

NEC

SILICON TRANSISTOR
μPA804T

**NPN SILICON EPITAXIAL TRANSISTOR
(WITH BUILT-IN 2 ELEMENTS) MINI MOLD**

The 2SC4571 has built-in 2 transistors which were developed for UHF.

FEATURES

- High f_T
 $f_T = 5.0 \text{ GHz TYP. (@ } V_{CE} = 5 \text{ V, } I_c = 5 \text{ mA, } f = 1 \text{ GHz)}$
- Small Collector Capacitance
 $C_{ob} = 0.9 \text{ pF TYP. (@ } V_{CB} = 5 \text{ V, } I_E = 0, f = 1 \text{ MHz)}$
- A surface Mounting Package Adopted
- Built-in 2 Transistors ($2 \times 2\text{SC4571}$)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μPA804T	Loose products (50 PCS)	Embossed tape 8 mm wide. Pin 6 (Q1 Base), Pin 5 (Q2 Base), Pin 4 (Q2 Emitter) face to perforation side of the tape.
μPA804T-T1	Taping products (3 KPCS/Reel)	

Remark If you require an evaluation sample, please contact an NEC Sales Representative. (Unit sample quantity is 50 pcs.)

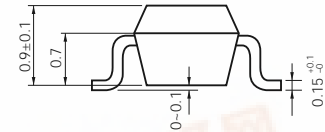
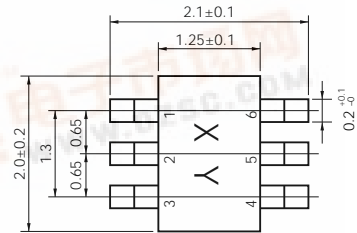
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3	V
Collector Current	I_c	60	mA
Total Power Dissipation	P_T	120 in 1 element 160 in 2 elements ^{Note}	mW
Junction Temperature	T_j	125	°C
Storage Temperature	T_{stg}	-55 to 125	°C

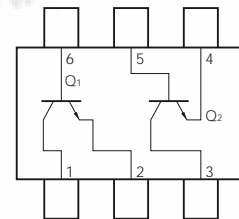
Note 90 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

- 1. Collector (Q1)
- 2. Emitter (Q1)
- 3. Collector (Q2)
- 4. Emitter (Q2)
- 5. Base (Q2)
- 6. Base (Q1)



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I _{CB0}	V _{CB} = 15 V, I _E = 0			0.1	μA
Emitter Cutoff Current	I _{EB0}	V _{EB} = 1 V, I _C = 0			0.1	μA
Collector to Emitter Saturation Voltage	V _{CE(sat)}	h _{FE} = 10, I _C = 5 mA			0.5	V
DC Current Gain	h _{FE}	V _{CE} = 5 V, I _C = 5 mA ^{Note 1}	60		200	
Gain Bandwidth Product (1)	f _T	V _{CE} = 5 V, I _C = 5 mA, f = 1 GHz	3	5		GHz
Feed-back Capacitance	C _{re}	V _{CB} = 5 V, I _E = 0, f = 1 MHz ^{Note 2}		0.9	1.2	pF
Insertion Power Gain (1)	S ₂₁ ²	V _{CE} = 5 V, I _C = 5 mA, f = 1 GHz	5			dB
h _{FE} Ratio	h _{FE1} /h _{FE2}	V _{CE} = 5 V, I _C = 5 mA A smaller value among h _{FE} of h _{FE1} = Q1, Q2 A larger value among h _{FE} of h _{FE2} = Q1, Q2	0.85			

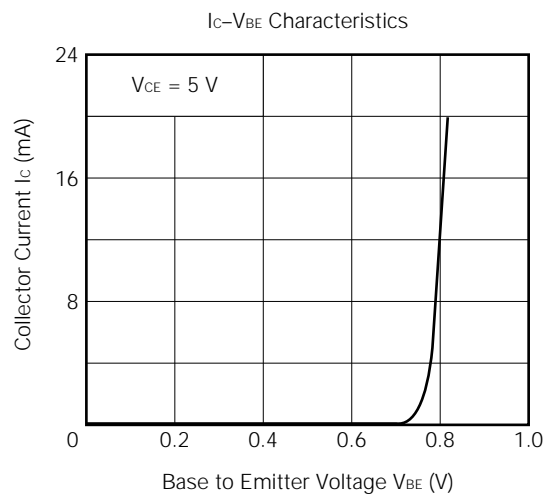
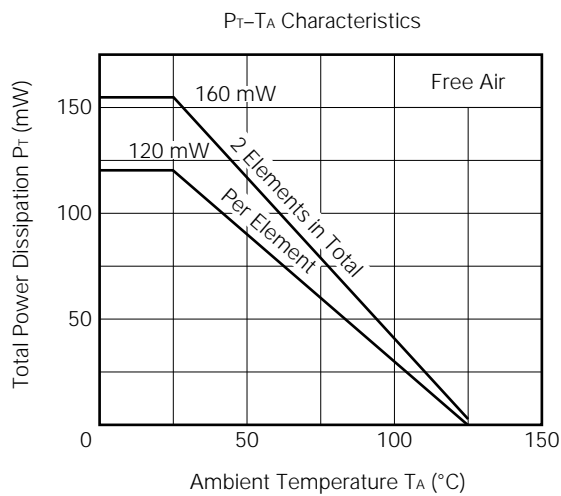
Notes 1. Pulse Measurement: P_w ≤ 350 μs, Duty cycle ≤ 2 %

2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

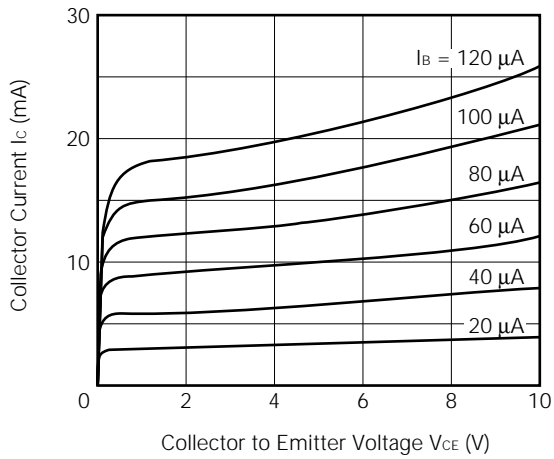
h_{FE} CLASSIFICATION

Rank	FB	GB
Marking	T76	T77
h _{FE} Value	60 to 120	100 to 200

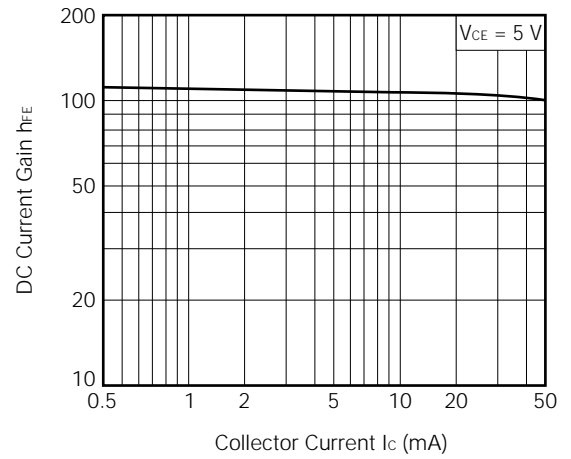
TYPICAL CHARACTERISTICS (T_A = 25 °C)



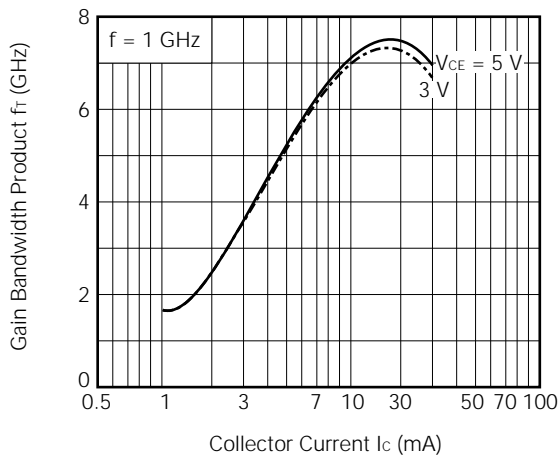
I_c - V_{CE} Characteristics



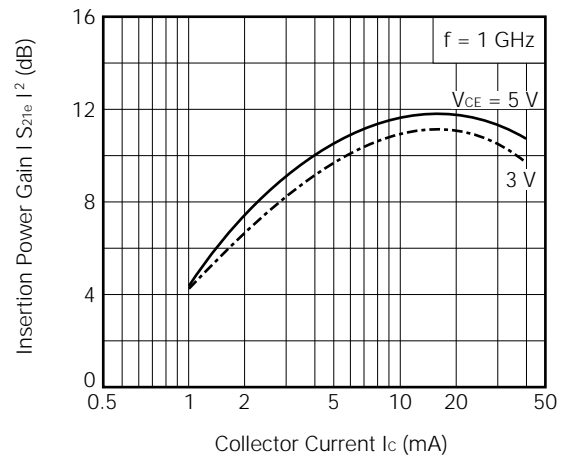
h_{FE} - I_c Characteristics



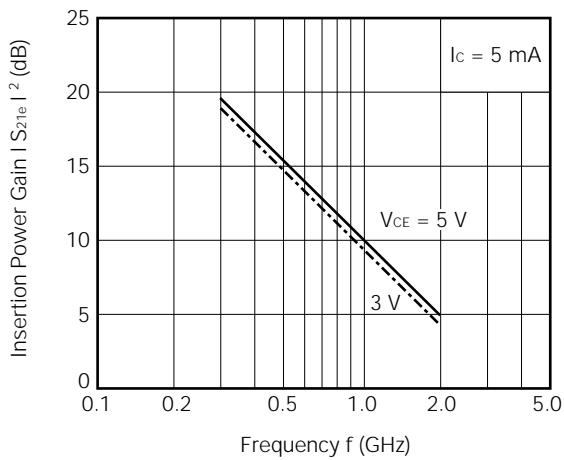
f_T - I_c Characteristics



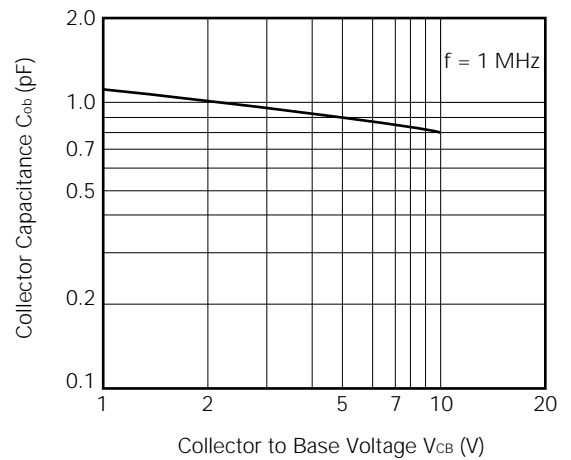
$|S_{21e}|^2$ - I_c Characteristics



$|S_{21e}|^2$ - f Characteristics



C_{ob} - V_{CB} Characteristics



S-PARAMETERS

V_{CE} = 5 V, I_c = 5 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.874	-24.2	8.628	152.9	.032	71.8	.910	-18.4
200.00	.752	-49.1	8.089	135.3	.054	61.2	.763	-30.3
300.00	.625	-70.9	7.278	121.4	.068	55.5	.643	-36.7
400.00	.523	-89.3	6.406	110.0	.079	52.9	.560	-40.1
500.00	.444	-105.3	5.617	101.1	.088	52.1	.502	-42.3
600.00	.396	-117.4	4.890	94.1	.097	51.8	.462	-43.8
700.00	.359	-129.0	4.345	88.0	.105	51.9	.434	-45.2
800.00	.336	-138.5	3.893	82.9	.114	52.0	.414	-46.6
900.00	.318	-147.3	3.529	78.3	.122	52.4	.398	-47.9
1000.00	.307	-155.3	3.221	74.0	.131	52.3	.385	-49.5
1100.00	.299	-162.8	2.959	70.1	.140	52.2	.376	-51.0
1200.00	.294	-169.3	2.751	66.4	.149	52.0	.371	-52.7
1300.00	.292	-175.3	2.565	62.9	.158	52.4	.364	-54.2
1400.00	.292	179.1	2.407	59.5	.167	51.9	.359	-55.6
1500.00	.293	173.6	2.269	56.4	.177	51.3	.356	-57.3
1600.00	.296	168.8	2.155	53.3	.186	51.2	.350	-58.9
1700.00	.298	164.4	2.045	50.2	.195	50.6	.346	-60.4
1800.00	.300	160.2	1.950	47.4	.206	49.9	.342	-62.3
1900.00	.302	156.1	1.873	44.6	.215	49.4	.337	-64.5
2000.00	.310	151.8	1.793	41.6	.225	48.8	.327	-67.1
2100.00	.314	148.3	1.726	38.9	.235	48.2	.322	-69.4
2200.00	.318	144.7	1.662	36.3	.245	47.2	.317	-72.4
2300.00	.323	141.3	1.609	33.7	.255	46.3	.312	-75.3
2400.00	.328	138.2	1.556	31.2	.265	45.4	.307	-78.9
2500.00	.335	135.1	1.513	28.7	.274	44.5	.304	-82.9
2600.00	.339	131.9	1.466	26.3	.284	43.4	.302	-87.1
2700.00	.345	129.3	1.427	23.9	.294	42.5	.302	-91.0
2800.00	.349	126.3	1.387	21.5	.304	41.5	.304	-94.8
2900.00	.356	123.8	1.353	19.3	.315	40.4	.309	-98.9
3000.00	.361	121.0	1.323	17.2	.323	39.4	.313	-102.4

V_{CE} = 5 V, I_c = 3 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.923	-19.2	5.456	157.3	.034	75.1	.951	-13.6
200.00	.844	-39.4	5.317	142.0	.060	63.0	.852	-24.1
300.00	.746	-57.9	5.047	128.9	.078	55.7	.752	-31.3
400.00	.660	-74.5	4.667	118.1	.091	51.5	.674	-35.8
500.00	.575	-90.3	4.321	108.3	.101	48.3	.612	-39.0
600.00	.516	-102.7	3.860	100.4	.108	46.4	.567	-41.5
700.00	.461	-114.8	3.546	93.2	.115	45.7	.532	-43.6
800.00	.423	-125.2	3.237	87.1	.122	45.3	.507	-45.4
900.00	.396	-134.9	2.979	81.6	.128	44.8	.486	-47.1
1000.00	.375	-143.6	2.749	76.6	.134	45.2	.471	-48.8
1100.00	.362	-151.4	2.547	72.4	.142	45.3	.461	-50.5
1200.00	.349	-158.8	2.380	68.0	.147	45.4	.452	-52.3
1300.00	.343	-165.2	2.222	64.2	.154	45.9	.445	-54.0
1400.00	.339	-171.7	2.101	60.4	.161	46.1	.438	-55.6
1500.00	.336	-177.6	1.984	57.0	.169	46.4	.433	-57.3
1600.00	.337	177.0	1.887	53.5	.177	46.5	.428	-59.0
1700.00	.338	172.0	1.798	50.3	.184	46.6	.423	-61.1
1800.00	.337	167.1	1.719	47.2	.193	46.7	.419	-63.1
1900.00	.339	162.7	1.648	44.0	.201	46.5	.411	-65.2
2000.00	.345	158.0	1.579	41.2	.211	46.3	.405	-68.0
2100.00	.348	153.8	1.524	38.4	.219	46.0	.399	-70.4
2200.00	.351	150.0	1.470	35.4	.229	45.6	.394	-73.4
2300.00	.357	146.1	1.424	32.8	.238	45.3	.389	-76.4
2400.00	.361	142.5	1.376	30.1	.247	44.6	.386	-80.0
2500.00	.367	139.2	1.338	27.5	.257	44.0	.383	-83.8
2600.00	.371	135.8	1.296	25.0	.266	43.5	.381	-88.0
2700.00	.376	132.6	1.263	22.5	.275	42.9	.380	-91.4
2800.00	.381	129.3	1.231	20.1	.287	42.1	.385	-95.4
2900.00	.387	126.4	1.199	17.9	.297	41.4	.389	-99.2
3000.00	.392	123.4	1.169	15.7	.306	40.4	.391	-103.0

S-PARAMETERS

V_{CE} = 5 V, I_c = 1 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.977	-14.2	1.896	165.0	.036	79.9	.988	-7.4
200.00	.944	-28.0	1.948	150.9	.069	69.5	.954	-14.2
300.00	.897	-41.9	1.954	139.2	.095	61.1	.911	-20.1
400.00	.848	-54.9	1.907	128.9	.116	53.7	.867	-25.2
500.00	.793	-68.0	1.878	119.8	.131	47.9	.820	-29.5
600.00	.744	-79.1	1.745	110.9	.143	42.2	.786	-33.4
700.00	.689	-90.6	1.697	102.7	.151	38.6	.752	-36.6
800.00	.646	-101.4	1.630	95.2	.155	35.1	.726	-39.6
900.00	.605	-111.3	1.579	88.5	.157	32.9	.702	-42.3
1000.00	.570	-121.0	1.519	82.1	.161	31.1	.684	-44.8
1100.00	.542	-130.0	1.455	76.5	.162	30.0	.669	-47.4
1200.00	.516	-138.2	1.393	71.2	.162	29.1	.661	-49.9
1300.00	.500	-145.7	1.325	66.3	.161	29.0	.650	-52.2
1400.00	.489	-153.1	1.270	61.8	.163	29.4	.643	-54.3
1500.00	.478	-160.1	1.213	57.5	.163	29.3	.637	-56.7
1600.00	.470	-166.6	1.168	53.5	.163	30.5	.631	-59.0
1700.00	.465	-172.8	1.128	49.5	.164	31.6	.624	-61.6
1800.00	.461	-178.5	1.086	45.9	.166	33.5	.621	-64.0
1900.00	.458	-175.7	1.047	42.5	.169	34.4	.614	-66.7
2000.00	.458	-170.1	1.012	39.2	.173	36.3	.608	-69.6
2100.00	.460	-165.0	.980	36.1	.178	38.0	.603	-72.6
2200.00	.460	-160.3	.946	33.1	.183	39.5	.599	-76.0
2300.00	.462	-155.6	.922	30.4	.191	40.9	.593	-79.3
2400.00	.465	-151.1	.889	27.7	.198	42.3	.591	-83.1
2500.00	.469	-146.7	.867	25.3	.206	43.0	.588	-87.2
2600.00	.472	-142.5	.843	22.8	.216	44.2	.588	-91.3
2700.00	.476	-138.7	.820	20.5	.227	44.8	.586	-95.3
2800.00	.479	-134.7	.799	18.5	.239	45.2	.589	-99.4
2900.00	.482	-130.9	.779	16.5	.251	45.2	.591	-103.3
3000.00	.487	-127.2	.761	14.8	.263	45.4	.593	-107.1

V_{CE} = 3 V, I_c = 5 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.871	-26.4	8.583	152.2	.037	69.9	.894	-21.2
200.00	.735	-53.1	7.998	133.6	.061	59.2	.730	-35.0
300.00	.608	-76.6	7.129	119.2	.076	53.4	.601	-42.3
400.00	.512	-96.0	6.208	107.9	.087	51.2	.515	-46.6
500.00	.441	-112.5	5.402	99.1	.096	49.9	.452	-49.3
600.00	.400	-125.0	4.681	92.2	.105	49.8	.410	-51.2
700.00	.367	-136.5	4.139	86.3	.116	50.1	.379	-52.9
800.00	.349	-146.0	3.707	81.3	.124	50.1	.358	-54.5
900.00	.338	-154.7	3.362	76.6	.133	50.5	.341	-55.7
1000.00	.328	-162.1	3.061	72.4	.142	50.5	.327	-57.7
1100.00	.324	-168.9	2.817	68.5	.153	50.5	.317	-59.3
1200.00	.319	-175.4	2.611	64.8	.162	50.1	.311	-61.0
1300.00	.319	-179.0	2.436	61.4	.172	49.9	.305	-62.6
1400.00	.321	-173.8	2.296	57.9	.181	49.7	.300	-64.3
1500.00	.322	-168.7	2.159	54.7	.192	49.5	.294	-65.8
1600.00	.324	-164.3	2.048	51.6	.201	48.8	.289	-67.7
1700.00	.328	-160.2	1.950	48.5	.212	48.2	.284	-69.3
1800.00	.329	-155.9	1.858	45.8	.221	47.6	.280	-71.4
1900.00	.333	-152.0	1.777	42.7	.234	46.9	.272	-73.9
2000.00	.339	-148.2	1.716	40.0	.242	46.1	.265	-77.0
2100.00	.343	-144.7	1.647	37.4	.253	45.2	.258	-79.9
2200.00	.348	-141.6	1.587	34.7	.264	44.1	.254	-83.4
2300.00	.353	-138.2	1.537	32.2	.274	43.3	.249	-86.6
2400.00	.357	-135.1	1.487	29.6	.284	42.3	.246	-90.8
2500.00	.364	-132.3	1.446	27.1	.293	41.0	.243	-95.6
2600.00	.368	-129.3	1.403	24.8	.305	40.4	.244	-100.0
2700.00	.373	-126.5	1.366	22.4	.313	39.2	.245	-104.3
2800.00	.377	-123.8	1.330	19.9	.324	38.1	.250	-109.0
2900.00	.383	-121.1	1.298	17.9	.334	36.9	.255	-112.8
3000.00	.388	-118.3	1.268	15.7	.344	35.8	.260	-116.4

S-PARAMETERS

V_{CE} = 3 V, I_c = 3 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.912	-21.6	5.515	157.0	.039	74.4	.941	-15.6
200.00	.834	-42.0	5.289	140.5	.068	61.3	.829	-27.6
300.00	.733	-61.8	4.989	127.0	.088	54.0	.720	-35.4
400.00	.645	-79.5	4.582	115.9	.102	48.7	.634	-40.9
500.00	.563	-95.8	4.216	106.2	.111	46.0	.567	-44.5
600.00	.508	-108.6	3.750	98.3	.119	44.2	.520	-47.3
700.00	.459	-121.1	3.422	91.1	.126	43.4	.483	-49.6
800.00	.426	-131.5	3.114	85.1	.134	43.0	.457	-51.6
900.00	.403	-140.9	2.860	79.8	.140	42.7	.435	-53.4
1000.00	.387	-149.5	2.628	74.7	.147	43.0	.418	-55.3
1100.00	.374	-157.2	2.441	70.4	.155	43.2	.408	-57.2
1200.00	.365	-164.3	2.273	66.1	.161	43.0	.399	-59.1
1300.00	.360	-170.7	2.132	62.3	.169	43.3	.390	-60.8
1400.00	.359	-176.5	2.007	58.7	.176	43.6	.383	-62.6
1500.00	.358	-177.6	1.899	55.2	.184	43.7	.378	-64.5
1600.00	.359	-172.6	1.801	51.8	.192	43.8	.371	-66.4
1700.00	.360	-167.7	1.720	48.3	.200	43.6	.366	-68.5
1800.00	.361	-163.3	1.648	45.3	.209	43.6	.361	-70.6
1900.00	.363	-158.7	1.582	42.3	.218	43.4	.355	-72.9
2000.00	.369	-154.5	1.513	39.2	.227	43.1	.347	-76.1
2100.00	.372	-150.4	1.462	36.5	.236	42.9	.340	-78.8
2200.00	.375	-146.9	1.409	33.7	.246	42.4	.336	-82.3
2300.00	.380	-143.2	1.366	31.0	.256	41.8	.331	-85.3
2400.00	.385	-139.8	1.323	28.4	.265	41.4	.328	-89.4
2500.00	.391	-136.5	1.287	25.8	.275	40.3	.326	-93.8
2600.00	.394	-133.3	1.250	23.4	.284	39.8	.326	-98.0
2700.00	.401	-130.2	1.215	20.9	.295	39.0	.327	-102.2
2800.00	.405	-127.0	1.183	18.5	.305	38.2	.332	-106.2
2900.00	.410	-124.2	1.156	16.3	.314	37.4	.337	-110.2
3000.00	.415	-121.3	1.130	14.2	.324	36.5	.342	-113.8

V_{CE} = 3 V, I_c = 1 mA, Z_o = 50 Ω

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.970	-14.8	1.932	163.5	.042	78.2	.984	-8.3
200.00	.940	-29.4	1.944	149.6	.079	68.4	.945	-16.0
300.00	.890	-43.9	1.949	137.4	.109	59.0	.895	-22.6
400.00	.839	-57.5	1.894	127.0	.132	51.8	.846	-28.2
500.00	.782	-71.0	1.854	117.6	.149	45.3	.795	-32.8
600.00	.734	-82.5	1.723	108.5	.161	40.1	.757	-36.9
700.00	.680	-94.1	1.674	100.1	.168	36.1	.720	-40.5
800.00	.638	-105.2	1.606	92.6	.174	32.7	.691	-43.7
900.00	.598	-115.4	1.548	85.8	.177	30.0	.666	-46.5
1000.00	.565	-125.0	1.486	79.4	.179	28.5	.646	-49.3
1100.00	.541	-133.7	1.422	73.9	.180	27.2	.633	-51.8
1200.00	.518	-142.1	1.354	68.5	.179	26.0	.621	-54.5
1300.00	.504	-149.6	1.287	63.6	.180	25.9	.610	-56.9
1400.00	.494	-156.8	1.235	59.0	.180	26.0	.603	-59.3
1500.00	.485	-163.5	1.183	54.8	.179	26.2	.596	-61.8
1600.00	.478	-169.9	1.136	50.8	.180	27.0	.590	-64.3
1700.00	.476	-175.8	1.098	46.9	.181	27.5	.584	-66.9
1800.00	.472	-178.5	1.054	43.4	.182	29.1	.578	-69.6
1900.00	.470	-173.0	1.019	39.9	.184	30.4	.573	-72.3
2000.00	.472	-167.6	.987	36.6	.189	31.9	.566	-75.6
2100.00	.473	-162.6	.952	33.8	.193	33.5	.560	-78.9
2200.00	.474	-158.0	.922	30.8	.198	34.5	.556	-82.5
2300.00	.476	-153.5	.897	28.0	.205	36.1	.551	-86.1
2400.00	.480	-149.2	.866	25.4	.212	37.3	.548	-90.2
2500.00	.484	-144.9	.846	23.0	.220	38.3	.546	-94.5
2600.00	.488	-141.0	.823	20.7	.230	39.3	.547	-98.9
2700.00	.491	-137.0	.801	18.5	.240	39.9	.546	-103.1
2800.00	.495	-133.2	.781	16.4	.252	40.2	.550	-107.3
2900.00	.498	-129.7	.763	14.6	.263	40.4	.553	-111.3
3000.00	.501	-125.9	.745	12.9	.275	40.5	.555	-115.2

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