

**2SC5782**

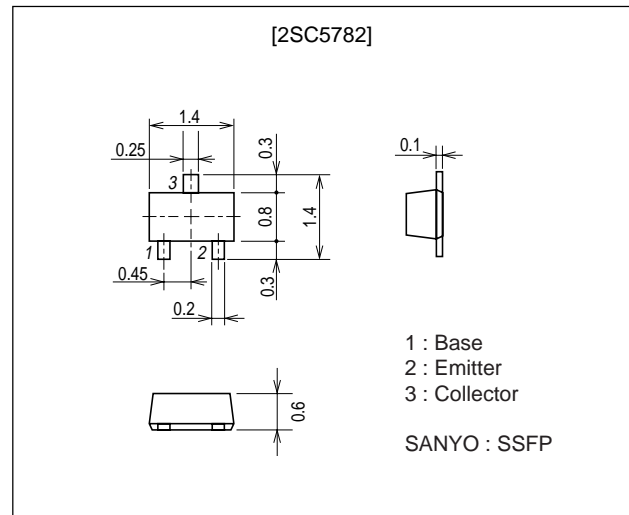
UHF to S Band Low-Noise Amplifier and OSC Applications

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=2GHz).
- Ultraminiature and thin flat lead package.
(1.4mmX0.8mmX0.6mm)

Package Dimensions

unit : mm
2159



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		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

This product adopts a high-frequency process. Please be careful when handling it because it is susceptible to static electricity.

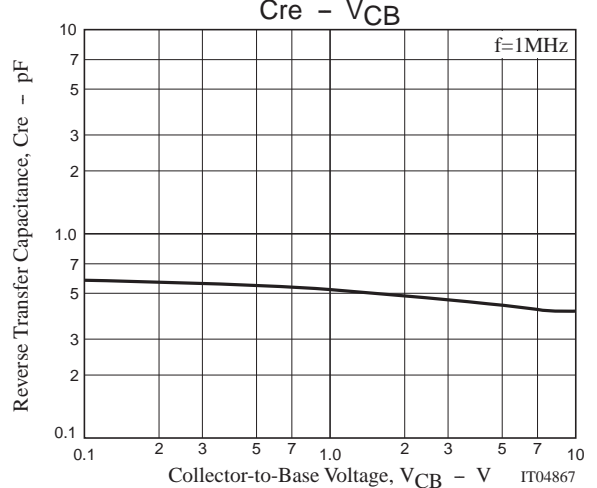
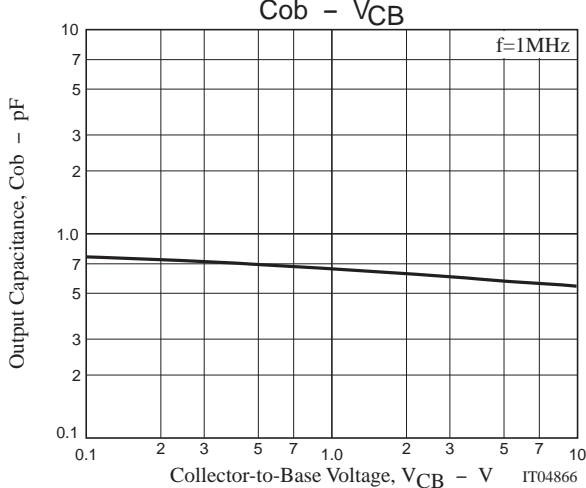
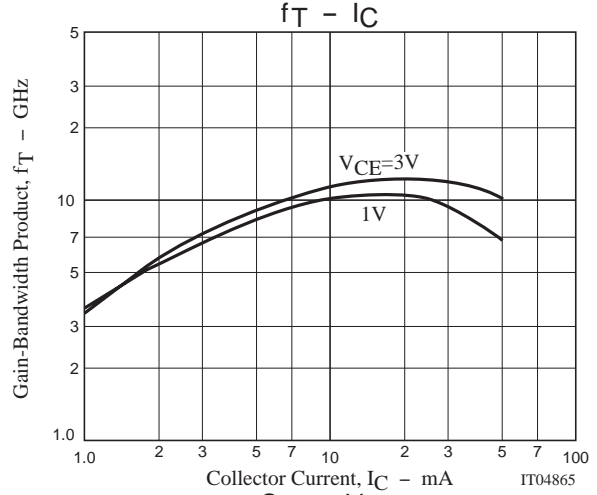
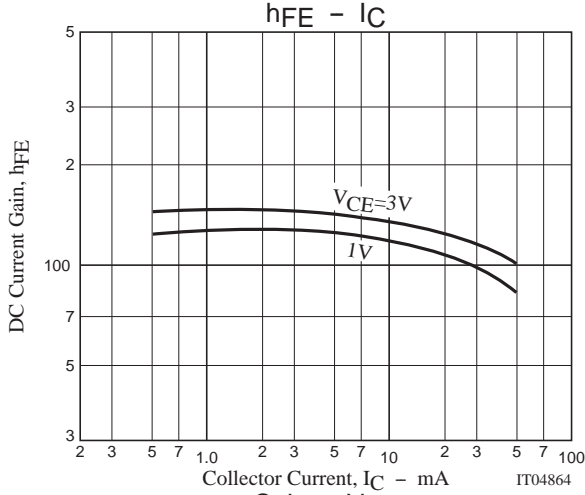
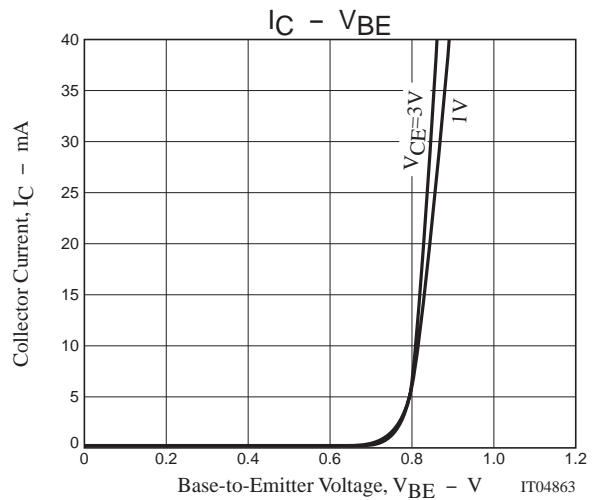
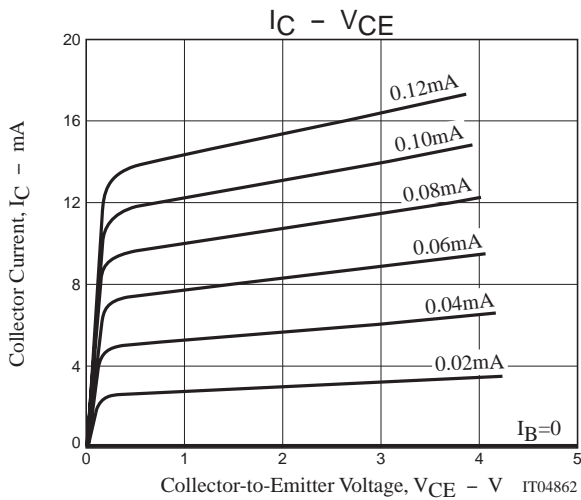
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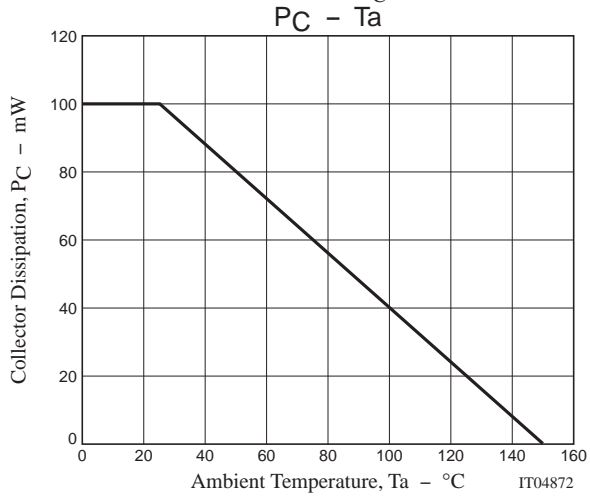
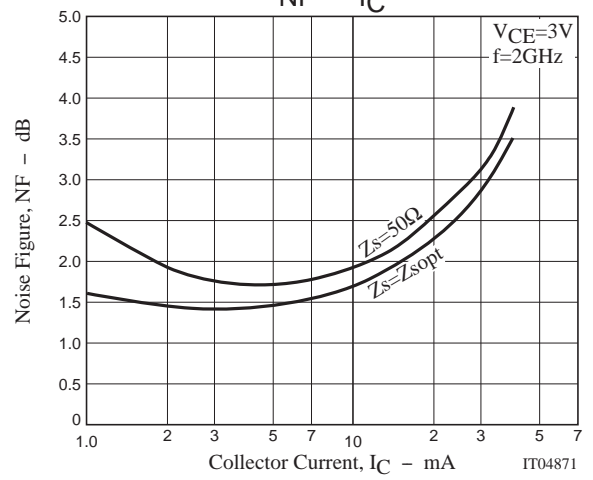
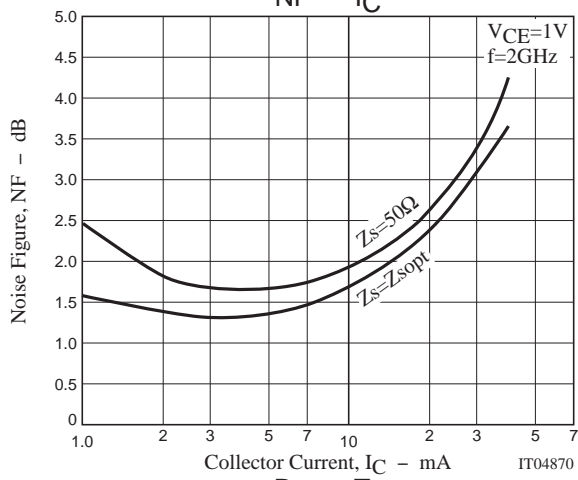
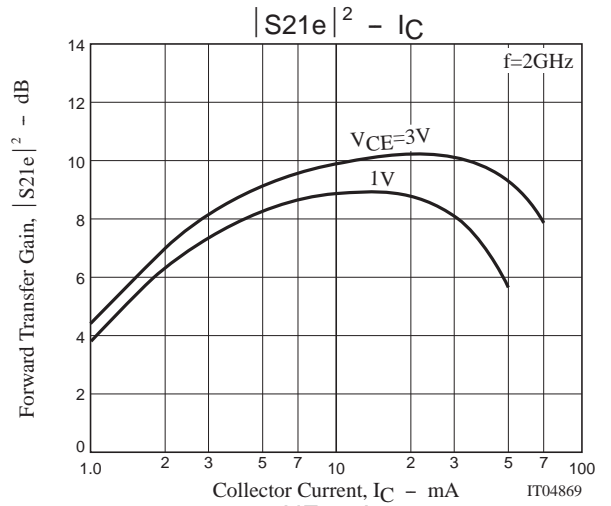
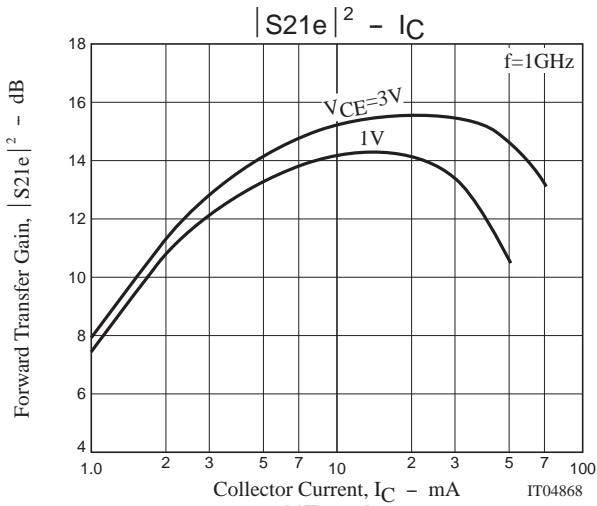
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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	μA
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} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.972	-9.50	3.324	171.60	0.032	82.87	0.985	-6.84
200	0.962	-18.52	3.264	163.75	0.064	76.84	0.975	-13.64
400	0.928	-36.08	3.112	148.65	0.119	64.51	0.930	-26.12
600	0.889	-52.39	2.888	134.98	0.163	53.46	0.872	-37.37
800	0.837	-66.26	2.648	122.57	0.193	44.87	0.810	-46.61
1000	0.809	-79.08	2.483	111.70	0.218	37.46	0.764	-54.56
1200	0.763	-90.61	2.275	101.43	0.231	30.91	0.719	-61.92
1400	0.726	-100.35	2.073	91.95	0.239	25.83	0.685	-67.13
1600	0.691	-109.24	1.934	83.55	0.248	21.58	0.658	-72.68
1800	0.654	-117.33	1.797	76.03	0.247	17.83	0.637	-76.93
2000	0.626	-124.10	1.677	69.00	0.247	14.84	0.625	-81.06
2200	0.601	-130.16	1.565	62.27	0.246	11.92	0.612	-84.63
2400	0.580	-135.57	1.448	56.66	0.240	9.07	0.602	-86.88
2600	0.560	-141.25	1.383	51.43	0.235	8.12	0.599	-90.79
2800	0.548	-146.06	1.296	46.36	0.227	7.30	0.596	-93.36
3000	0.540	-151.31	1.249	41.73	0.225	7.79	0.601	-96.39

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.872	-21.68	12.424	163.67	0.030	77.47	0.937	-15.86
200	0.826	-41.24	11.523	149.85	0.056	67.08	0.868	-29.71
400	0.723	-73.67	9.250	128.43	0.091	52.54	0.709	-50.70
600	0.646	-98.00	7.400	113.04	0.107	44.46	0.582	-65.09
800	0.588	-113.87	5.977	102.50	0.119	40.46	0.498	-74.79
1000	0.568	-127.08	5.082	93.56	0.130	38.70	0.448	-81.90
1200	0.541	-137.25	4.353	86.36	0.136	37.62	0.409	-89.26
1400	0.521	-145.89	3.779	79.99	0.144	37.47	0.386	-93.45
1600	0.508	-152.60	3.369	74.29	0.151	37.93	0.374	-97.90
1800	0.494	-158.57	3.041	69.09	0.159	37.54	0.366	-101.22
2000	0.479	-164.53	2.754	64.22	0.165	37.88	0.362	-104.12
2200	0.470	-169.56	2.541	59.57	0.174	38.32	0.356	-107.88
2400	0.450	-173.39	2.325	55.66	0.180	38.11	0.346	-109.32
2600	0.448	-177.87	2.184	52.18	0.188	38.95	0.355	-112.14
2800	0.435	178.40	2.038	47.80	0.196	38.61	0.354	-114.46
3000	0.435	174.57	1.942	44.45	0.206	39.00	0.356	-116.77

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.767	-32.72	19.369	157.20	0.028	73.89	0.884	-22.79
200	0.702	-60.20	16.622	139.80	0.050	61.86	0.764	-40.71
400	0.600	-98.47	11.711	117.56	0.073	50.38	0.562	-63.93
600	0.555	-121.75	8.693	103.81	0.084	46.35	0.444	-78.10
800	0.522	-135.28	6.774	95.19	0.094	45.68	0.377	-87.30
1000	0.519	-146.32	5.626	87.43	0.107	45.55	0.344	-94.09
1200	0.505	-154.32	4.763	81.47	0.115	47.16	0.321	-101.46
1400	0.497	-161.23	4.095	76.00	0.126	47.73	0.307	-104.91
1600	0.491	-166.53	3.641	71.09	0.137	47.78	0.302	-109.07
1800	0.482	-171.39	3.277	66.41	0.148	47.81	0.300	-112.30
2000	0.474	-176.01	2.953	62.13	0.157	47.96	0.304	-114.55
2200	0.467	179.16	2.716	57.99	0.171	48.25	0.302	-117.84
2400	0.449	175.64	2.486	54.42	0.180	46.94	0.294	-119.01
2600	0.451	171.55	2.335	51.37	0.190	47.57	0.305	-121.57
2800	0.439	168.24	2.169	47.30	0.201	46.53	0.303	-124.11
3000	0.441	165.15	2.060	43.97	0.213	46.46	0.311	-125.83

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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	0.624	-48.93	25.263	149.69	0.026	68.05	0.798	-30.65
200	0.573	-83.86	19.625	130.01	0.042	57.52	0.635	-51.44
400	0.534	-122.60	12.438	109.06	0.060	50.66	0.435	-74.81
600	0.522	-141.81	8.844	97.32	0.071	50.88	0.340	-88.70
800	0.510	-152.47	6.781	89.82	0.082	51.50	0.294	-97.53
1000	0.513	-160.65	5.576	83.02	0.094	53.06	0.276	-103.58
1200	0.510	-167.04	4.699	77.81	0.106	54.44	0.265	-110.10
1400	0.504	-171.93	4.022	72.79	0.118	55.03	0.259	-113.13
1600	0.502	-176.18	3.569	68.25	0.132	54.71	0.263	-116.54
1800	0.498	179.48	3.198	63.88	0.144	54.38	0.266	-119.43
2000	0.490	175.62	2.885	59.85	0.155	54.69	0.271	-121.43
2200	0.485	171.39	2.657	55.73	0.169	53.58	0.275	-124.43
2400	0.470	168.21	2.428	52.46	0.180	52.54	0.269	-125.54
2600	0.472	165.02	2.275	49.30	0.193	52.53	0.282	-127.34
2800	0.462	161.86	2.125	45.18	0.204	51.72	0.283	-129.73
3000	0.463	158.77	2.015	42.21	0.217	50.75	0.293	-131.71

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	0.975	-8.66	3.445	172.15	0.028	81.31	0.985	-6.17
200	0.967	-16.98	3.433	164.80	0.055	76.44	0.976	-12.30
400	0.936	-33.23	3.246	150.82	0.103	66.22	0.938	-23.51
600	0.902	-48.25	3.077	137.92	0.143	56.46	0.887	-34.03
800	0.852	-61.32	2.808	126.00	0.169	47.64	0.831	-42.68
1000	0.823	-73.92	2.665	115.50	0.192	40.56	0.790	-50.10
1200	0.778	-84.76	2.457	105.44	0.206	34.32	0.743	-57.30
1400	0.738	-94.63	2.253	96.16	0.215	29.67	0.706	-62.54
1600	0.702	-103.47	2.112	87.81	0.223	25.08	0.683	-67.67
1800	0.666	-111.22	1.980	80.41	0.225	21.94	0.661	-71.83
2000	0.637	-118.10	1.836	73.35	0.225	19.29	0.648	-75.76
2200	0.608	-124.15	1.720	66.40	0.224	16.85	0.632	-79.73
2400	0.582	-130.15	1.586	60.88	0.221	13.39	0.622	-81.91
2600	0.565	-135.55	1.527	55.77	0.216	12.71	0.621	-85.36
2800	0.546	-140.09	1.425	50.29	0.212	12.10	0.616	-87.99
3000	0.537	-145.90	1.374	45.93	0.207	12.28	0.616	-91.19

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	0.892	-18.34	12.380	165.31	0.025	79.51	0.944	-13.38
200	0.847	-35.62	11.581	152.73	0.049	69.85	0.886	-25.65
400	0.749	-64.64	9.619	132.37	0.081	57.01	0.746	-44.10
600	0.661	-87.51	7.903	117.21	0.100	47.28	0.625	-57.12
800	0.593	-103.50	6.509	106.16	0.111	44.19	0.536	-66.29
1000	0.565	-117.10	5.568	97.29	0.122	41.61	0.482	-72.86
1200	0.529	-127.82	4.808	89.67	0.128	40.03	0.440	-79.72
1400	0.505	-136.27	4.175	83.22	0.135	39.91	0.413	-83.40
1600	0.489	-143.82	3.738	77.50	0.143	39.55	0.396	-87.67
1800	0.472	-150.40	3.380	72.06	0.151	40.01	0.387	-90.90
2000	0.456	-156.03	3.071	67.21	0.156	40.31	0.380	-93.96
2200	0.442	-161.65	2.832	62.45	0.167	40.39	0.374	-97.28
2400	0.423	-166.05	2.581	58.45	0.171	39.88	0.362	-98.53
2600	0.417	-170.82	2.435	54.91	0.179	40.34	0.367	-101.52
2800	0.406	-174.62	2.274	50.37	0.188	40.16	0.365	-104.01
3000	0.407	-178.72	2.156	47.23	0.194	41.30	0.369	-106.34

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.802	-26.99	19.371	159.74	0.026	74.65	0.905	-18.69
200	0.739	-50.17	17.050	143.85	0.044	63.96	0.802	-34.40
400	0.619	-85.36	12.605	122.03	0.067	53.64	0.613	-54.88
600	0.551	-108.81	9.584	107.91	0.082	49.65	0.490	-67.55
800	0.507	-123.64	7.571	98.69	0.091	47.84	0.412	-75.99
1000	0.493	-135.48	6.328	90.89	0.101	48.72	0.371	-82.01
1200	0.476	-144.54	5.375	84.54	0.110	48.18	0.342	-88.43
1400	0.460	-152.33	4.640	79.00	0.120	49.17	0.323	-91.82
1600	0.451	-158.14	4.128	74.06	0.130	48.99	0.317	-95.73
1800	0.444	-163.53	3.708	69.38	0.140	49.61	0.309	-98.72
2000	0.435	-168.64	3.362	65.10	0.149	49.59	0.310	-101.80
2200	0.428	-173.80	3.088	60.84	0.161	49.19	0.308	-105.18
2400	0.408	-177.50	2.815	57.15	0.171	48.23	0.298	-106.20
2600	0.407	178.38	2.646	53.94	0.181	49.10	0.308	-108.71
2800	0.397	174.27	2.464	50.04	0.191	48.09	0.306	-111.72
3000	0.400	171.20	2.336	46.78	0.203	48.31	0.312	-113.88

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

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
100	0.681	-38.13	26.466	153.51	0.022	70.92	0.847	-24.70
200	0.606	-67.79	21.551	134.97	0.038	59.90	0.702	-42.79
400	0.519	-106.19	14.298	113.61	0.054	54.68	0.497	-63.18
600	0.485	-127.90	10.362	101.29	0.068	52.45	0.387	-74.58
800	0.462	-140.45	8.010	93.52	0.078	54.39	0.325	-82.24
1000	0.462	-150.06	6.613	86.54	0.091	54.96	0.298	-87.57
1200	0.454	-157.53	5.586	81.00	0.101	55.31	0.278	-94.11
1400	0.448	-163.38	4.798	76.11	0.111	56.28	0.267	-96.85
1600	0.444	-168.29	4.257	71.65	0.125	56.18	0.268	-100.57
1800	0.437	-173.02	3.824	67.28	0.138	55.37	0.265	-103.27
2000	0.432	-177.44	3.449	63.40	0.149	55.72	0.271	-105.82
2200	0.430	177.96	3.177	59.25	0.164	54.84	0.271	-110.06
2400	0.412	174.56	2.890	55.78	0.171	53.07	0.262	-110.91
2600	0.414	171.18	2.722	52.85	0.183	53.37	0.273	-113.29
2800	0.403	167.51	2.530	48.88	0.194	53.09	0.273	-115.69
3000	0.407	164.62	2.396	45.77	0.208	52.49	0.282	-118.20

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