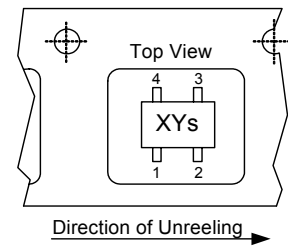
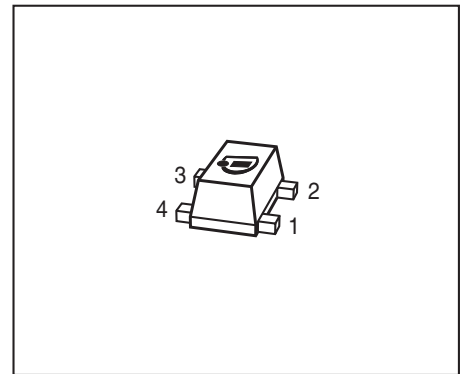


**Low Noise SiGe:C Bipolar RF Transistor**

- High gain low noise RF transistor
- Based on Infineon's reliable high volume Silicon Germanium technology
- Outstanding noise figure  $NF_{min} = 0.7$  dB at 1.8 GHz  
Outstanding noise figure  $NF_{min} = 1.3$  dB at 6 GHz
- Maximum stable gain  
 $G_{ms} = 21$  dB at 1.8 GHz  
 $G_{ma} = 10$  dB at 6 GHz
- Pb-free (RoHS compliant) and halogen-free thin small flat package (1.4 x 0.8 x 0.59 mm) with visible leads
- Qualification report according to AEC-Q101 available



**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

Type	Marking	Pin Configuration						Package
BFP620F	R2s	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	$V_{CEO}$		V
$T_A = 25$ °C		2.3	
$T_A = -55$ °C		2.1	
Collector-emitter voltage	$V_{CES}$	7.5	
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 <sup>1)</sup>	$P_{tot}$	185	mW
$T_S \leq 96$ °C			
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{Stg}$	-55 ... 150	

<sup>1)</sup>  $T_S$  is measured on the emitter lead at the soldering point to the pcb

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	290	K/W

**Electrical Characteristics** at  $T_A = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Collector-emitter breakdown voltage $I_C = 1\text{ mA}$ , $I_B = 0$	$V_{(BR)CEO}$	2.3	2.8	-	V
Collector-emitter cutoff current $V_{CE} = 7.5\text{ V}$ , $V_{BE} = 0$	$I_{CES}$	-	-	10	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 5\text{ V}$ , $I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 0.5\text{ V}$ , $I_C = 0$	$I_{EBO}$	-	-	3	$\mu\text{A}$
DC current gain $I_C = 50\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , pulse measured	$h_{FE}$	110	180	270	-

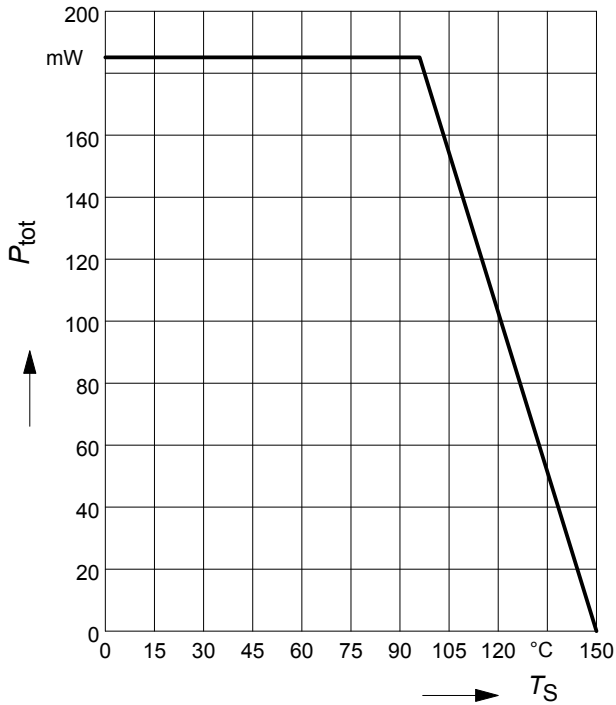
<sup>1)</sup>For the definition of  $R_{thJS}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

**Electrical Characteristics at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

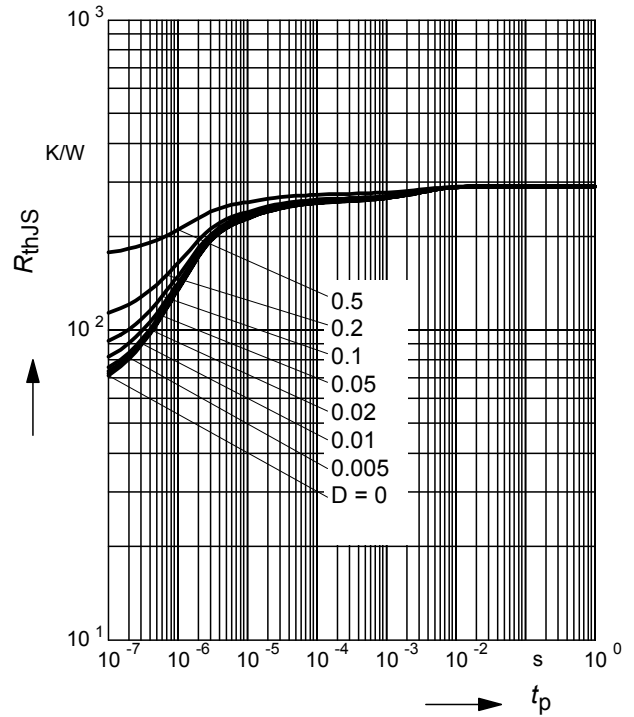
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 50\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $f = 1\text{ GHz}$	$f_T$	-	65	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.12	0.2	pF
Collector emitter capacitance $V_{CE} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.2	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	0.45	-	
Minimum noise figure $I_C = 5\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$ $I_C = 5\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $f = 6\text{ GHz}$ , $Z_S = Z_{Sopt}$	$NF_{min}$	-	0.7 1.3	-	dB
Power gain, maximum stable <sup>1)</sup> $I_C = 50\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$G_{ms}$	-	21	-	dB
Power gain, maximum available <sup>1)</sup> $I_C = 50\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 6\text{ GHz}$	$G_{ma}$	-	10	-	dB
Transducer gain $I_C = 50\text{ mA}$ , $V_{CE} = 1.5\text{ V}$ , $Z_S = Z_L = 50\text{ }\Omega$ , $f = 1.8\text{ GHz}$ $f = 6\text{ GHz}$	$ S_{21e} ^2$	-	19.5 9.5	-	dB
Third order intercept point at output <sup>2)</sup> $V_{CE} = 2\text{ V}$ , $I_C = 50\text{ mA}$ , $Z_S = Z_L = 50\text{ }\Omega$ , $f = 1.8\text{ GHz}$	$IP3$	-	25	-	dBm
1dB compression point at output $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_L = 50\text{ }\Omega$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	14	-	

<sup>1)</sup> $G_{ma} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$ ,  $G_{ms} = |S_{21e} / S_{12e}|$ 
<sup>2)</sup>IP3 value depends on termination of all intermodulation frequency components.  
Termination used for this measurement is 50 $\Omega$  from 0.1 MHz to 6 GHz

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

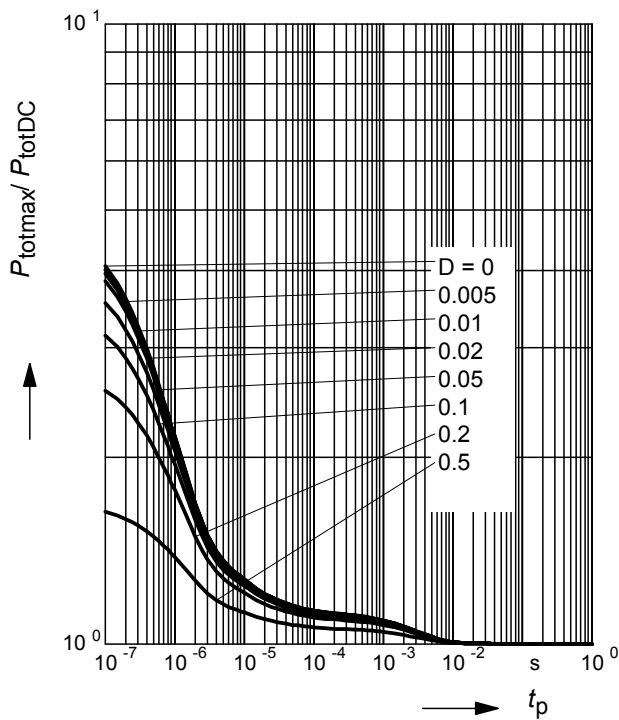


**Permissible Pulse Load  $R_{thJS} = f(t_p)$**



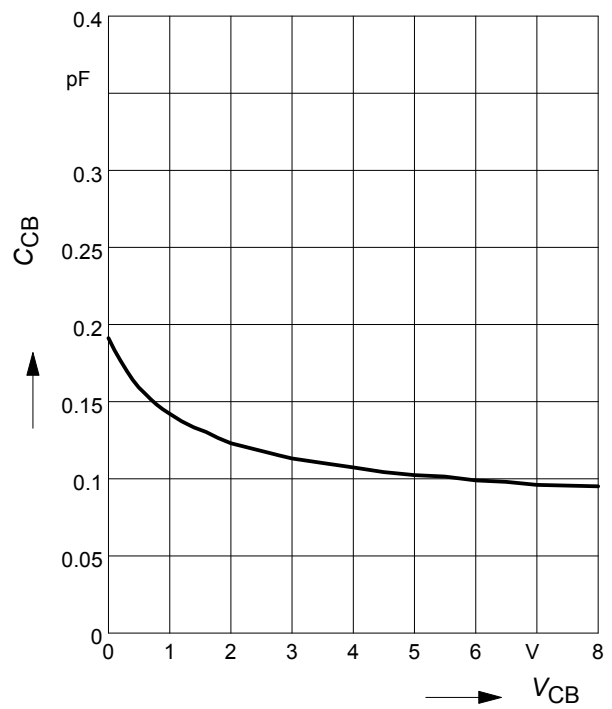
**Permissible Pulse Load**

$P_{totmax}/P_{totDC} = f(t_p)$



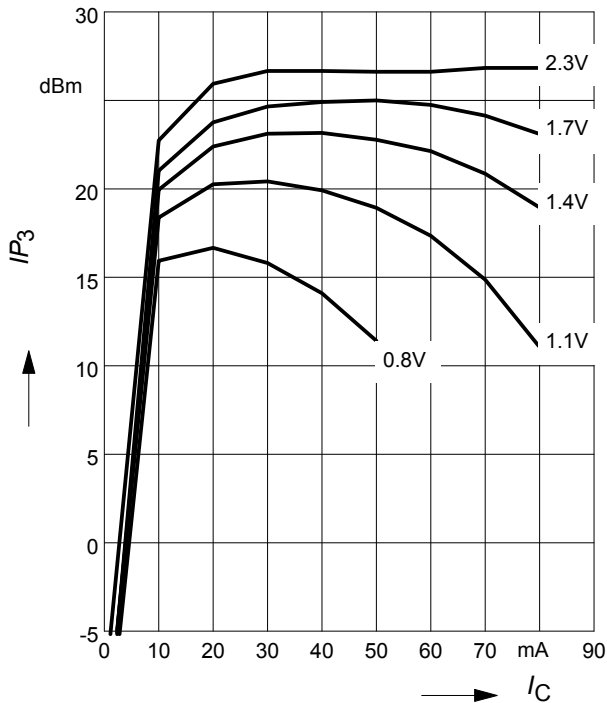
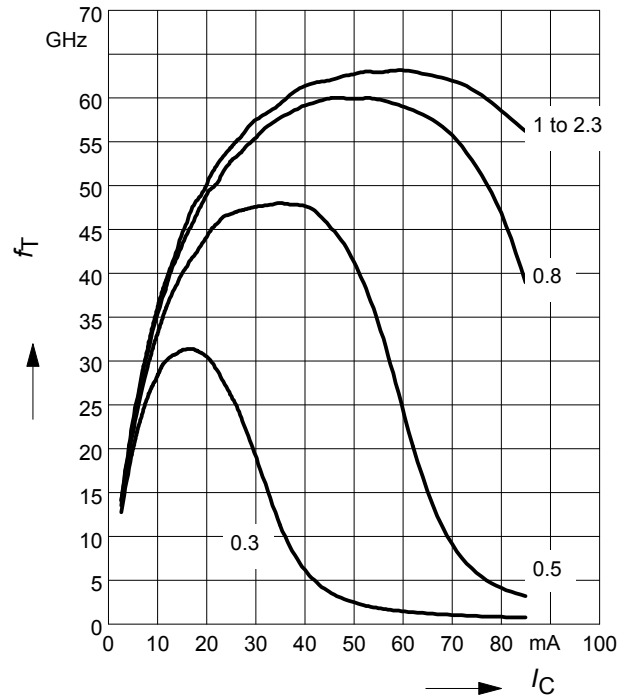
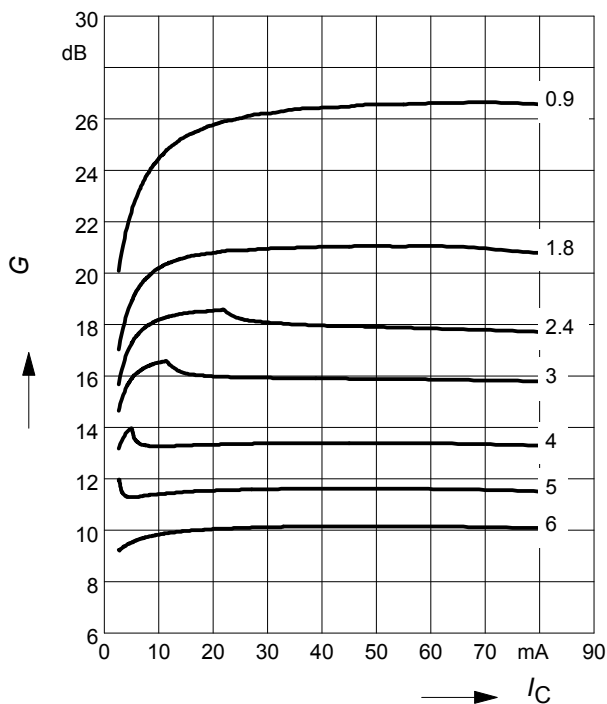
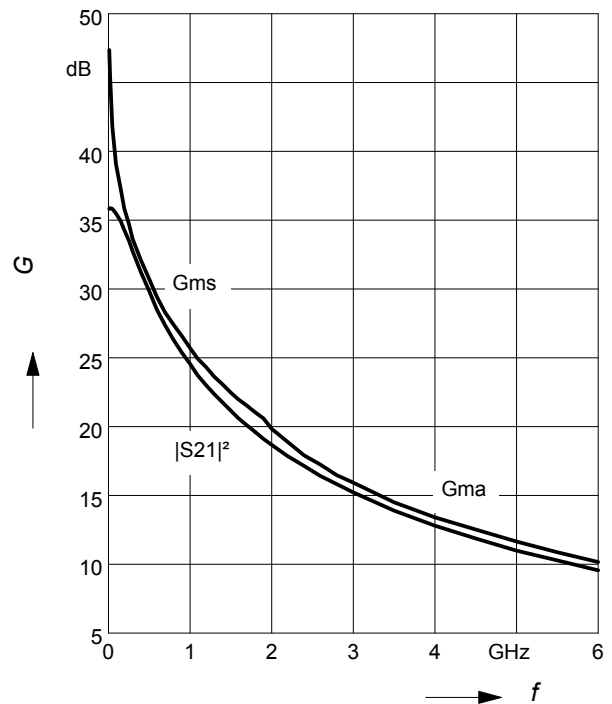
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

$f = 1\text{MHz}$



**Third order Intercept Point  $IP_3=f(I_C)$** 

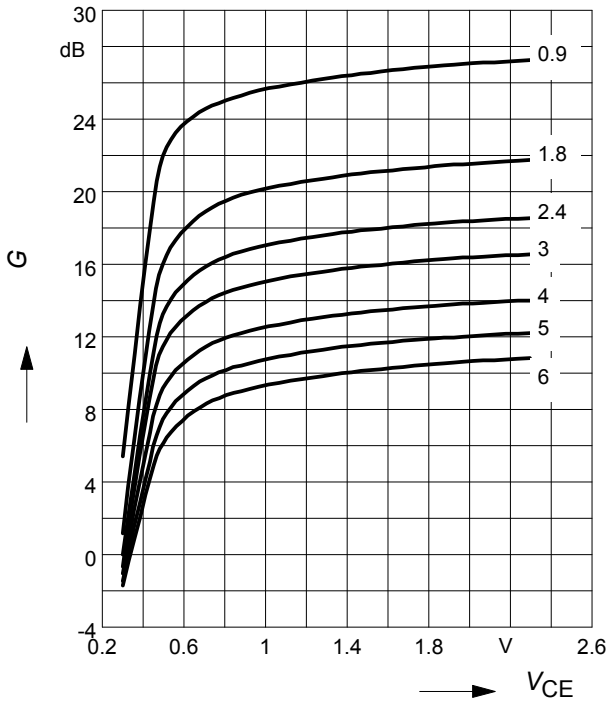
 (Output,  $Z_S=Z_L=50\Omega$ )

 $V_{CE}$  = parameter,  $f=1.8\text{GHz}$ 

**Transition frequency  $f_T=f(I_C)$** 
 $f=1\text{GHz}$ 
 $V_{CE}$  = Parameter in V

**Power gain  $G_{ma}, G_{ms}=f(I_C)$** 
 $V_{CE}=1.5\text{V}$ 
 $f$  = Parameter in GHz

**Power Gain  $G_{ma}, G_{ms}=f(f)$** 
 $|S_{21}|^2=f(f)$ 
 $V_{CE}=1.5\text{V}, I_C=50\text{mA}$ 


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

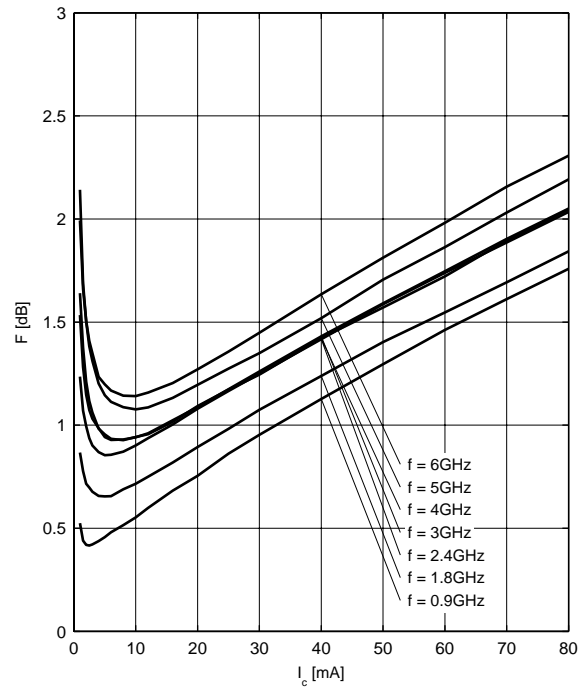
$I_C = 50\text{mA}$

$f = \text{Parameter in GHz}$



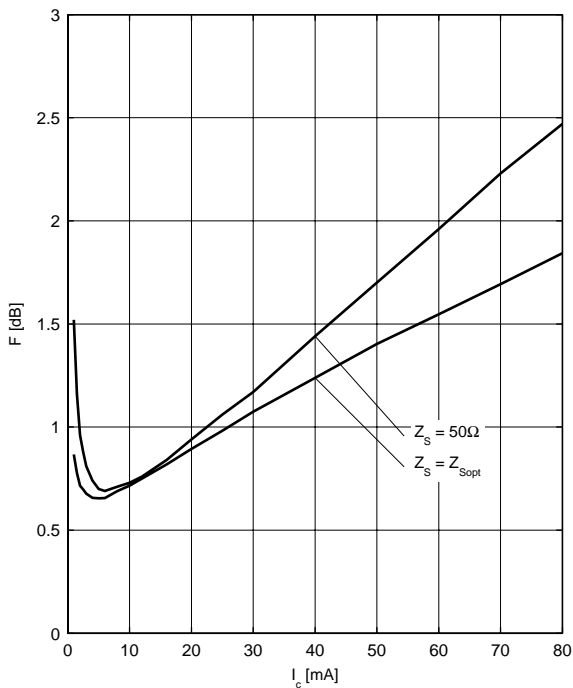
**Noise figure  $F = f(I_C)$**

$V_{CE} = 1.5\text{V}$ ,  $Z_S = Z_{Sopt}$



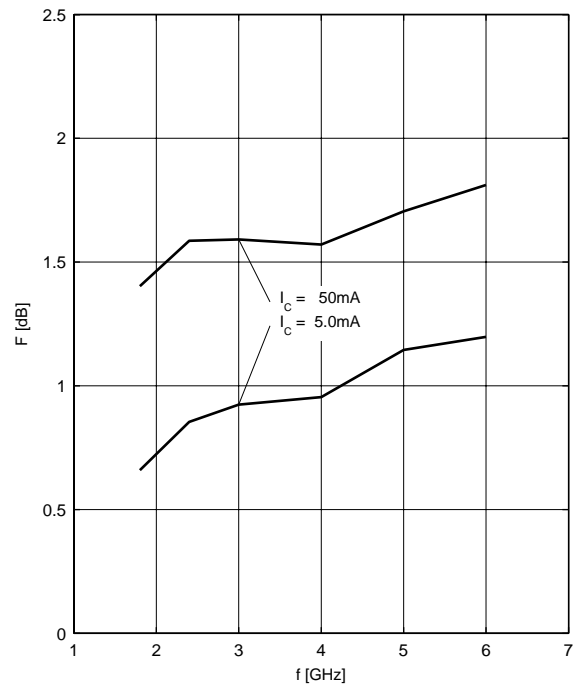
**Noise figure  $F = f(I_C)$**

$V_{CE} = 1.5\text{V}$ ,  $f = 1.8\text{ GHz}$



**Noise figure  $F = f(f)$**

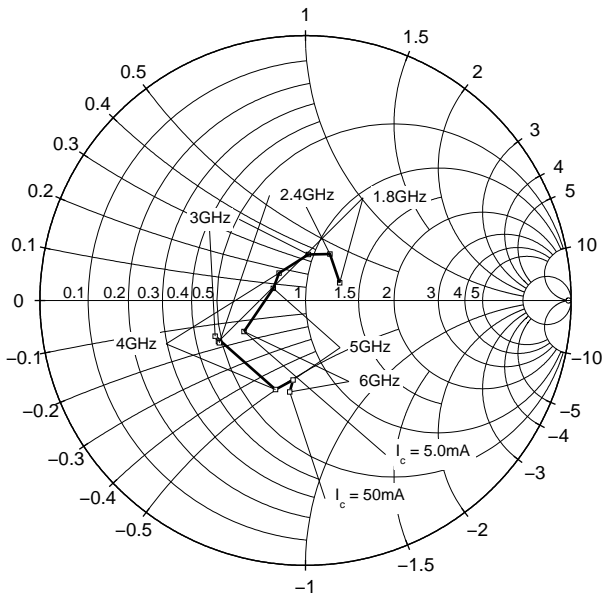
$V_{CE} = 1.5\text{V}$ ,  $Z_S = Z_{Sopt}$



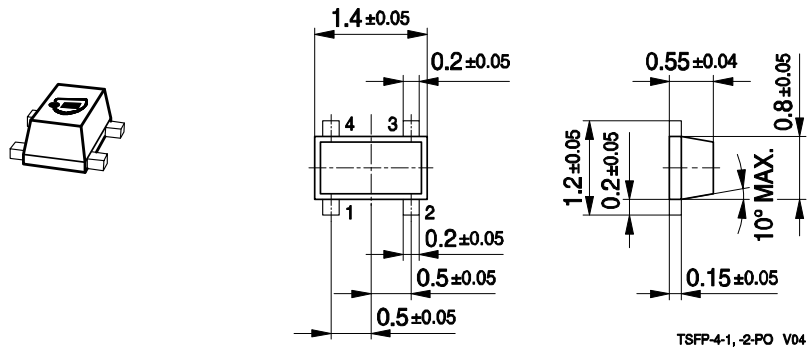
Source impedance for min.

noise figure vs. frequency

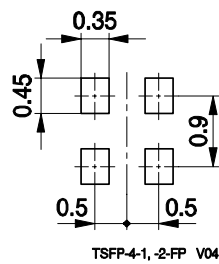
$V_{CE} = 1.5V, I_C = 5.0mA/50.0mA$



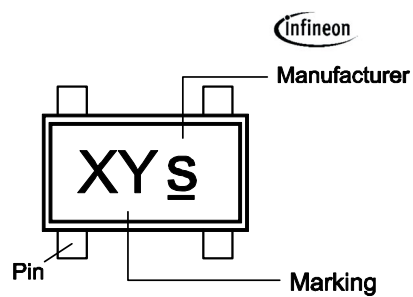
### Package Outline



### Foot Print

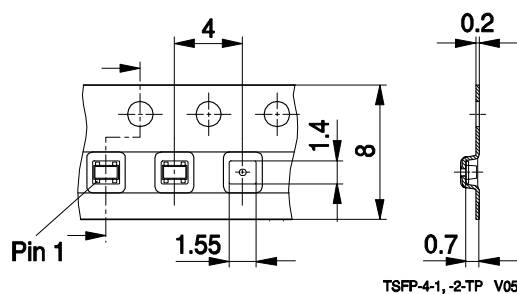


### Marking Layout (Example)



### Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel





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