



SBFP420B

UHF to C Band Low Noise Amplifier, Oscillation Applications

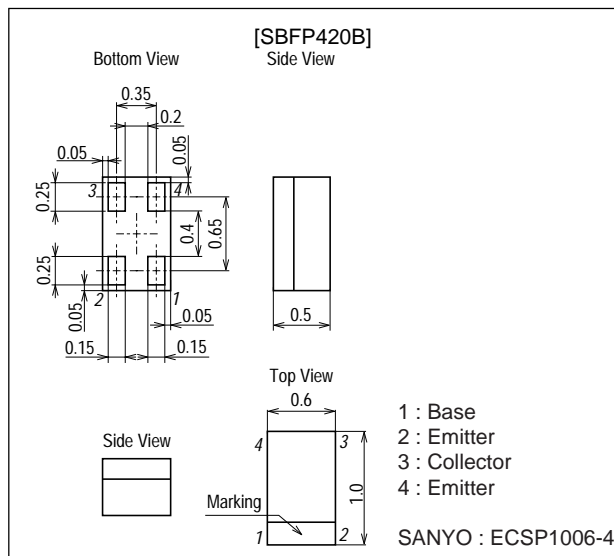
Features

- Low noise : NF=1.1dB typ (f=1.8GHz).
- High cut-off frequency : $f_T=20\text{GHz}$ typ ($V_{CE}=1\text{V}$).
: $f_T=25\text{GHz}$ typ ($V_{CE}=3\text{V}$).
- Low voltage operation.
- High Gain : $|S_{21e}|^2=17\text{dB}$ typ (f=1.8GHz).
- Ultrasmall (1006 size), thin (0.5mm) leadless package.

Package Dimensions

unit : mm

2214



Specifications

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		15	V
Collector-to-Emitter Voltage	V_{CEO}		4.5	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		35	mA
Collector Dissipation	PC		100	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Electrical Characteristics at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=5\text{V}, I_E=0$			200	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1.5\text{V}, I_C=0$			35	μA
DC Current Gain	hFE	$V_{CE}=4\text{V}, I_C=20\text{mA}$	50		150	
Gain-Bandwidth Product	f_{T1}	$V_{CE}=1\text{V}, I_C=10\text{mA}$		20		GHz
	f_{T2}	$V_{CE}=3\text{V}, I_C=30\text{mA}$	18	25		GHz
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1\text{V}, f=1\text{MHz}$		0.17	0.27	pF

Marking : AD

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■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

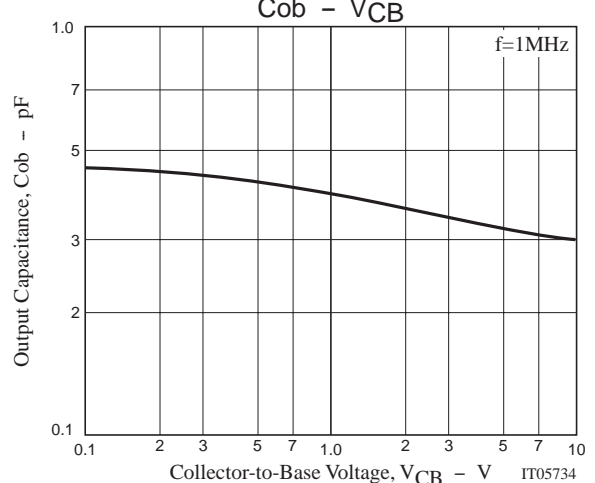
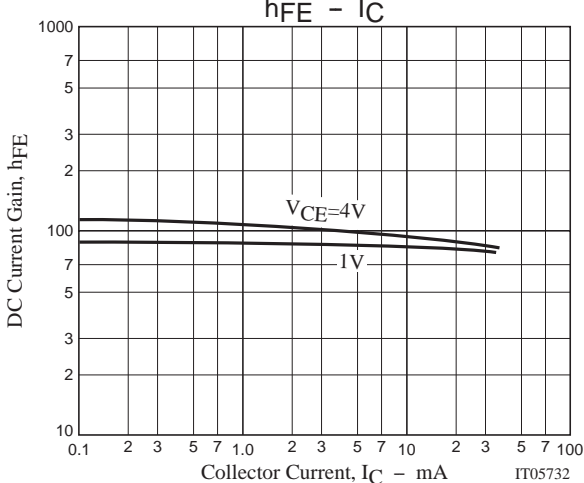
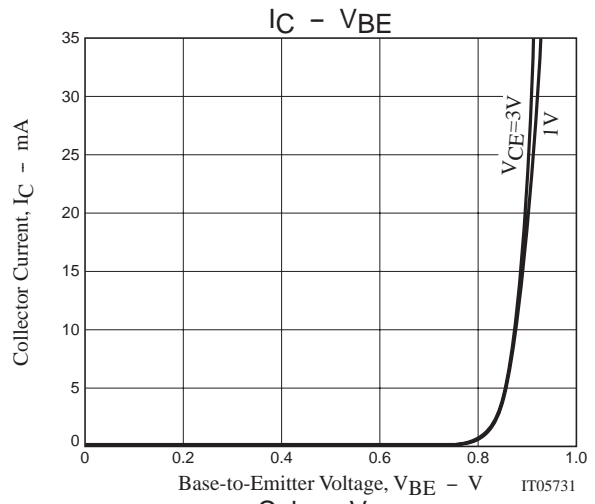
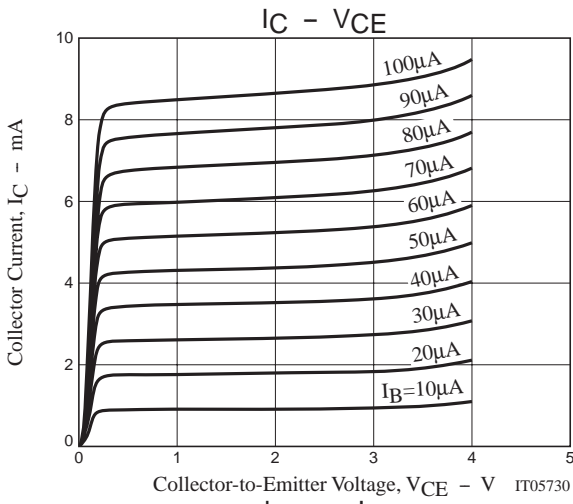
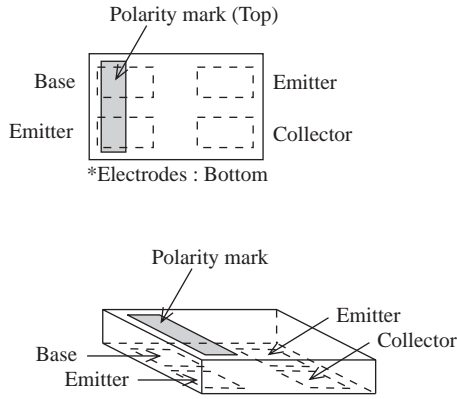
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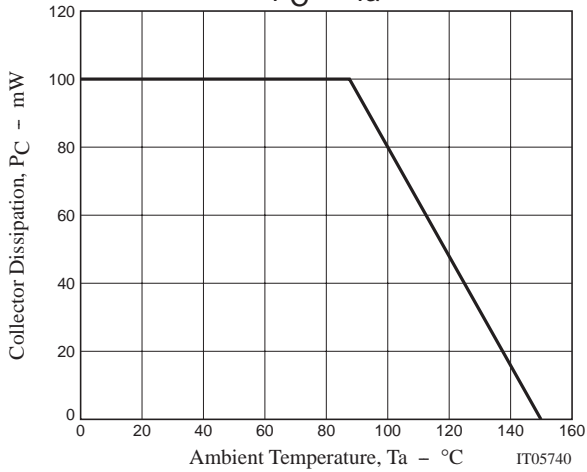
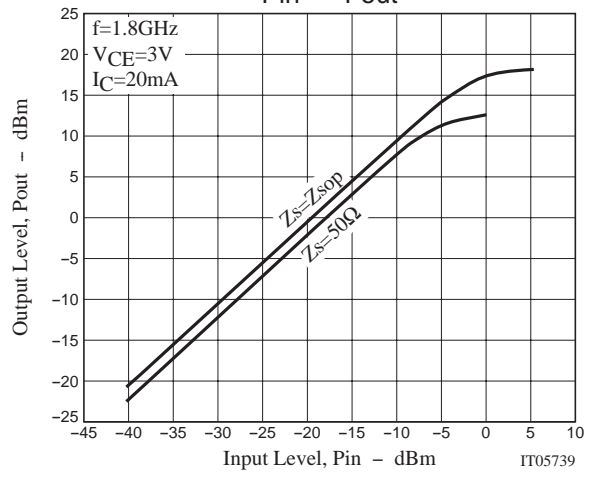
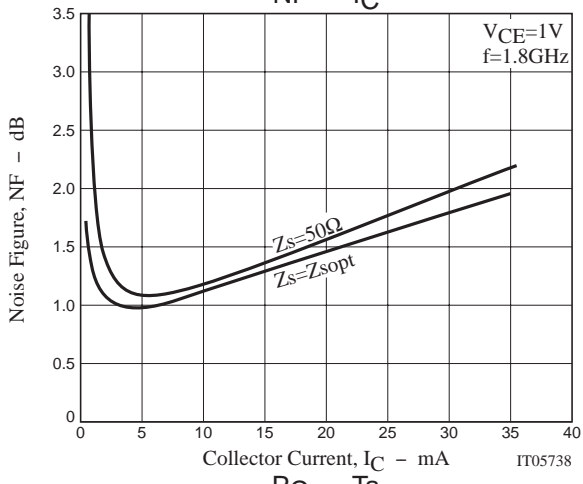
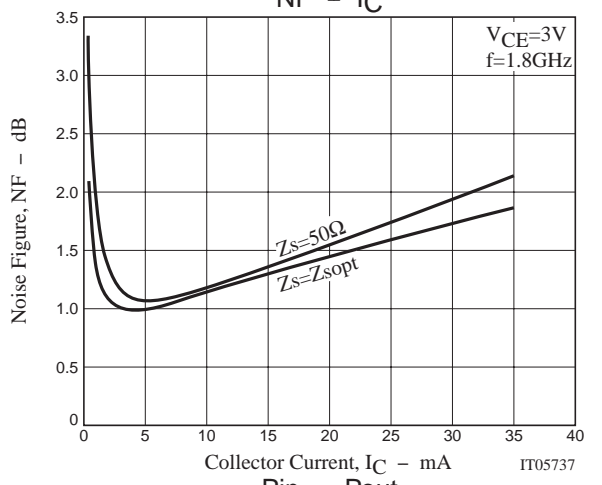
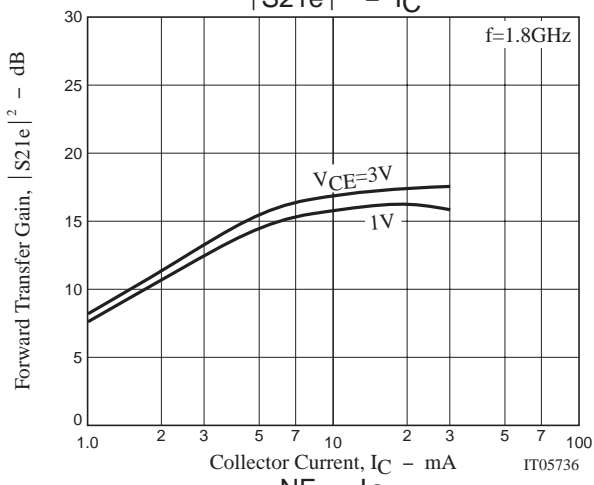
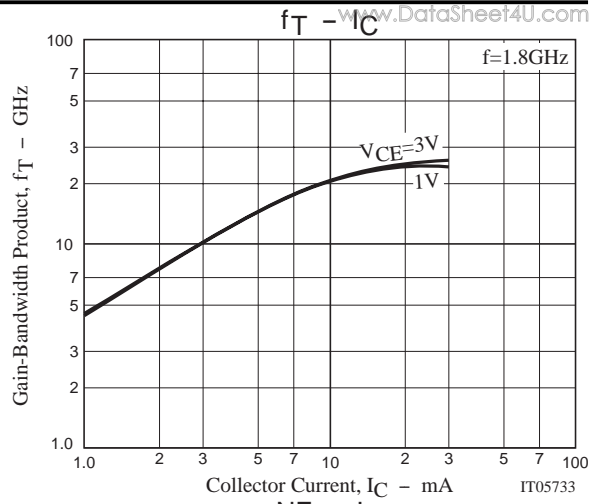
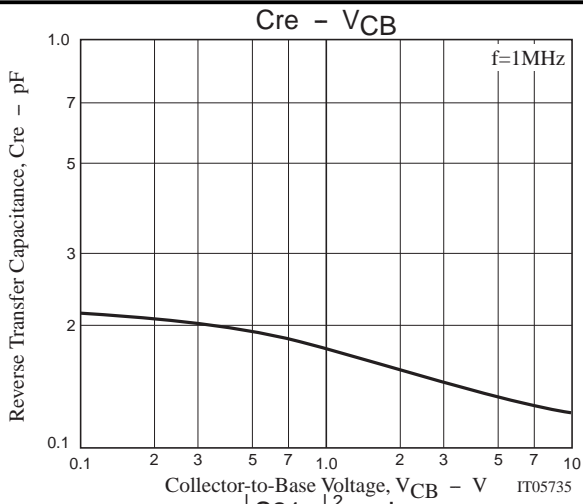
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^{21}$	$V_{CE}=1V, I_C=10mA, f=1.8GHz$		16		dB
	$ S_{21e} ^{22}$	$V_{CE}=2V, I_C=20mA, f=1.8GHz$	14	17		dB
Noise Figure	NF	$V_{CE}=2V, I_C=5mA, f=1.8GHz$		1.1	1.5	dB

Electrical Connection (Top view)



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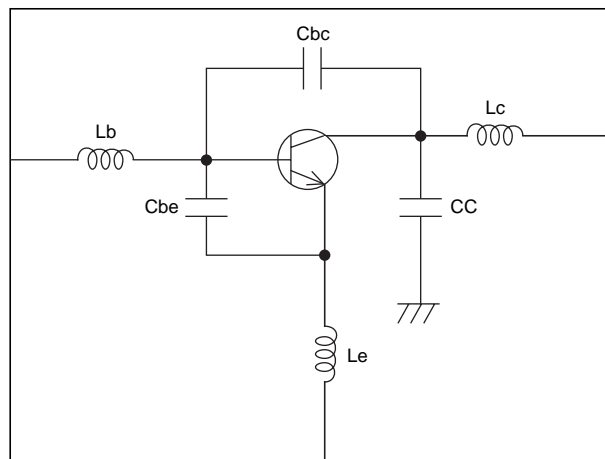


SPICE PARAMETERS

model : Gummel-Poon

Parameter	Value	Unit	Parameter	Value	Unit
IS	0.20045f	A	TF	6.7661p	S
BF	72.534		XTF	0.42199	
NF	1.2432		VTF	0.23794	V
VAF	28.383	V	ITF	1m	A
IKF	0.48731	A	PTF	0	deg
ISE	19.049f	A	CJC	234.53f	F
NE	2.0518		VJC	0.81969	V
BR	7.8287		MJC	0.30232	
NR	1.3325		XCJC	0.3	
VAR	19.705	V	TR	2.3249n	S
IKR	691.41m	A	FC	0.73234	
ISC	19.237a	A	CJS	0	F
NC	1.1724		VJS	0.75	V
RB	8.5757	Ω	MJS	0	
IRB	729.83μ	A	CC	100f	F
RBM	3.4849	Ω	Cbc	4f	F
RE	0.31111	Ω	Cbe	100f	F
RC	0.10105	Ω	Lb	0.6n	H
XTB	0		Lc	0.6n	H
EG	1.11	eV	Le	0.3n	H
XTI	3				
CJE	1.8063f	F			
VJE	0.8051	V			
MJE	0.46576				

SCHEMATIC



*Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production.

SBFP420B

S Parameters (Common emitter)

V_{CE}=1V, I_C=1mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.966	-13.8	3.618	168.7	0.024	81.3	0.993	-8.0
400	0.942	-27.6	3.566	158.3	0.047	73.4	0.967	-15.6
600	0.920	-40.3	3.360	147.9	0.069	64.7	0.936	-22.7
800	0.895	-52.8	3.223	138.6	0.087	57.2	0.897	-29.4
1000	0.874	-64.5	3.039	128.2	0.104	50.3	0.854	-35.4
1200	0.859	-76.4	2.894	120.0	0.117	43.7	0.812	-40.9
1400	0.825	-86.3	2.703	112.4	0.128	38.1	0.776	-45.8
1600	0.800	-95.7	2.536	105.1	0.136	32.4	0.742	-50.3
1800	0.765	-104.6	2.361	98.2	0.143	27.5	0.709	-54.6
2000	0.756	-114.3	2.266	91.8	0.148	22.9	0.681	-58.3
2200	0.734	-122.3	2.114	85.4	0.152	18.9	0.656	-62.0
2400	0.716	-130.2	1.988	80.1	0.155	15.0	0.633	-65.5
2600	0.693	-137.3	1.867	74.2	0.156	11.8	0.612	-68.7
2800	0.688	-144.9	1.777	69.2	0.157	8.4	0.594	-71.9
3000	0.679	-151.1	1.692	63.7	0.158	5.4	0.579	-75.0
3200	0.665	-157.9	1.611	58.7	0.157	2.9	0.565	-78.0
3400	0.654	-163.4	1.537	54.8	0.156	0.5	0.550	-81.1
3600	0.654	-169.1	1.480	50.4	0.156	-1.6	0.538	-84.1
3800	0.647	-174.6	1.411	45.6	0.155	-3.5	0.527	-87.1
4000	0.644	-180.0	1.358	42.0	0.152	-5.4	0.518	-90.1
4200	0.638	174.8	1.314	37.7	0.151	-7.0	0.509	-93.2
4400	0.633	169.3	1.258	33.7	0.149	-7.9	0.502	-96.5
4600	0.632	164.8	1.214	30.0	0.148	-9.2	0.496	-99.6
4800	0.630	159.4	1.173	25.8	0.146	-9.9	0.489	-102.8
5000	0.627	155.2	1.142	22.6	0.145	-10.3	0.484	-106.0
5200	0.618	150.9	1.108	18.5	0.143	-10.8	0.481	-109.1
5400	0.622	146.6	1.062	15.7	0.142	-11.1	0.477	-112.4
5600	0.624	142.0	1.032	11.5	0.141	-11.1	0.474	-115.6
5800	0.622	137.2	1.003	9.1	0.141	-11.2	0.471	-118.8
6000	0.625	132.4	0.977	5.1	0.141	-10.8	0.467	-121.9

SBFP420B

S Parameters (Common emitter)

VCE=1V, IC=5mA, ZO=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.797	-29.6	14.707	159.5	0.022	73.5	0.953	-16.5
400	0.745	-52.0	13.292	142.4	0.041	64.1	0.861	-30.5
600	0.690	-73.2	11.337	128.3	0.054	54.8	0.761	-41.6
800	0.635	-90.6	9.824	117.2	0.063	48.0	0.668	-50.2
1000	0.597	-106.2	8.447	106.7	0.070	43.9	0.592	-57.2
1200	0.569	-118.1	7.421	99.0	0.075	40.6	0.528	-62.8
1400	0.540	-128.5	6.557	92.5	0.080	38.1	0.482	-67.4
1600	0.530	-137.3	5.836	86.6	0.084	35.9	0.444	-71.6
1800	0.504	-146.0	5.243	81.4	0.088	34.3	0.411	-75.4
2000	0.506	-154.0	4.814	76.3	0.092	33.1	0.383	-78.7
2200	0.495	-161.0	4.376	71.4	0.096	32.3	0.362	-81.9
2400	0.490	-167.8	4.033	67.5	0.100	31.4	0.342	-85.0
2600	0.478	-173.7	3.721	63.2	0.104	30.6	0.325	-87.8
2800	0.485	-180.0	3.467	59.3	0.108	29.5	0.311	-90.4
3000	0.474	175.4	3.249	55.2	0.112	28.6	0.300	-93.2
3200	0.478	170.2	3.039	51.2	0.116	27.8	0.289	-95.9
3400	0.472	165.7	2.871	48.3	0.121	26.7	0.279	-98.7
3600	0.471	161.4	2.739	44.7	0.125	26.0	0.269	-101.7
3800	0.473	157.4	2.591	41.3	0.130	25.0	0.261	-104.5
4000	0.465	152.4	2.476	38.1	0.135	23.9	0.255	-107.5
4200	0.469	149.4	2.385	34.6	0.140	22.8	0.248	-110.6
4400	0.466	144.5	2.273	31.5	0.145	21.4	0.244	-114.0
4600	0.473	141.3	2.174	28.2	0.150	20.2	0.240	-117.0
4800	0.467	137.2	2.088	25.2	0.156	19.0	0.237	-120.3
5000	0.476	132.9	2.015	21.8	0.161	17.6	0.233	-123.4
5200	0.468	129.8	1.947	18.5	0.166	16.3	0.232	-126.7
5400	0.473	127.1	1.868	15.8	0.171	14.9	0.229	-129.8
5600	0.470	123.1	1.813	12.5	0.177	13.4	0.227	-132.9
5800	0.474	119.7	1.757	10.2	0.182	11.9	0.225	-136.1
6000	0.482	115.3	1.708	6.8	0.188	10.1	0.222	-138.9

SBFP420B

S Parameters (Common emitter)

V_{CE}=1V, I_C=10mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.662	-40.2	23.505	152.0	0.020	69.3	0.898	-23.5
400	0.591	-72.9	19.411	131.5	0.034	58.7	0.747	-40.8
600	0.536	-96.4	15.298	116.9	0.043	52.1	0.616	-52.5
800	0.499	-114.0	12.548	106.7	0.049	49.0	0.519	-60.8
1000	0.477	-128.9	10.407	97.3	0.055	47.7	0.447	-67.3
1200	0.463	-140.4	8.898	90.8	0.061	47.1	0.392	-72.4
1400	0.451	-147.9	7.738	85.0	0.066	45.7	0.354	-76.7
1600	0.442	-157.5	6.813	80.0	0.071	45.3	0.325	-80.9
1800	0.434	-164.1	6.069	75.6	0.076	44.5	0.299	-84.7
2000	0.444	-170.9	5.526	71.1	0.082	44.0	0.278	-88.2
2200	0.440	-177.2	5.004	66.9	0.087	43.2	0.262	-91.3
2400	0.434	177.4	4.586	63.5	0.093	42.3	0.247	-94.7
2600	0.432	170.5	4.236	59.6	0.099	41.4	0.235	-97.7
2800	0.439	167.3	3.931	56.2	0.105	39.9	0.224	-100.7
3000	0.435	163.2	3.673	52.6	0.111	38.8	0.215	-103.7
3200	0.434	159.3	3.426	49.0	0.117	37.8	0.207	-106.6
3400	0.434	154.4	3.237	46.1	0.124	36.2	0.199	-109.7
3600	0.431	151.6	3.079	42.8	0.129	34.9	0.193	-113.0
3800	0.431	147.8	2.911	39.6	0.136	33.0	0.188	-116.4
4000	0.436	143.0	2.777	36.7	0.142	31.6	0.182	-119.5
4200	0.433	139.9	2.673	33.4	0.149	30.0	0.178	-123.3
4400	0.437	136.9	2.543	30.6	0.155	28.6	0.175	-126.9
4600	0.442	133.1	2.432	27.3	0.161	26.6	0.174	-130.3
4800	0.437	128.9	2.332	24.4	0.167	24.7	0.171	-133.9
5000	0.442	125.6	2.249	21.5	0.174	23.0	0.169	-137.2
5200	0.436	123.6	2.167	18.3	0.180	21.2	0.168	-140.7
5400	0.443	120.5	2.080	15.6	0.187	19.2	0.167	-144.3
5600	0.442	117.0	2.018	12.5	0.193	17.4	0.166	-147.6
5800	0.445	113.0	1.957	10.3	0.199	15.4	0.164	-150.8
6000	0.454	110.1	1.897	6.9	0.206	13.3	0.163	-154.0

SBFP420B

S Parameters (Common emitter)

V_{CE}=1V, I_C=15mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.560	-51.1	28.841	147.1	0.019	69.4	0.855	-28.1
400	0.515	-87.8	22.378	125.3	0.030	60.5	0.669	-46.8
600	0.471	-111.0	16.951	111.3	0.037	54.4	0.534	-58.1
800	0.445	-128.2	13.565	101.8	0.044	51.6	0.442	-66.0
1000	0.436	-142.4	11.082	93.2	0.050	51.4	0.378	-72.0
1200	0.424	-152.4	9.392	87.1	0.055	51.0	0.330	-77.1
1400	0.422	-159.6	8.133	81.9	0.062	51.4	0.298	-81.5
1600	0.420	-167.3	7.132	77.4	0.068	50.5	0.274	-85.8
1800	0.415	-173.4	6.339	73.3	0.074	50.1	0.252	-89.8
2000	0.422	-178.7	5.757	69.0	0.080	49.2	0.234	-93.4
2200	0.423	175.7	5.206	65.0	0.086	48.1	0.221	-96.9
2400	0.423	170.7	4.768	61.8	0.093	46.8	0.209	-100.4
2600	0.417	165.8	4.389	58.3	0.100	46.0	0.199	-103.7
2800	0.427	161.3	4.080	54.9	0.105	44.1	0.189	-106.6
3000	0.428	158.7	3.807	51.4	0.112	42.7	0.183	-110.2
3200	0.426	153.2	3.554	47.9	0.119	41.4	0.176	-113.2
3400	0.423	149.5	3.349	45.3	0.126	39.5	0.169	-116.7
3600	0.424	146.9	3.188	42.1	0.133	38.0	0.164	-120.3
3800	0.420	143.2	3.017	39.0	0.140	36.3	0.159	-124.0
4000	0.426	139.2	2.884	36.1	0.146	34.4	0.156	-127.6
4200	0.428	135.7	2.756	32.9	0.153	32.5	0.152	-131.3
4400	0.429	132.5	2.626	30.1	0.159	30.6	0.151	-135.3
4600	0.430	129.0	2.518	27.1	0.167	28.5	0.149	-139.0
4800	0.426	126.0	2.408	24.2	0.173	26.7	0.148	-142.8
5000	0.435	123.1	2.331	21.2	0.180	24.8	0.147	-146.4
5200	0.431	120.2	2.236	18.1	0.186	22.8	0.147	-149.8
5400	0.437	117.9	2.148	15.7	0.193	20.6	0.147	-153.5
5600	0.431	113.9	2.080	12.6	0.199	18.6	0.146	-156.7
5800	0.440	111.1	2.022	10.1	0.206	16.7	0.145	-160.3
6000	0.442	107.4	1.966	7.0	0.213	14.6	0.144	-163.3

SBFP420B

S Parameters (Common emitter)

V_{CE}=1V, I_C=20mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.490	-60.8	32.300	143.6	0.017	69.2	0.815	-31.4
400	0.470	-98.5	23.945	121.3	0.028	58.2	0.614	-50.7
600	0.435	-122.3	17.681	107.8	0.035	56.9	0.479	-61.5
800	0.420	-138.9	13.993	98.9	0.041	55.3	0.393	-69.0
1000	0.417	-150.2	11.344	90.8	0.047	55.0	0.336	-75.1
1200	0.412	-160.0	9.570	85.0	0.053	55.0	0.293	-80.1
1400	0.417	-166.3	8.269	80.1	0.059	54.3	0.266	-84.5
1600	0.412	-172.3	7.233	75.8	0.066	53.9	0.244	-88.9
1800	0.410	-178.8	6.424	71.8	0.073	52.7	0.225	-93.1
2000	0.417	176.8	5.824	67.9	0.079	51.8	0.210	-97.0
2200	0.419	171.5	5.272	63.9	0.086	50.8	0.199	-100.6
2400	0.418	166.5	4.825	60.8	0.092	49.2	0.188	-104.2
2600	0.421	161.5	4.442	57.3	0.100	48.3	0.178	-107.8
2800	0.425	157.3	4.124	54.1	0.107	46.6	0.171	-111.1
3000	0.425	154.8	3.844	50.8	0.113	44.9	0.165	-114.3
3200	0.425	151.5	3.585	47.3	0.121	43.3	0.159	-117.5
3400	0.424	147.2	3.386	44.7	0.127	41.5	0.154	-121.5
3600	0.424	144.1	3.218	41.5	0.135	39.7	0.149	-125.3
3800	0.420	139.7	3.043	38.5	0.141	37.6	0.145	-128.9
4000	0.431	136.5	2.903	35.6	0.149	35.7	0.142	-132.8
4200	0.430	133.8	2.788	32.5	0.155	33.8	0.139	-137.1
4400	0.428	130.6	2.650	29.8	0.162	31.8	0.139	-141.3
4600	0.427	128.0	2.536	26.8	0.169	29.8	0.138	-144.9
4800	0.429	123.3	2.433	23.8	0.176	27.9	0.137	-148.6
5000	0.436	120.6	2.345	21.0	0.183	25.7	0.136	-152.3
5200	0.431	118.4	2.256	17.7	0.189	23.7	0.137	-155.8
5400	0.438	115.7	2.162	15.2	0.196	21.5	0.138	-159.5
5600	0.437	112.6	2.102	12.3	0.203	19.4	0.137	-162.8
5800	0.436	109.0	2.036	10.0	0.210	17.3	0.136	-166.3
6000	0.444	105.5	1.977	6.9	0.216	15.0	0.135	-169.7

SBFP420B

S Parameters (Common emitter)

VCE=3V, IC=1mA, ZO=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.972	-13.9	3.620	169.4	0.018	80.7	0.994	-6.5
400	0.940	-24.9	3.580	160.1	0.036	74.9	0.977	-12.8
600	0.940	-37.7	3.406	150.2	0.052	67.9	0.956	-18.8
800	0.910	-49.2	3.305	141.6	0.067	61.4	0.928	-24.5
1000	0.888	-60.1	3.131	131.8	0.080	53.8	0.896	-29.8
1200	0.864	-71.6	3.016	123.8	0.091	47.9	0.861	-34.8
1400	0.843	-81.1	2.837	116.5	0.100	42.3	0.830	-39.3
1600	0.817	-90.9	2.682	109.2	0.108	36.9	0.801	-43.5
1800	0.785	-99.9	2.510	102.4	0.113	32.6	0.772	-47.4
2000	0.769	-108.9	2.412	96.1	0.119	27.9	0.747	-51.0
2200	0.747	-117.3	2.256	89.7	0.122	23.9	0.724	-54.4
2400	0.727	-124.8	2.135	84.4	0.125	20.2	0.702	-57.7
2600	0.702	-132.4	2.008	78.4	0.126	16.8	0.682	-60.7
2800	0.701	-139.7	1.918	73.1	0.127	13.8	0.665	-63.7
3000	0.684	-146.3	1.832	68.1	0.128	10.8	0.650	-66.6
3200	0.673	-152.5	1.738	62.9	0.128	8.4	0.635	-69.4
3400	0.656	-158.8	1.659	58.9	0.128	6.1	0.621	-72.2
3600	0.654	-164.8	1.602	54.5	0.127	4.0	0.607	-75.0
3800	0.644	-170.4	1.523	49.9	0.126	2.2	0.597	-77.8
4000	0.636	-175.4	1.463	46.0	0.125	0.6	0.587	-80.5
4200	0.635	179.0	1.419	42.2	0.124	-0.5	0.577	-83.4
4400	0.628	173.7	1.361	38.1	0.122	-1.6	0.570	-86.4
4600	0.628	168.2	1.305	34.0	0.122	-2.5	0.562	-89.2
4800	0.619	163.2	1.260	30.0	0.120	-2.8	0.555	-92.2
5000	0.622	158.1	1.225	26.6	0.119	-3.2	0.550	-95.1
5200	0.607	154.4	1.189	22.8	0.119	-3.3	0.546	-98.0
5400	0.615	149.4	1.141	19.4	0.118	-3.5	0.542	-101.0
5600	0.612	144.9	1.118	15.7	0.119	-2.8	0.539	-104.0
5800	0.613	139.6	1.077	12.9	0.119	-2.6	0.534	-106.9
6000	0.615	135.3	1.047	9.6	0.119	-2.1	0.531	-109.9

SBFP420B

S Parameters (Common emitter)

V_{CE}=3V, I_C=5mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.808	-24.0	14.851	161.3	0.016	73.3	0.966	-12.6
400	0.772	-46.1	13.683	145.9	0.031	67.7	0.897	-23.5
600	0.706	-65.1	11.933	132.1	0.041	59.1	0.818	-32.4
800	0.655	-81.2	10.529	121.3	0.049	53.3	0.742	-39.5
1000	0.601	-95.2	9.205	110.6	0.056	48.6	0.675	-45.1
1200	0.573	-108.7	8.160	102.7	0.060	44.3	0.616	-49.8
1400	0.540	-119.1	7.255	95.9	0.065	41.8	0.573	-53.6
1600	0.519	-128.2	6.478	89.9	0.069	40.6	0.536	-57.2
1800	0.500	-137.5	5.835	84.4	0.073	39.0	0.503	-60.2
2000	0.489	-145.4	5.382	79.3	0.076	37.7	0.477	-62.9
2200	0.475	-153.2	4.898	74.2	0.080	36.7	0.456	-65.5
2400	0.460	-159.6	4.509	70.3	0.083	35.8	0.435	-68.0
2600	0.454	-166.9	4.159	65.7	0.087	34.8	0.419	-70.3
2800	0.457	-172.4	3.895	61.9	0.090	34.5	0.405	-72.5
3000	0.445	-177.6	3.639	57.9	0.094	33.6	0.393	-74.8
3200	0.442	176.9	3.410	53.9	0.098	32.7	0.381	-77.0
3400	0.435	172.2	3.216	50.8	0.102	31.9	0.370	-79.3
3600	0.438	167.6	3.066	47.4	0.106	30.8	0.360	-81.5
3800	0.432	163.3	2.900	43.8	0.110	30.1	0.351	-84.0
4000	0.430	158.6	2.771	40.7	0.115	28.8	0.344	-86.4
4200	0.432	154.2	2.663	37.2	0.119	27.5	0.336	-89.0
4400	0.430	150.0	2.529	34.1	0.123	26.8	0.330	-91.8
4600	0.433	146.4	2.420	30.8	0.129	25.7	0.325	-94.4
4800	0.432	142.1	2.319	27.6	0.133	24.6	0.321	-97.1
5000	0.436	137.9	2.244	24.6	0.138	23.1	0.316	-99.8
5200	0.430	135.1	2.166	21.4	0.143	21.7	0.314	-102.5
5400	0.441	131.7	2.073	18.7	0.147	20.4	0.310	-105.4
5600	0.439	128.2	2.017	15.5	0.153	19.2	0.308	-108.1
5800	0.437	123.6	1.944	12.9	0.158	17.5	0.305	-110.7
6000	0.444	120.0	1.890	9.5	0.163	16.0	0.302	-113.3

SBFP420B

S Parameters (Common emitter)

V_{CE}=3V, I_C=10mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.671	-34.9	23.953	154.7	0.015	70.8	0.927	-17.4
400	0.608	-62.7	20.493	135.6	0.025	63.8	0.808	-30.4
600	0.540	-84.5	16.604	121.1	0.034	56.5	0.699	-39.4
800	0.488	-102.0	13.870	110.6	0.040	52.7	0.610	-45.5
1000	0.459	-117.1	11.637	100.7	0.045	51.7	0.544	-50.2
1200	0.440	-128.2	10.011	93.9	0.049	50.6	0.492	-53.9
1400	0.423	-138.1	8.747	88.0	0.054	50.0	0.455	-57.1
1600	0.407	-147.4	7.719	82.8	0.058	49.1	0.425	-60.1
1800	0.397	-154.8	6.880	78.1	0.063	48.9	0.399	-62.8
2000	0.400	-162.1	6.279	73.6	0.068	48.1	0.378	-65.1
2200	0.393	-168.3	5.686	69.2	0.073	47.2	0.362	-67.4
2400	0.390	-175.1	5.209	65.7	0.078	46.6	0.346	-69.8
2600	0.383	178.6	4.807	61.8	0.082	45.0	0.333	-71.7
2800	0.390	174.6	4.465	58.3	0.088	44.3	0.323	-73.7
3000	0.386	170.3	4.165	54.7	0.093	43.1	0.313	-75.9
3200	0.385	166.0	3.891	51.1	0.099	42.0	0.304	-78.1
3400	0.383	161.5	3.664	48.3	0.104	40.6	0.295	-80.2
3600	0.384	157.5	3.487	45.0	0.110	39.2	0.286	-82.5
3800	0.380	152.6	3.299	41.8	0.116	37.8	0.279	-84.9
4000	0.380	148.3	3.145	38.9	0.121	36.1	0.272	-87.2
4200	0.386	144.6	3.014	35.8	0.126	34.9	0.265	-90.1
4400	0.387	141.5	2.865	32.9	0.132	33.1	0.262	-92.9
4600	0.384	137.9	2.740	29.6	0.137	31.4	0.257	-95.6
4800	0.381	133.8	2.623	26.8	0.143	29.8	0.253	-98.6
5000	0.392	130.7	2.532	23.9	0.149	28.0	0.250	-101.3
5200	0.383	127.0	2.443	20.7	0.154	26.2	0.249	-104.1
5400	0.391	125.1	2.337	18.2	0.159	24.3	0.247	-107.1
5600	0.395	121.2	2.268	15.1	0.166	22.8	0.244	-109.8
5800	0.394	117.2	2.191	12.7	0.172	20.7	0.242	-112.2
6000	0.399	113.7	2.134	9.4	0.178	19.0	0.240	-114.8

SBFP420B

S Parameters (Common emitter)

$V_{CE}=3V, I_C=15mA, Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.581	-41.7	29.624	150.5	0.014	69.8	0.897	-20.2
400	0.512	-73.8	24.021	129.9	0.023	62.9	0.749	-33.9
600	0.458	-96.9	18.679	115.5	0.030	58.0	0.632	-42.0
800	0.417	-114.8	15.225	105.6	0.035	56.8	0.546	-47.2
1000	0.393	-129.8	12.576	96.5	0.041	55.6	0.485	-51.2
1200	0.389	-139.2	10.715	90.1	0.045	55.1	0.438	-54.4
1400	0.374	-148.9	9.291	84.6	0.050	54.7	0.407	-57.2
1600	0.373	-156.6	8.161	79.8	0.055	54.2	0.382	-59.9
1800	0.366	-163.6	7.265	75.5	0.061	53.5	0.359	-62.5
2000	0.371	-169.8	6.608	71.3	0.066	53.3	0.340	-64.7
2200	0.368	-175.8	5.971	67.3	0.071	51.8	0.327	-66.9
2400	0.367	178.5	5.468	63.9	0.077	50.8	0.313	-69.3
2600	0.362	172.4	5.033	60.2	0.083	49.9	0.302	-71.3
2800	0.370	168.3	4.669	56.8	0.089	48.5	0.292	-73.1
3000	0.367	164.2	4.363	53.5	0.094	47.0	0.284	-75.5
3200	0.367	160.4	4.069	50.0	0.100	45.7	0.276	-77.6
3400	0.363	155.4	3.832	47.3	0.106	44.0	0.268	-79.8
3600	0.365	152.2	3.642	44.2	0.112	42.5	0.260	-82.0
3800	0.365	148.7	3.443	41.0	0.117	40.9	0.254	-84.5
4000	0.374	144.9	3.278	38.3	0.123	38.7	0.249	-86.9
4200	0.369	140.9	3.145	35.1	0.129	37.1	0.243	-89.7
4400	0.371	137.3	2.990	32.4	0.135	35.4	0.239	-92.6
4600	0.370	133.7	2.860	29.2	0.141	33.4	0.234	-95.4
4800	0.371	130.2	2.738	26.3	0.146	31.7	0.232	-98.2
5000	0.375	126.8	2.640	23.6	0.153	29.7	0.228	-101.1
5200	0.370	124.7	2.550	20.4	0.158	28.0	0.227	-104.0
5400	0.379	122.2	2.439	18.0	0.164	25.9	0.224	-106.9
5600	0.379	118.8	2.362	14.8	0.171	24.1	0.223	-109.5
5800	0.384	114.4	2.289	12.7	0.177	21.9	0.220	-112.2
6000	0.392	111.5	2.217	9.5	0.183	20.0	0.218	-114.8

SBFP420B

S Parameters (Common emitter)

V_{CE}=3V, I_C=20mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.492	-48.5	33.460	147.5	0.013	67.4	0.875	-22.2
400	0.457	-82.8	26.097	126.1	0.022	62.3	0.710	-35.7
600	0.405	-106.7	19.813	112.1	0.028	59.5	0.590	-43.1
800	0.387	-124.4	15.904	102.6	0.032	58.8	0.509	-47.7
1000	0.367	-138.1	13.013	94.0	0.038	59.3	0.453	-51.1
1200	0.365	-146.8	11.041	88.0	0.043	58.6	0.410	-54.0
1400	0.356	-155.4	9.556	82.8	0.048	57.8	0.382	-56.6
1600	0.353	-163.0	8.367	78.2	0.054	58.0	0.359	-59.2
1800	0.353	-169.6	7.434	74.0	0.060	56.7	0.338	-61.6
2000	0.353	-175.3	6.754	70.1	0.065	56.1	0.322	-63.8
2200	0.357	179.5	6.109	66.1	0.071	54.8	0.309	-66.0
2400	0.351	173.9	5.585	62.9	0.077	53.4	0.297	-68.3
2600	0.356	167.8	5.141	59.2	0.083	52.5	0.287	-70.4
2800	0.361	164.0	4.777	56.0	0.088	50.5	0.279	-72.3
3000	0.356	161.6	4.444	52.8	0.094	48.7	0.271	-74.5
3200	0.359	156.9	4.149	49.3	0.100	47.4	0.263	-76.7
3400	0.355	152.5	3.904	46.7	0.106	45.9	0.256	-78.8
3600	0.352	149.2	3.711	43.8	0.112	44.4	0.248	-80.8
3800	0.357	145.4	3.512	40.6	0.118	42.2	0.243	-83.6
4000	0.359	142.3	3.345	37.8	0.125	40.6	0.238	-86.0
4200	0.356	137.9	3.209	34.7	0.130	38.5	0.232	-88.8
4400	0.369	134.8	3.042	31.9	0.136	36.6	0.228	-91.8
4600	0.362	131.5	2.913	28.9	0.142	35.0	0.225	-94.4
4800	0.366	128.0	2.794	26.1	0.148	33.0	0.222	-97.4
5000	0.367	124.8	2.689	23.4	0.155	31.0	0.219	-100.3
5200	0.365	122.3	2.595	20.2	0.161	28.9	0.218	-103.1
5400	0.373	119.9	2.482	18.0	0.167	26.8	0.215	-106.1
5600	0.373	116.8	2.408	14.7	0.172	24.9	0.213	-108.7
5800	0.374	112.2	2.326	12.5	0.178	22.9	0.210	-111.5
6000	0.386	109.7	2.262	9.4	0.184	20.9	0.208	-113.9

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