

INCHANGE Semiconductor

isc RF Product Specification

isc Silicon NPN RF Transistor

2SC4570

DESCRIPTION

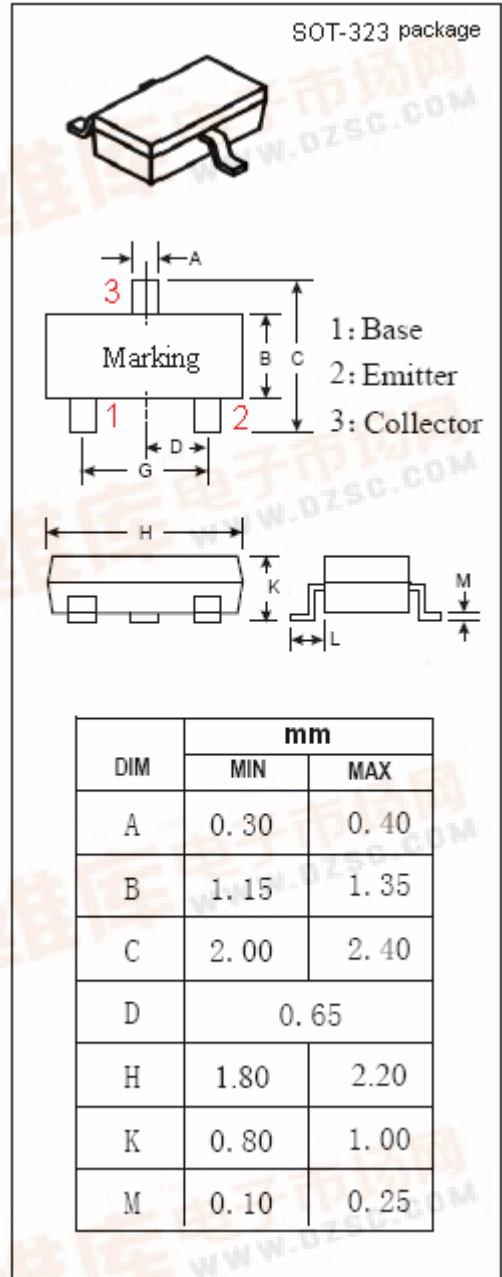
- High Current-Gain—Bandwidth Product  
 $f_T = 5.5 \text{ GHz TYP. @ } V_{CE} = 5 \text{ V, } I_C = 5 \text{ mA, } f = 1.0 \text{ GHz}$
- Low  $C_{OB}$   
 $0.7 \text{ pF TYP. @ } V_{CB} = 5 \text{ V, } I_E = 0, f = 1.0 \text{ MHz}$

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	30	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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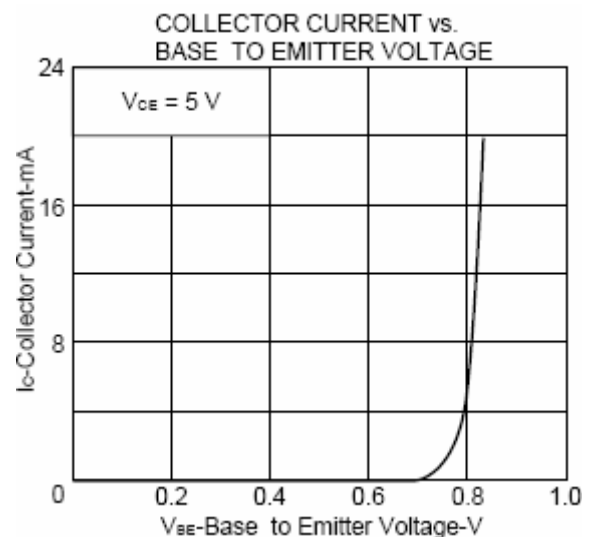
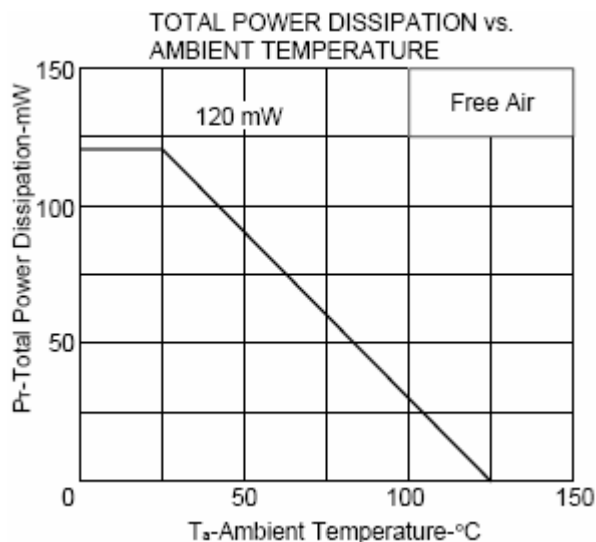
ELECTRICAL CHARACTERISTICS

T<sub>C</sub>=25°C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
I <sub>CB0</sub>	Collector Cutoff Current	V <sub>CB</sub> = 15V; I <sub>E</sub> = 0			0.1	μ A
I <sub>EB0</sub>	Emitter Cutoff Current	V <sub>EB</sub> = 1V; I <sub>C</sub> = 0			0.1	μ A
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 5mA ; I <sub>B</sub> = 0.5mA			0.5	V
h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> = 5mA ; V <sub>CE</sub> = 5V	40		200	
f <sub>T</sub>	Current-Gain—Bandwidth Product	I <sub>C</sub> = 5mA ; V <sub>CE</sub> = 5V		5.5		GHz
C <sub>OB</sub>	Output Capacitance	I <sub>E</sub> = 0 ; V <sub>CB</sub> = 3V;f= 1.0MHz		0.7	0.9	pF
S <sub>21e</sub>   <sup>2</sup>	Insertion Power Gain	I <sub>C</sub> = 5mA ; V <sub>CE</sub> = 5V;f= 1.0GHz	5.0			dB

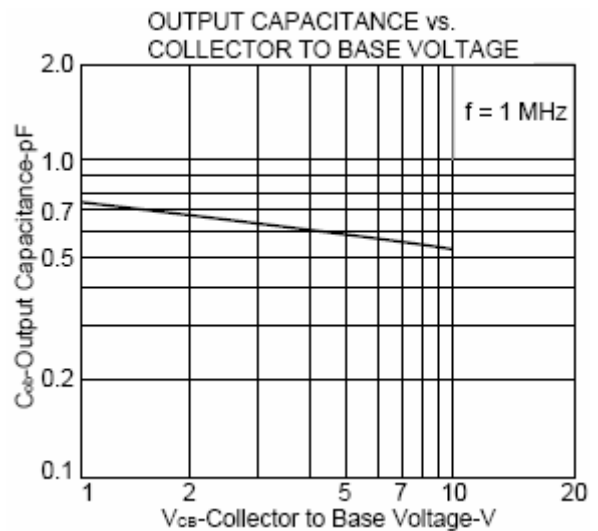
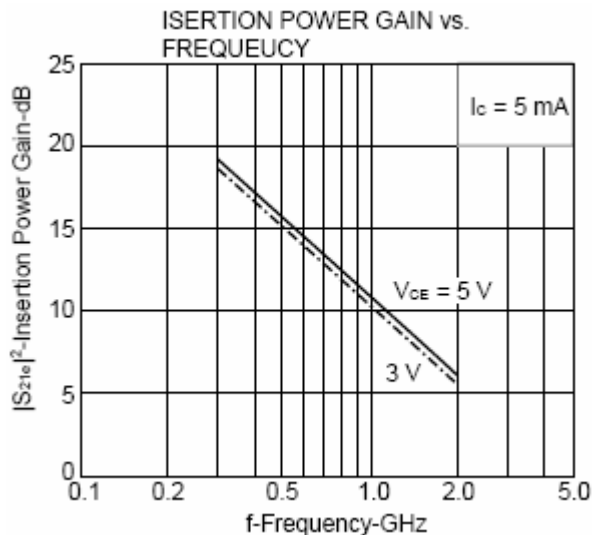
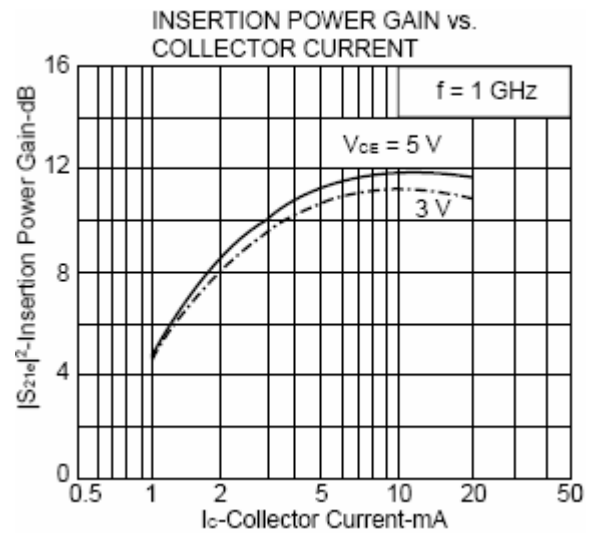
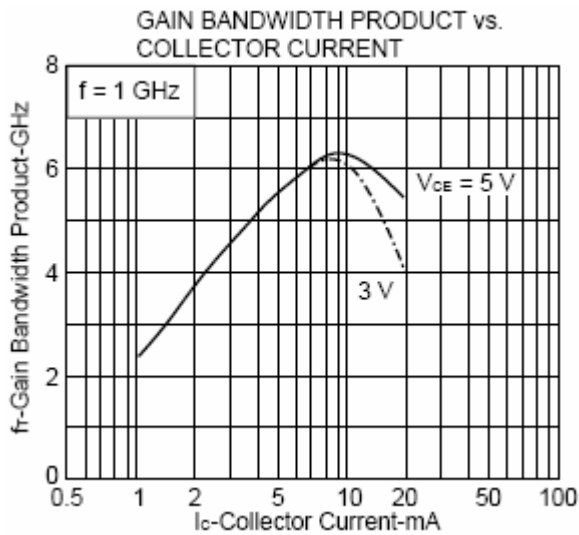
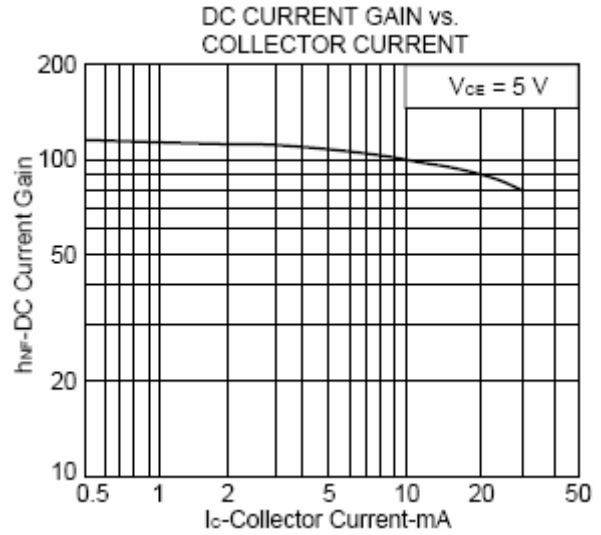
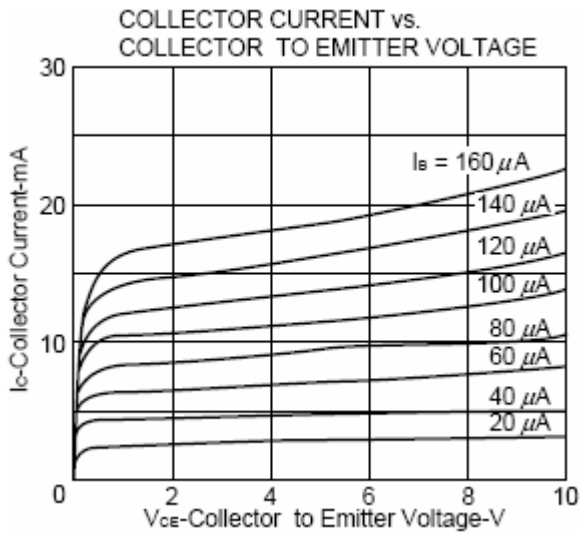
◆ h<sub>FE</sub> Classification

Rank	T72	T73	T74
Marking	T72	T73	T74
h <sub>FE</sub>	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	0.887	-16.9	8.517	156.4	0.024	76.9	0.940	-13.3
200	0.781	-34.4	8.107	140.8	0.042	68.3	0.832	-22.8
300	0.663	-49.9	7.483	127.9	0.057	62.6	0.735	-28.2
400	0.555	-63.2	6.775	117.0	0.067	60.4	0.662	-31.4
500	0.456	-74.9	6.086	107.9	0.076	59.2	0.606	-33.4
600	0.388	-83.6	5.369	100.7	0.085	58.1	0.567	-35.0
700	0.328	-92.0	4.815	94.4	0.094	58.3	0.540	-36.3
800	0.285	-99.2	4.342	89.2	0.103	57.9	0.520	-37.6
900	0.250	-106.3	3.955	84.3	0.111	58.0	0.503	-38.8
1000	0.223	-113.2	3.618	80.2	0.122	56.7	0.490	-40.1
1100	0.201	-120.2	3.334	76.5	0.129	57.1	0.482	-41.5
1200	0.184	-127.0	3.101	72.8	0.138	56.5	0.474	-42.9
1300	0.169	-133.9	2.899	69.4	0.147	55.9	0.467	-44.4
1400	0.159	-140.6	2.724	66.0	0.156	55.6	0.463	-45.7
1500	0.150	-148.7	2.561	63.1	0.166	55.0	0.457	-47.1
1600	0.145	-155.8	2.428	60.1	0.174	54.2	0.453	-48.4
1700	0.141	-162.4	2.314	57.1	0.183	53.5	0.448	-49.8
1800	0.137	-168.8	2.206	54.5	0.193	53.2	0.445	-51.3
1900	0.136	-175.8	2.114	51.6	0.201	52.4	0.439	-52.7
2000	0.139	-177.0	2.029	48.8	0.210	51.4	0.429	-54.9
2100	0.140	-170.8	1.946	46.4	0.219	50.6	0.423	-56.7
2200	0.141	-165.7	1.875	43.9	0.229	49.5	0.417	-58.9
2300	0.145	-160.2	1.816	41.3	0.239	48.5	0.413	-61.1
2400	0.148	-155.2	1.757	38.9	0.247	47.7	0.406	-63.7
2500	0.154	-150.9	1.708	36.4	0.258	46.3	0.401	-66.8
2600	0.158	-146.8	1.658	34.1	0.266	45.5	0.397	-70.0
2700	0.163	-142.4	1.614	31.8	0.273	44.3	0.393	-73.0
2800	0.167	-138.3	1.570	29.5	0.284	43.3	0.394	-76.5
2900	0.173	-135.3	1.534	27.3	0.291	42.4	0.395	-79.8
3000	0.179	-131.3	1.498	25.1	0.299	41.2	0.396	-82.7

## isc Silicon NPN RF Transistor

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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	0.929	-14.0	5.432	162.2	0.025	78.4	0.968	-10.1
200	0.868	-26.8	5.334	147.4	0.046	70.8	0.900	-18.5
300	0.785	-39.6	5.158	135.7	0.063	64.4	0.823	-24.5
400	0.700	-51.3	4.873	125.9	0.076	59.3	0.756	-29.0
500	0.613	-62.7	4.628	116.9	0.086	56.7	0.698	-32.2
600	0.543	-71.7	4.216	109.1	0.096	55.1	0.656	-34.8
700	0.469	-80.8	3.934	101.8	0.103	53.8	0.620	-36.7
800	0.412	-88.7	3.645	95.5	0.112	52.9	0.594	-38.6
900	0.363	-96.1	3.383	89.9	0.119	52.4	0.572	-40.0
1000	0.323	-102.8	3.153	84.8	0.126	51.5	0.554	-41.6
1100	0.290	-109.7	2.936	80.4	0.135	51.6	0.542	-43.0
1200	0.262	-116.1	2.752	76.2	0.143	51.6	0.534	-44.8
1300	0.241	-122.4	2.577	72.3	0.149	51.3	0.523	-46.1
1400	0.224	-129.3	2.438	68.6	0.157	50.5	0.517	-47.4
1500	0.208	-136.0	2.310	65.3	0.165	50.4	0.509	-48.9
1600	0.197	-142.4	2.193	61.9	0.173	50.1	0.502	-50.2
1700	0.189	-148.9	2.095	58.7	0.181	49.4	0.497	-51.6
1800	0.180	-155.2	2.000	55.7	0.189	49.1	0.491	-53.2
1900	0.174	-161.7	1.918	52.7	0.198	48.7	0.484	-54.9
2000	0.171	-169.2	1.848	49.9	0.207	48.1	0.478	-56.8
2100	0.170	-175.5	1.779	47.1	0.215	47.6	0.469	-58.6
2200	0.168	178.7	1.719	44.2	0.223	46.8	0.464	-60.9
2300	0.169	172.8	1.664	41.7	0.231	46.0	0.458	-63.1
2400	0.170	167.5	1.609	39.1	0.239	45.4	0.452	-65.7
2500	0.173	162.3	1.566	36.6	0.248	44.4	0.446	-68.7
2600	0.175	157.6	1.522	34.1	0.257	43.6	0.443	-72.0
2700	0.179	152.6	1.483	31.6	0.263	42.6	0.440	-74.9
2800	0.183	147.9	1.444	29.2	0.274	42.0	0.440	-78.3
2900	0.187	144.0	1.411	26.9	0.282	40.9	0.441	-81.4
3000	0.191	139.8	1.380	24.7	0.289	40.1	0.442	-84.5

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

Freque. MHz	$S_{11}$		$S_{21}$		$S_{12}$		$S_{22}$	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.974	-8.7	1.934	166.8	0.026	83.1	0.993	-5.8
200	0.957	-18.0	1.952	156.5	0.051	76.3	0.970	-11.2
300	0.922	-27.1	1.975	146.8	0.073	69.1	0.941	-16.4
400	0.882	-35.5	1.960	138.2	0.092	63.4	0.911	-20.8
500	0.837	-44.3	1.956	130.5	0.108	58.5	0.874	-24.9
600	0.793	-52.1	1.846	122.9	0.123	54.3	0.844	-28.6
700	0.741	-60.0	1.815	115.4	0.133	50.5	0.812	-32.0
800	0.693	-67.7	1.768	108.5	0.142	47.2	0.785	-34.9
900	0.645	-75.0	1.726	102.2	0.148	44.9	0.757	-37.7
1000	0.596	-82.7	1.706	96.0	0.155	42.6	0.735	-40.1
1100	0.547	-90.0	1.668	90.3	0.160	40.8	0.716	-42.3
1200	0.504	-97.0	1.625	84.9	0.166	39.7	0.704	-44.6
1300	0.470	-103.2	1.568	79.9	0.170	38.8	0.690	-46.6
1400	0.438	-109.9	1.523	75.1	0.174	37.9	0.680	-48.4
1500	0.410	-116.0	1.461	70.9	0.178	37.2	0.669	-50.1
1600	0.386	-122.2	1.421	66.6	0.180	36.9	0.660	-52.0
1700	0.362	-128.5	1.376	62.5	0.184	36.6	0.651	-53.8
1800	0.344	-134.4	1.331	58.9	0.189	36.3	0.643	-55.7
1900	0.329	-140.3	1.293	55.2	0.193	36.5	0.635	-57.7
2000	0.312	-147.2	1.261	51.8	0.198	36.3	0.626	-59.7
2100	0.302	-153.2	1.225	48.5	0.201	36.5	0.618	-61.8
2200	0.293	-158.9	1.189	45.2	0.206	36.4	0.613	-64.3
2300	0.285	-165.1	1.166	42.2	0.211	36.6	0.605	-66.7
2400	0.280	-170.8	1.129	39.2	0.217	36.4	0.600	-69.6
2500	0.276	-176.5	1.107	36.4	0.222	36.4	0.594	-72.6
2600	0.272	177.7	1.078	33.6	0.228	36.7	0.591	-75.9
2700	0.271	172.4	1.055	30.9	0.233	36.4	0.588	-79.1
2800	0.270	167.1	1.030	28.3	0.241	36.4	0.589	-82.4
2900	0.270	162.1	1.012	26.0	0.247	36.4	0.588	-85.6
3000	0.271	157.0	0.989	23.6	0.253	36.4	0.588	-88.6

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

Freque.	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.879	-17.8	8.523	155.5	0.027	75.6	0.932	-15.0
200	0.768	-36.6	8.074	139.8	0.047	66.8	0.812	-25.5
300	0.646	-53.1	7.436	126.6	0.061	61.3	0.704	-31.5
400	0.536	-67.3	6.691	115.7	0.073	58.7	0.627	-35.1
500	0.442	-80.0	5.987	106.5	0.082	57.5	0.568	-37.3
600	0.375	-89.5	5.261	99.5	0.092	56.7	0.528	-39.0
700	0.319	-98.7	4.707	93.2	0.101	56.9	0.496	-40.3
800	0.279	-106.9	4.239	87.9	0.110	56.5	0.475	-41.7
900	0.247	-114.8	3.852	83.3	0.120	56.0	0.456	-42.8
1000	0.222	-122.5	3.526	79.1	0.129	55.4	0.443	-44.2
1100	0.203	-130.1	3.239	75.1	0.139	55.6	0.434	-45.6
1200	0.189	-137.5	3.013	71.5	0.148	55.0	0.427	-47.0
1300	0.178	-144.8	2.814	68.2	0.157	54.6	0.419	-48.3
1400	0.170	-152.1	2.641	64.8	0.167	54.2	0.415	-49.7
1500	0.163	-159.6	2.498	62.0	0.177	53.4	0.408	-51.0
1600	0.160	-166.3	2.366	58.8	0.187	52.5	0.403	-52.4
1700	0.159	-173.0	2.245	55.9	0.196	51.8	0.398	-54.0
1800	0.156	-178.7	2.145	52.9	0.205	51.3	0.392	-55.4
1900	0.157	175.0	2.051	50.5	0.215	50.4	0.385	-57.0
2000	0.161	168.3	1.974	47.7	0.224	49.5	0.378	-59.0
2100	0.164	163.1	1.903	45.1	0.234	48.8	0.370	-60.7
2200	0.166	158.3	1.828	42.6	0.244	47.5	0.364	-63.4
2300	0.170	153.3	1.771	40.1	0.253	46.4	0.359	-65.7
2400	0.173	149.2	1.714	37.6	0.262	45.5	0.353	-68.6
2500	0.179	145.1	1.664	35.2	0.272	44.5	0.347	-71.8
2600	0.183	141.2	1.613	32.9	0.282	43.3	0.345	-75.2
2700	0.189	137.8	1.573	30.5	0.291	42.2	0.340	-78.6
2800	0.193	133.9	1.530	28.2	0.300	40.9	0.342	-82.2
2900	0.199	130.8	1.494	26.0	0.309	39.8	0.342	-85.6
3000	0.205	127.5	1.462	23.9	0.316	38.7	0.343	-88.8

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

Freque.	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.920	-14.3	5.495	160.8	0.028	77.6	0.962	-11.3
200	0.860	-28.2	5.327	146.5	0.051	69.7	0.886	-20.5
300	0.774	-41.7	5.129	134.7	0.069	63.1	0.802	-27.2
400	0.689	-54.1	4.838	124.8	0.083	58.5	0.731	-32.1
500	0.600	-66.2	4.584	115.6	0.094	55.3	0.669	-35.5
600	0.530	-75.7	4.162	107.8	0.103	53.2	0.623	-38.2
700	0.456	-85.4	3.873	100.4	0.112	52.1	0.585	-40.3
800	0.402	-94.0	3.577	94.1	0.120	51.3	0.556	-42.2
900	0.354	-101.9	3.323	88.6	0.129	50.4	0.533	-43.9
1000	0.317	-109.3	3.082	83.5	0.136	50.3	0.513	-45.3
1100	0.286	-116.4	2.865	79.2	0.144	50.2	0.500	-47.0
1200	0.261	-123.8	2.687	74.9	0.152	49.6	0.491	-48.5
1300	0.241	-130.3	2.518	71.0	0.160	49.6	0.480	-49.9
1400	0.228	-137.6	2.381	67.2	0.168	49.0	0.471	-51.3
1500	0.214	-144.5	2.255	64.0	0.177	48.5	0.464	-52.5
1600	0.205	-151.3	2.144	60.6	0.185	48.2	0.458	-54.1
1700	0.198	-157.9	2.045	57.3	0.194	47.6	0.451	-55.6
1800	0.192	-163.9	1.956	54.3	0.202	47.1	0.444	-57.1
1900	0.188	-170.5	1.873	51.3	0.210	46.6	0.437	-58.8
2000	0.187	-177.6	1.802	48.4	0.219	46.2	0.429	-60.9
2100	0.187	176.7	1.738	45.8	0.227	45.4	0.421	-62.8
2200	0.187	171.2	1.675	43.0	0.236	44.4	0.416	-65.2
2300	0.189	165.7	1.626	40.3	0.245	43.6	0.408	-67.4
2400	0.191	160.8	1.574	37.7	0.253	42.9	0.402	-70.4
2500	0.195	155.9	1.531	35.2	0.263	42.1	0.397	-73.7
2600	0.197	151.5	1.486	32.7	0.272	41.1	0.395	-76.8
2700	0.202	147.3	1.449	30.3	0.279	40.3	0.392	-80.3
2800	0.205	143.1	1.413	27.8	0.288	39.2	0.391	-83.6
2900	0.209	139.4	1.379	25.6	0.297	38.2	0.392	-86.8
3000	0.214	135.5	1.350	23.3	0.305	37.5	0.394	-90.1



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

Freque.	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.973	-9.2	1.928	166.5	0.029	82.1	0.990	-6.3
200	0.954	-18.7	1.948	155.8	0.057	74.4	0.967	-12.2
300	0.918	-28.1	1.975	145.9	0.080	68.1	0.935	-17.6
400	0.878	-36.9	1.954	137.0	0.102	62.2	0.901	-22.5
500	0.831	-46.1	1.948	129.2	0.120	56.9	0.860	-26.9
600	0.785	-54.0	1.838	121.4	0.134	52.4	0.827	-30.9
700	0.733	-62.3	1.808	113.9	0.145	49.0	0.794	-34.5
800	0.684	-70.4	1.758	106.9	0.156	45.3	0.764	-37.6
900	0.634	-77.9	1.717	100.5	0.163	42.9	0.734	-40.5
1000	0.586	-85.8	1.689	94.2	0.169	40.8	0.711	-43.0
1100	0.539	-93.2	1.649	88.5	0.175	38.7	0.693	-45.3
1200	0.495	-100.5	1.607	83.0	0.179	37.4	0.677	-47.5
1300	0.464	-107.2	1.549	78.1	0.184	36.1	0.661	-49.5
1400	0.433	-114.0	1.449	73.3	0.188	35.2	0.649	-51.5
1500	0.406	-120.4	1.440	69.1	0.191	34.8	0.639	-53.3
1600	0.383	-126.8	1.396	64.9	0.195	34.5	0.627	-55.2
1700	0.363	-133.3	1.359	60.7	0.198	33.9	0.619	-57.2
1800	0.346	-139.4	1.310	57.0	0.203	33.8	0.609	-59.1
1900	0.331	-145.4	1.273	53.4	0.206	33.7	0.601	-61.0
2000	0.318	-152.2	1.242	49.9	0.210	33.5	0.591	-63.4
2100	0.308	-158.4	1.206	46.6	0.215	33.7	0.582	-65.5
2200	0.300	-164.1	1.169	43.3	0.220	33.3	0.576	-68.1
2300	0.294	-170.1	1.148	40.3	0.224	33.3	0.568	-70.6
2400	0.290	-175.5	1.112	37.4	0.229	33.3	0.563	-73.7
2500	0.288	-178.7	1.091	34.6	0.235	33.1	0.558	-76.9
2600	0.286	-173.3	1.064	31.9	0.241	33.2	0.554	-80.2
2700	0.284	-168.1	1.042	29.2	0.247	32.9	0.551	-83.5
2800	0.284	-162.9	1.015	26.5	0.253	33.1	0.551	-86.9
2900	0.285	-158.3	.997	24.2	0.259	32.8	0.552	-90.2
3000	0.286	-153.5	.977	21.8	0.265	33.2	0.552	-93.4