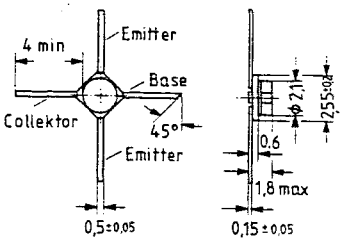
Preliminary data

The BFQ 77 is a bipolar NPN Silicon Microwave Transistor with submicron structure to achieve best noise figure and high gain at low collector current up to 4 GHz. The standard transistor is made using SIEMENS economy ceramic package (CEREC). A hi-rel version and other package-styles are offered on request.

Type	Mark	Ordering code
BFQ 77	77	Q62702-F0863



Dimensions in mm
Weight approx. 0.5 g

Maximum rating (T_{amb} = 25°C)

Collector-emitter voltage	V_{CEO}	15	V
Collector-emitter voltage (R_{BE} = 0)	V_{CES}	25	V
Collector base voltage	V_{CBO}	25	V
Emitter base voltage	V_{EBO}	2	V
Collector current	I_C	20	mA
Storage temperature range	T_{stg}	−65 to +150	°C
Junction temperature	T_j	200	°C
Total power dissipation	P_{tot}	250	mW

Thermal resistance

Junction to ambient air	R_{thJA}	≦ 600	K/W

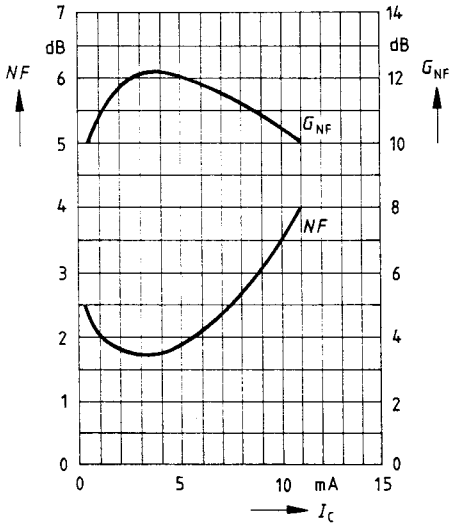
Static characteristics (T_{amb} = 25°C)

Collector-emitter breakdown voltage (I_C = 100 uA)	$V_{(BR)CES}$	≧ 25	V
Collector cutoff current (V_{CB} = 10 V)	I_{CBO}	≦ 50	nA
DC current gain (V_{CE} = 10 V; I_C = 4 mA)	h_{FE}	≧ 50	

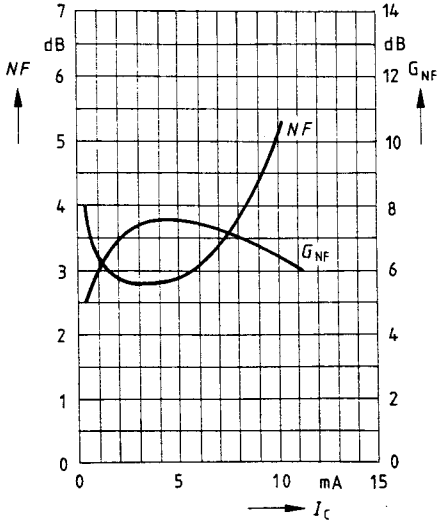
Dynamic characteristics (T_{amb} = 25°C)

Transition frequency (V_{CE} = 10 V; I_C = 8 mA)	f_T	7	GHz
Power gain (V_{CE} = 10 V; I_C = 8 mA; f = 2 GHz)	G_{max}	13	dB
Reverse transfer capacitance (V_{CE} = 10 V; I_C = 1 mA; f = 1 MHz)	C_{12e}	0.2	pF
Noise figure (V_{CE} = 10 V; I_C = 4 mA; F = 2 GHz)	NF	1.8 (≦ 2.0)	dB
Associated gain (V_{CE} = 10 V; I_C = 4 mA; f = 2 GHz)	G_{NF}	12.0	dB

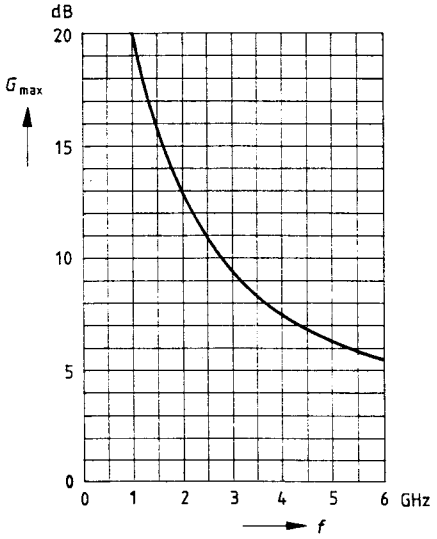
Noise figure NF = $f(I_c)$
Associated gain G_{NF} = $f(I_c)$
V_{CE} = 10 V, f = 2 GHz, T_{amb} = 25°C



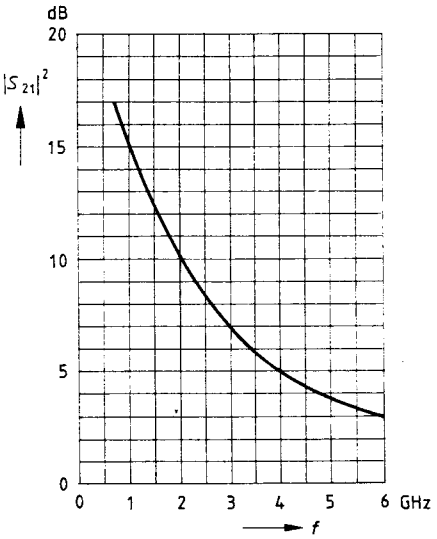
Noise figure NF = $f(I_c)$
Associated gain G_{NF} = $f(I_c)$
V_{CE} = 10 V, f = 4 GHz, T_{amb} = 25°C



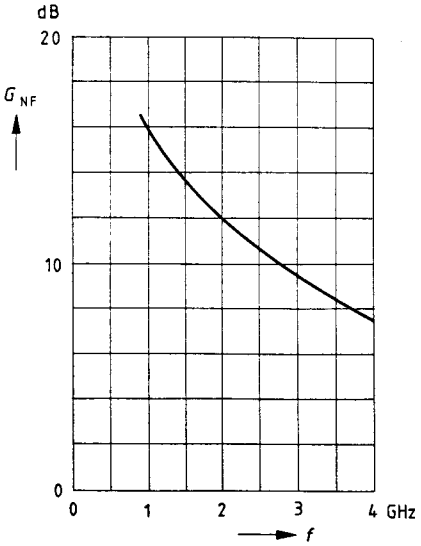
Power gain $G_{max} = f(f)$
V_{CE} = 10 V, I_C = 8 mA, T_{amb} = 25°C



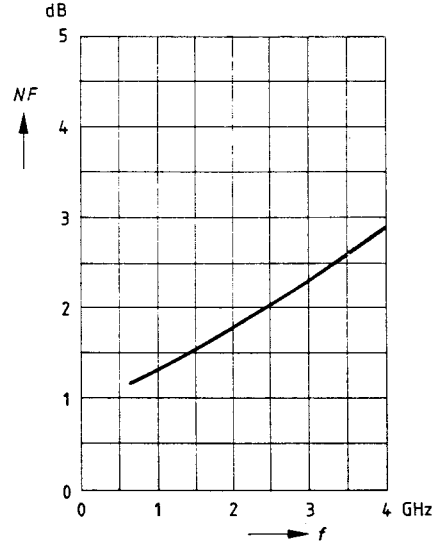
S parameter $|S_{21}|^2 = f(f)$
V_{CE} = 6V, I_c = 5,5 mA, Z = 50 Ω



Associated gain $G_{NF} = f(f)$
V_{CE} = 10 V, I_C = 4 mA, T_{amb} = 25°C



Noise figure NF = $f(f)$
V_{CE} = 10 V, I_C = 4 mA, T_{amb} = 25°C



S parameters, common emitter, Z = 50Ω
Operating point: V_{CE} = 6 V, I_C = 2.5 mA

f MHz	S11	φ	S21	φ	S22	φ	S12	φ
2000	0.548	−128.1	2.802	97.1	0.617	− 46.4	0.081	48.6
2500	0.491	−155.9	2.427	74.2	0.572	− 49.4	0.086	56.8
3000	0.458	−169.6	2.025	64.3	0.586	− 57.1	0.101	55.6
3500	0.500	177.0	1.908	62.0	0.586	− 69.6	0.122	57.9
4000	0.525	160.5	1.801	49.0	0.556	− 80.9	0.151	67.7
4500	0.587	150.8	1.585	37.4	0.529	− 91.4	0.178	54.9
5000	0.591	142.9	1.464	30.7	0.548	− 96.5	0.179	56.7
5500	0.614	142.8	1.400	24.9	0.612	−108.0	0.206	56.5
6000	0.622	121.2	1.287	13.3	0.576	−121.1	0.231	63.7

Operating point: V_{CE} = 6 V; I_C = 5 mA

f MHz	S11	φ	S21	φ	S22	φ	S12	φ
2000	0.454	−161.7	3.487	86.3	0.578	− 42.9	0.071	58.3
2500	0.454	175.1	3.090	69.3	0.544	− 46.5	0.086	65.5
3000	0.425	162.7	2.331	55.5	0.564	− 54.3	0.107	70.1
3500	0.461	157.9	2.143	55.1	0.563	− 67.9	0.131	69.3
4000	0.510	146.8	1.975	40.6	0.536	− 79.7	0.151	65.4
4500	0.587	139.6	1.768	34.7	0.509	− 90.5	0.179	56.1
5000	0.594	140.8	1.540	24.5	0.527	− 93.5	0.191	64.2
5500	0.608	136.4	1.528	21.9	0.588	−107.2	0.234	64.9
6000	0.624	113.7	1.395	11.3	0.558	−120.7	0.240	64.0

Operating point: V_{CE} = 10 V, I_C = 5 mA

f MHz	S11	φ	S21	φ	S22	φ	S12	φ
2000	0.437	−159.5	3.589	87.5	0.577	− 43.9	0.073	58.3
2500	0.434	177.0	3.199	72.0	0.536	− 46.9	0.087	64.2
3000	0.402	164.7	2.455	57.5	0.560	− 54.4	0.107	68.8
3500	0.441	160.6	2.126	53.1	0.560	− 68.1	0.127	64.1
4000	0.490	149.3	2.032	46.9	0.527	− 79.6	0.158	70.9
4500	0.567	142.2	1.822	36.6	0.502	− 90.5	0.184	57.0
5000	0.582	141.7	1.708	29.9	0.519	− 92.6	0.194	67.8
5500	0.590	138.2	1.578	24.1	0.579	−107.3	0.230	64.2
6000	0.597	116.1	1.445	12.5	0.551	−120.1	0.252	61.3

Operating point: V_{CE} = 10 V, I_C = 10 mA

f MHz	S11	φ	S21	φ	S22	φ	S12	φ
2000	0.423	−177.2	3.652	81.7	0.561	− 40.2	0.067	66.8
2500	0.445	164.1	3.137	63.7	0.528	− 43.8	0.085	73.4
3000	0.419	152.5	2.469	53.0	0.554	− 52.0	0.109	75.8
3500	0.449	151.3	2.226	54.1	0.560	− 65.9	0.130	69.5
4000	0.502	142.8	2.009	43.7	0.530	− 78.1	0.161	74.7
4500	0.587	136.6	1.758	33.2	0.501	− 88.6	0.185	59.3
5000	0.591	137.6	1.708	26.9	0.526	− 90.5	0.199	61.8
5500	0.604	134.5	1.563	21.3	0.581	−105.9	0.235	63.4
6000	0.621	111.8	1.421	10.8	0.553	−119.3	0.263	63.7