

MICROWAVE LOW NOISE AMPLIFIER  
NPN SILICON EPITAXIAL TRANSISTOR  
COMPACT MINI MOLD

FEATURES

- Low Voltage Operation, Low Phase Distortion
- Low Noise  
 $NF = 1.5 \text{ dB TYP. @ } V_{CE} = 3 \text{ V, } I_c = 7 \text{ mA, } f = 2 \text{ GHz}$   
 $NF = 1.7 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_c = 3 \text{ mA, } f = 2 \text{ GHz}$
- Large Absolute Maximum Collector Current  
 $I_c = 100 \text{ mA}$
- Compact Mini Mold Package  
 EIAJ: SC-70

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5193-T1	3 Kpcs/Reel	Embossed tape 8 mm wide. Pin 3 (collector) face to perforation side of the tape.
2SC5193-T2	3 Kpcs/Reel	Embossed tape 8 mm wide. Pin 1 (Emitter), Pin 2 (Base) face to perforation side of the tape.

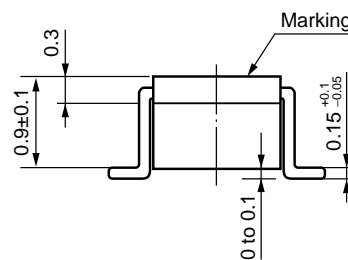
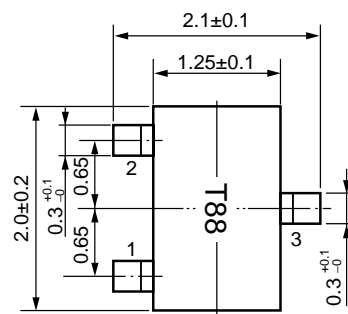
**Remark** If you require an evaluation sample, please contact an NEC Sales Representative. (Unit sample quantity is 50 pcs.)

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

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	$V_{CBO}$	9	V
Collector to Emitter Voltage	$V_{CEO}$	6	V
Emitter to Base Voltage	$V_{EBO}$	2	V
Collector Current	$I_c$	100	mA
Total Power Dissipation	$P_T$	150	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$

PACKAGE DRAWING

(Units: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

This device uses radio frequency technology. Take due precautions to protect it from excessive input levels such as static electricity.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

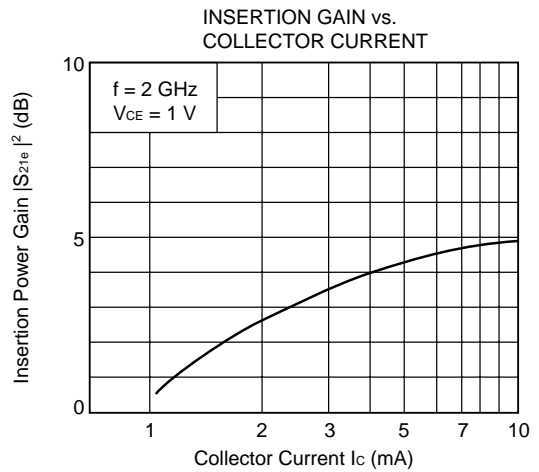
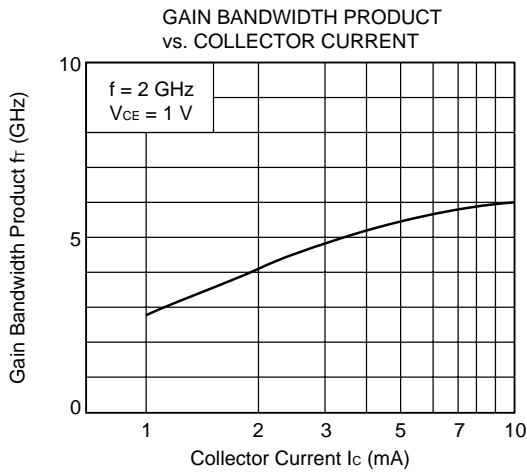
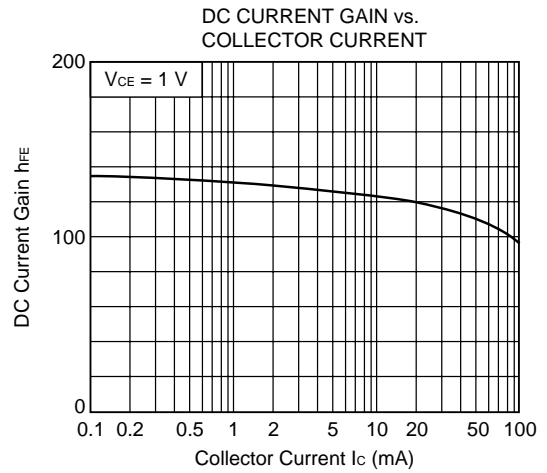
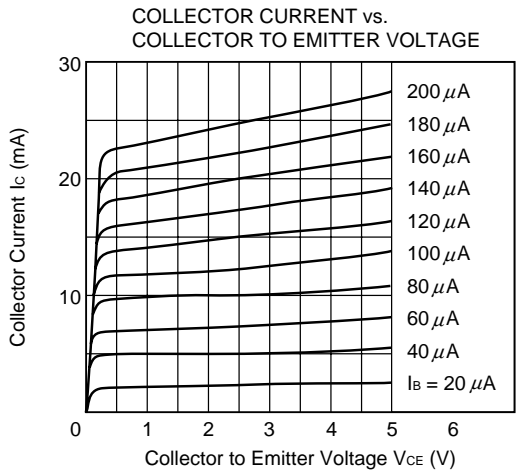
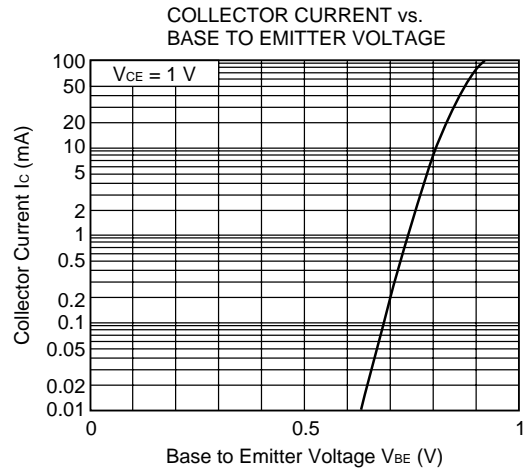
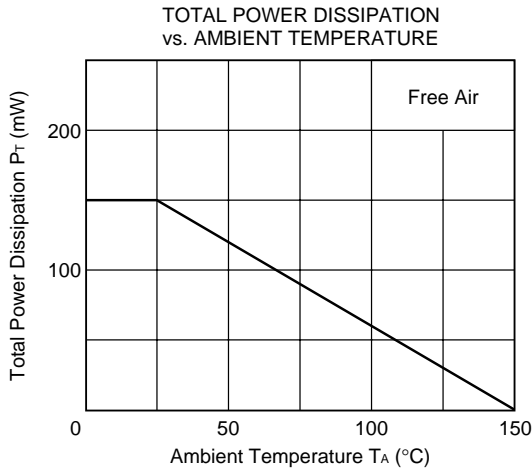
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0			100	nA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0			100	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA <sup>Note 1</sup>	80		160	
Insertion Power Gain (1)	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz	2.5	3.5		dB
Insertion Power Gain (2)	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2.0 GHz		6.5		dB
Noise Figure (1)	NF	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz		1.7	2.5	dB
Noise Figure (2)	NF	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 7 mA, f = 2.0 GHz		1.5		dB
Gain Bandwidth Product (1)	f <sub>T</sub>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz	4	4.5		GHz
Gain Bandwidth Product (2)	f <sub>T</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2.0 GHz		9		GHz
Collector Capacitance	C <sub>re</sub>	V <sub>CB</sub> = 1 V, I <sub>E</sub> = 0, f = 1.0 MHz <sup>Note 2</sup>		0.75	0.85	pF

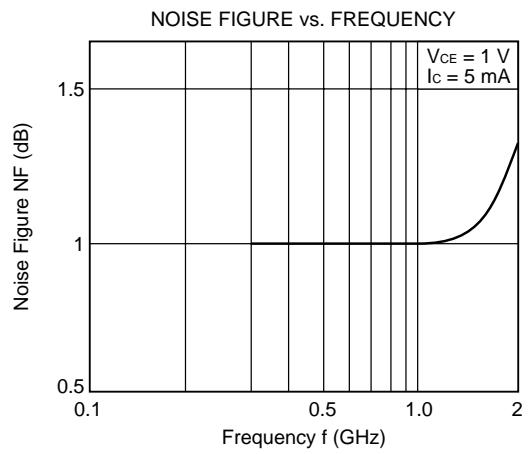
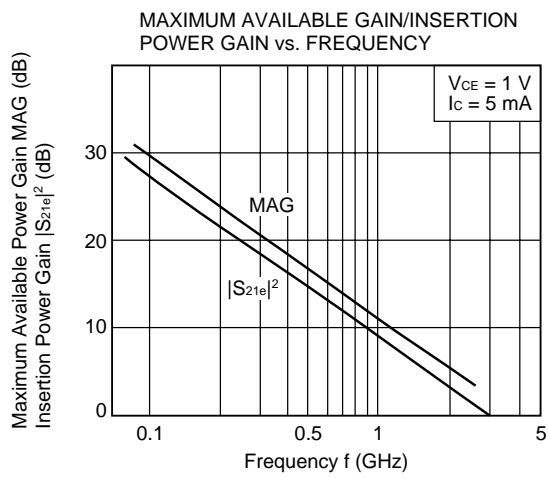
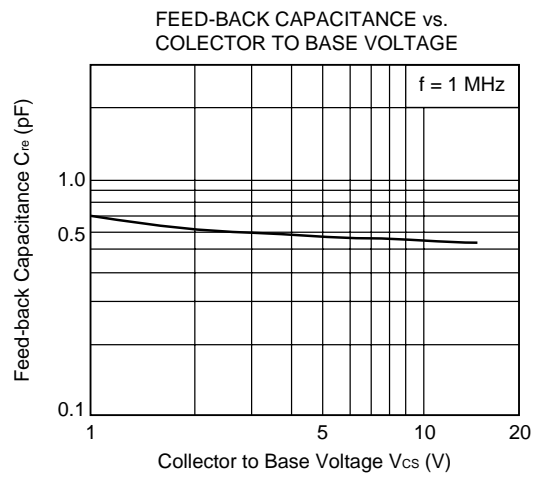
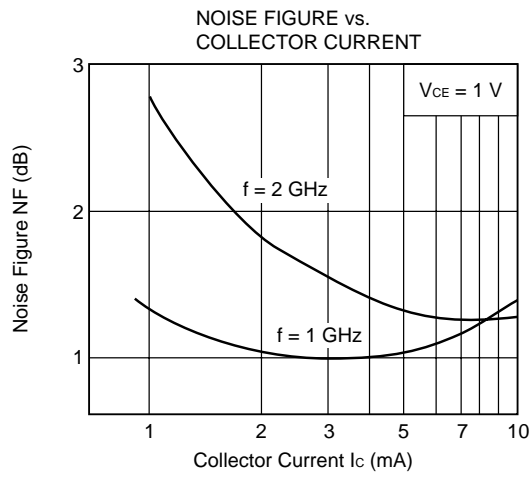
- Notes**
1. Pulse Measurement: PW ≤ 350 μs, Duty cycle ≤ 2 %, Pulsed
  2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

**h<sub>FE</sub> Classification**

Rank	FB
Marking	T88
h <sub>FE</sub>	80 to 160

TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)





**S-PARAMETER**

V<sub>CE</sub> = 1 V, I<sub>c</sub> = 1 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.952	-18.2	3.497	166.0	0.050	74.0	0.979	-8.3
200.00	0.913	-37.9	3.208	150.4	0.101	64.5	0.927	-18.9
300.00	0.871	-55.6	3.048	135.4	0.141	56.5	0.855	-28.2
400.00	0.817	-68.8	2.825	124.1	0.169	49.8	0.803	-33.7
500.00	0.737	-82.6	2.332	114.8	0.184	42.1	0.746	-39.1
600.00	0.657	-93.4	2.236	107.2	0.196	37.7	0.691	-41.0
700.00	0.624	-103.9	2.043	99.0	0.206	33.0	0.639	-45.4
800.00	0.594	-117.9	1.864	91.9	0.208	30.5	0.573	-46.2
900.00	0.560	-127.1	1.715	85.0	0.208	29.0	0.538	-49.5
1000.00	0.544	-137.1	1.593	80.3	0.203	27.8	0.494	-51.7
1100.00	0.527	-145.1	1.458	75.3	0.200	25.6	0.478	-55.7
1200.00	0.534	-154.5	1.391	70.9	0.195	24.4	0.450	-60.1
1300.00	0.554	-163.9	1.258	66.7	0.195	24.1	0.426	-62.4
1400.00	0.566	-169.0	1.200	63.5	0.194	25.6	0.409	-66.3
1500.00	0.547	-175.2	1.185	55.1	0.199	26.0	0.406	-67.7
1600.00	0.523	179.3	1.176	51.3	0.201	29.6	0.392	-72.4
1700.00	0.540	172.6	1.129	48.8	0.198	33.0	0.375	-76.0
1800.00	0.530	165.2	1.109	47.4	0.199	37.3	0.370	-80.9
1900.00	0.559	160.8	1.028	45.2	0.200	40.0	0.365	-87.1
2000.00	0.571	156.2	0.981	43.6	0.203	43.2	0.364	-91.0

V<sub>CE</sub> = 1 V, I<sub>c</sub> = 3 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.864	-29.3	8.784	157.7	0.050	64.3	0.927	-16.5
200.00	0.768	-37.8	7.364	136.9	0.088	56.8	0.797	-34.0
300.00	0.675	-79.1	6.372	139.7	0.115	51.1	0.667	-46.3
400.00	0.584	-94.9	5.374	110.1	0.130	47.2	0.568	-52.1
500.00	0.504	-110.1	4.501	102.3	0.138	44.1	0.485	-55.8
600.00	0.455	-123.0	3.906	96.2	0.148	43.4	0.430	-57.0
700.00	0.428	-134.7	3.298	89.7	0.156	42.3	0.380	-61.3
800.00	0.405	-145.9	2.938	84.1	0.163	42.8	0.321	-63.1
900.00	0.381	-154.2	2.915	79.4	0.171	43.7	0.286	-64.8
1000.00	0.379	-163.1	2.397	75.8	0.178	44.6	0.239	-66.7
1100.00	0.374	-171.9	2.196	72.0	0.184	44.7	0.246	-70.8
1200.00	0.389	-178.5	2.061	68.3	0.190	44.6	0.226	-76.4
1300.00	0.404	174.9	1.916	64.3	0.198	44.2	0.201	-79.4
1400.00	0.414	172.1	1.829	60.6	0.210	44.4	0.184	-83.7
1500.00	0.411	165.7	1.759	55.5	0.225	44.2	0.176	-85.9
1600.00	0.402	161.8	1.680	52.5	0.241	45.3	0.167	-92.5
1700.00	0.417	156.7	1.606	50.1	0.249	48.9	0.159	-97.7
1800.00	0.428	151.2	1.537	49.4	0.259	48.8	0.151	-107.2
1900.00	0.446	148.4	1.458	47.4	0.265	48.7	0.130	-114.4
2000.00	0.457	144.8	1.394	43.8	0.272	48.6	0.155	-120.7

V<sub>CE</sub> = 1 V, I<sub>c</sub> = 5 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.790	-37.9	12.042	152.3	0.043	67.5	0.886	-23.5
200.00	0.672	-69.2	9.515	129.2	0.079	54.7	0.708	-42.2
300.00	0.564	-91.9	7.780	113.6	0.101	51.0	0.562	-55.7
400.00	0.475	-108.5	3.993	103.8	0.115	49.2	0.456	-61.2
500.00	0.415	-123.8	4.959	97.3	0.124	48.6	0.374	-63.8
600.00	0.383	-137.1	4.268	92.1	0.135	49.0	0.329	-64.4
700.00	0.366	-147.8	3.741	86.2	0.146	48.6	0.289	-69.8
800.00	0.331	-138.3	3.313	81.3	0.156	47.4	0.235	-73.5
900.00	0.332	-166.3	2.927	77.3	0.168	50.2	0.202	-75.2
1000.00	0.335	-174.3	2.677	74.1	0.179	51.1	0.181	-76.6
1100.00	0.337	177.3	2.431	70.7	0.188	50.8	0.175	-81.8
1200.00	0.333	172.0	2.282	67.4	0.197	50.3	0.158	-90.1
1300.00	0.365	166.3	2.124	63.6	0.208	49.5	0.134	-95.4
1400.00	0.375	164.2	2.027	59.9	0.222	48.9	0.120	-101.8
1500.00	0.378	158.6	1.944	55.4	0.240	48.1	0.114	-106.3
1600.00	0.373	155.0	1.850	52.7	0.258	48.4	0.112	-116.2
1700.00	0.387	150.8	1.764	50.6	0.269	49.5	0.107	-128.3
1800.00	0.401	146.1	1.679	50.0	0.279	50.2	0.109	-137.3
1900.00	0.418	143.8	1.603	48.2	0.286	50.1	0.114	-144.5
2000.00	0.429	140.6	1.526	46.7	0.294	49.5	0.125	-150.2

V<sub>CE</sub> = 1 V, I<sub>c</sub> = 7 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.736	-44.1	14.388	148.1	0.041	61.2	0.833	-28.2
200.00	0.603	-77.3	10.890	124.2	0.074	53.6	0.642	-48.4
300.00	0.494	-100.6	8.181	109.3	0.094	51.9	0.497	-62.1
400.00	0.415	-117.8	6.500	100.3	0.108	51.7	0.389	-68.0
500.00	0.369	-133.0	5.307	94.7	0.118	52.1	0.310	-70.2
600.00	0.350	-145.9	4.558	89.8	0.132	52.9	0.271	-70.5
700.00	0.336	-155.9	3.974	84.3	0.144	52.7	0.240	-77.0
800.00	0.324	-166.0	3.500	79.9	0.156	53.1	0.191	-83.3
900.00	0.309	-173.7	3.096	76.3	0.169	53.8	0.158	-85.9
1000.00	0.314	178.7	2.819	73.3	0.183	54.2	0.141	-87.1
1100.00	0.319	171.0	2.583	70.1	0.193	53.7	0.139	-93.2
1200.00	0.335	166.5	2.407	66.9	0.204	52.9	0.128	-104.6
1300.00	0.347	161.6	2.235	63.3	0.215	51.8	0.106	-113.9
1400.00	0.336	159.6	2.137	59.8	0.231	50.8	0.093	-123.2
1500.00	0.362	154.5	2.032	55.5	0.250	49.7	0.093	-129.3
1600.00	0.359	151.2	1.932	52.9	0.268	49.5	0.098	-140.1
1700.00	0.373	147.4	1.845	50.9	0.280	50.4	0.102	-133.9
1800.00	0.388	143.2	1.756	50.5	0.291	50.7	0.110	-161.6
1900.00	0.404	141.0	1.676	48.7	0.299	50.5	0.116	-167.2
2000.00	0.415	138.1	1.597	47.5	0.307	49.6	0.130	-170.3

V<sub>CE</sub> = 1 V, I<sub>c</sub> = 10 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.676	-49.5	16.485	144.1	0.041	59.8	0.808	-31.3
200.00	0.545	-83.0	11.960	120.0	0.071	53.3	0.588	-53.4
300.00	0.442	-108.8	8.726	105.9	0.090	53.3	0.433	-67.7
400.00	0.372	-126.4	6.820	97.6	0.103	54.1	0.339	-73.9
500.00	0.339	-141.2	5.333	92.6	0.116	54.9	0.263	-76.2
600.00	0.328	-153.6	4.754	88.1	0.130	33.9	0.229	-76.4
700.00	0.318	-162.8	4.124	82.9	0.143	55.4	0.205	-84.2
800.00	0.309	-172.4	3.626	78.7	0.157	55.7	0.162	-93.2
900.00	0.295	-179.8	3.201	75.3	0.171	56.3	0.131	-97.4
1000.00	0.303	173.2	2.922	72.6	0.186	56.4	0.115	-99.3
1100.00	0.310	166.1	2.674	69.6	0.198	55.7	0.118	-105.7
1200.00	0.326	162.2	2.480	66.5	0.209	54.5	0.113	-119.6
1300.00	0.336	157.7	2.312	63.1	0.221	53.1	0.096	-132.9
1400.00	0.345	156.0	2.205	39.5	0.237	51.9	0.089	-144.2
1500.00	0.333	151.3	2.100	55.5	0.257	50.6	0.091	-151.0
1600.00	0.351	148.1	1.989	55.0	0.276	50.2	0.101	-159.3
1700.00	0.360	144.8	1.904	51.0	0.230	50.9	0.111	-171.4
1800.00	0.380	140.9	1.804	50.7	0.300	51.0	0.122	-177.0
1900.00	0.396	139.0	1.724	49.0	0.307	50.7	0.129	178.5
2000.00	0.407	136.0	1.642	47.6	0.315	49.7	0.143	177.0

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 1 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	1.003	-16.7	3.418	166.9	0.029	74.7	0.989	-3.6
200.00	0.956	-32.7	3.121	154.7	0.078	64.7	0.951	-14.1
300.00	0.938	-48.4	3.082	141.4	0.113	60.2	0.897	-21.7
400.00	0.895	-61.8	2.931	129.6	0.138	53.4	0.857	-26.1
500.00	0.793	-75.1	2.631	120.5	0.130	46.1	0.811	-30.5
600.00	0.700	-83.7	2.365	114.3	0.160	42.9	0.774	-31.5
700.00	0.671	-96.0	2.189	106.3	0.171	38.2	0.735	-35.8
800.00	0.629	-108.8	1.997	98.9	0.172	34.9	0.665	-35.9
900.00	0.581	-117.9	1.837	92.0	0.172	33.9	0.636	-38.4
1000.00	0.554	-127.4	1.706	87.7	0.170	33.3	0.590	-39.3
1100.00	0.535	-135.4	1.570	82.7	0.167	31.4	0.579	-43.2
1200.00	0.531	-145.8	1.510	78.0	0.162	30.6	0.541	-47.1
1300.00	0.540	-156.4	1.359	74.3	0.162	30.5	0.522	-48.3
1400.00	0.542	-161.9	1.299	71.7	0.162	32.5	0.510	-51.5
1500.00	0.527	-168.3	1.278	62.8	0.166	33.5	0.509	-52.6
1600.00	0.497	-174.3	1.272	58.3	0.169	37.6	0.493	-56.2
1700.00	0.512	178.3	1.216	55.8	0.169	41.3	0.476	-58.1
1800.00	0.492	170.4	1.209	54.2	0.171	46.9	0.469	-62.0
1900.00	0.524	165.5	1.119	52.2	0.176	49.9	0.454	-66.3
2000.00	0.534	159.9	1.069	50.4	0.180	33.4	0.454	-69.3

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 3 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.924	-23.0	8.393	160.8	0.031	54.9	0.965	-10.7
200.00	0.830	-46.1	7.259	143.7	0.070	59.2	0.964	-24.0
300.00	0.750	-65.0	6.624	128.1	0.096	55.7	0.760	-34.3
400.00	0.653	-79.4	3.805	116.8	0.111	51.5	0.671	-38.9
500.00	0.548	-93.1	4.720	108.8	0.119	48.5	0.599	-41.3
600.00	0.471	-104.2	4.121	103.1	0.127	47.9	0.555	-41.1
700.00	0.433	-116.2	3.695	96.4	0.136	46.5	0.509	-44.9
800.00	0.397	-128.3	3.302	90.5	0.141	46.3	0.441	-44.6
900.00	0.361	-136.7	2.944	85.5	0.147	47.4	0.409	-43.0
1000.00	0.345	-146.1	2.696	82.0	0.153	48.6	0.378	-44.9
1100.00	0.332	-155.5	2.479	77.9	0.158	48.6	0.368	-48.3
1200.00	0.336	-164.1	2.328	74.3	0.163	48.8	0.338	-52.4
1300.00	0.346	-172.7	2.158	70.3	0.170	48.7	0.314	-52.7
1400.00	0.332	-177.1	2.063	67.1	0.180	49.3	0.300	54.5
1500.00	0.347	176.5	1.997	61.8	0.194	49.2	0.294	-55.3
1600.00	0.338	171.8	1.906	58.4	0.207	50.6	0.282	-58.8
1700.00	0.349	165.6	1.818	56.0	0.216	52.3	0.262	-60.8
1800.00	0.355	139.2	1.740	55.1	0.225	54.4	0.251	-64.3
1900.00	0.373	155.6	1.650	53.2	0.233	53.1	0.241	-68.3
2000.00	0.387	131.2	1.376	31.6	0.240	55.5	0.239	-72.5

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 5 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.865	-27.8	11.588	156.9	0.036	49.9	0.938	-13.2
200.00	0.742	-53.4	9.364	137.4	0.066	58.5	0.805	-29.3
300.00	0.637	-73.2	8.312	121.7	0.086	53.0	0.675	-40.3
400.00	0.531	-87.6	6.607	110.7	0.100	53.2	0.576	-44.3
500.00	0.438	-101.3	5.519	103.7	0.109	52.0	0.500	-45.6
600.00	0.376	-113.3	4.799	98.6	0.118	52.5	0.461	-44.5
700.00	0.343	-125.0	4.262	92.5	0.128	52.0	0.418	-48.1
800.00	0.315	-136.9	3.784	87.3	0.135	52.5	0.357	-47.9
900.00	0.286	-145.5	3.354	83.0	0.143	53.5	0.325	-47.4
1000.00	0.276	-154.9	3.048	79.8	0.154	54.4	0.301	-46.6
1100.00	0.268	-164.6	2.812	76.3	0.163	54.4	0.294	-50.1
1200.00	0.276	-172.4	2.613	73.0	0.170	54.2	0.267	-54.7
1300.00	0.286	179.9	2.441	69.4	0.180	53.6	0.243	-54.8
1400.00	0.293	173.9	2.321	63.9	0.192	53.4	0.228	-56.1
1500.00	0.294	169.9	2.232	61.4	0.207	52.8	0.222	-57.0
1600.00	0.290	165.5	2.123	58.3	0.223	53.4	0.211	-61.0
1700.00	0.303	160.1	2.030	56.3	0.234	54.4	0.191	-63.5
1800.00	0.313	154.3	1.932	53.6	0.244	55.8	0.179	-67.5
1900.00	0.330	151.2	1.836	53.8	0.252	56.0	0.171	-71.9
2000.00	0.341	147.2	1.757	52.4	0.259	55.8	0.168	-77.4



V<sub>CE</sub> = 3 V, I<sub>c</sub> = 7 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.811	-32.6	14.032	153.7	0.027	57.0	0.922	-18.2
200.00	0.668	-59.1	11.239	132.2	0.063	56.7	0.752	-33.9
300.00	0.553	-79.0	8.969	116.7	0.081	55.4	0.611	-44.6
400.00	0.449	-93.3	7.293	106.9	0.094	55.4	0.510	-47.9
500.00	0.370	-107.1	6.039	100.6	0.103	55.3	0.435	-48.1
600.00	0.318	-119.6	5.212	93.8	0.114	56.2	0.400	-46.5
700.00	0.290	-131.1	4.581	90.2	0.125	55.8	0.364	-50.1
800.00	0.268	-142.9	4.057	85.5	0.134	56.2	0.305	-50.1
900.00	0.244	-151.8	3.587	81.6	0.145	57.1	0.275	-49.0
1000.00	0.237	-161.2	3.266	78.6	0.157	57.6	0.255	-47.7
1100.00	0.233	-170.9	3.003	75.4	0.167	57.5	0.249	-51.5
1200.00	0.243	-178.1	2.794	72.3	0.173	57.0	0.225	-56.7
1300.00	0.253	174.8	2.596	68.9	0.186	56.1	0.199	-56.7
1400.00	0.261	171.0	2.474	65.4	0.199	55.4	0.185	-37.7
1500.00	0.265	165.4	2.365	61.3	0.216	54.6	0.179	-38.7
1600.00	0.265	161.2	2.253	58.4	0.232	54.7	0.169	-63.3
1700.00	0.277	156.4	2.153	56.5	0.245	55.5	0.149	-66.8
1800.00	0.290	151.1	2.046	56.9	0.233	56.4	0.137	-71.3
1900.00	0.306	148.3	1.943	54.2	0.264	56.4	0.130	-76.7
2000.00	0.318	144.6	1.856	52.8	0.271	53.9	0.128	-83.6

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 10 mA, Z<sub>o</sub> = 50 Ω

FREQUENCY (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.775	-34.3	16.213	130.4	0.031	42.4	0.916	-18.1
200.00	0.609	-63.8	12.257	128.4	0.037	55.3	0.712	-37.2
300.00	0.488	-83.7	9.683	115.4	0.077	56.3	0.569	-47.6
400.00	0.390	-98.0	7.790	104.3	0.091	56.6	0.467	-30.5
500.00	0.321	-111.7	6.396	98.4	0.101	57.6	0.394	-50.4
600.00	0.277	-124.8	5.493	93.8	0.113	58.5	0.362	-48.1
700.00	0.253	-136.0	4.808	88.6	0.125	58.4	0.329	-51.9
800.00	0.236	-147.8	4.252	84.3	0.135	58.4	0.273	-52.2
900.00	0.216	-157.0	3.752	80.7	0.147	59.1	0.242	-50.9
1000.00	0.212	-166.4	3.408	77.8	0.160	59.6	0.224	-49.1
1100.00	0.221	-176.0	3.131	74.8	0.171	59.2	0.220	-53.1
1200.00	0.221	177.3	2.909	71.9	0.180	58.5	0.197	-59.1
1300.00	0.232	170.6	2.711	68.6	0.191	57.3	0.171	-59.2
1400.00	0.240	167.1	2.581	65.2	0.205	56.3	0.157	-60.1
1500.00	0.247	161.8	2.457	61.2	0.222	55.2	0.150	-61.2
1600.00	0.248	158.0	2.335	58.5	0.239	55.2	0.141	-66.8
1700.00	0.261	153.6	2.236	56.6	0.252	53.8	0.121	-71.4
1800.00	0.275	148.5	2.120	56.2	0.263	56.5	0.101	-77.2
1900.00	0.291	146.1	2.019	54.6	0.272	56.4	0.104	-83.3
2000.00	0.302	142.6	1.923	53.2	0.279	56.8	0.104	-91.6

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