

**SBFP405B**

UHF to C Band Low Noise Amplifier, Oscillation Applications

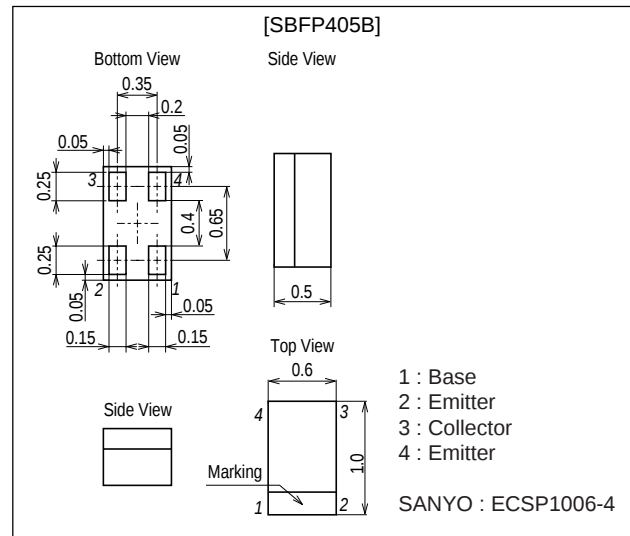
Features

- Low noise : NF=1.25dB typ (f=1.8GHz).
- High cutoff frequency : $f_T=25\text{GHz}$ typ ($V_{CE}=3\text{V}$).
- High gain : $|S_{21e}|^2=18\text{dB}$ typ (f=1.8GHz).

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		12	mA
Collector Dissipation	P_C		55	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}	$V_{CB}=5\text{V}, I_E=0$			150	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1.5\text{V}, I_C=0$			15	μA
DC Current Gain	h_{FE}	$V_{CE}=4\text{V}, I_C=5\text{mA}$	50		150	
Gain-Bandwidth Product	f_T	$V_{CE}=3\text{V}, I_C=10\text{mA}$	18	25		GHz
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1\text{V}, f=1\text{MHz}$		0.13	0.23	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=2\text{V}, I_C=5\text{mA}, f=1.8\text{GHz}$	14	18		dB
Noise Figure	NF	$V_{CE}=2\text{V}, I_C=2\text{mA}, f=1.8\text{GHz}$		1.25	1.65	dB

Marking : AB

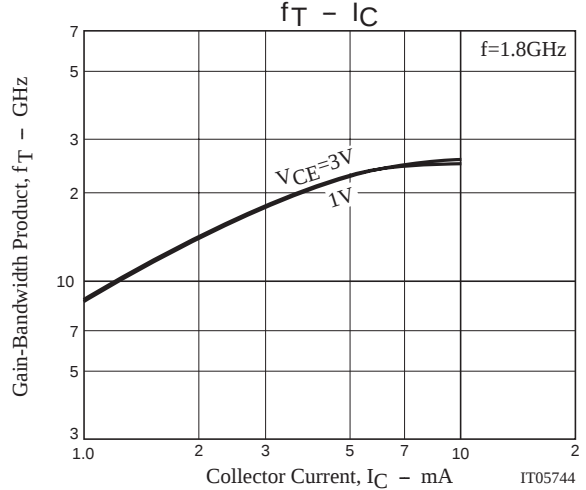
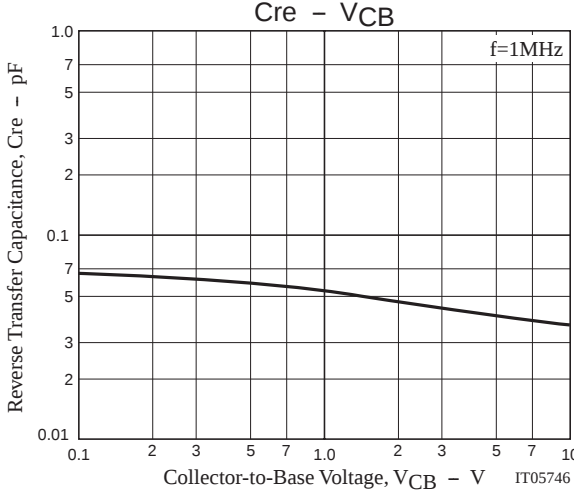
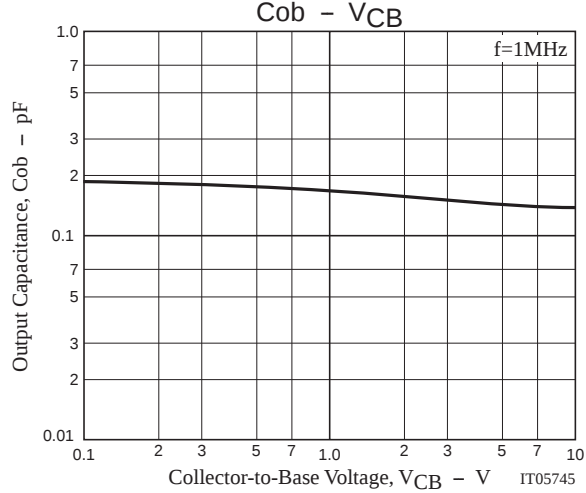
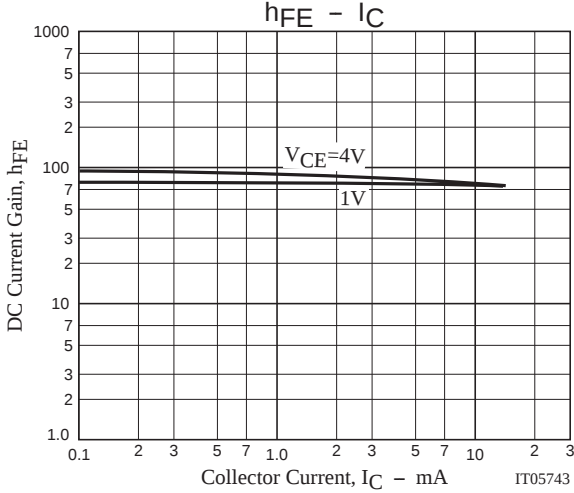
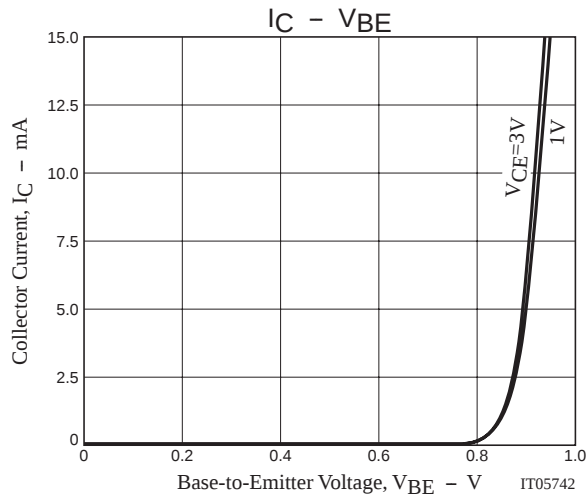
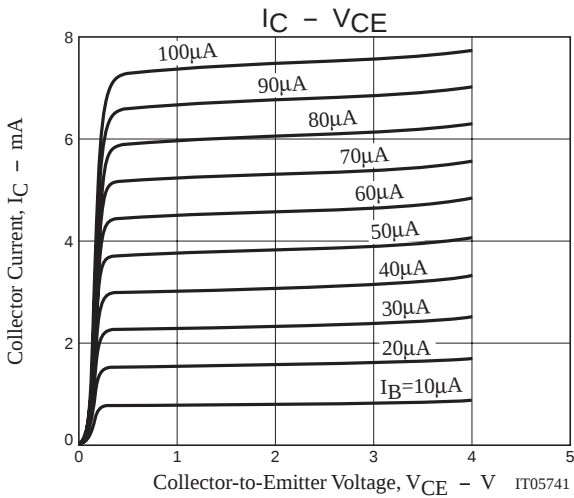
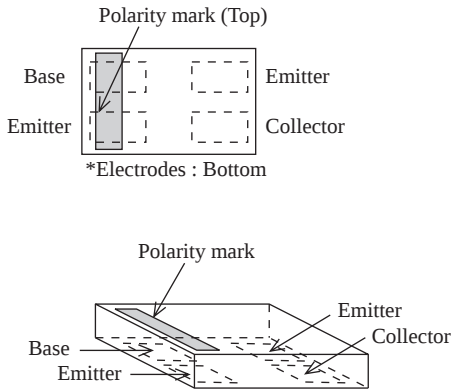
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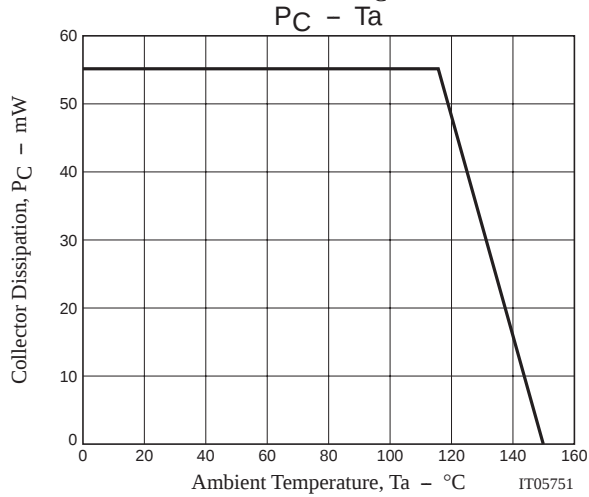
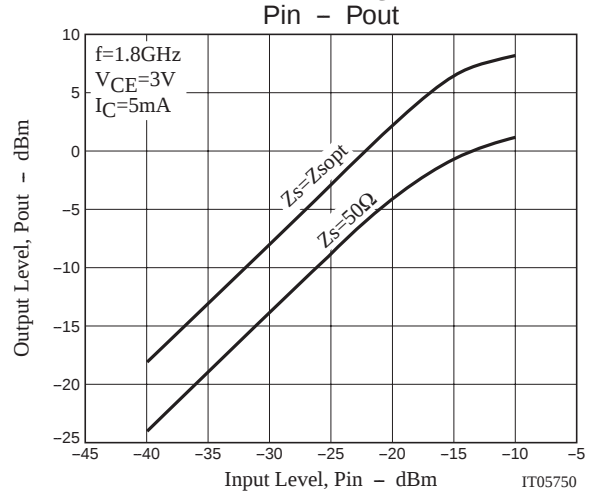
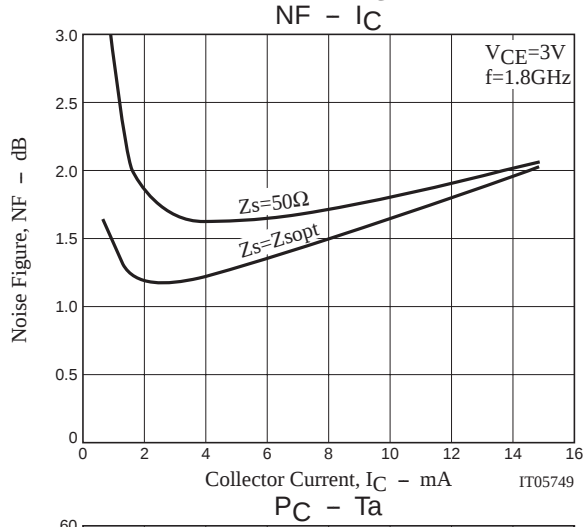
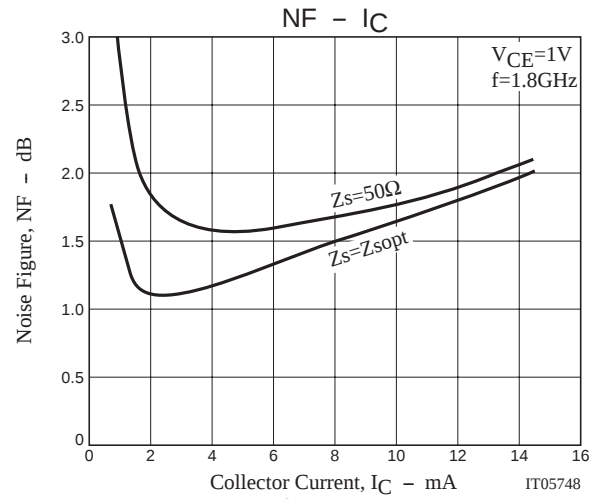
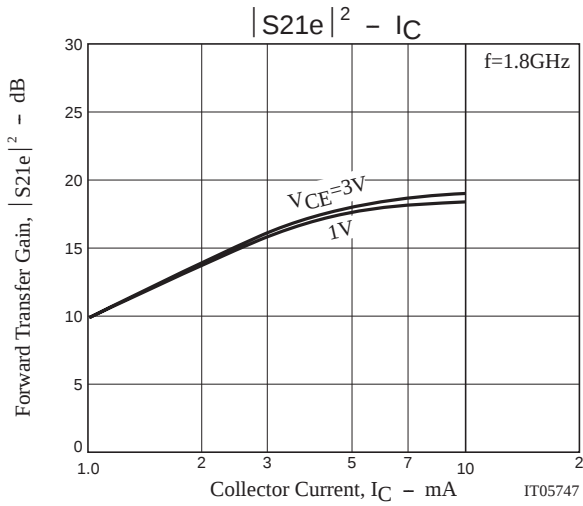
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

32603 TS IM TA-100135 No.7456-1/15

Electrical Connection (Top view)



SBFP405B



SBFP405B

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	0.967	-7.3	3.571	173.4	0.008	81.5	1.001	-4.2
400	0.946	-13.3	3.569	167.5	0.016	81.5	0.992	-8.2
600	0.952	-19.6	3.467	161.1	0.024	78.0	0.984	-12.2
800	0.936	-26.0	3.455	155.5	0.032	74.3	0.974	-16.0
1000	0.918	-32.5	3.381	148.3	0.039	70.3	0.961	-19.9
1200	0.908	-39.3	3.353	143.1	0.046	66.0	0.945	-23.6
1400	0.893	-45.0	3.272	137.2	0.053	62.0	0.932	-27.2
1600	0.877	-51.2	3.191	131.8	0.059	58.6	0.916	-30.7
1800	0.850	-56.7	3.098	125.8	0.066	55.2	0.900	-34.1
2000	0.833	-63.5	3.077	121.1	0.072	51.5	0.883	-37.3
2200	0.808	-69.0	2.968	115.0	0.077	47.7	0.868	-40.4
2400	0.789	-74.3	2.885	110.3	0.083	44.0	0.850	-43.5
2600	0.751	-80.2	2.789	104.3	0.088	40.5	0.833	-46.4
2800	0.736	-86.2	2.732	99.5	0.092	37.2	0.817	-49.2
3000	0.716	-91.5	2.661	94.7	0.096	34.2	0.802	-52.0
3200	0.704	-96.7	2.586	90.0	0.099	31.6	0.786	-54.6
3400	0.670	-101.7	2.483	85.9	0.103	28.4	0.770	-57.2
3600	0.653	-106.8	2.436	81.8	0.105	26.0	0.754	-59.8
3800	0.621	-111.9	2.365	77.0	0.108	23.3	0.741	-62.2
4000	0.604	-116.1	2.278	73.5	0.110	20.8	0.728	-64.6
4200	0.586	-121.5	2.234	69.1	0.112	18.3	0.715	-67.0
4400	0.569	-126.3	2.173	65.1	0.114	16.0	0.703	-69.6
4600	0.547	-131.7	2.098	61.1	0.116	13.9	0.691	-71.9
4800	0.534	-136.9	2.044	56.8	0.117	11.4	0.680	-74.3
5000	0.523	-142.1	2.009	53.4	0.119	9.2	0.669	-76.7
5200	0.510	-145.7	1.966	49.6	0.120	7.7	0.662	-79.0
5400	0.493	-151.9	1.890	45.9	0.121	5.6	0.652	-81.3
5600	0.479	-156.5	1.857	41.9	0.123	4.0	0.644	-83.6
5800	0.460	-161.2	1.806	38.8	0.124	1.9	0.634	-85.8
6000	0.445	-166.1	1.763	34.9	0.125	0.5	0.626	-88.0

SBFP405B

S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.890	-10.6	9.130	170.3	0.008	97.0	0.991	-5.7
400	0.865	-20.0	9.001	161.4	0.015	78.4	0.978	-10.9
600	0.854	-28.9	8.565	152.6	0.023	74.0	0.958	-16.0
800	0.827	-38.3	8.266	144.6	0.028	69.6	0.931	-20.8
1000	0.786	-46.3	7.854	135.5	0.036	64.2	0.903	-25.3
1200	0.754	-55.2	7.522	128.5	0.041	61.8	0.871	-29.5
1400	0.715	-62.5	7.080	121.7	0.045	56.7	0.845	-33.1
1600	0.674	-69.9	6.682	115.2	0.050	53.6	0.815	-36.7
1800	0.637	-76.5	6.249	109.1	0.054	51.0	0.789	-40.0
2000	0.609	-83.7	5.996	103.5	0.058	48.0	0.763	-42.9
2200	0.569	-90.1	5.607	97.7	0.062	45.4	0.740	-45.7
2400	0.538	-96.1	5.298	92.9	0.065	43.4	0.717	-48.4
2600	0.499	-102.6	4.989	87.3	0.068	41.1	0.696	-50.9
2800	0.474	-108.4	4.741	82.9	0.071	39.0	0.677	-53.2
3000	0.459	-113.5	4.510	78.5	0.074	36.8	0.660	-55.5
3200	0.435	-118.9	4.275	74.1	0.077	35.8	0.644	-57.6
3400	0.407	-123.6	4.059	70.5	0.080	33.8	0.629	-59.7
3600	0.389	-129.0	3.900	66.8	0.082	32.6	0.614	-61.7
3800	0.374	-134.2	3.726	62.6	0.085	31.4	0.602	-63.7
4000	0.360	-139.0	3.552	59.5	0.087	29.5	0.591	-65.7
4200	0.336	-144.1	3.427	55.6	0.090	28.1	0.580	-67.7
4400	0.328	-150.0	3.285	52.4	0.092	26.8	0.570	-70.0
4600	0.315	-154.1	3.150	48.6	0.095	25.3	0.562	-71.9
4800	0.305	-160.1	3.032	45.2	0.098	23.8	0.553	-74.0
5000	0.300	-165.8	2.948	42.0	0.101	22.4	0.545	-76.1
5200	0.290	-168.7	2.845	38.7	0.104	21.0	0.539	-78.3
5400	0.282	-173.9	2.731	35.6	0.107	19.6	0.532	-80.3
5600	0.275	-178.7	2.652	32.2	0.110	18.5	0.526	-82.4
5800	0.262	174.7	2.558	29.4	0.113	16.7	0.518	-84.5
6000	0.252	168.9	2.488	25.9	0.116	15.5	0.513	-86.4

SBFP405B

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	0.841	-13.3	13.312	167.7	0.008	80.1	0.985	-6.5
400	0.810	-24.5	12.942	156.9	0.015	75.4	0.959	-12.8
600	0.778	-36.2	12.021	146.3	0.022	71.9	0.929	-18.5
800	0.724	-46.6	11.295	137.1	0.027	66.5	0.891	-23.6
1000	0.677	-56.0	10.434	127.2	0.033	62.9	0.850	-28.1
1200	0.637	-65.3	9.721	119.7	0.037	58.5	0.811	-32.0
1400	0.591	-73.2	8.944	112.7	0.041	56.0	0.779	-35.4
1600	0.545	-80.2	8.255	106.3	0.045	54.0	0.747	-38.6
1800	0.501	-87.4	7.588	100.3	0.048	51.3	0.717	-41.4
2000	0.477	-95.0	7.154	95.0	0.051	49.2	0.693	-44.1
2200	0.446	-101.5	6.599	89.5	0.054	47.7	0.671	-46.5
2400	0.412	-107.8	6.152	85.1	0.058	46.4	0.649	-48.8
2600	0.377	-114.6	5.731	79.9	0.060	45.0	0.631	-50.9
2800	0.363	-119.8	5.404	75.8	0.064	42.8	0.615	-53.0
3000	0.344	-124.7	5.097	71.7	0.067	42.4	0.600	-55.0
3200	0.324	-129.8	4.806	67.7	0.070	40.6	0.587	-56.9
3400	0.304	-134.7	4.533	64.4	0.073	39.2	0.574	-58.8
3600	0.296	-141.8	4.328	61.0	0.076	38.6	0.561	-60.7
3800	0.280	-146.2	4.117	57.2	0.079	37.0	0.552	-62.5
4000	0.265	-151.4	3.919	54.1	0.083	35.4	0.543	-64.4
4200	0.253	-156.0	3.771	50.7	0.086	34.2	0.533	-66.4
4400	0.246	-161.5	3.592	47.5	0.090	32.8	0.525	-68.4
4600	0.239	-167.9	3.440	44.0	0.093	31.4	0.518	-70.5
4800	0.230	-173.0	3.304	40.8	0.097	29.7	0.512	-72.5
5000	0.229	-177.8	3.199	37.8	0.100	28.3	0.505	-74.7
5200	0.223	179.0	3.089	34.8	0.103	26.9	0.501	-76.7
5400	0.216	171.8	2.954	31.8	0.107	25.0	0.494	-78.7
5600	0.211	167.1	2.867	28.7	0.110	23.7	0.489	-80.8
5800	0.203	161.6	2.760	26.2	0.114	22.0	0.483	-82.8
6000	0.199	155.4	2.680	22.8	0.117	20.5	0.478	-84.8

SBFP405B

S Parameters (Common emitter)

$V_{CE}=1V$, $I_C=7mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.800	-16.3	16.550	165.7	0.006	69.7	0.976	-7.4
400	0.754	-29.3	15.820	153.1	0.015	70.7	0.943	-14.3
600	0.699	-41.8	14.370	141.4	0.020	68.1	0.901	-20.2
800	0.648	-53.2	13.187	131.5	0.026	64.1	0.855	-25.2
1000	0.593	-63.7	11.919	121.3	0.030	61.9	0.809	-29.6
1200	0.546	-73.7	10.882	113.8	0.034	58.5	0.766	-33.1
1400	0.500	-81.1	9.850	106.9	0.038	56.6	0.733	-36.2
1600	0.455	-88.9	8.976	100.7	0.041	54.8	0.703	-38.9
1800	0.421	-95.5	8.174	95.0	0.044	52.9	0.676	-41.5
2000	0.401	-103.5	7.636	90.0	0.048	51.1	0.652	-43.9
2200	0.367	-109.3	6.988	84.7	0.051	50.2	0.632	-46.0
2400	0.338	-116.2	6.484	80.5	0.054	49.1	0.613	-48.1
2600	0.309	-123.4	6.016	75.8	0.057	47.5	0.596	-50.1
2800	0.303	-129.5	5.644	71.9	0.061	46.5	0.582	-52.0
3000	0.288	-134.8	5.302	68.0	0.064	45.4	0.570	-53.9
3200	0.279	-139.9	4.982	64.1	0.068	44.3	0.558	-55.8
3400	0.248	-145.6	4.692	61.0	0.071	43.4	0.546	-57.6
3600	0.241	-150.8	4.480	57.8	0.074	41.3	0.536	-59.4
3800	0.232	-156.6	4.245	54.1	0.078	40.3	0.528	-61.2
4000	0.219	-160.9	4.037	51.2	0.081	39.1	0.521	-63.1
4200	0.211	-167.0	3.883	47.9	0.085	37.1	0.512	-65.0
4400	0.212	-172.9	3.700	44.8	0.089	35.9	0.505	-67.2
4600	0.205	-177.6	3.533	41.6	0.093	34.5	0.500	-69.1
4800	0.199	175.7	3.386	38.5	0.096	33.0	0.493	-71.2
5000	0.193	171.3	3.275	35.7	0.100	31.1	0.487	-73.3
5200	0.191	167.6	3.161	32.6	0.104	29.7	0.483	-75.3
5400	0.189	160.6	3.022	29.9	0.107	28.0	0.477	-77.4
5600	0.185	156.9	2.929	26.6	0.111	26.2	0.473	-79.5
5800	0.181	151.2	2.819	24.2	0.114	24.6	0.467	-81.6
6000	0.189	144.9	2.736	21.0	0.118	23.0	0.464	-83.5

SBFP405B

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	0.729	-18.8	20.014	163.0	0.007	75.5	0.966	-8.5
400	0.678	-35.0	18.649	148.3	0.014	72.1	0.918	-15.9
600	0.626	-50.0	16.407	135.4	0.020	66.6	0.863	-21.9
800	0.553	-63.1	14.605	125.0	0.023	64.4	0.808	-26.5
1000	0.495	-74.3	12.882	114.7	0.028	61.0	0.761	-30.2
1200	0.448	-84.7	11.517	107.5	0.032	58.3	0.718	-33.3
1400	0.407	-93.8	10.273	100.8	0.035	56.8	0.687	-36.0
1600	0.371	-100.6	9.258	94.9	0.038	55.8	0.660	-38.3
1800	0.342	-108.7	8.351	89.6	0.042	54.3	0.636	-40.6
2000	0.327	-116.5	7.731	84.9	0.045	53.6	0.615	-42.7
2200	0.303	-123.5	7.044	79.9	0.048	52.4	0.599	-44.7
2400	0.284	-129.9	6.499	76.1	0.051	51.6	0.583	-46.7
2600	0.261	-138.2	6.011	71.6	0.055	50.7	0.569	-48.5
2800	0.247	-143.3	5.624	67.9	0.058	49.8	0.556	-50.4
3000	0.241	-150.0	5.271	64.3	0.062	48.7	0.547	-52.2
3200	0.233	-154.5	4.935	60.6	0.065	47.7	0.537	-54.1
3400	0.219	-161.0	4.642	57.7	0.069	45.9	0.527	-55.9
3600	0.216	-166.7	4.417	54.5	0.072	44.9	0.518	-57.7
3800	0.211	-172.0	4.187	51.1	0.076	43.4	0.512	-59.6
4000	0.196	-177.2	3.972	48.2	0.080	42.0	0.505	-61.4
4200	0.193	175.8	3.821	45.0	0.084	40.2	0.497	-63.4
4400	0.197	170.2	3.639	42.0	0.088	38.7	0.493	-65.6
4600	0.193	165.4	3.469	38.9	0.092	36.8	0.486	-67.6
4800	0.189	160.1	3.332	35.8	0.096	35.3	0.481	-69.6
5000	0.194	155.3	3.213	33.1	0.100	33.7	0.476	-71.7
5200	0.185	153.6	3.099	30.1	0.103	32.3	0.473	-73.9
5400	0.195	147.9	2.967	27.4	0.107	30.1	0.468	-75.9
5600	0.191	141.4	2.876	24.4	0.111	28.5	0.463	-78.1
5800	0.188	134.6	2.770	21.9	0.115	26.8	0.458	-80.2
6000	0.195	129.4	2.684	18.8	0.119	24.7	0.455	-82.3

SBFP405B

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	0.979	-6.1	3.494	173.8	0.005	80.7	0.999	-3.7
400	0.954	-12.6	3.506	168.3	0.012	81.1	0.995	-7.2
600	0.959	-18.2	3.410	162.3	0.018	80.2	0.990	-10.7
800	0.941	-24.7	3.400	156.8	0.023	75.4	0.982	-14.1
1000	0.925	-30.8	3.343	149.8	0.030	71.4	0.973	-17.6
1200	0.920	-37.2	3.333	144.8	0.035	68.7	0.961	-21.0
1400	0.904	-42.3	3.241	139.3	0.041	65.1	0.952	-24.1
1600	0.883	-48.2	3.185	133.9	0.047	62.0	0.940	-27.4
1800	0.858	-54.1	3.097	128.3	0.051	58.8	0.927	-30.4
2000	0.845	-60.2	3.084	123.4	0.056	55.2	0.914	-33.5
2200	0.820	-65.8	2.981	117.6	0.060	51.8	0.902	-36.4
2400	0.800	-71.2	2.905	113.1	0.065	48.6	0.888	-39.3
2600	0.765	-77.1	2.819	106.9	0.069	45.2	0.874	-42.1
2800	0.753	-82.3	2.766	102.4	0.073	42.6	0.862	-44.8
3000	0.737	-87.5	2.703	97.9	0.076	39.1	0.849	-47.4
3200	0.718	-92.7	2.630	93.1	0.079	36.4	0.835	-50.0
3400	0.687	-97.0	2.536	89.0	0.082	33.7	0.821	-52.5
3600	0.665	-102.3	2.486	84.9	0.084	31.4	0.807	-54.9
3800	0.641	-107.4	2.421	80.1	0.086	28.8	0.796	-57.2
4000	0.622	-111.5	2.333	76.6	0.088	26.2	0.784	-59.6
4200	0.600	-116.5	2.285	72.2	0.091	24.0	0.772	-62.0
4400	0.589	-121.5	2.223	68.3	0.092	21.7	0.761	-64.4
4600	0.562	-127.2	2.156	64.0	0.093	19.6	0.751	-66.7
4800	0.542	-131.7	2.098	60.0	0.095	17.9	0.741	-69.0
5000	0.541	-136.5	2.066	56.5	0.096	15.6	0.731	-71.3
5200	0.518	-140.2	2.018	52.7	0.098	13.7	0.724	-73.5
5400	0.502	-146.1	1.947	49.0	0.100	12.1	0.716	-75.7
5600	0.491	-150.0	1.903	45.1	0.101	10.5	0.707	-78.0
5800	0.468	-155.6	1.851	42.1	0.102	8.6	0.699	-80.2
6000	0.450	-160.4	1.815	38.2	0.103	7.0	0.692	-82.3

SBFP405B

S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.903	-8.9	9.036	170.6	0.006	69.0	0.995	-4.5
400	0.886	-18.5	8.934	162.4	0.012	76.0	0.985	-9.1
600	0.864	-27.3	8.534	154.0	0.017	75.3	0.970	-13.4
800	0.834	-35.4	8.271	146.3	0.023	71.6	0.952	-17.5
1000	0.800	-43.4	7.896	137.5	0.027	67.7	0.931	-21.3
1200	0.765	-52.0	7.608	130.7	0.031	62.9	0.906	-25.0
1400	0.726	-58.5	7.189	124.1	0.035	60.3	0.887	-28.4
1600	0.695	-65.2	6.814	117.6	0.039	58.5	0.865	-31.6
1800	0.651	-72.0	6.407	111.4	0.041	55.5	0.844	-34.6
2000	0.629	-79.1	6.170	106.0	0.045	52.9	0.822	-37.4
2200	0.589	-85.2	5.784	100.1	0.048	50.3	0.804	-40.1
2400	0.554	-90.1	5.467	95.4	0.051	48.2	0.785	-42.7
2600	0.516	-96.6	5.166	89.7	0.054	46.7	0.767	-45.1
2800	0.496	-101.8	4.932	85.2	0.056	44.1	0.751	-47.4
3000	0.469	-106.7	4.697	80.8	0.059	42.4	0.736	-49.7
3200	0.451	-112.5	4.466	76.4	0.061	41.4	0.723	-51.8
3400	0.413	-117.6	4.233	72.8	0.063	39.5	0.709	-53.9
3600	0.405	-122.1	4.066	69.2	0.066	38.2	0.696	-55.9
3800	0.381	-126.5	3.892	64.9	0.069	36.9	0.685	-57.8
4000	0.362	-131.3	3.705	61.8	0.070	35.4	0.675	-59.8
4200	0.342	-136.1	3.585	57.9	0.073	33.9	0.664	-61.9
4400	0.326	-141.7	3.429	54.6	0.076	32.8	0.656	-64.1
4600	0.316	-146.8	3.291	50.8	0.078	31.6	0.648	-66.1
4800	0.303	-151.8	3.171	47.3	0.081	30.3	0.640	-68.1
5000	0.293	-156.6	3.079	44.3	0.084	28.8	0.632	-70.2
5200	0.285	-160.1	2.981	41.0	0.086	27.5	0.627	-72.3
5400	0.272	-165.4	2.861	37.8	0.088	26.1	0.620	-74.4
5600	0.266	-170.4	2.769	34.4	0.091	24.8	0.615	-76.4
5800	0.248	-175.7	2.673	31.7	0.093	23.5	0.608	-78.5
6000	0.244	178.8	2.603	28.3	0.096	22.0	0.603	-80.4

SBFP405B

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	0.869	-11.7	13.188	168.1	0.004	79.0	0.991	-5.4
400	0.823	-23.4	12.844	158.2	0.010	79.4	0.972	-10.4
600	0.795	-33.1	12.016	148.0	0.016	73.6	0.951	-15.0
800	0.741	-42.5	11.363	139.2	0.020	70.4	0.924	-19.3
1000	0.688	-51.5	10.583	129.5	0.025	64.9	0.894	-23.2
1200	0.647	-60.3	9.922	122.2	0.028	62.5	0.863	-26.7
1400	0.604	-67.1	9.165	115.2	0.031	59.7	0.839	-29.8
1600	0.562	-74.9	8.508	108.7	0.034	58.1	0.814	-32.7
1800	0.518	-81.5	7.849	102.7	0.037	56.7	0.791	-35.4
2000	0.493	-88.6	7.425	97.5	0.039	53.9	0.771	-38.0
2200	0.457	-94.7	6.871	91.8	0.043	52.8	0.754	-40.3
2400	0.427	-100.2	6.421	87.4	0.045	51.4	0.734	-42.7
2600	0.391	-106.2	5.993	82.1	0.048	50.7	0.719	-44.8
2800	0.372	-111.8	5.661	78.0	0.050	49.0	0.705	-46.9
3000	0.353	-116.5	5.346	73.9	0.053	47.7	0.692	-48.9
3200	0.337	-121.4	5.046	69.9	0.056	46.4	0.680	-50.9
3400	0.310	-125.7	4.758	66.5	0.058	45.2	0.668	-52.8
3600	0.295	-130.3	4.548	63.1	0.061	43.7	0.656	-54.7
3800	0.278	-135.8	4.330	59.3	0.064	42.7	0.649	-56.6
4000	0.258	-140.5	4.114	56.2	0.067	41.5	0.639	-58.5
4200	0.248	-145.1	3.968	52.8	0.070	39.7	0.631	-60.5
4400	0.240	-152.1	3.783	49.5	0.073	38.8	0.624	-62.6
4600	0.227	-156.7	3.617	46.2	0.076	37.6	0.617	-64.6
4800	0.220	-162.6	3.479	42.9	0.078	36.3	0.611	-66.6
5000	0.212	-167.8	3.368	40.0	0.082	34.9	0.604	-68.7
5200	0.202	-170.4	3.246	36.9	0.085	33.2	0.601	-70.7
5400	0.202	-176.8	3.108	34.0	0.088	31.7	0.595	-72.8
5600	0.195	178.1	3.009	30.9	0.091	30.2	0.590	-74.8
5800	0.191	173.1	2.900	28.4	0.094	28.6	0.584	-76.9
6000	0.182	167.3	2.820	25.1	0.097	27.0	0.581	-78.8

SBFP405B

S Parameters (Common emitter)

$V_{CE}=3V$, $I_C=7mA$, $Z_O=50\Omega$

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.804	-14.5	16.384	166.4	0.005	91.1	0.989	-5.8
400	0.772	-25.8	15.773	154.7	0.011	76.2	0.963	-11.3
600	0.720	-37.9	14.448	143.5	0.015	74.9	0.933	-16.1
800	0.663	-48.5	13.378	133.9	0.018	68.1	0.900	-20.3
1000	0.609	-58.0	12.216	123.8	0.022	65.2	0.866	-24.0
1200	0.564	-67.1	11.226	116.5	0.025	61.3	0.833	-27.3
1400	0.521	-74.1	10.223	109.6	0.028	60.5	0.808	-30.1
1600	0.475	-81.4	9.363	103.3	0.031	59.3	0.784	-32.8
1800	0.434	-87.7	8.553	97.4	0.034	57.4	0.762	-35.3
2000	0.413	-95.2	8.013	92.5	0.037	55.8	0.741	-37.6
2200	0.376	-101.5	7.366	87.1	0.040	55.0	0.725	-39.8
2400	0.350	-106.7	6.837	82.9	0.042	54.6	0.710	-42.1
2600	0.319	-112.8	6.350	78.0	0.045	53.2	0.694	-44.0
2800	0.307	-118.5	5.977	74.1	0.048	52.7	0.683	-46.0
3000	0.291	-124.7	5.623	70.2	0.051	51.2	0.672	-48.0
3200	0.276	-126.9	5.291	66.3	0.054	49.7	0.661	-49.9
3400	0.246	-133.0	4.975	63.1	0.056	49.1	0.650	-51.8
3600	0.238	-137.0	4.740	60.0	0.059	48.0	0.640	-53.7
3800	0.231	-142.3	4.509	56.2	0.063	46.4	0.633	-55.6
4000	0.207	-148.8	4.273	53.4	0.065	44.9	0.625	-57.4
4200	0.199	-153.4	4.113	50.0	0.068	43.3	0.618	-59.4
4400	0.196	-159.8	3.920	47.0	0.072	42.2	0.611	-61.6
4600	0.186	-167.1	3.745	43.7	0.075	40.7	0.606	-63.5
4800	0.180	-171.4	3.592	40.6	0.078	39.1	0.599	-65.5
5000	0.182	-175.4	3.483	37.7	0.082	37.6	0.594	-67.6
5200	0.170	-179.1	3.350	34.8	0.085	35.8	0.590	-69.7
5400	0.173	173.9	3.211	32.1	0.087	34.3	0.585	-71.7
5600	0.162	169.6	3.107	28.9	0.091	32.9	0.582	-73.8
5800	0.156	162.7	2.992	26.4	0.095	31.1	0.575	-75.9
6000	0.151	155.1	2.902	23.3	0.098	29.4	0.573	-77.8

SBFP405B

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	0.745	-16.2	19.967	164.2	0.005	88.8	0.981	-6.4
400	0.707	-30.2	18.852	150.8	0.010	78.8	0.950	-12.3
600	0.647	-43.1	16.844	138.6	0.014	72.9	0.912	-17.1
800	0.583	-54.9	15.211	128.4	0.018	67.9	0.872	-21.1
1000	0.520	-65.3	13.572	118.2	0.021	64.2	0.837	-24.5
1200	0.479	-74.2	12.272	110.9	0.023	65.0	0.803	-27.4
1400	0.435	-81.1	11.011	104.2	0.026	62.4	0.778	-30.0
1600	0.396	-89.2	9.977	98.2	0.029	61.4	0.756	-32.5
1800	0.359	-95.7	9.040	92.7	0.032	59.3	0.736	-34.7
2000	0.338	-102.1	8.394	88.0	0.034	59.1	0.718	-36.9
2200	0.303	-108.9	7.670	82.9	0.037	58.1	0.704	-39.0
2400	0.281	-113.7	7.089	79.0	0.040	58.2	0.690	-41.1
2600	0.261	-121.5	6.569	74.2	0.043	57.3	0.677	-43.0
2800	0.251	-126.3	6.158	70.6	0.045	55.5	0.666	-45.0
3000	0.237	-131.8	5.770	67.0	0.049	54.7	0.657	-47.0
3200	0.224	-136.4	5.413	63.2	0.052	53.3	0.648	-48.8
3400	0.204	-142.4	5.084	60.3	0.055	51.9	0.638	-50.7
3600	0.202	-145.4	4.838	57.2	0.058	50.2	0.629	-52.6
3800	0.186	-153.3	4.599	53.7	0.062	49.3	0.622	-54.5
4000	0.169	-158.5	4.353	50.8	0.064	47.7	0.616	-56.4
4200	0.163	-165.8	4.192	47.6	0.068	46.3	0.609	-58.4
4400	0.160	-170.2	3.989	44.7	0.071	45.2	0.603	-60.4
4600	0.161	-174.9	3.806	41.5	0.075	43.3	0.598	-62.5
4800	0.150	176.3	3.646	38.5	0.078	41.7	0.593	-64.5
5000	0.153	171.0	3.525	35.8	0.081	39.7	0.588	-66.6
5200	0.145	168.1	3.404	33.0	0.085	38.4	0.585	-68.6
5400	0.148	162.1	3.255	30.1	0.088	36.4	0.580	-70.7
5600	0.144	158.2	3.151	27.2	0.091	34.8	0.576	-72.8
5800	0.142	149.2	3.033	24.7	0.095	33.3	0.571	-74.9
6000	0.144	141.9	2.943	21.7	0.098	31.4	0.568	-76.9

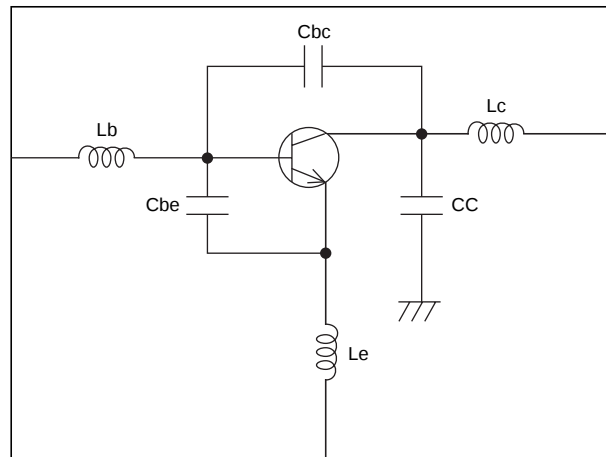
SBFP405B

SPICE PARAMETERS

model : Gummel-Poon

Parameter	Value	Unit	Parameter	Value	Unit
IS	0.21024f	A	TF	4.5899p	S
BF	83.23		XTF	0.3641	
NF	1.0405		VTF	0.19762	V
VAF	39.251	V	ITF	1.3364m	A
IKF	0.16493	A	PTF	0	deg
ISE	15.761f	A	CJC	96.941f	F
NE	1.7763		VJC	0.99532	V
BR	10.526		MJC	0.48652	
NR	0.96647		XCJC	0.08161	
VAR	34.368	V	TR	1.4935n	S
IKR	250.52m	A	FC	0.99469	
ISC	37.223a	A	CJS	0	F
NC	1.3152		VJS	0.75	V
RB	15	Ω	MJS	0	
IRB	212.15m	A	CC	100f	F
RBM	1.3491	Ω	Cbc	4f	F
RE	1.9289	Ω	Cbe	100f	F
RC	0.12691	Ω	Lb	0.6n	H
XTB	0		Lc	0.6n	H
EG	1.11	eV	Le	0.3n	H
XTI	3				
CJE	3.7265f	F			
VJE	0.70367	V			
MJE	0.37747				

SCHEMATIC



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