



SBFP540B

UHF to C Band Low Noise Amplifier, Oscillation Applications

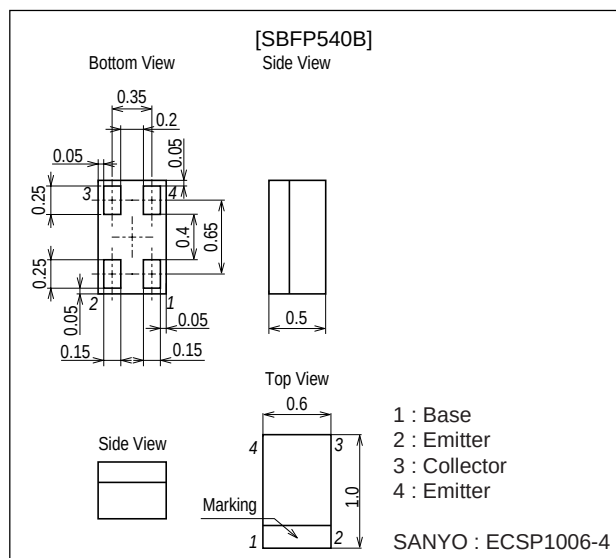
Features

- Low noise : NF=0.9dB typ (f=1.8GHz).
- High cut-off frequency : $f_T=20\text{GHz}$ typ ($V_{CE}=1\text{V}$).
: $f_T=29\text{GHz}$ typ ($V_{CE}=4\text{V}$).
- Low voltage operation.
- High Gain : $|S_{21e}|^2=18.5\text{dB}$ 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}		14	V
Collector-to-Emitter Voltage	V_{CEO}		4.5	V
Emitter-to-Base Voltage	V_{EBO}		1	V
Collector Current	I_C		80	mA
Collector Dissipation	P_C		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}	$V_{EB}=1\text{V}, I_C=0$			70	μA
DC Current Gain	h_{FE}	$V_{CE}=3.5\text{V}, I_C=20\text{mA}$	50		200	
Gain-Bandwidth Product	f_{T1}	$V_{CE}=1\text{V}, I_C=10\text{mA}$		20		GHz
	f_{T2}	$V_{CE}=4\text{V}, I_C=50\text{mA}$	22	29		GHz
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1\text{V}, f=1\text{MHz}$		0.15	0.25	pF

Marking : AF

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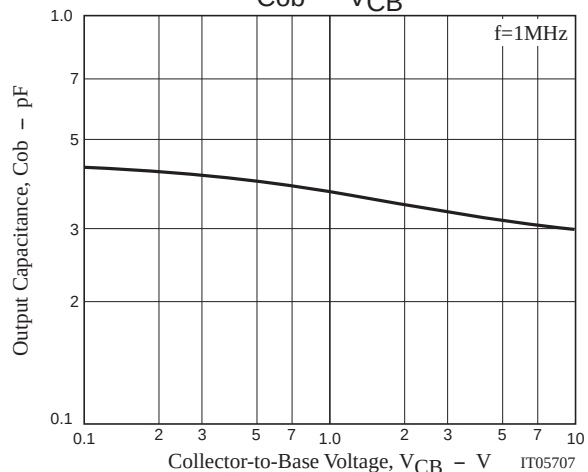
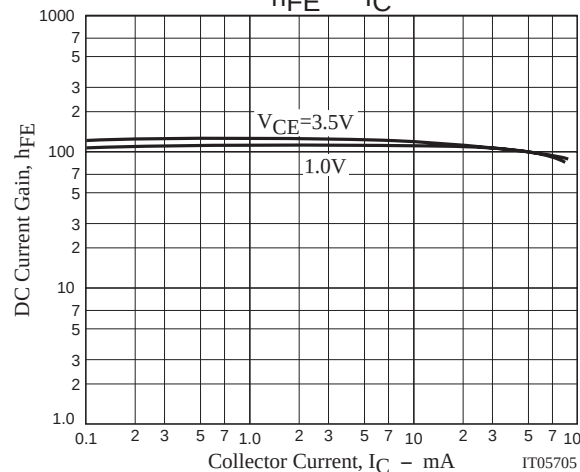
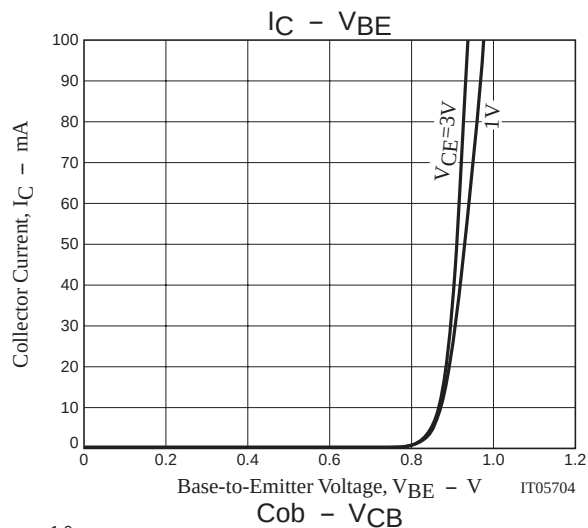
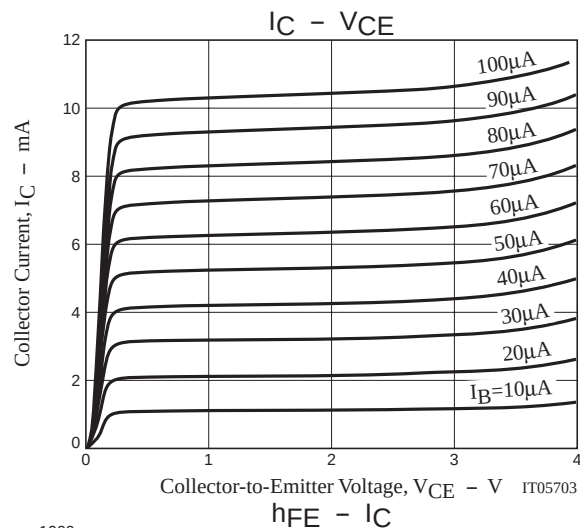
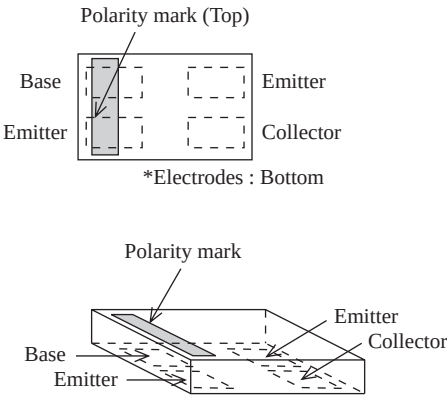
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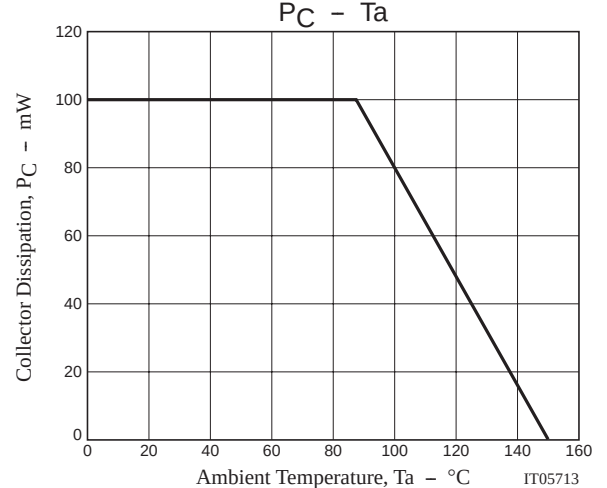
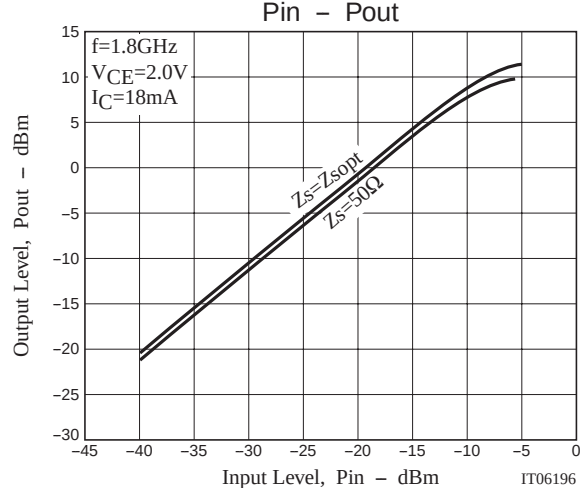
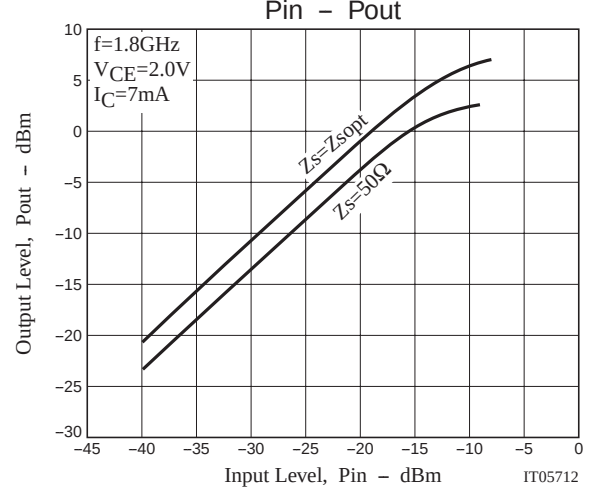
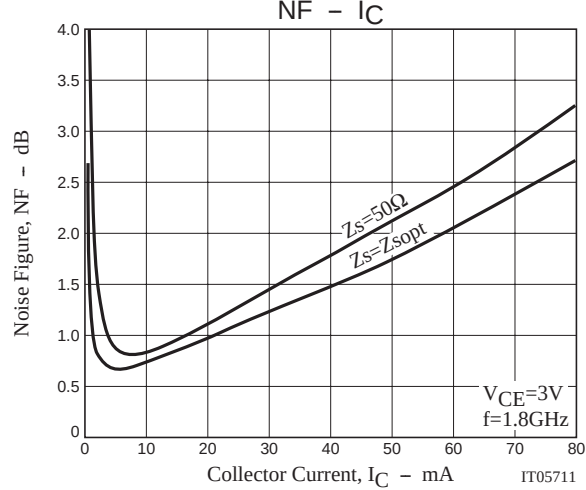
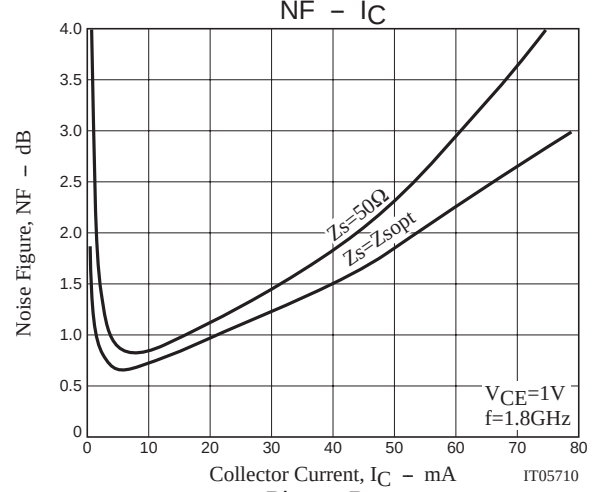
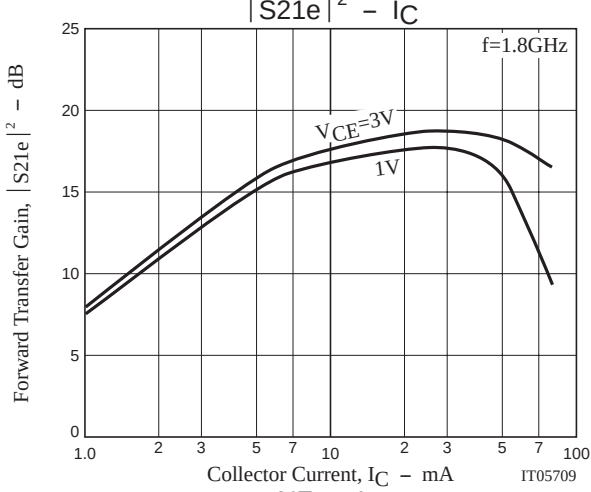
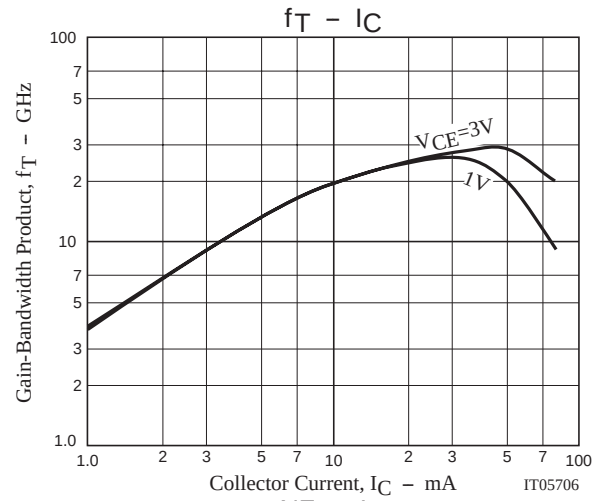
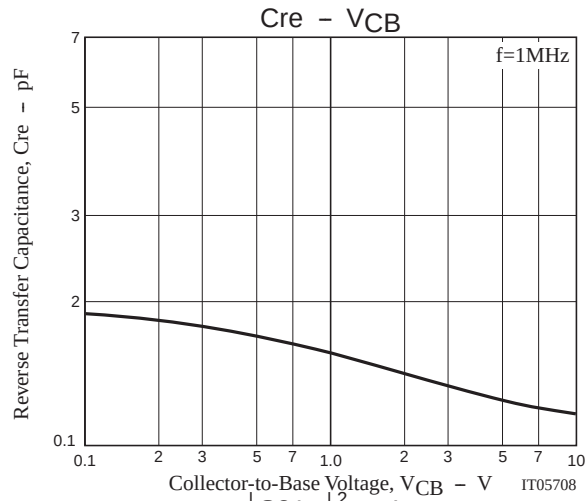
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^{21}$	$V_{CE}=1V, I_C=10mA, f=1.8GHz$		17.5		dB
	$ S_{21e} ^{22}$	$V_{CE}=2V, I_C=20mA, f=1.8GHz$	16	18.5		dB
Noise Figure	NF	$V_{CE}=2V, I_C=5mA, f=1.8GHz$		0.9	1.3	dB

Electrical Connection (Top view)



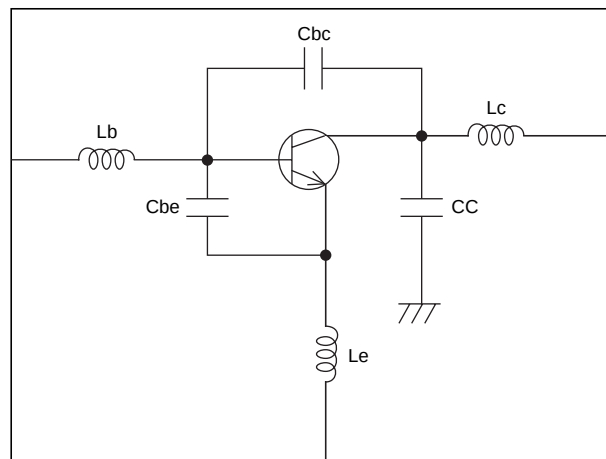
SBFP540B



SPICE PARAMETERS

model : Gummel-Poon

Parameter	Value	Unit	Parameter	Value	Unit
IS	82.84a	A	TF	6.76p	S
BF	107.5		XTF	0.4219	
NF	1		VTF	0.23794	V
VAF	28.383	V	ITF	1m	A
IKF	0.48731	A	PTF	0	deg
ISE	11.15p	A	CJC	234f	F
NE	3.19		VJC	0.81969	V
BR	5.5		MJC	0.30232	
NR	1		XCJC	0.3	
VAR	19.705	V	TR	2.324n	S
IKR	0.02	A	FC	0.73234	
ISC	19.237a	A	CJS	0	F
NC	1.172		VJS	0.75	V
RB	1.3	Ω	MJS	0	
IRB	729.83 μ	A	CC	100f	F
RBM	5.4	Ω	Cbc	4f	F
RE	0.31111	Ω	Cbe	100f	F
RC	4	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.

SBFP540B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=1mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.964	-14.7	3.684	168.7	0.022	79.6	0.996	-7.1
400	0.940	-28.8	3.623	158.6	0.040	73.5	0.974	-13.8
600	0.942	-42.8	3.422	148.2	0.060	66.0	0.948	-20.3
800	0.920	-55.7	3.276	139.0	0.077	58.0	0.914	-26.4
1000	0.892	-67.7	3.080	128.9	0.092	50.9	0.878	-31.8
1200	0.875	-80.4	2.934	120.6	0.103	43.5	0.840	-36.9
1400	0.854	-90.3	2.750	113.1	0.114	37.0	0.807	-41.4
1600	0.827	-100.0	2.566	105.9	0.121	31.2	0.776	-45.7
1800	0.799	-109.2	2.392	99.2	0.126	25.6	0.745	-49.5
2000	0.797	-118.1	2.282	93.0	0.131	20.6	0.719	-53.0
2200	0.769	-126.7	2.125	86.7	0.134	16.1	0.697	-56.4
2400	0.756	-134.2	2.000	81.5	0.134	11.7	0.676	-59.7
2600	0.736	-141.4	1.876	75.6	0.135	8.2	0.657	-62.7
2800	0.731	-148.1	1.780	70.7	0.135	4.6	0.641	-65.7
3000	0.723	-154.5	1.697	65.5	0.133	1.4	0.628	-68.7
3200	0.719	-160.9	1.605	60.5	0.131	-1.2	0.615	-71.6
3400	0.708	-166.6	1.528	56.7	0.130	-3.5	0.603	-74.5
3600	0.705	-172.3	1.472	52.3	0.127	-6.3	0.592	-77.6
3800	0.697	-176.9	1.407	47.8	0.125	-7.8	0.584	-80.5
4000	0.699	177.5	1.349	44.3	0.121	-9.9	0.575	-83.5
4200	0.693	173.0	1.308	40.2	0.118	-11.0	0.568	-86.6
4400	0.697	167.8	1.252	36.3	0.116	-11.8	0.561	-89.7
4600	0.690	162.4	1.197	32.3	0.112	-12.6	0.556	-92.8
4800	0.686	158.3	1.155	28.7	0.110	-12.7	0.550	-96.0
5000	0.683	153.9	1.122	25.2	0.107	-12.4	0.544	-99.3
5200	0.679	149.7	1.086	21.4	0.104	-12.0	0.542	-102.4
5400	0.680	145.7	1.043	18.1	0.102	-11.7	0.537	-105.7
5600	0.685	141.5	1.015	14.7	0.101	-10.4	0.534	-109.0
5800	0.678	137.0	0.984	12.1	0.100	-8.9	0.530	-112.3
6000	0.688	132.4	0.955	8.2	0.100	-7.4	0.525	-115.6

SBFP540B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=5mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.857	-26.2	15.222	161.2	0.021	79.0	0.965	-14.4
400	0.811	-48.9	13.999	145.1	0.037	65.9	0.893	-27.2
600	0.749	-69.3	12.143	131.2	0.049	56.8	0.806	-37.8
800	0.704	-86.5	10.658	120.1	0.058	49.9	0.719	-46.5
1000	0.660	-101.1	9.232	109.4	0.065	44.4	0.641	-53.4
1200	0.620	-114.5	8.149	101.6	0.071	40.1	0.574	-59.0
1400	0.594	-124.6	7.213	95.0	0.074	36.3	0.523	-63.7
1600	0.575	-134.4	6.429	89.1	0.078	33.8	0.480	-67.5
1800	0.551	-142.7	5.767	83.9	0.081	32.1	0.443	-71.0
2000	0.546	-150.2	5.313	79.0	0.084	30.2	0.412	-74.1
2200	0.536	-157.7	4.829	74.2	0.086	29.2	0.388	-76.9
2400	0.520	-164.1	4.441	70.3	0.089	27.8	0.365	-79.7
2600	0.514	-170.4	4.104	66.1	0.092	26.8	0.346	-82.0
2800	0.510	-175.9	3.834	62.3	0.094	26.6	0.332	-84.4
3000	0.509	179.9	3.598	58.4	0.097	25.2	0.319	-87.0
3200	0.506	175.2	3.371	54.5	0.100	25.1	0.309	-89.4
3400	0.499	170.2	3.180	51.5	0.103	24.3	0.298	-91.9
3600	0.498	165.8	3.035	48.1	0.107	23.6	0.289	-94.3
3800	0.495	162.0	2.870	44.6	0.110	23.1	0.282	-96.9
4000	0.498	157.3	2.748	41.6	0.113	22.2	0.276	-99.4
4200	0.495	153.8	2.640	38.2	0.117	21.4	0.270	-102.1
4400	0.493	150.0	2.516	35.2	0.121	20.5	0.266	-105.1
4600	0.495	145.8	2.406	31.8	0.125	19.5	0.261	-107.8
4800	0.493	142.3	2.310	28.7	0.129	18.9	0.257	-110.7
5000	0.497	137.9	2.228	25.7	0.134	17.7	0.252	-113.5
5200	0.494	135.3	2.153	22.3	0.137	16.7	0.250	-116.5
5400	0.499	131.8	2.059	19.6	0.142	15.7	0.246	-119.7
5600	0.492	128.3	2.004	16.4	0.147	14.6	0.243	-122.8
5800	0.496	124.8	1.937	13.9	0.151	13.1	0.240	-126.0
6000	0.506	121.2	1.878	10.6	0.156	12.0	0.237	-129.0

SBFP540B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=10mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.724	-36.4	24.978	154.7	0.018	75.1	0.925	-20.6
400	0.673	-65.8	21.340	135.1	0.032	62.9	0.798	-37.3
600	0.606	-88.8	17.205	120.2	0.041	54.6	0.676	-49.4
800	0.559	-106.5	14.271	109.6	0.047	49.8	0.574	-58.3
1000	0.522	-120.9	11.886	99.9	0.052	46.2	0.496	-65.2
1200	0.506	-133.3	10.180	93.0	0.056	44.6	0.432	-70.6
1400	0.481	-142.4	8.864	87.4	0.061	43.0	0.387	-75.1
1600	0.468	-150.9	7.798	82.5	0.065	42.6	0.351	-79.1
1800	0.459	-159.3	6.941	78.1	0.069	42.0	0.319	-82.8
2000	0.463	-165.2	6.321	73.7	0.074	41.1	0.293	-85.7
2200	0.454	-171.5	5.727	69.6	0.078	40.2	0.274	-88.7
2400	0.451	-177.2	5.250	66.3	0.083	39.5	0.255	-91.8
2600	0.444	177.6	4.838	62.6	0.088	39.1	0.241	-94.4
2800	0.447	172.4	4.506	59.3	0.091	38.1	0.228	-97.0
3000	0.440	169.1	4.205	55.8	0.097	37.1	0.219	-99.5
3200	0.443	164.8	3.929	52.2	0.102	35.9	0.211	-102.1
3400	0.438	160.9	3.711	49.5	0.107	35.1	0.202	-104.9
3600	0.440	157.2	3.535	46.4	0.112	33.7	0.195	-107.6
3800	0.431	153.2	3.341	43.2	0.117	32.2	0.190	-110.3
4000	0.438	149.1	3.190	40.4	0.123	31.2	0.185	-112.9
4200	0.437	145.4	3.063	37.2	0.127	29.7	0.180	-116.2
4400	0.438	142.3	2.912	34.4	0.133	28.3	0.177	-119.3
4600	0.443	139.2	2.788	31.3	0.138	26.8	0.173	-122.1
4800	0.438	135.5	2.681	28.4	0.144	25.2	0.170	-125.2
5000	0.442	132.1	2.577	25.5	0.149	23.5	0.166	-128.2
5200	0.439	129.3	2.485	22.3	0.155	21.8	0.164	-131.5
5400	0.443	126.2	2.380	20.0	0.160	20.1	0.162	-135.2
5600	0.440	123.2	2.312	16.8	0.165	18.4	0.160	-138.6
5800	0.448	119.7	2.233	14.5	0.171	16.7	0.158	-142.1
6000	0.449	115.9	2.170	11.3	0.177	14.8	0.156	-145.5

SBFP540B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=20mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.587	-51.2	35.662	147.2	0.015	78.8	0.861	-28.1
400	0.520	-86.8	27.656	125.2	0.026	60.1	0.680	-47.3
600	0.474	-110.1	20.843	111.0	0.033	56.2	0.544	-59.5
800	0.454	-127.6	16.603	101.4	0.038	54.9	0.448	-68.2
1000	0.437	-140.1	13.485	92.9	0.043	53.2	0.380	-74.7
1200	0.428	-150.4	11.364	87.2	0.049	53.1	0.328	-80.4
1400	0.416	-158.3	9.812	82.3	0.055	52.2	0.291	-84.9
1600	0.416	-165.4	8.559	78.0	0.060	51.7	0.262	-89.3
1800	0.414	-171.8	7.596	74.2	0.065	50.5	0.239	-93.3
2000	0.415	-176.6	6.892	70.4	0.071	50.4	0.217	-97.1
2200	0.414	177.9	6.243	66.7	0.077	49.1	0.202	-100.5
2400	0.409	172.5	5.704	63.6	0.082	47.9	0.187	-104.2
2600	0.409	167.2	5.250	60.3	0.088	47.0	0.176	-107.5
2800	0.416	164.1	4.877	57.2	0.094	45.4	0.167	-110.6
3000	0.413	160.6	4.550	54.0	0.099	43.9	0.160	-113.6
3200	0.410	157.2	4.245	50.7	0.105	42.8	0.154	-116.8
3400	0.411	152.7	4.009	48.2	0.112	40.9	0.148	-120.0
3600	0.412	151.1	3.803	45.1	0.118	39.3	0.142	-123.2
3800	0.408	146.3	3.604	42.3	0.124	37.5	0.139	-126.8
4000	0.408	142.8	3.443	39.5	0.130	35.7	0.136	-129.8
4200	0.411	139.2	3.312	36.5	0.136	34.0	0.132	-133.1
4400	0.412	136.4	3.140	33.9	0.142	32.3	0.130	-136.7
4600	0.410	133.1	3.011	30.7	0.148	30.3	0.128	-140.0
4800	0.410	130.0	2.886	28.1	0.153	28.3	0.126	-143.7
5000	0.423	126.8	2.777	25.1	0.160	26.4	0.124	-147.2
5200	0.414	124.2	2.678	22.2	0.165	24.3	0.122	-150.7
5400	0.419	121.7	2.560	19.9	0.172	22.3	0.122	-154.9
5600	0.423	118.9	2.485	16.9	0.177	20.5	0.121	-158.6
5800	0.422	115.1	2.407	14.6	0.183	18.4	0.120	-163.0
6000	0.428	112.1	2.333	11.5	0.190	16.4	0.119	-166.5

SBFP540B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=30mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.480	-60.3	40.722	142.7	0.015	62.6	0.813	-32.3
400	0.463	-100.4	29.859	120.2	0.024	59.7	0.609	-52.3
600	0.428	-124.7	21.825	106.6	0.030	58.6	0.477	-64.0
800	0.419	-139.6	17.098	97.8	0.035	57.8	0.388	-72.3
1000	0.410	-151.7	13.775	90.0	0.041	57.6	0.328	-78.9
1200	0.415	-158.9	11.535	84.7	0.047	56.5	0.283	-84.5
1400	0.403	-166.8	9.938	80.1	0.053	56.3	0.251	-89.3
1600	0.402	-173.2	8.659	76.1	0.058	55.7	0.227	-93.9
1800	0.404	-178.9	7.684	72.5	0.064	54.3	0.206	-98.2
2000	0.410	177.5	6.962	68.8	0.070	54.1	0.188	-102.3
2200	0.405	172.0	6.297	65.3	0.077	52.4	0.175	-105.9
2400	0.406	167.8	5.758	62.4	0.083	51.0	0.163	-110.0
2600	0.416	162.9	5.295	59.1	0.089	49.9	0.153	-113.6
2800	0.414	159.1	4.916	56.3	0.095	48.3	0.145	-117.2
3000	0.408	156.1	4.585	53.1	0.101	46.5	0.140	-120.5
3200	0.414	153.4	4.280	49.9	0.107	45.1	0.135	-124.1
3400	0.413	150.0	4.040	47.3	0.113	43.1	0.130	-127.6
3600	0.415	146.2	3.838	44.5	0.119	41.6	0.126	-131.2
3800	0.409	143.8	3.633	41.5	0.127	39.3	0.124	-134.5
4000	0.410	139.3	3.465	38.8	0.133	37.4	0.121	-137.6
4200	0.409	136.5	3.328	35.9	0.139	35.6	0.118	-141.6
4400	0.414	134.3	3.160	33.3	0.145	33.5	0.117	-144.9
4600	0.412	130.5	3.031	30.3	0.151	31.6	0.115	-148.4
4800	0.416	127.8	2.901	27.5	0.157	29.5	0.114	-152.4
5000	0.420	125.0	2.797	24.9	0.164	27.5	0.112	-156.3
5200	0.409	122.3	2.696	21.9	0.169	25.5	0.112	-159.6
5400	0.422	119.4	2.574	19.5	0.176	23.3	0.112	-164.1
5600	0.422	115.9	2.500	16.3	0.181	21.2	0.112	-168.2
5800	0.425	112.3	2.422	14.3	0.188	19.0	0.111	-172.5
6000	0.428	110.4	2.350	11.3	0.194	16.9	0.112	-176.2

SBFP540B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=1mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.968	-13.9	3.707	169.3	0.019	82.7	0.996	-5.9
400	0.966	-27.3	3.643	159.8	0.032	73.7	0.983	-11.8
600	0.948	-40.0	3.468	150.1	0.046	68.3	0.964	-17.3
800	0.927	-53.1	3.344	141.5	0.061	61.3	0.940	-22.6
1000	0.909	-64.9	3.171	131.5	0.073	54.2	0.913	-27.6
1200	0.887	-76.9	3.037	123.6	0.083	47.6	0.883	-32.1
1400	0.859	-87.0	2.855	116.1	0.092	40.9	0.855	-36.3
1600	0.840	-96.8	2.688	108.8	0.099	35.0	0.827	-40.4
1800	0.811	-106.1	2.505	102.1	0.104	29.8	0.799	-43.9
2000	0.797	-114.9	2.400	96.0	0.107	24.4	0.774	-47.3
2200	0.779	-123.1	2.239	89.5	0.110	19.9	0.754	-50.5
2400	0.765	-130.6	2.104	84.5	0.111	15.5	0.732	-53.6
2600	0.738	-138.5	1.978	78.6	0.111	11.7	0.713	-56.6
2800	0.734	-145.3	1.880	73.6	0.111	8.4	0.696	-59.4
3000	0.731	-151.6	1.784	68.7	0.110	5.1	0.684	-62.3
3200	0.721	-157.6	1.706	63.7	0.109	2.7	0.672	-65.2
3400	0.705	-163.5	1.628	60.1	0.107	0.1	0.660	-67.9
3600	0.705	-169.4	1.556	55.9	0.105	-2.1	0.651	-70.8
3800	0.695	-174.8	1.488	51.1	0.103	-3.6	0.643	-73.5
4000	0.696	-179.4	1.428	47.5	0.099	-5.2	0.636	-76.3
4200	0.685	175.0	1.384	43.5	0.098	-6.1	0.628	-79.1
4400	0.683	170.0	1.325	39.5	0.095	-6.8	0.622	-82.0
4600	0.687	165.2	1.270	35.7	0.092	-7.2	0.616	-84.9
4800	0.683	160.0	1.222	31.9	0.089	-7.0	0.609	-87.8
5000	0.676	155.7	1.185	28.6	0.087	-6.6	0.604	-90.7
5200	0.669	151.7	1.151	24.5	0.085	-5.3	0.599	-93.7
5400	0.672	147.4	1.101	21.4	0.084	-4.1	0.594	-96.8
5600	0.673	142.9	1.075	17.9	0.083	-2.2	0.588	-99.8
5800	0.674	138.7	1.036	15.0	0.083	-0.2	0.583	-102.9
6000	0.677	134.1	1.008	11.4	0.084	2.1	0.578	-105.9

SBFP540B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=5mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.858	-24.2	15.230	162.5	0.016	74.0	0.975	-11.4
400	0.822	-44.3	14.234	147.6	0.028	70.1	0.919	-21.7
600	0.764	-62.5	12.543	134.2	0.039	60.0	0.851	-30.6
800	0.715	-80.0	11.164	123.3	0.047	53.6	0.779	-37.9
1000	0.656	-93.8	9.795	112.5	0.054	48.2	0.711	-43.8
1200	0.633	-107.3	8.720	104.5	0.058	44.2	0.650	-48.6
1400	0.597	-118.3	7.765	97.7	0.062	39.8	0.603	-52.5
1600	0.575	-127.7	6.942	91.6	0.065	37.6	0.561	-55.9
1800	0.543	-136.3	6.246	86.3	0.068	34.9	0.524	-58.8
2000	0.539	-144.1	5.760	81.2	0.071	33.8	0.494	-61.3
2200	0.522	-151.5	5.244	76.3	0.073	32.6	0.470	-63.6
2400	0.506	-157.8	4.829	72.4	0.075	31.2	0.447	-65.9
2600	0.496	-165.2	4.454	68.0	0.077	30.3	0.429	-68.0
2800	0.493	-171.1	4.166	64.2	0.080	30.0	0.413	-70.0
3000	0.491	-175.6	3.900	60.3	0.082	29.2	0.401	-72.3
3200	0.484	-180.0	3.663	56.5	0.085	28.9	0.390	-74.4
3400	0.468	175.1	3.454	53.4	0.088	27.8	0.380	-76.5
3600	0.475	170.3	3.290	50.1	0.091	27.6	0.372	-78.8
3800	0.470	166.4	3.124	46.7	0.093	26.8	0.365	-81.0
4000	0.474	161.0	2.980	43.6	0.097	26.4	0.359	-83.1
4200	0.471	157.3	2.865	40.2	0.100	25.9	0.353	-85.5
4400	0.469	152.9	2.727	37.1	0.104	25.1	0.348	-88.0
4600	0.467	149.7	2.608	33.8	0.107	24.5	0.344	-90.2
4800	0.469	146.2	2.507	30.7	0.111	23.5	0.339	-92.7
5000	0.465	141.9	2.423	27.5	0.115	22.7	0.334	-95.2
5200	0.465	138.8	2.332	24.4	0.118	21.6	0.330	-97.8
5400	0.469	134.8	2.231	21.6	0.123	20.6	0.325	-100.6
5600	0.470	131.3	2.163	18.4	0.127	19.8	0.321	-103.2
5800	0.472	127.9	2.093	16.1	0.131	18.5	0.317	-106.0
6000	0.477	124.2	2.029	12.6	0.136	17.4	0.313	-108.8

SBFP540B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=10mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.743	-31.0	25.035	156.8	0.014	70.5	0.946	-15.9
400	0.675	-57.9	21.960	138.4	0.025	65.2	0.844	-29.1
600	0.614	-79.6	18.119	123.8	0.033	57.0	0.742	-38.9
800	0.560	-97.3	15.295	113.0	0.038	53.6	0.651	-46.0
1000	0.517	-111.9	12.871	102.9	0.043	50.6	0.578	-51.4
1200	0.488	-124.7	11.110	95.8	0.047	47.7	0.516	-55.5
1400	0.469	-133.4	9.701	89.9	0.052	47.0	0.472	-58.8
1600	0.453	-143.8	8.550	84.7	0.055	45.9	0.435	-61.7
1800	0.431	-151.3	7.614	80.1	0.059	45.1	0.403	-64.2
2000	0.433	-157.7	6.951	75.7	0.063	44.4	0.377	-66.3
2200	0.424	-165.1	6.295	71.5	0.066	43.6	0.357	-68.3
2400	0.418	-170.6	5.771	68.1	0.070	42.4	0.337	-70.4
2600	0.410	-177.3	5.310	64.3	0.075	42.1	0.323	-72.2
2800	0.409	178.5	4.944	61.0	0.078	41.0	0.311	-74.0
3000	0.408	175.3	4.625	57.4	0.083	40.1	0.301	-76.1
3200	0.408	170.2	4.318	53.9	0.087	39.6	0.292	-78.1
3400	0.404	165.3	4.073	51.2	0.092	38.3	0.284	-80.0
3600	0.399	162.2	3.875	48.2	0.096	37.3	0.277	-82.2
3800	0.401	157.9	3.674	45.0	0.101	36.0	0.271	-84.3
4000	0.398	153.8	3.499	42.2	0.105	34.7	0.266	-86.3
4200	0.404	149.2	3.363	39.1	0.110	33.6	0.261	-88.5
4400	0.404	146.8	3.199	36.2	0.114	32.2	0.258	-90.9
4600	0.399	143.2	3.061	33.1	0.119	30.7	0.254	-93.2
4800	0.399	139.7	2.932	30.2	0.124	29.1	0.250	-95.6
5000	0.400	135.7	2.830	27.4	0.129	27.6	0.245	-98.0
5200	0.401	133.1	2.723	24.2	0.133	26.1	0.242	-100.6
5400	0.403	129.8	2.607	21.6	0.139	24.7	0.237	-103.4
5600	0.408	126.2	2.529	18.5	0.144	22.9	0.234	-106.1
5800	0.409	122.6	2.443	16.4	0.148	21.2	0.230	-108.8
6000	0.416	119.2	2.374	13.3	0.154	19.5	0.227	-111.7

SBFP540B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=20mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.587	-43.2	36.139	150.1	0.013	76.7	0.899	-21.2
400	0.532	-74.3	29.186	129.1	0.021	64.4	0.749	-36.1
600	0.475	-98.8	22.575	114.6	0.027	59.8	0.626	-45.4
800	0.428	-115.1	18.225	104.7	0.032	57.7	0.535	-51.7
1000	0.403	-130.2	14.913	95.7	0.037	56.1	0.466	-56.3
1200	0.393	-139.8	12.652	89.6	0.042	55.3	0.414	-59.9
1400	0.377	-149.0	10.917	84.5	0.046	54.7	0.376	-62.7
1600	0.372	-157.2	9.554	80.0	0.051	54.7	0.346	-65.2
1800	0.365	-163.8	8.483	76.1	0.056	53.7	0.319	-67.3
2000	0.370	-170.6	7.706	72.1	0.060	52.7	0.297	-69.3
2200	0.364	-175.8	6.954	68.4	0.065	51.8	0.281	-71.2
2400	0.361	178.7	6.360	65.3	0.070	50.7	0.265	-73.2
2600	0.362	172.7	5.864	61.9	0.075	49.7	0.252	-74.8
2800	0.359	169.6	5.438	58.8	0.080	48.7	0.243	-76.7
3000	0.362	166.1	5.075	55.6	0.086	47.1	0.235	-78.7
3200	0.359	162.3	4.734	52.4	0.091	46.1	0.228	-80.6
3400	0.355	157.5	4.465	49.9	0.097	43.9	0.222	-82.5
3600	0.362	155.1	4.245	46.9	0.101	42.6	0.215	-84.7
3800	0.359	151.2	4.025	44.0	0.107	40.9	0.211	-86.9
4000	0.356	147.8	3.832	41.2	0.112	39.3	0.207	-88.8
4200	0.362	143.9	3.682	38.2	0.117	37.2	0.202	-91.0
4400	0.361	141.2	3.496	35.7	0.123	35.9	0.200	-93.5
4600	0.356	137.6	3.342	32.6	0.128	33.8	0.197	-95.8
4800	0.362	134.2	3.205	29.8	0.133	32.0	0.193	-98.0
5000	0.371	130.4	3.093	27.0	0.139	30.3	0.189	-100.7
5200	0.364	128.4	2.977	24.2	0.144	28.6	0.186	-103.3
5400	0.369	126.3	2.846	21.8	0.149	26.6	0.183	-106.5
5600	0.373	122.0	2.762	18.7	0.155	24.7	0.180	-109.0
5800	0.372	118.2	2.669	16.6	0.160	22.6	0.176	-111.9
6000	0.379	115.3	2.586	13.6	0.165	20.6	0.173	-114.7

SBFP540B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=30mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.502	-49.8	41.895	146.5	0.010	63.4	0.867	-23.9
400	0.432	-85.8	32.242	124.6	0.019	63.5	0.698	-39.3
600	0.402	-109.3	24.185	110.5	0.025	63.1	0.572	-48.1
800	0.377	-125.9	19.201	101.2	0.029	62.6	0.482	-53.9
1000	0.361	-139.1	15.560	92.8	0.034	59.3	0.420	-57.9
1200	0.362	-149.3	13.117	87.2	0.040	60.2	0.371	-61.3
1400	0.355	-156.0	11.301	82.4	0.045	59.3	0.337	-63.7
1600	0.350	-164.2	9.853	78.2	0.050	58.1	0.311	-66.1
1800	0.344	-171.7	8.742	74.5	0.055	57.6	0.285	-68.2
2000	0.350	-175.6	7.930	70.8	0.060	56.7	0.266	-70.0
2200	0.348	179.8	7.161	67.2	0.066	54.7	0.252	-72.0
2400	0.345	174.0	6.548	64.3	0.071	53.6	0.237	-73.8
2600	0.343	168.1	6.022	60.9	0.076	52.4	0.227	-75.5
2800	0.350	164.1	5.591	58.0	0.081	50.8	0.218	-77.1
3000	0.343	161.9	5.219	54.9	0.087	49.8	0.211	-79.1
3200	0.344	158.7	4.866	51.7	0.093	47.8	0.204	-81.1
3400	0.343	153.8	4.584	49.3	0.098	46.4	0.199	-83.0
3600	0.347	151.6	4.358	46.5	0.103	44.8	0.193	-85.3
3800	0.342	148.4	4.130	43.6	0.109	42.5	0.190	-87.4
4000	0.347	143.2	3.938	40.9	0.115	40.7	0.186	-89.4
4200	0.348	140.2	3.776	38.0	0.120	38.8	0.182	-91.7
4400	0.351	138.5	3.588	35.4	0.125	37.2	0.179	-94.3
4600	0.352	134.8	3.434	32.5	0.131	35.2	0.176	-96.6
4800	0.350	131.6	3.290	29.7	0.137	33.2	0.173	-99.0
5000	0.362	129.1	3.172	27.0	0.142	31.2	0.169	-101.6
5200	0.352	126.9	3.059	24.1	0.148	29.2	0.166	-104.3
5400	0.359	123.5	2.923	21.7	0.154	27.3	0.163	-107.5
5600	0.362	120.4	2.837	18.7	0.158	25.3	0.161	-110.2
5800	0.359	116.0	2.744	16.6	0.164	23.2	0.157	-113.1
6000	0.360	113.6	2.654	13.5	0.170	21.5	0.155	-116.3

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