



2SC5666

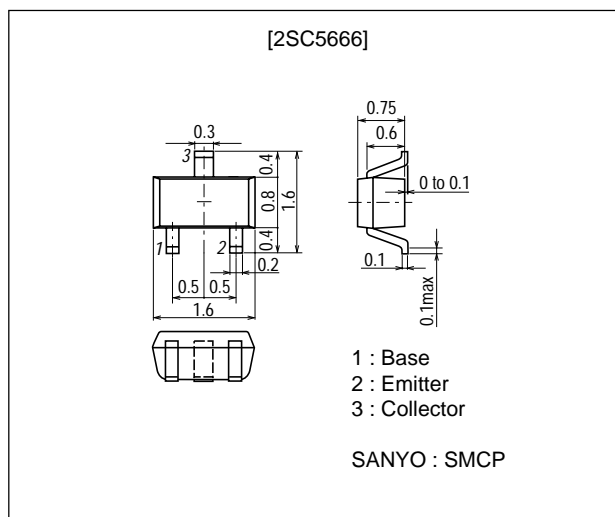
UHF to S Band Low-Noise Amplifier and OSC Applications

Features

- Low noise : NF=1.3dB typ (f=2GHz).
- High cutoff frequency : $f_T=8.5\text{GHz typ (}V_{CE}=1\text{V)}$.
: $f_T=12.5\text{GHz typ (}V_{CE}=3\text{V)}$.
- Low operating voltage.
- High gain : $|S_{21e}|^2=10.5\text{dB typ (}f=2\text{GHz)}$.

Package Dimensions

unit : mm
2106A



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to- Base Voltage	V_{CB0}		9	V
Collector-to-Emitter Voltage	V_{CEO}		4	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_C		40	mA
Collector Dissipation	P_C		100	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

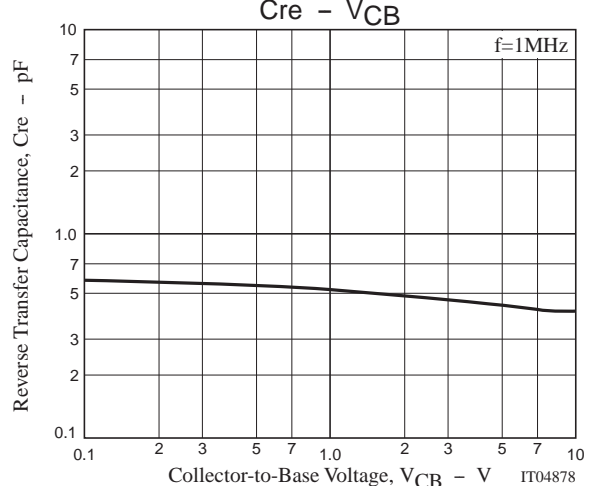
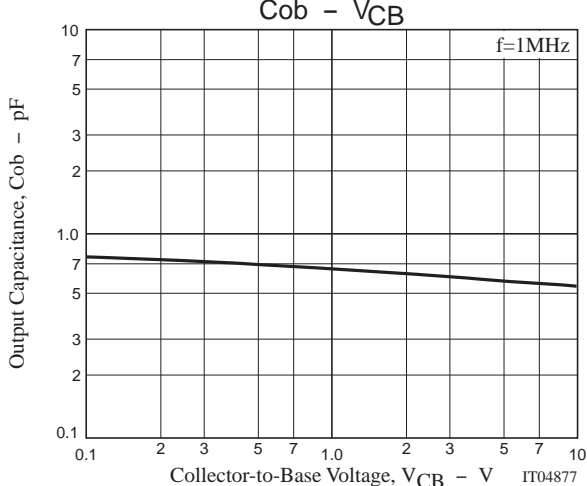
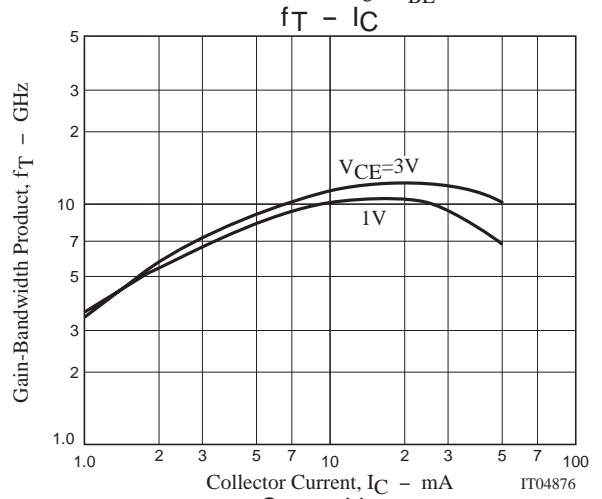
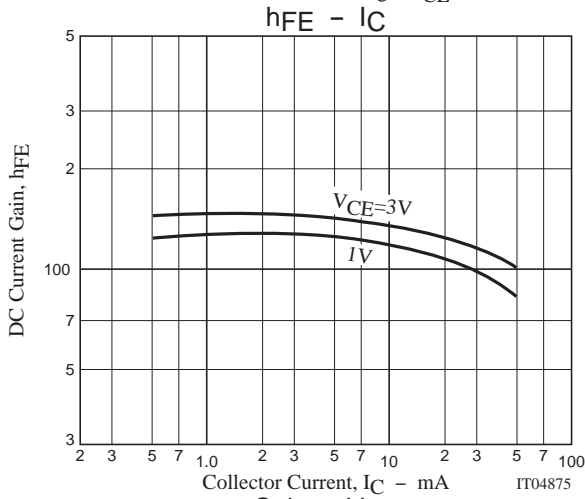
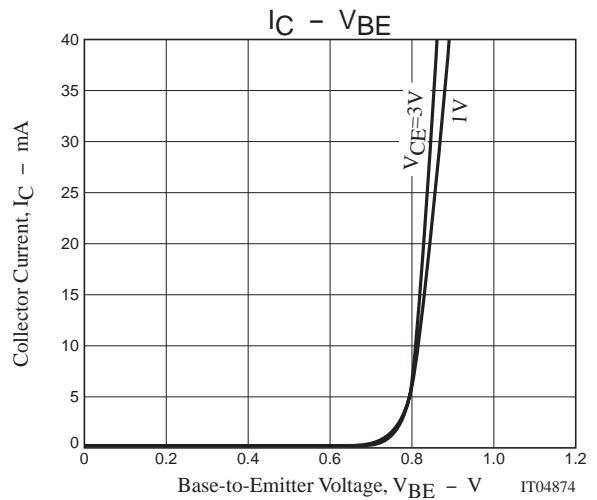
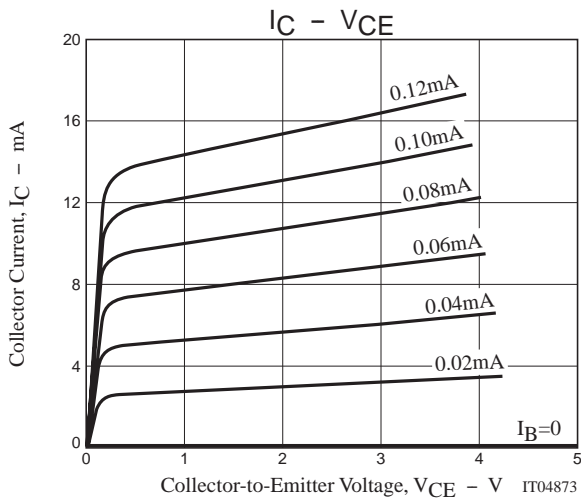
Marking : NJ

Pay attention to handling since it is liable to be affected by static electricity due to the high-frequency process adopted.

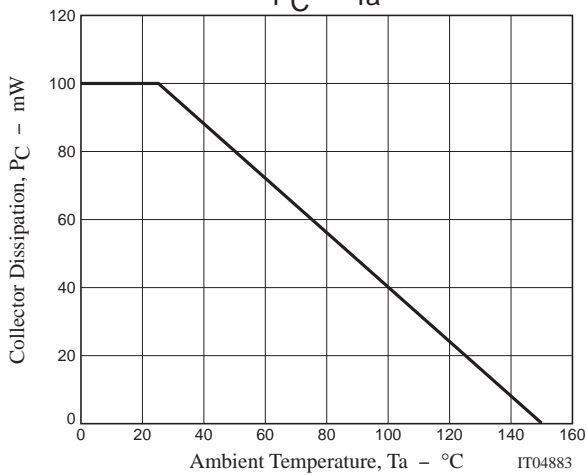
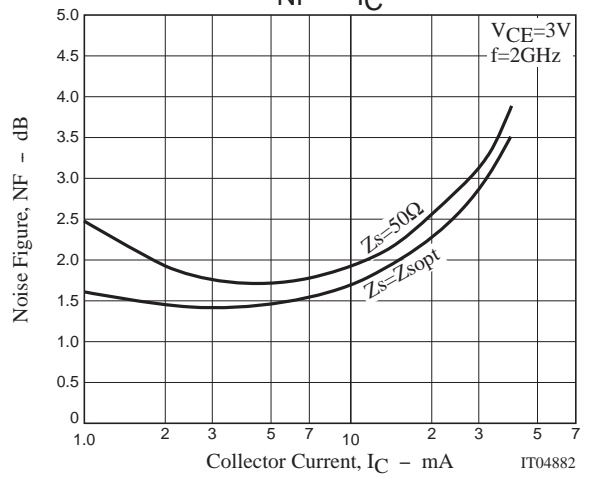
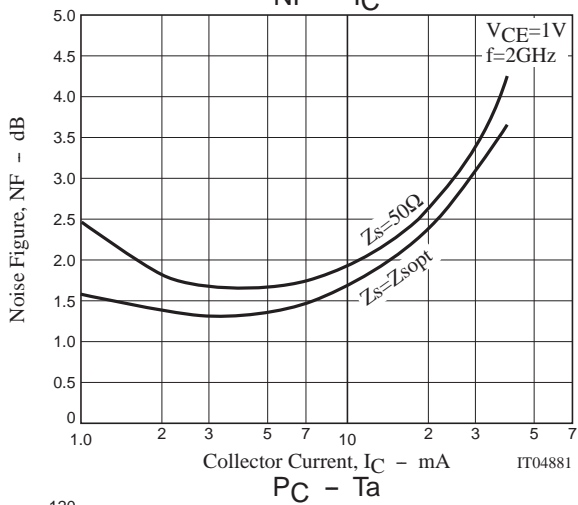
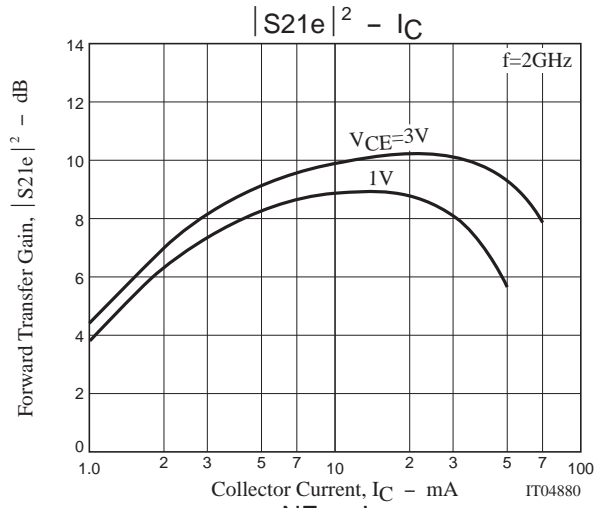
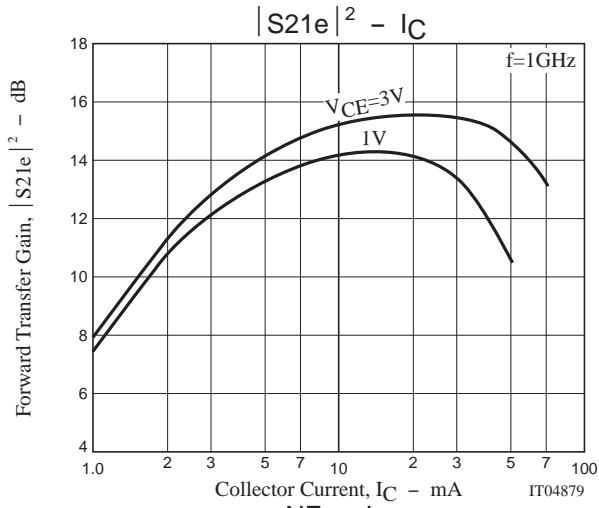
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Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=5V, I_E=0$			1.0	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1V, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=1V, I_C=5mA$	100		160	
Gain-Bandwidth Product	f_T1	$V_{CE}=1V, I_C=5mA$	7.0	8.5		GHz
	f_T2	$V_{CE}=3V, I_C=20mA$	10.5	12.5		GHz
Output Capacitance	C_{ob}	$V_{CB}=1V, f=1MHz$		0.65	0.8	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=1V, f=1MHz$		0.5	0.7	pF
Forward Transfer Gain	S21e ₂₁	$V_{CE}=1V, I_C=5mA, f=2GHz$	7.0	8.5		dB
	S21e ₂₂	$V_{CE}=3V, I_C=20mA, f=2GHz$	9.0	10.5		dB
Noise Figure	NF	$V_{CE}=1V, I_C=3mA, f=2GHz$		1.3	2.0	dB



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S Parameters (Common emitter)

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.973	-9.37	3.452	171.30	0.032	84.64	0.981	-6.86
200	0.959	-18.52	3.379	163.09	0.063	77.16	0.969	-13.36
400	0.920	-36.02	3.180	147.72	0.118	64.82	0.920	-25.40
600	0.870	-52.54	2.983	133.52	0.160	54.30	0.857	-36.21
800	0.809	-66.25	2.729	120.80	0.191	46.36	0.788	-45.12
1000	0.766	-79.65	2.257	109.78	0.213	39.67	0.736	-52.58
1200	0.710	-91.49	2.341	99.29	0.227	33.53	0.684	-59.58
1400	0.665	-101.98	2.127	89.83	0.234	29.19	0.646	-64.55
1600	0.624	-111.34	1.982	81.46	0.241	25.57	0.618	-69.64
1800	0.584	-119.75	1.850	73.70	0.242	23.60	0.592	-73.65
2000	0.547	-127.71	1.722	66.76	0.241	21.39	0.576	-77.85
2200	0.519	-134.50	1.627	59.90	0.242	19.82	0.556	-81.78
2400	0.497	-140.47	1.503	54.19	0.236	18.05	0.545	-83.82
2600	0.476	-147.99	1.439	49.22	0.235	18.66	0.537	-87.87
2800	0.456	-153.82	1.358	43.69	0.232	19.00	0.529	-91.11
3000	0.449	-160.19	1.311	39.62	0.234	20.75	0.526	-94.26

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.868	-20.41	12.043	163.10	0.030	78.85	0.927	-15.14
200	0.810	-39.31	11.132	148.63	0.056	68.05	0.855	-28.24
400	0.676	-70.04	8.818	126.73	0.091	55.91	0.688	-47.24
600	0.580	-93.06	7.015	111.29	0.110	49.19	0.559	-59.83
800	0.510	-108.65	5.644	100.66	0.124	46.95	0.472	-68.06
1000	0.476	-122.60	4.793	91.68	0.136	45.10	0.421	-74.33
1200	0.444	-133.21	4.110	84.27	0.146	45.28	0.379	-80.89
1400	0.422	-142.46	3.570	77.70	0.160	45.45	0.351	-84.60
1600	0.407	-150.73	3.197	71.90	0.172	44.75	0.336	-88.68
1800	0.390	-157.43	2.891	66.51	0.184	45.30	0.322	-92.79
2000	0.378	-164.63	2.631	61.53	0.198	44.74	0.317	-95.95
2200	0.366	-171.48	2.431	56.60	0.211	44.47	0.307	-99.98
2400	0.348	-176.15	2.230	52.36	0.220	43.18	0.292	-101.62
2600	0.345	177.81	2.110	48.75	0.233	43.72	0.297	-105.11
2800	0.335	172.40	1.972	44.29	0.249	42.73	0.292	-108.53
3000	0.338	167.48	1.877	40.82	0.264	42.60	0.288	-112.12

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.764	-29.84	18.265	156.65	0.028	74.42	0.874	-21.28
200	0.676	-54.78	15.535	138.81	0.048	63.90	0.754	-37.68
400	0.536	-90.44	10.885	116.45	0.075	55.09	0.546	-57.82
600	0.467	-113.60	8.066	102.71	0.091	52.85	0.427	-69.47
800	0.422	-128.36	6.297	93.75	0.106	53.04	0.355	-76.91
1000	0.411	-140.25	5.231	86.09	0.122	52.50	0.319	-82.75
1200	0.392	-149.73	4.441	79.76	0.136	52.76	0.290	-89.60
1400	0.382	-157.82	3.830	74.05	0.150	53.24	0.273	-92.78
1600	0.377	-164.52	3.419	69.03	0.167	52.21	0.264	-97.51
1800	0.367	-170.55	3.078	64.23	0.181	52.36	0.257	-100.85
2000	0.360	-176.92	2.791	59.58	0.199	51.67	0.258	-104.60
2200	0.354	177.02	2.576	55.23	0.213	50.42	0.250	-108.98
2400	0.337	172.42	2.363	51.24	0.229	49.07	0.240	-110.28
2600	0.341	167.28	2.225	47.94	0.244	48.69	0.243	-114.43
2800	0.333	162.15	2.085	43.63	0.259	47.55	0.242	-118.13
3000	0.341	158.12	1.974	40.45	0.275	46.58	0.241	-121.69

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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
100	0.618	-42.72	23.610	149.60	0.026	72.24	0.790	-27.83
200	0.529	-74.27	18.319	129.80	0.044	62.28	0.629	-46.47
400	0.441	-112.50	11.603	108.70	0.064	57.35	0.427	-66.16
600	0.410	-133.77	8.264	96.73	0.081	57.08	0.330	-77.07
800	0.391	-146.17	6.377	88.96	0.098	58.13	0.278	-84.38
1000	0.392	-155.66	5.230	82.09	0.114	58.23	0.253	-90.30
1200	0.384	-163.36	4.421	76.40	0.132	58.63	0.236	-97.18
1400	0.382	-169.82	3.811	71.22	0.150	58.66	0.225	-100.40
1600	0.380	-175.23	3.387	66.29	0.167	57.19	0.224	-105.09
1800	0.375	179.48	3.040	61.86	0.183	56.13	0.223	-108.81
2000	0.373	174.13	2.759	57.48	0.201	55.60	0.224	-112.07
2200	0.371	168.30	2.546	53.22	0.218	54.10	0.222	-116.70
2400	0.354	164.25	2.333	49.47	0.234	51.73	0.210	-188.27
2600	0.359	159.82	2.196	46.39	0.252	51.46	0.223	-122.85
2800	0.353	155.08	2.061	42.15	0.267	50.15	0.219	-126.76
3000	0.359	151.50	1.947	38.90	0.285	48.68	0.221	-129.41

V_{CE}=3V, I_C=1mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.979	-8.01	3.212	172.18	0.027	83.62	0.980	-5.69
200	0.969	-16.02	3.145	164.97	0.054	77.88	0.972	-11.21
400	0.935	-31.19	3.003	150.84	0.101	67.28	0.936	-21.65
600	0.896	-45.81	2.854	137.86	0.140	57.41	0.885	-31.17
800	0.841	-58.39	2.652	125.81	0.169	50.17	0.826	-39.37
1000	0.804	-70.63	2.496	115.17	0.192	43.47	0.784	-46.14
1200	0.750	-81.70	2.346	104.72	0.207	37.49	0.734	-52.92
1400	0.703	-91.99	2.157	95.17	0.217	33.26	0.697	-57.77
1600	0.661	-101.18	2.025	86.77	0.222	29.47	0.669	-62.63
1800	0.616	-109.04	1.907	79.04	0.227	26.52	0.643	-66.73
2000	0.575	-116.98	1.783	71.85	0.227	24.28	0.627	-70.63
2200	0.546	-124.19	1.688	64.68	0.229	23.06	0.603	-74.47
2400	0.516	-130.14	1.564	58.81	0.225	20.92	0.592	-76.39
2600	0.493	-136.84	1.507	53.54	0.220	21.44	0.582	-79.98
2800	0.469	-143.06	1.413	47.78	0.218	21.52	0.575	-83.30
3000	0.458	-149.94	1.375	43.64	0.221	22.84	0.570	-86.69

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
100	0.895	-17.00	11.719	164.93	0.027	80.24	0.931	-12.58
200	0.843	-32.71	11.021	151.89	0.048	71.52	0.873	-23.48
400	0.717	-59.47	9.077	131.27	0.081	59.96	0.734	-40.15
600	0.610	-80.49	7.427	115.92	0.101	52.95	0.610	-51.48
800	0.527	-95.40	6.067	104.96	0.115	49.60	0.520	-58.67
1000	0.481	-108.76	5.220	95.80	0.128	47.92	0.468	-64.49
1200	0.440	-119.43	4.503	88.43	0.139	48.04	0.421	-70.05
1400	0.408	-129.14	3.922	81.66	0.150	47.25	0.391	-73.23
1600	0.389	-137.62	3.535	75.58	0.162	47.13	0.371	-77.00
1800	0.367	-144.43	3.197	70.19	0.174	46.76	0.356	-80.26
2000	0.349	-152.28	2.917	65.15	0.184	46.96	0.348	-83.46
2200	0.334	-159.10	2.699	60.25	0.199	46.78	0.336	-87.00
2400	0.313	-163.95	2.467	55.92	0.207	45.92	0.322	-88.01
2600	0.310	-170.55	2.339	52.24	0.221	45.95	0.320	-91.33
2800	0.296	-175.85	2.183	47.62	0.233	45.33	0.313	-94.61
3000	0.300	178.00	2.081	44.35	0.248	45.02	0.311	-98.19

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.810	-24.23	18.091	159.23	0.024	75.47	0.888	-17.34
200	0.727	-44.76	15.845	143.22	0.043	68.43	0.788	-31.12
400	0.571	-76.23	11.634	121.04	0.069	58.69	0.602	-48.48
600	0.473	-98.02	8.836	107.04	0.085	56.11	0.479	-58.66
800	0.415	-112.49	6.986	97.68	0.099	55.44	0.401	-64.92
1000	0.389	-125.02	5.845	89.81	0.113	54.58	0.360	-69.48
1200	0.362	-134.86	4.979	83.32	0.127	54.86	0.325	-75.26
1400	0.344	-144.09	4.310	77.63	0.142	54.58	0.305	-77.55
1600	0.333	-151.39	3.847	72.54	0.157	54.44	0.294	-81.52
1800	0.322	-157.65	3.470	67.71	0.171	54.60	0.285	-84.96
2000	0.314	-164.79	3.145	63.28	0.186	53.05	0.279	-87.88
2200	0.304	-171.79	2.912	58.68	0.203	53.17	0.270	-91.98
2400	0.286	-176.05	2.664	54.79	0.213	51.27	0.257	-93.01
2600	0.288	177.53	2.514	51.61	0.228	50.93	0.262	-96.25
2800	0.279	172.50	2.342	47.27	0.246	50.16	0.251	-100.34
3000	0.285	168.03	2.231	44.06	0.259	48.61	0.252	-103.57

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.687	-32.49	24.296	153.10	0.022	75.55	0.833	-22.46
200	0.586	-58.40	19.679	134.65	0.038	64.60	0.694	-37.92
400	0.448	-92.92	13.058	113.27	0.058	60.12	0.493	-54.16
600	0.385	-114.95	9.489	100.88	0.076	58.66	0.383	-62.72
800	0.351	-128.20	7.348	92.79	0.091	59.71	0.322	-68.12
1000	0.339	-139.45	6.081	85.93	0.106	59.17	0.292	-72.14
1200	0.326	-148.09	5.153	80.07	0.123	60.25	0.266	-77.46
1400	0.321	-155.61	4.444	75.02	0.139	60.09	0.252	-79.72
1600	0.317	-162.36	3.960	70.25	0.156	59.58	0.248	-83.95
1800	0.309	-168.19	3.567	65.83	0.172	59.01	0.242	-87.72
2000	0.305	-174.56	3.224	61.44	0.187	57.22	0.241	-90.83
2200	0.300	178.81	2.987	57.40	0.206	56.28	0.235	-95.69
2400	0.285	174.62	2.725	53.65	0.218	54.42	0.220	-95.46
2600	0.288	169.71	2.568	50.67	0.235	53.79	0.228	-99.86
2800	0.282	164.54	2.401	46.41	0.251	52.35	0.219	-103.68
3000	0.289	160.80	2.275	43.43	0.267	51.29	0.225	-107.39

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