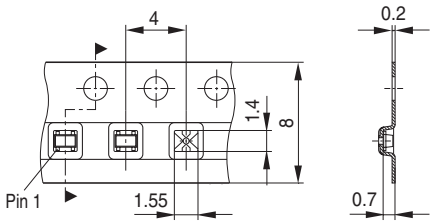
Marking Layout



Example

Packing

Code E6327: Reel ø180 mm = 3.000 Pieces/Reel
Code E6433: Reel ø330 mm = 10.000 Pieces/Reel



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