

INCHANGE Semiconductor

isc RF Product Specification

isc Silicon NPN RF Transistor

2SC4571

DESCRIPTION

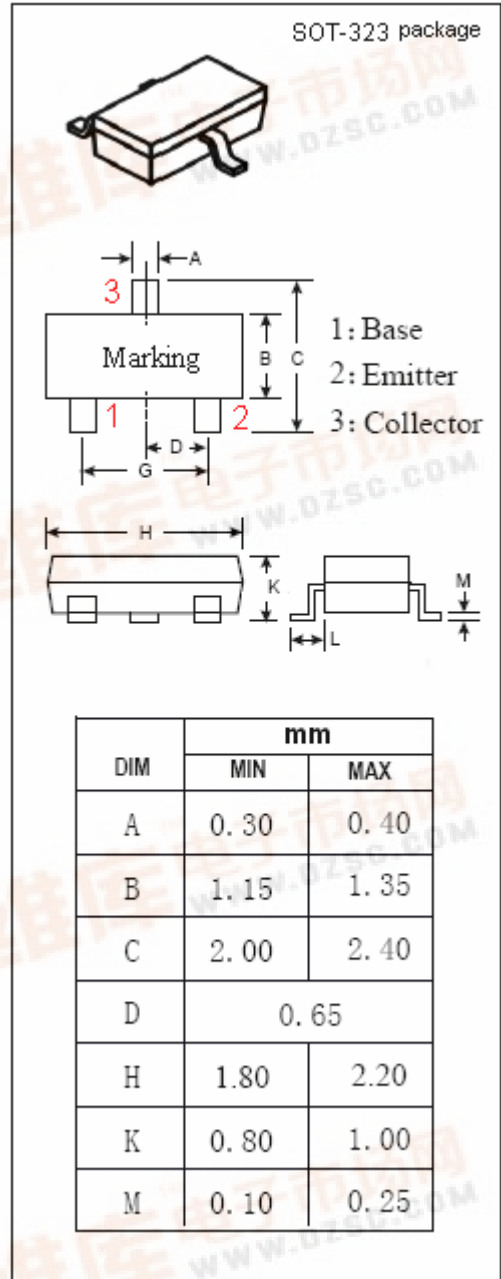
- High Current-Gain—Bandwidth Product
 $f_T = 5.0 \text{ GHz TYP. @ } V_{CE} = 5 \text{ V, } I_C = 5 \text{ mA, } f = 1.0 \text{ GHz}$
- Low C_{OB}
 $0.9\text{pF TYP. @ } V_{CB} = 5 \text{ V, } I_E = 0, f = 1.0 \text{ MHz}$

APPLICATIONS

- Designed for use in UHF oscillator and mixer.

ABSOLUTE MAXIMUM RATINGS($T_a=25^\circ\text{C}$)

SYMBOL	PARAMETER	VALUE	UNIT
V_{CBO}	Collector-Base Voltage	20	V
V_{CEO}	Collector-Emitter Voltage	12	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_C	Collector Current-Continuous	60	mA
P_C	Collector Power Dissipation @ $T_C=25^\circ\text{C}$	0.12	W
T_J	Junction Temperature	125	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-55~125	$^\circ\text{C}$



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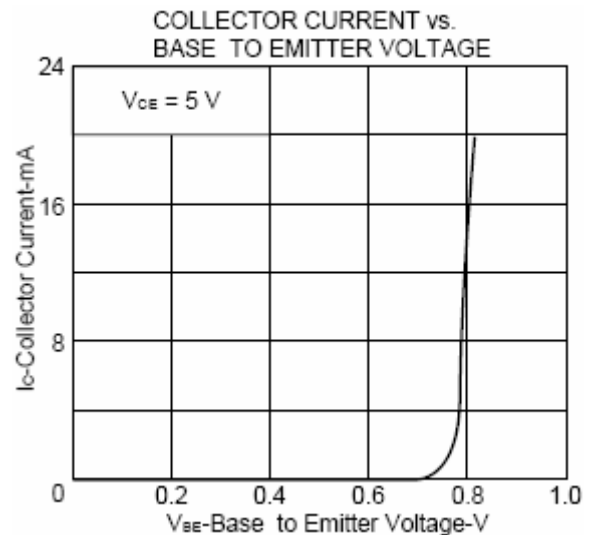
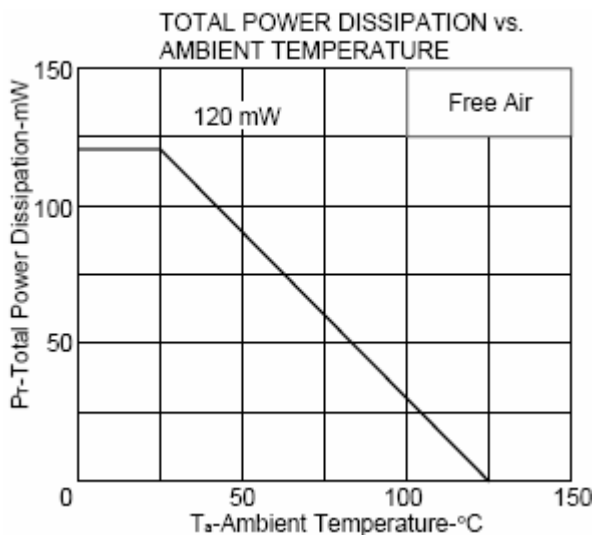
ELECTRICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
I _{CB0}	Collector Cutoff Current	V _{CB} = 15V; I _E = 0			0.1	μ A
I _{EB0}	Emitter Cutoff Current	V _{EB} = 1V; I _C = 0			0.1	μ A
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 5mA ; I _B = 0.5mA			0.5	V
h _{FE}	DC Current Gain	I _C = 5mA ; V _{CE} = 5V	40		200	
f _T	Current-Gain—Bandwidth Product	I _C = 5mA ; V _{CE} = 5V		5.0		GHz
C _{OB}	Output Capacitance	I _E = 0 ; V _{CB} = 3V;f= 1.0MHz		0.9	1.2	pF
S _{21e} ²	Insertion Power Gain	I _C = 5mA ; V _{CE} = 5V;f= 1.0GHz	5.0			dB

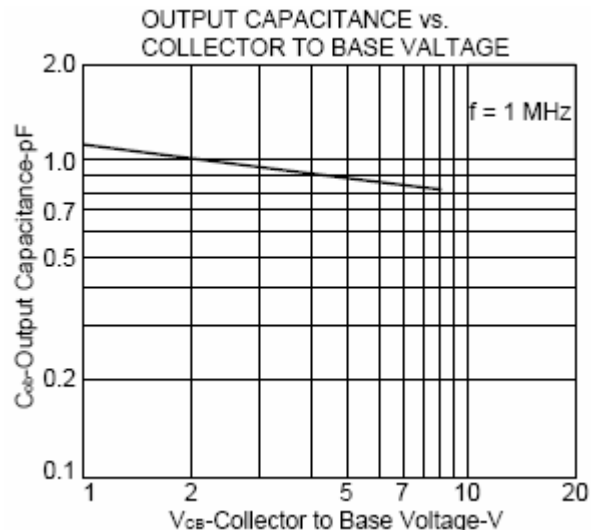
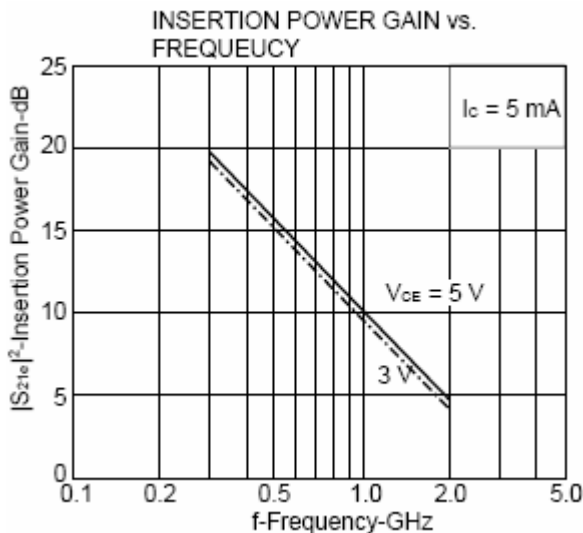
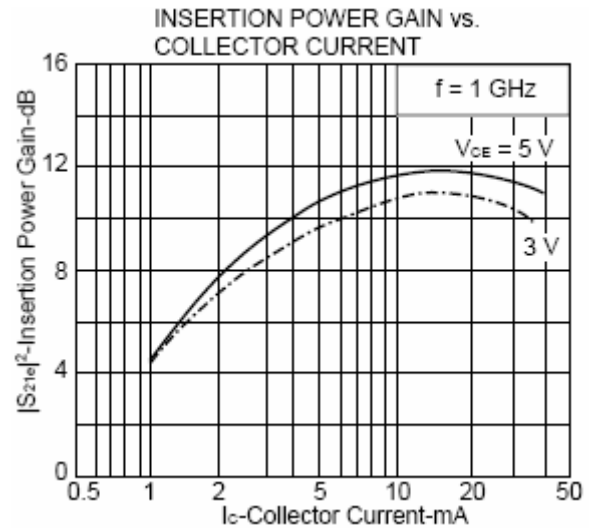
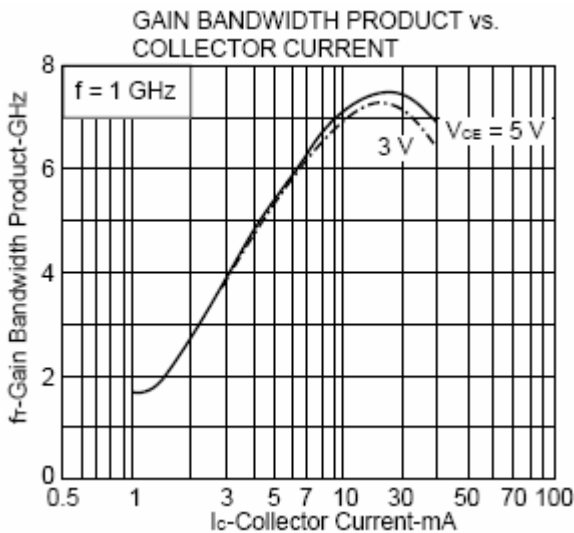
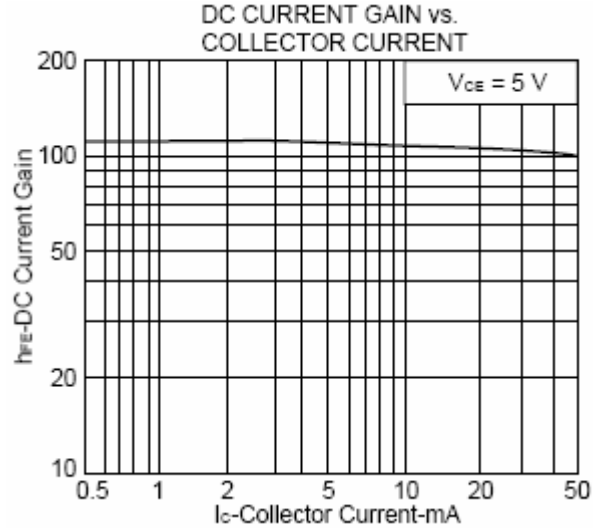
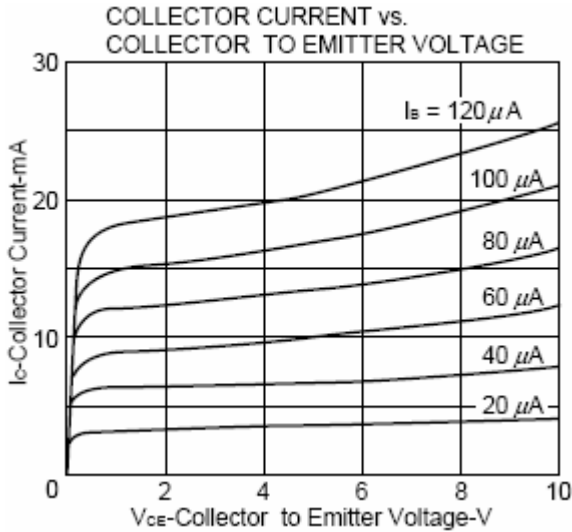
◆ h_{FE} Classification

Rank	T75	T76	T77
Marking	T75	T76	T77
h _{FE}	40-80	60-120	100-200



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S-PARAMETER $V_{CE} = 5\text{ V}$, $I_c = 5\text{ mA}$, $Z_o = 50\ \Omega$

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.874	-24.2	8.628	152.9	0.032	71.8	0.910	-18.4
200	0.752	-49.1	8.089	135.3	0.054	61.2	0.763	-30.3
300	0.625	-70.9	7.278	121.4	0.068	55.5	0.643	-36.7
400	0.523	-89.3	6.406	110.0	0.079	52.9	0.560	-40.1
500	0.444	-105.3	5.617	101.1	0.088	52.1	0.502	-42.3
600	0.396	-117.4	4.890	94.1	0.097	51.8	0.462	-43.8
700	0.359	-129.0	4.345	88.0	0.105	51.9	0.434	-45.2
800	0.336	-138.5	3.893	82.9	0.114	52.0	0.414	-46.6
900	0.318	-147.3	3.529	78.3	0.122	52.4	0.398	-47.9
1000	0.307	-155.3	3.221	74.0	0.131	52.3	0.385	-49.5
1100	0.299	-162.8	2.959	70.1	0.140	52.2	0.376	-51.0
1200	0.294	-169.3	2.751	66.4	0.149	52.0	0.371	-52.7
1300	0.292	-175.3	2.565	62.9	0.158	52.4	0.364	-54.2
1400	0.292	179.1	2.407	59.5	0.167	51.9	0.359	-55.6
1500	0.293	173.6	2.269	56.4	0.177	51.3	0.356	-57.3
1600	0.296	168.8	2.155	53.3	0.186	51.2	0.350	-58.9
1700	0.298	164.4	2.045	50.2	0.195	50.6	0.346	-60.4
1800	0.300	160.2	1.950	47.4	0.206	49.9	0.342	-62.3
1900	0.302	156.1	1.873	44.6	0.215	49.4	0.337	-64.5
2000	0.310	151.8	1.793	41.6	0.225	48.8	0.327	-67.1
2100	0.314	148.3	1.726	38.9	0.235	48.2	0.322	-69.4
2200	0.318	144.7	1.662	36.3	0.245	47.2	0.317	-72.4
2300	0.313	141.3	1.609	33.7	0.255	46.3	0.312	-75.3
2400	0.328	138.2	1.556	31.2	0.265	45.4	0.307	-78.9
2500	0.335	135.1	1.513	28.7	0.274	44.5	0.304	-82.9
2600	0.339	131.9	1.466	26.3	0.284	43.4	0.302	-87.1
2700	0.345	129.3	1.427	23.9	0.294	42.5	0.302	-91.0
2800	0.349	126.3	1.387	21.5	0.304	41.5	0.304	-94.8
2900	0.356	123.8	1.353	19.3	0.315	40.4	0.309	-98.9
3000	0.361	121.0	1.323	17.2	0.323	39.4	0.313	-102.4

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$V_{CE} = 5\text{ V}$, $I_c = 3\text{ mA}$, $Z_o = 50\ \Omega$

Freque.	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.923	-19.2	5.456	157.3	0.034	75.1	0.951	-13.6
200	0.844	-39.4	5.317	142.0	0.060	63.0	0.852	-24.1
300	0.746	-57.9	5.047	128.9	0.078	55.7	0.752	-31.3
400	0.660	-74.5	4.667	118.1	0.091	51.5	0.674	-35.8
500	0.575	-90.3	4.321	108.3	0.101	48.3	0.612	-39.0
600	0.516	-102.7	3.860	100.4	0.108	46.4	0.567	-41.5
700	0.461	-114.8	3.546	93.2	0.115	45.7	0.532	-43.6
800	0.423	-125.2	3.237	87.1	0.122	45.3	0.507	-45.4
900	0.396	-134.9	2.979	81.6	0.128	44.8	0.486	-47.1
1000	0.375	-143.6	2.749	76.6	0.134	45.2	0.471	-48.8
1100	0.362	-151.4	2.547	72.4	0.142	45.3	0.461	-50.5
1200	0.349	-158.8	2.380	68.0	0.147	45.4	0.452	-52.3
1300	0.343	-165.2	2.222	64.2	0.154	45.9	0.445	-54.0
1400	0.339	-171.7	2.101	60.4	0.161	46.1	0.438	-55.6
1500	0.336	-177.6	1.984	57.0	0.169	46.4	0.433	-57.3
1600	0.337	177.0	1.887	53.5	0.177	46.5	0.428	-59.0
1700	0.338	172.0	1.798	50.3	0.184	46.6	0.423	-61.1
1800	0.337	167.1	1.719	47.2	0.193	46.7	0.419	-63.1
1900	0.339	162.7	1.648	44.0	0.201	46.5	0.411	-65.2
2000	0.345	158.0	1.579	41.2	0.211	46.3	0.405	-68.0
2100	0.348	153.8	1.524	38.4	0.219	46.0	0.399	-70.4
2200	0.351	150.0	1.470	35.4	0.229	45.6	0.394	-73.4
2300	0.357	146.1	1.424	32.8	0.238	45.3	0.389	-76.4
2400	0.361	142.5	1.376	30.1	0.247	44.6	0.386	-80.0
2500	0.367	139.2	1.338	27.5	0.257	44.0	0.383	-83.8
2600	0.371	135.8	1.296	25.0	0.266	43.5	0.381	-88.0
2700	0.376	132.6	1.263	22.5	0.275	42.9	0.380	-91.4
2800	0.381	129.3	1.231	20.1	0.287	42.1	0.385	-95.4
2900	0.387	126.4	1.199	17.9	0.297	41.4	0.389	-99.2
3000	0.392	123.4	1.169	15.7	0.306	40.4	0.391	-103.0

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$V_{CE} = 5\text{ V}$, $I_c = 1\text{ mA}$, $Z_o = 50\ \Omega$

Freque.	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.977	-14.2	1.896	165.0	0.036	79.9	0.988	-7.4
200	0.944	-28.0	1.948	150.9	0.069	69.5	0.954	-14.2
300	0.897	-41.9	1.954	139.2	0.095	61.1	0.911	-20.1
400	0.848	-54.9	1.907	128.9	0.116	53.7	0.867	-25.2
500	0.793	-68.0	1.878	119.8	0.131	47.9	0.820	-29.5
600	0.744	-79.1	1.745	110.9	0.143	42.2	0.786	-33.4
700	0.689	-90.6	1.697	102.7	0.151	38.6	0.752	-36.6
800	0.646	-101.4	1.630	95.2	0.155	35.1	0.726	-39.6
900	0.605	-111.3	1.579	88.5	0.157	32.9	0.702	-42.3
1000	0.570	-121.0	1.519	82.1	0.161	31.1	0.684	-44.8
1100	0.542	-130.0	1.455	76.5	0.162	30.0	0.669	-47.4
1200	0.516	-138.2	1.393	71.2	0.162	29.1	0.661	-49.9
1300	0.500	-145.7	1.325	66.3	0.161	29.0	0.650	-52.2
1400	0.489	-153.1	1.270	61.8	0.163	29.4	0.643	-54.3
1500	0.478	-160.1	1.213	57.5	0.163	29.3	0.637	-56.7
1600	0.470	-166.6	1.168	53.5	0.163	30.5	0.631	-59.0
1700	0.465	-172.8	1.128	49.5	0.164	31.6	0.624	-61.6
1800	0.461	-178.5	1.086	45.9	0.166	33.5	0.621	-64.0
1900	0.458	175.7	1.047	42.5	0.169	34.4	0.614	-66.7
2000	0.458	170.1	1.012	39.2	0.173	36.3	0.608	-69.6
2100	0.460	165.0	0.980	36.1	0.178	38.0	0.603	-72.6
2200	0.460	160.3	0.946	33.1	0.183	39.5	0.599	-76.0
2300	0.462	155.6	0.922	30.4	0.191	40.9	0.593	-79.3
2400	0.465	151.1	0.889	27.7	0.198	42.3	0.591	-83.1
2500	0.469	146.7	0.867	25.3	0.206	43.0	0.588	-87.2
2600	0.472	142.5	0.843	22.8	0.216	44.2	0.588	-91.3
2700	0.476	138.7	0.820	20.5	0.227	44.8	0.586	-95.3
2800	0.479	134.7	0.799	18.5	0.239	45.2	0.589	-99.4
2900	0.482	130.9	0.779	16.5	0.251	45.2	0.591	-103.3
3000	0.487	127.2	0.761	14.8	0.263	45.4	0.593	-107.1

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$V_{CE} = 3\text{ V}$, $I_c = 5\text{ mA}$, $Z_o = 50\ \Omega$

Freque.	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.871	-26.4	8.583	152.2	0.037	69.9	0.894	-21.2
200	0.735	-53.1	7.998	133.6	0.061	59.2	0.730	-35.0
300	0.608	-76.6	7.129	119.2	0.076	53.4	0.601	-42.3
400	0.512	-96.0	6.208	107.9	0.087	51.2	0.515	-46.6
500	0.441	-112.5	5.402	99.1	0.096	49.9	0.452	-49.3
600	0.400	-125.0	4.681	92.2	0.105	49.8	0.410	-51.2
700	0.367	-136.5	4.139	86.3	0.116	50.1	0.379	-52.9
800	0.349	-146.0	3.707	81.3	0.124	50.1	0.358	-54.5
900	0.338	-154.7	3.362	76.6	0.133	50.5	0.341	-55.7
1000	0.328	-162.1	3.061	72.4	0.142	50.5	0.327	-57.7
1100	0.324	-168.9	2.817	68.5	0.153	50.5	0.317	-59.3
1200	0.319	-175.4	2.611	64.8	0.162	50.1	0.311	-61.0
1300	0.319	179.0	2.436	61.4	0.172	49.9	0.305	-62.6
1400	0.321	173.8	2.296	57.9	0.181	49.7	0.300	-64.3
1500	0.322	168.7	2.159	54.7	0.192	49.5	0.294	-65.8
1600	0.324	164.3	2.048	51.6	0.201	48.8	0.289	-67.7
1700	0.328	160.2	1.950	48.5	0.212	48.2	0.284	-69.3
1800	0.329	155.9	1.858	45.8	0.221	47.6	0.280	-71.4
1900	0.333	152.0	1.777	42.7	0.234	46.9	0.272	-73.9
2000	0.339	148.2	1.716	40.0	0.242	46.1	0.265	-77.0
2100	0.343	144.7	1.647	37.4	0.253	45.2	0.258	-79.9
2200	0.348	141.6	1.587	34.7	0.264	44.1	0.254	-83.4
2300	0.353	138.2	1.537	32.2	0.274	43.3	0.249	-86.6
2400	0.357	135.1	1.487	29.6	0.284	42.3	0.246	-90.8
2500	0.364	132.3	1.446	27.1	0.293	41.0	0.243	-95.6
2600	0.368	129.3	1.403	24.8	0.305	40.4	0.244	-100.0
2700	0.373	126.5	1.366	22.4	0.313	39.2	0.245	-104.3
2800	.377	123.8	1.330	19.9	0.324	38.1	0.250	-109.0
2900	0.383	121.1	1.298	17.9	0.334	36.9	0.255	-112.8
3000	0.388	118.3	1.268	15.7	0.344	35.8	0.260	-116.4

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Freque.	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.912	-21.6	5.515	157.0	0.039	74.4	0.941	-15.6
200	0.834	-42.0	5.289	140.5	0.068	61.3	0.829	-27.6
300	0.733	-61.8	4.989	127.0	0.088	54.0	0.720	-35.4
400	0.645	-79.5	4.582	115.9	0.102	48.7	0.634	-40.9
500	0.563	-95.8	4.216	106.2	0.111	46.0	0.567	-44.5
600	0.508	-108.6	3.750	98.3	0.119	44.2	0.520	-47.3
700	0.459	-121.1	3.422	91.1	0.126	43.4	0.483	-49.6
800	0.426	-131.5	3.114	85.1	0.134	43.0	0.457	-51.6
900	0.403	-140.9	2.860	79.8	0.140	42.7	0.435	-53.4
1000	0.387	-149.5	2.628	74.7	0.147	43.0	0.418	-55.3
1100	0.374	-157.2	2.441	70.4	0.155	43.2	0.408	-57.2
1200	0.365	-164.3	2.273	66.1	0.161	43.0	0.399	-59.1
1300	0.360	-170.7	2.132	62.3	0.169	43.3	0.390	-60.8
1400	0.359	-176.5	2.007	58.7	0.176	43.6	0.383	-62.6
1500	0.358	177.6	1.899	55.2	0.184	43.7	0.378	-64.5
1600	0.359	172.6	1.801	51.8	0.192	43.8	0.371	-66.4
1700	0.360	167.7	1.720	48.3	0.200	43.6	0.366	-68.5
1800	0.361	163.3	1.648	45.3	0.209	43.6	0.361	-70.6
1900	0.363	158.7	1.582	42.3	0.218	43.4	0.355	-72.9
2000	0.369	154.5	1.513	39.2	0.227	43.1	0.347	-76.1
2100	0.372	150.4	1.462	36.5	0.236	42.9	0.340	-78.8
2200	0.375	146.9	1.409	33.7	0.246	42.4	0.336	-82.3
2300	0.380	143.2	1.366	31.0	0.256	41.8	0.331	-85.3
2400	0.385	139.8	1.323	28.4	0.265	41.4	0.328	-89.4
2500	0.391	136.5	1.287	25.8	0.275	40.3	0.326	-93.8
2600	0.394	133.3	1.250	23.4	0.284	39.8	0.326	-98.0
2700	0.401	130.2	1.215	20.9	0.295	39.0	0.327	-102.2
2800	0.405	127.0	1.183	18.5	0.305	38.2	0.332	-106.2
2900	0.410	124.2	1.156	16.3	0.314	37.4	0.337	-110.2
3000	0.415	121.3	1.130	14.2	0.324	36.5	0.342	-113.8

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$V_{CE} = 3\text{ V}$, $I_c = 1\text{ mA}$, $Z_o = 50\ \Omega$

Freque. MHz	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.970	_14.8	1.932	163.6	0.042	78.2	0.984	-8.3
200	0.940	_29.4	1.944	149.6	0.079	68.4	0.945	-16.0
300	0.890	_43.9	1.949	137.4	0.109	59.0	0.895	-22.6
400	0.839	_57.5	1.894	127.0	0.132	51.8	0.846	-28.2
500	0.782	_71.0	1.854	117.6	0.149	45.3	0.795	-32.8
600	0.734	_82.5	1.723	108.5	0.161	40.1	0.757	-36.9
700	0.680	_94.1	1.674	100.1	0.168	36.1	0.720	-40.5
800	0.638	_105.2	1.606	92.6	0.174	32.7	0.691	-43.7
900	0.598	_115.4	1.548	85.8	0.177	30.0	0.666	-46.5
1000	0.565	_125.0	1.486	79.4	0.179	28.5	0.646	-49.3
1100	0.541	_133.7	1.422	73.9	0.180	27.2	0.633	-51.8
1200	0.518	_142.1	1.354	68.5	0.179	26.0	0.621	-54.5
1300	0.504	_149.6	1.287	63.6	0.180	25.9	0.610	-56.9
1400	0.494	_156.8	1.235	59.0	0.180	26.0	0.603	-59.3
1500	0.485	_163.5	1.183	54.8	0.179	26.2	0.596	-61.8
1600	0.478	_169.9	1.136	50.8	0.180	27.0	0.590	-64.3
1700	0.476	_175.8	1.098	46.9	0.181	27.5	0.584	-66.9
1800	0.472	178.5	1.054	43.4	0.182	29.1	0.578	-69.6
1900	0.470	173.0	1.019	39.9	0.184	30.4	0.573	-72.3
2000	0.472	167.6	0.987	36.6	0.189	31.9	0.566	-75.6
2100	0.473	162.6	0.952	33.8	0.193	33.5	0.560	-78.9
2200	0.474	158.0	0.922	30.8	0.198	34.5	0.556	-82.5
2300	0.476	153.5	0.897	28.0	0.205	36.1	0.551	-86.1
2400	0.480	149.2	0.866	25.4	0.212	37.3	0.548	-90.2
2500	0.484	144.9	0.846	23.0	0.220	38.3	0.546	-94.5
2600	0.488	141.0	0.823	20.7	0.230	39.3	0.547	-98.9
2700	0.491	137.0	0.801	18.5	0.240	39.9	0.546	-103.1
2800	0.495	133.2	0.781	16.4	0.252	4.02	0.550	-107.3
2900	0.498	129.7	0.763	14.6	0.263	4.04	0.553	-111.3
3000	0.501	125.9	0.745	12.9	0.275	4.05	0.555	-115.2