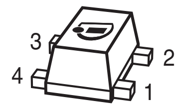
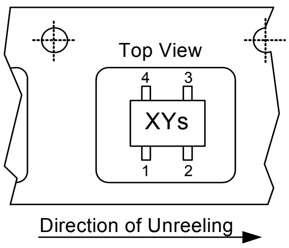
Linear Low Noise SiGe:C Bipolar RF Transistor



- For medium power amplifiers and driver stages
- Based on Infineon' s reliable high volume Silicon Germanium technology
- High *OIP3* and P_{-1dB}
- Ideal for low phase noise oscilators
- Maxim. available Gain G_{ma} = 21.5 dB at 1.8 GHz
  Minimun noise figure NF_{min} = 0.8 dB at 1.8 GHz
- Pb-free (RoHS compliant) and halogen-free thin small flat package with visible leads
- Qualification report according to AEC-Q101 available



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

Type	Marking	Pin Configuration						Package
BFP650F	R5s	1=B	2=E	3=C	4=E	-	-	TSFP-4

Maximum Ratings at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Collector-emitter voltage T_A = 25 °C T_A =-55 °C	V_{CEO}	 4 3.7	V
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_C	150	mA
Base current	I_B	10	
Total power dissipation[1)] $T_S \leq 85°C$	P_{tot}	500	mW
Junction temperature	T_J	150	°C
Storage temperature	T_{Stg}	-55 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	130	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 = 3 mA, I_B = 0	$V_{(BR)CEO}$	4	4.5	-	V
Collector-emitter cutoff current V_{CE} = 13 V, V_{BE} = 0	I_{CES}	-	-	100	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}	-	-	10	µA
DC current gain I_C = 80 mA, V_{CE} = 3 V, pulse measured	h_{FE}	110	180	270	-

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

[2] For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

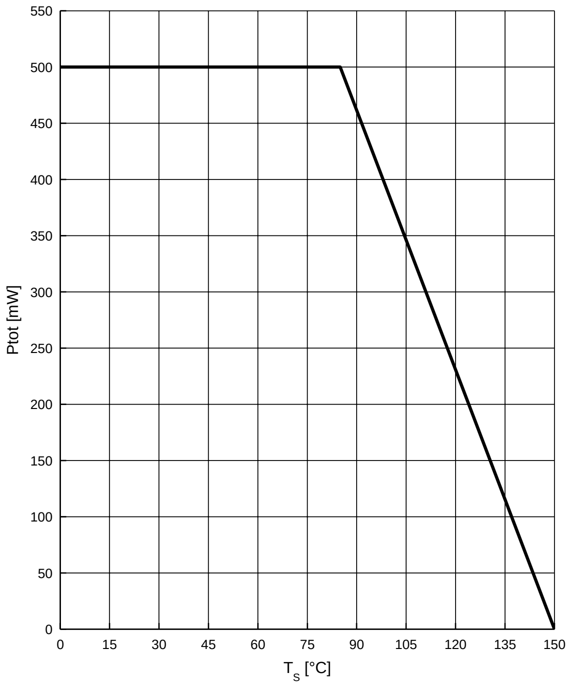
Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 80 mA, V_{CE} = 3 V, f = 1 GHz	f_T	-	42	-	GHz
Collector-base capacitance V_{CB} = 3 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.26	-	pF
Collector emitter capacitance V_{CE} = 3 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.45	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	1.3	-	
Minimum noise figure I_C = 10 mA, V_{CE} = 3 V, f = 1.8 GHz, $Z_S = Z_{Sopt}$ I_C = 10 mA, V_{CE} = 3 V, f = 6 GHz, $Z_S = Z_{Sopt}$	NF_{min}	 - -	 0.8 1.9	 - -	dB
Power gain, maximum available[1)] I_C = 80 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 1.8 GHz f = 6 GHz	G_{ma}	 - -	 21.5 11	 - -	
Transducer gain I_C = 80 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz f = 6 GHz	$\|S_{21e}\|^2$	 15 -	 17.5 7.5	 - -	dB
Third order intercept point at output[2)] V_{CE} = 3 V, I_C = 80 mA, f = 1.8 GHz, $Z_S = Z_L$ = 50 Ω	$IP3$	-	31	-	dBm
1dB compression point at output I_C = 80 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz	P_{-1dB}	-	17.5	-	

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

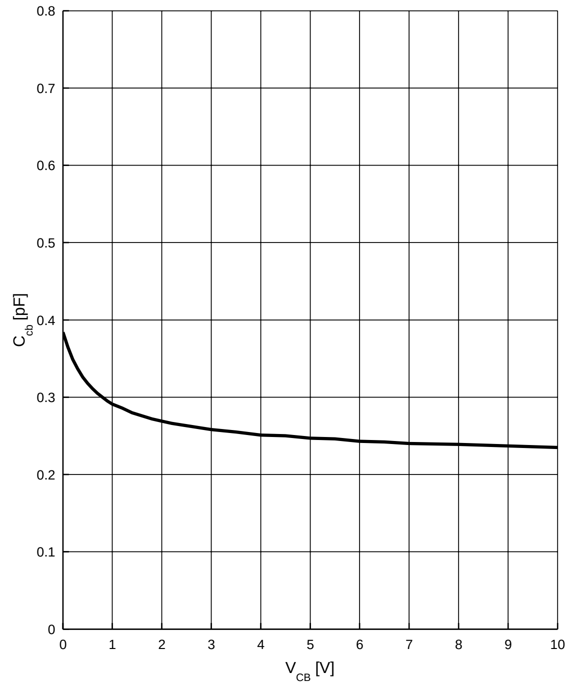
[2] IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

Total power dissipation $P_{tot} = f(T_S)$



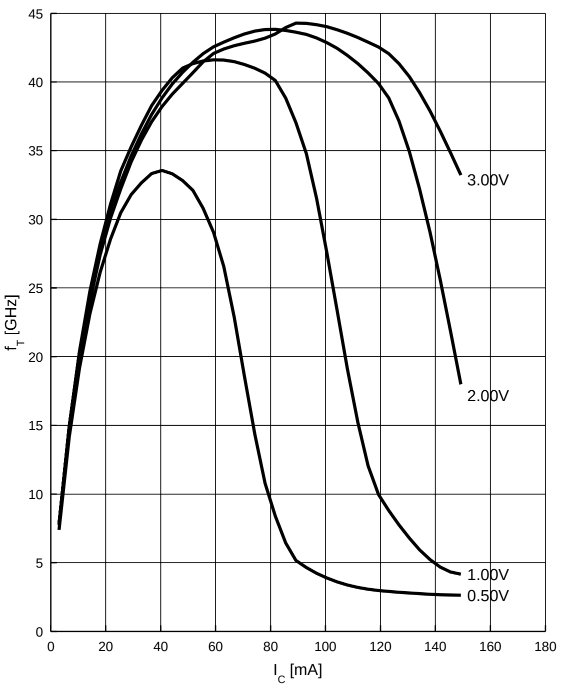
Collector-base capacitance $C_{cb} = f(V_{CB})$

f = 1 MHz



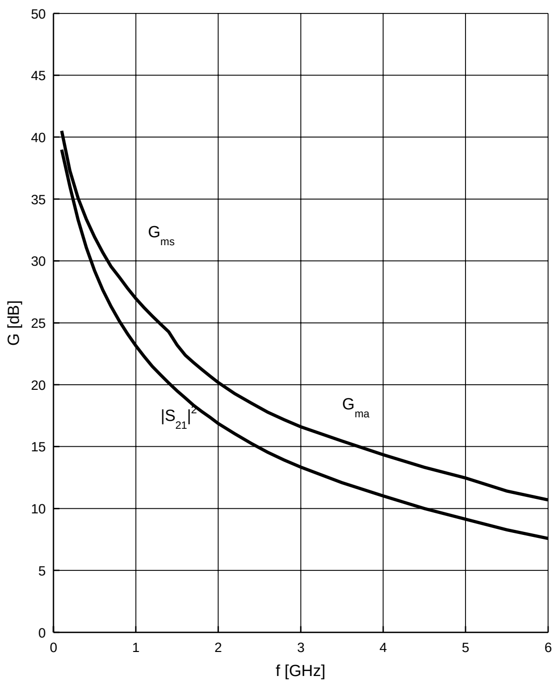
Transition frequency $f_T = f(I_C)$

V_{CE} = parameter in V, f = 1 GHz



Power gain G_{ma}, $G_{ms} = f(f)$

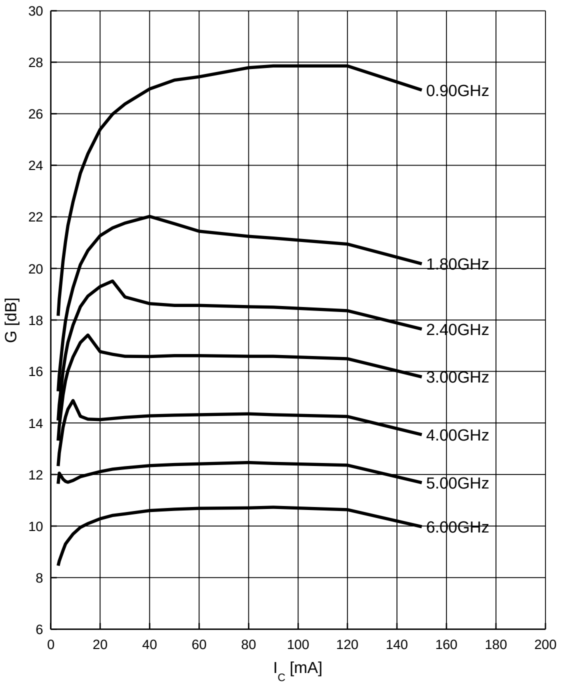
V_{CE} = 3 V, I_C = 80 mA



Power gain G_{ma}, $G_{ms} = f\ (I_C)$

$V_{CE} = 3$ V

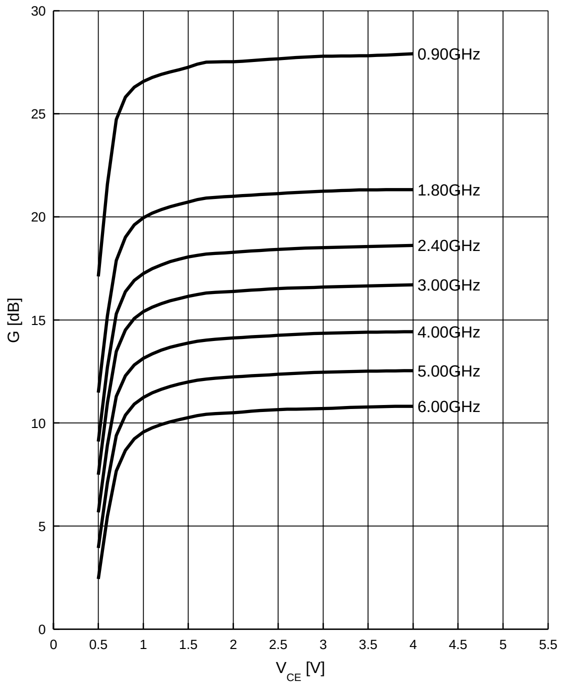
f = parameter in GHz



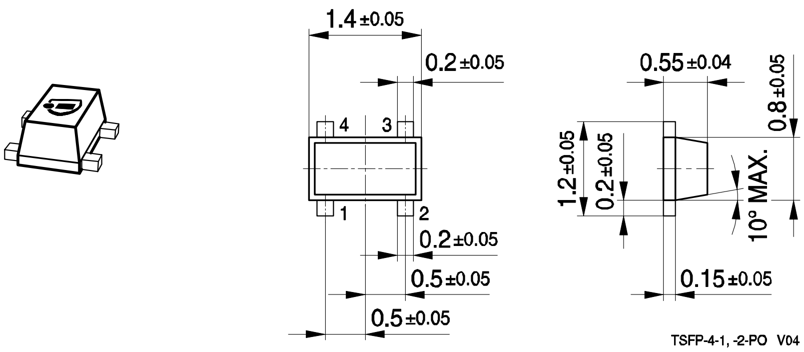
Power gain G_{ma}, $G_{ms} = f\ (V_{CE})$

$I_C = 80$ mA

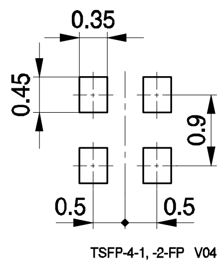
f = parameter in GHz



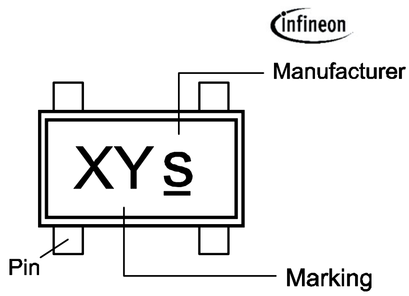
Package Outline



Foot Print

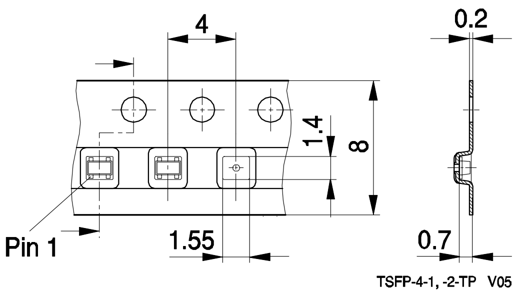


Marking Layout (Example)



Standard Packing

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



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