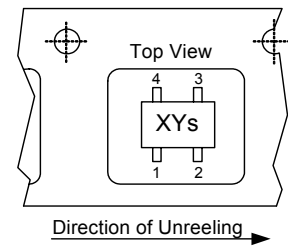
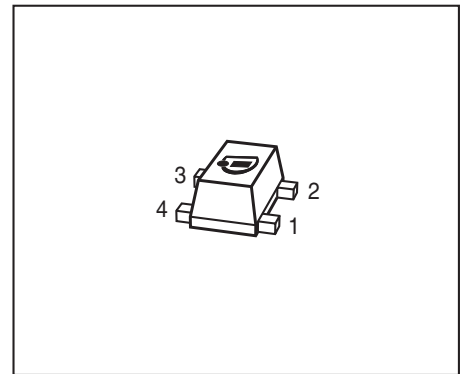


Low Noise SiGe:C Bipolar RF Transistor

- 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 ¹⁾	P_{tot}	185	mW
$T_S \leq 96$ °C			
Junction temperature	T_J	150	°C
Storage temperature	T_{Stg}	-55 ... 150	

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

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	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	μA
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	μA
DC current gain $I_C = 50\text{ mA}$, $V_{CE} = 1.5\text{ V}$, pulse measured	h_{FE}	110	180	270	-

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

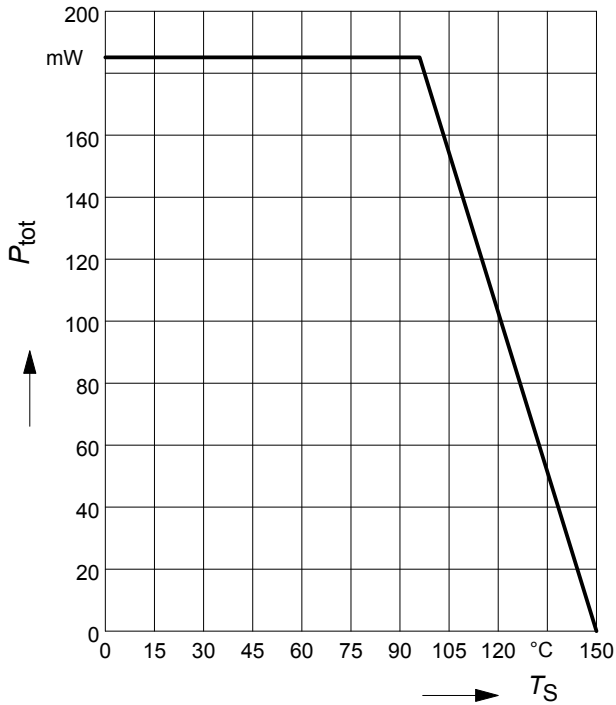
Electrical Characteristics at $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
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 ¹⁾ $I_C = 50\text{ mA}$, $V_{CE} = 1.5\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	G_{ms}	-	21	-	dB
Power gain, maximum available ¹⁾ $I_C = 50\text{ mA}$, $V_{CE} = 1.5\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 6\text{ GHz}$	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 ²⁾ $V_{CE} = 2\text{ V}$, $I_C = 50\text{ mA}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$	$IP3$	-	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	-	

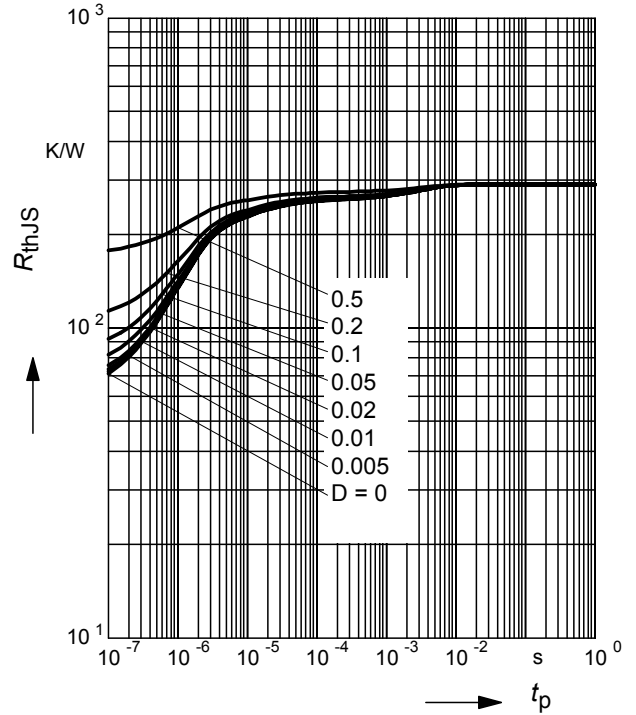
¹⁾ $G_{ma} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$, $G_{ms} = |S_{21e} / S_{12e}|$
²⁾IP3 value depends on termination of all intermodulation frequency components.

Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

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

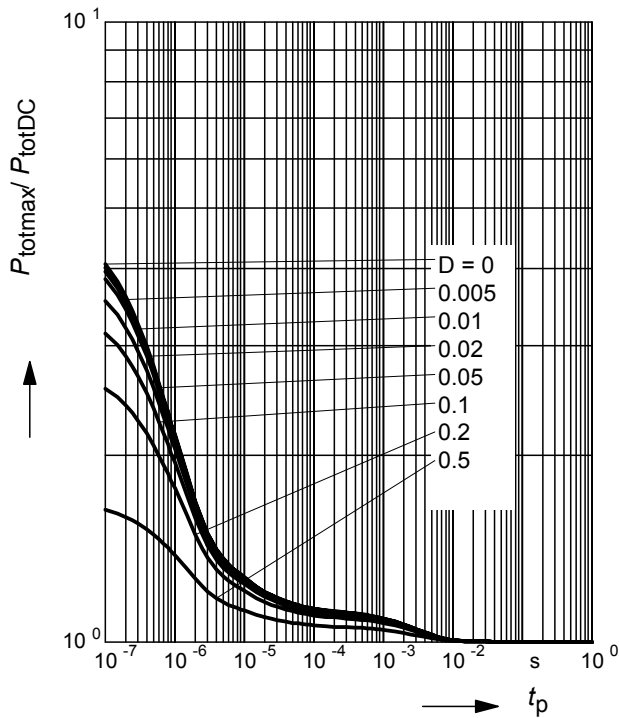


Permissible Pulse Load $R_{thJS} = f(t_p)$



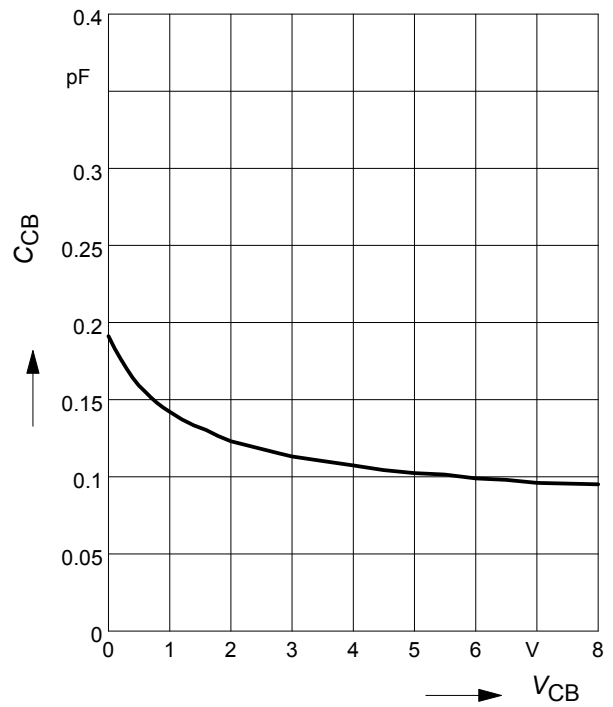
Permissible Pulse Load

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



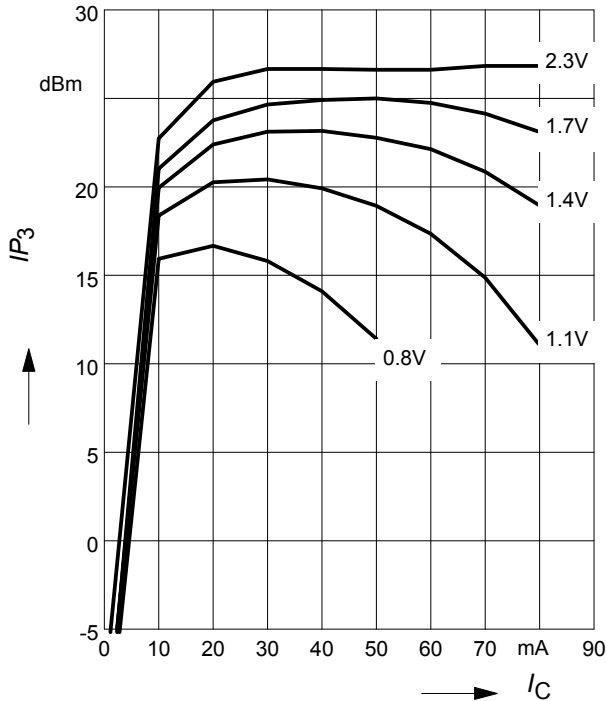
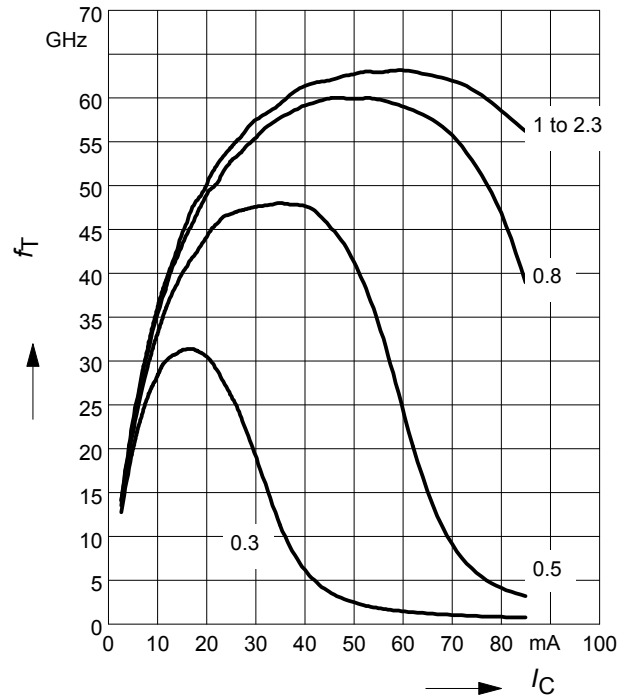
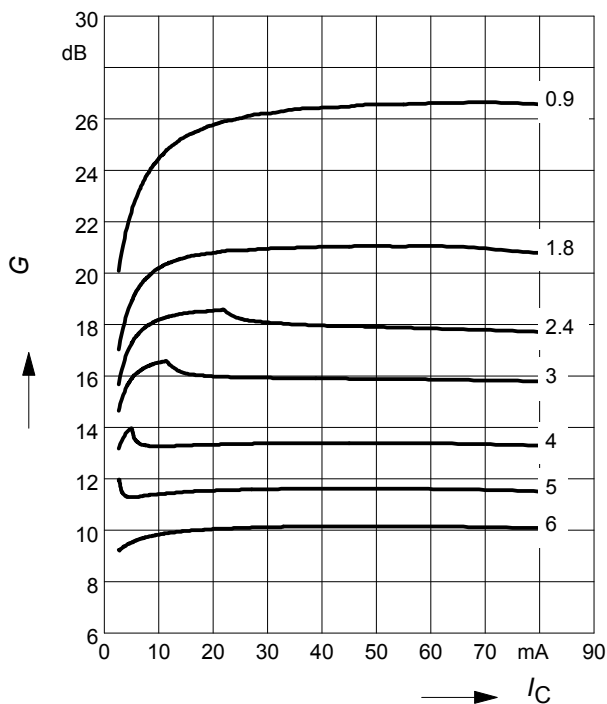
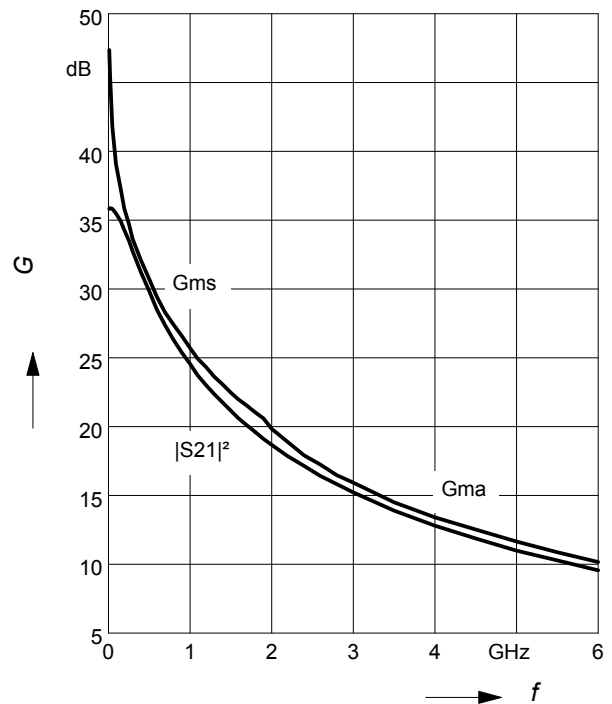
Collector-base capacitance $C_{cb} = f(V_{CB})$

$f = 1\text{MHz}$



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

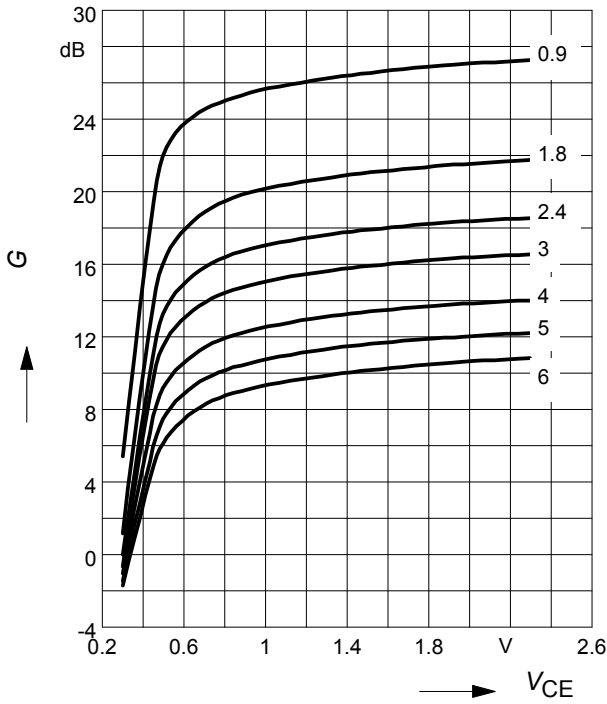
 (Output, $Z_S=Z_L=50\Omega$)

 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} , $G_{ms} = f(V_{CE})$

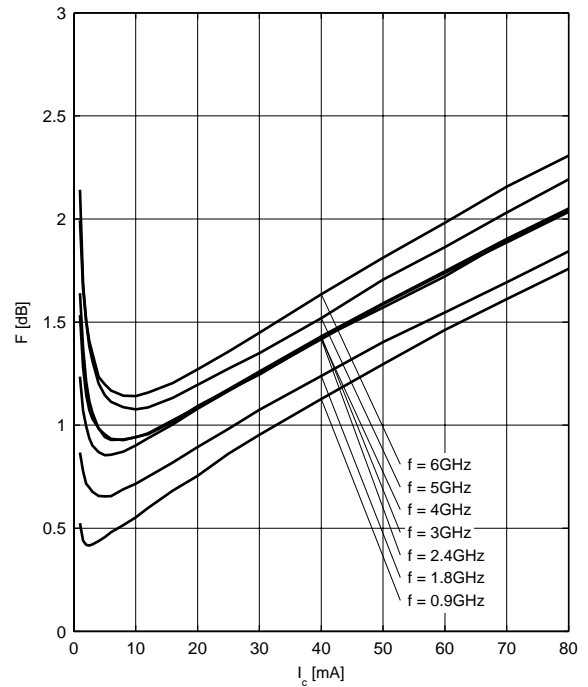
$I_C = 50\text{mA}$

$f = \text{Parameter in GHz}$



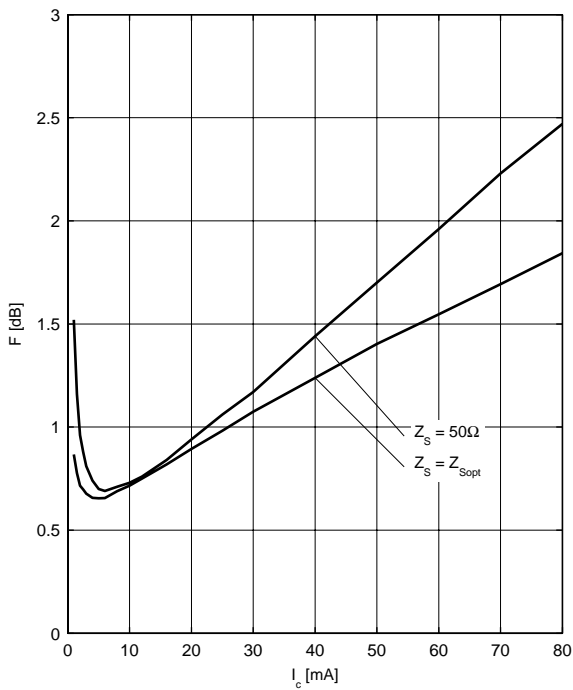
Noise figure $F = f(I_C)$

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



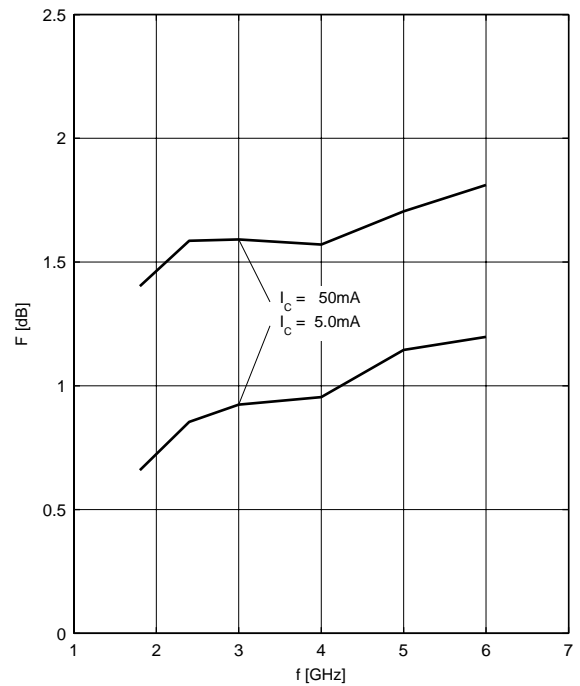
Noise figure $F = f(I_C)$

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



Noise figure $F = f(f)$

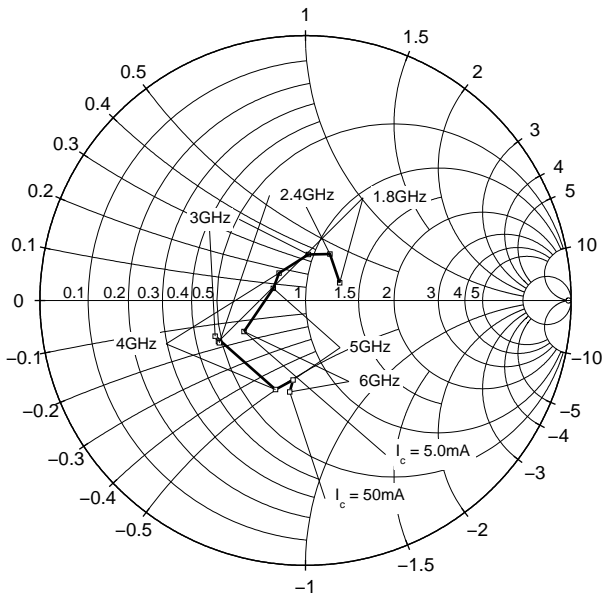
$V_{CE} = 1.5\text{V}$, $Z_S = Z_{Sopt}$



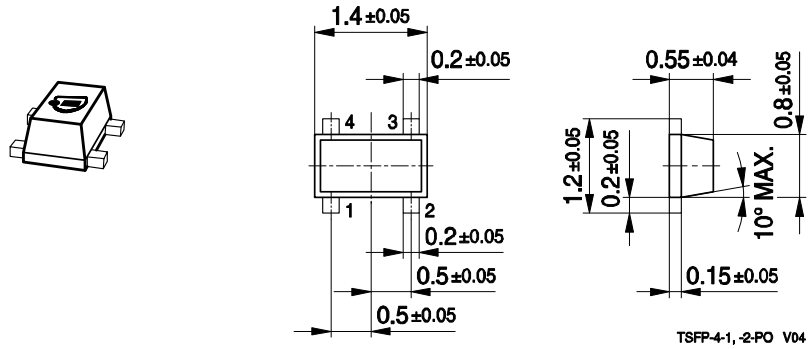
Source impedance for min.

noise figure vs. frequency

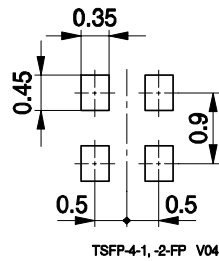
$V_{CE} = 1.5V, I_C = 5.0mA/50.0mA$



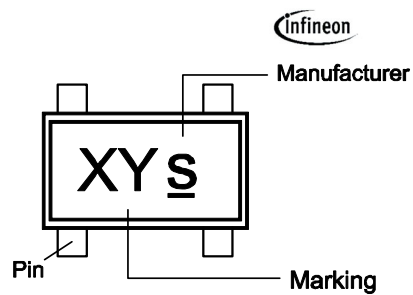
Package Outline



Foot Print

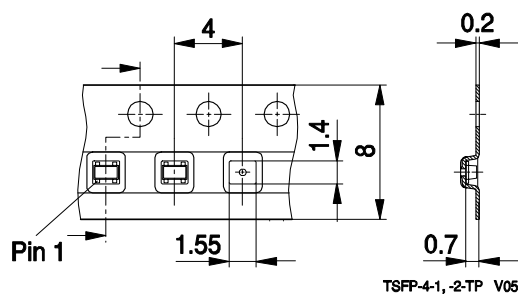


Marking Layout (Example)



Standard Packing

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



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