NEC

SILICON TRANSISTOR
2SC5191

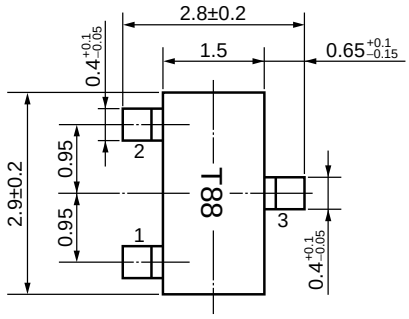
MICROWAVE LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR

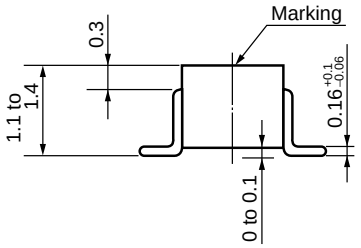
FEATURES

- Low Voltage Operation, Low Phase Distortion
- Low Noise
  NF = 1.5 dB TYP. @ V_{CE} = 3 V, I_C = 7 mA, f = 2 GHz
  NF = 1.7 dB TYP. @ V_{CE} = 1 V, I_C = 3 mA, f = 2 GHz
- Large Absolute Maximum Collector Current
  I_C = 100 mA
- Mini Mold Package
  EIAJ: SC-59

PACKAGE DRAWINGS

(Unit: mm)





PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5191-T1	3 Kpcs/Reel	Embossed tape 8 mm wide. Pin 3 (collector) face to perforation side of the tape.
2SC5191-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 °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	200	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I_{CBO}	V_{CB} = 5 V, I_E = 0			100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 1 V, I_C = 0			100	nA
DC Current Gain	h_{FE}	V_{CE} = 1 V, I_C = 3 mA[Note 1]	80		160	
Insertion Power Gain (1)	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 3 mA, f = 2.0 GHz	2.5	3.5		dB
Insertion Power Gain (2)	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 20 mA, f = 2.0 GHz		6.5		dB
Noise Figure (1)	NF	V_{CE} = 1 V, I_C = 3 mA, f = 2.0 GHz		1.7	2.5	dB
Noise Figure (2)	NF	V_{CE} = 3 V, I_C = 7 mA, f = 2.0 GHz		1.5		dB
Gain Bandwidth Product (1)	f_T	V_{CE} = 1 V, I_C = 3 mA, f = 2.0 GHz	4	4.5		GHz
Gain Bandwidth Product (2)	f_T	V_{CE} = 3 V, I_C = 20 mA, f = 2.0 GHz		8.5		GHz
Collector Capacitance	C_{re}	V_{CB} = 1 V, I_E = 0, f = 1.0 MHz[Note 2]		0.75	0.85	pF

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

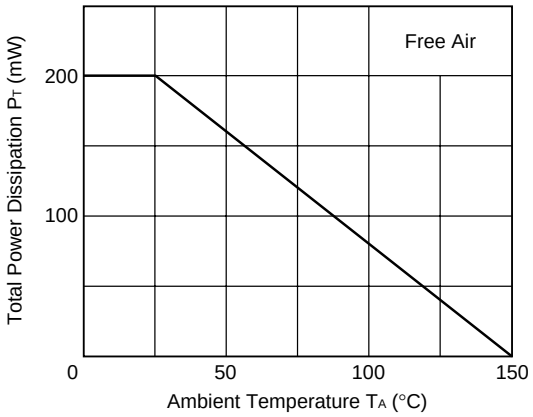
2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

h_{FE} Classification

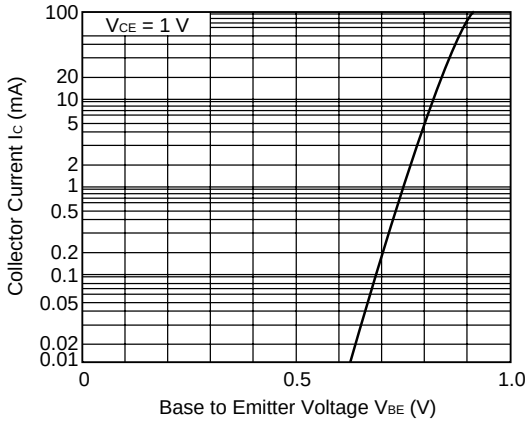
Rank	FB
Marking	T88
h_{FE}	80 to 160

TYPICAL CHARACTERISTICS (T_A = 25 °C)

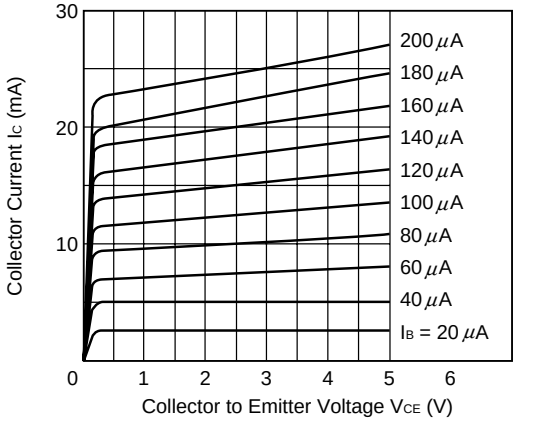
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



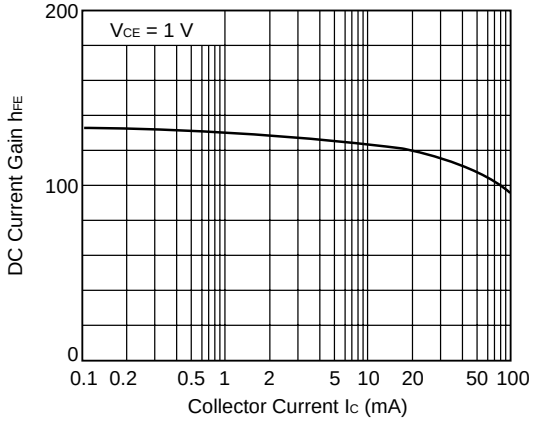
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



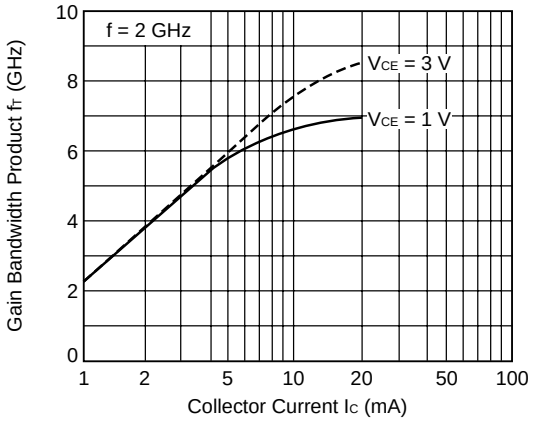
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



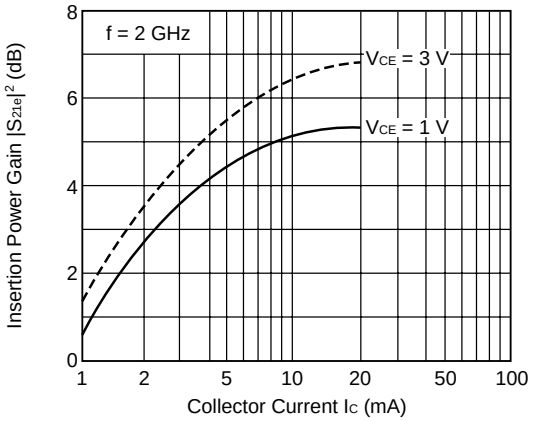
DC CURRENT GAIN vs. COLLECTOR CURRENT



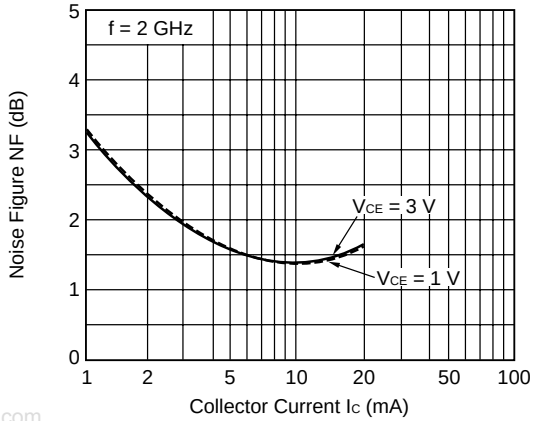
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



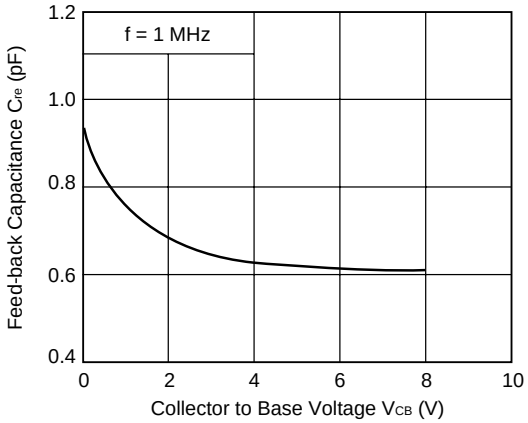
INSERTION GAIN vs. COLLECTOR CURRENT



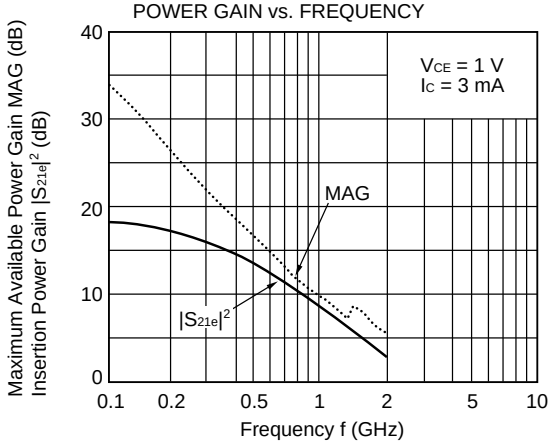
NOISE FIGURE vs.
COLLECTOR CURRENT



FEED-BACK CAPACITANCE vs.
COLECTOR TO BASE VOLTAGE



MAXIMUM AVAILABLE GAIN/INSERTION
POWER GAIN vs. FREQUENCY



S-PARAMETERS

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.969	–17.1	3.342	165.9	0.058	80.2	0.990	–9.6
200.00	0.923	–34.8	3.220	152.2	0.099	71.6	0.948	–17.9
300.00	0.868	–51.0	3.032	139.4	0.141	61.0	0.877	–26.0
400.00	0.831	–65.4	2.785	128.8	0.167	49.6	0.821	–33.3
500.00	0.762	–79.3	2.592	118.8	0.186	45.7	0.766	–38.6
600.00	0.715	–91.0	2.355	109.3	0.202	37.4	0.710	–42.5
700.00	0.678	–103.8	2.190	100.6	0.210	34.9	0.664	–46.5
800.00	0.645	–113.9	2.020	94.1	0.219	30.8	0.629	–50.1
900.00	0.617	–124.9	1.849	86.6	0.216	26.8	0.599	–54.8
1000.00	0.600	–134.1	1.759	80.4	0.226	23.6	0.573	–56.2
1100.00	0.586	–141.8	1.638	75.2	0.220	25.1	0.546	–60.1
1200.00	0.559	–150.3	1.530	70.0	0.223	23.0	0.514	–60.4
1300.00	0.556	–158.1	1.459	65.1	0.213	24.1	0.513	–64.9
1400.00	0.551	–166.4	1.379	61.2	0.216	26.2	0.495	–66.4
1500.00	0.532	–171.2	1.288	56.1	0.207	24.3	0.481	–69.4
1600.00	0.553	–177.8	1.237	53.3	0.209	25.5	0.477	–72.0
1700.00	0.552	176.8	1.206	50.2	0.214	26.9	0.468	–75.2
1800.00	0.548	170.0	1.145	46.7	0.204	29.2	0.470	–78.4
1900.00	0.537	164.3	1.058	43.5	0.199	30.8	0.470	–80.9
2000.00	0.552	160.5	1.051	41.2	0.209	31.8	0.442	–84.6

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.878	–27.3	8.524	158.6	0.042	70.2	0.931	–17.4
200.00	0.795	–52.6	7.536	140.5	0.086	63.9	0.840	–32.4
300.00	0.692	–73.3	6.465	125.8	0.113	52.7	0.708	–43.3
400.00	0.612	–90.3	5.488	115.3	0.123	47.8	0.602	–51.1
500.00	0.553	–105.9	4.763	106.3	0.143	44.7	0.535	–56.7
600.00	0.511	–117.9	4.142	98.5	0.153	43.8	0.479	–61.1
700.00	0.477	–130.1	3.673	92.1	0.156	42.1	0.422	–64.5
800.00	0.449	–139.3	3.273	86.6	0.164	40.8	0.386	–67.9
900.00	0.443	–149.3	2.951	81.4	0.166	42.2	0.362	–70.5
1000.00	0.427	–158.0	2.727	76.5	0.185	41.3	0.337	–73.2
1100.00	0.430	–165.7	2.524	72.4	0.183	40.8	0.318	–75.0
1200.00	0.414	–171.7	2.338	68.5	0.196	42.5	0.287	–79.0
1300.00	0.409	–178.9	2.194	64.4	0.205	42.9	0.295	–81.7
1400.00	0.421	177.0	2.072	61.3	0.211	42.6	0.277	–83.9
1500.00	0.397	170.0	1.924	57.3	0.221	41.8	0.264	–86.1
1600.00	0.430	165.1	1.823	55.2	0.228	41.2	0.258	–87.3
1700.00	0.415	161.5	1.753	52.2	0.242	43.4	0.257	–94.1
1800.00	0.446	155.0	1.641	48.9	0.252	44.0	0.242	–96.0
1900.00	0.414	150.3	1.561	46.7	0.261	42.6	0.239	–95.3
2000.00	0.432	147.2	1.523	44.6	0.268	42.8	0.227	–103.4

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.828	–34.9	12.029	153.2	0.047	72.5	0.896	–23.8
200.00	0.698	–64.4	9.922	133.0	0.076	59.6	0.750	–41.2
300.00	0.586	–86.5	8.024	118.3	0.100	52.5	0.602	–53.1
400.00	0.513	–103.4	6.568	108.6	0.111	49.5	0.488	–61.1
500.00	0.461	–118.7	5.561	100.5	0.121	48.7	0.428	–66.7
600.00	0.423	–132.0	4.754	93.8	0.129	46.9	0.363	–71.2
700.00	0.409	–143.3	4.178	88.3	0.147	49.8	0.330	–74.3
800.00	0.379	–152.0	3.699	83.5	0.156	47.9	0.299	–77.4
900.00	0.396	–160.6	3.317	78.8	0.162	47.2	0.275	–82.9
1000.00	0.380	–169.2	3.040	74.6	0.178	48.4	0.260	–84.9
1100.00	0.386	–175.8	2.810	70.8	0.185	49.2	0.237	–87.8
1200.00	0.379	177.9	2.596	67.4	0.200	48.0	0.222	–90.4
1300.00	0.374	172.3	2.412	63.9	0.208	48.2	0.224	–95.8
1400.00	0.385	167.2	2.269	60.9	0.216	47.4	0.203	–97.8
1500.00	0.366	162.1	2.136	57.4	0.233	46.8	0.197	–101.8
1600.00	0.394	157.6	1.994	55.6	0.247	47.5	0.189	–105.4
1700.00	0.387	154.4	1.940	52.4	0.253	48.2	0.200	–107.6
1800.00	0.401	149.9	1.822	50.2	0.265	46.1	0.186	–112.3
1900.00	0.394	143.8	1.705	47.1	0.276	47.1	0.181	–108.8
2000.00	0.413	142.2	1.661	45.5	0.294	46.2	0.183	–122.0

V_{CE} = 1 V, I_C = 7 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.765	–41.7	14.938	148.5	0.047	67.6	0.856	–29.5
200.00	0.621	–74.7	11.624	127.4	0.069	57.3	0.675	–49.1
300.00	0.514	–97.4	8.988	113.0	0.089	52.6	0.516	–61.4
400.00	0.450	–114.0	7.200	104.2	0.105	48.1	0.417	–69.3
500.00	0.417	–129.8	6.002	96.8	0.119	51.6	0.358	–75.2
600.00	0.382	–141.2	5.090	90.7	0.132	50.0	0.312	–77.7
700.00	0.370	–153.0	4.437	85.7	0.138	54.3	0.274	–81.5
800.00	0.352	–161.1	3.924	81.5	0.152	52.4	0.248	–88.8
900.00	0.368	–168.9	3.502	77.3	0.158	53.2	0.231	–92.2
1000.00	0.358	–177.0	3.198	73.1	0.176	53.7	0.211	–93.2
1100.00	0.360	177.8	2.961	70.1	0.191	52.3	0.191	–100.3
1200.00	0.360	171.7	2.726	66.8	0.206	53.1	0.185	–101.6
1300.00	0.365	165.9	2.534	63.2	0.217	52.1	0.187	–105.6
1400.00	0.369	160.9	2.380	60.3	0.235	51.6	0.171	–111.0
1500.00	0.351	155.9	2.225	57.4	0.240	50.3	0.165	–119.0
1600.00	0.382	153.0	2.099	55.6	0.258	50.4	0.157	–119.3
1700.00	0.374	150.9	2.035	52.8	0.267	50.3	0.166	–125.9
1800.00	0.395	145.3	1.909	50.1	0.276	47.7	0.166	–132.7
1900.00	0.389	140.7	1.796	48.2	0.279	48.1	0.156	–130.1
2000.00	0.394	137.7	1.732	46.0	0.307	45.0	0.158	–138.8

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.709	–49.2	17.593	143.9	0.046	65.1	0.813	–35.5
200.00	0.559	–84.3	12.812	122.2	0.062	62.1	0.599	–55.4
300.00	0.453	–107.2	9.641	108.9	0.078	52.2	0.458	–68.8
400.00	0.402	–124.4	7.603	100.7	0.099	55.9	0.354	–78.2
500.00	0.380	–139.0	6.276	93.8	0.108	52.3	0.308	–84.6
600.00	0.354	–149.7	5.297	88.3	0.122	55.0	0.254	–88.0
700.00	0.346	–160.7	4.604	83.8	0.140	56.0	0.232	–93.3
800.00	0.334	–168.4	4.044	79.8	0.145	57.5	0.208	–98.3
900.00	0.356	–175.4	3.614	75.9	0.163	55.1	0.202	–102.5
1000.00	0.346	176.7	3.290	72.1	0.173	54.1	0.177	–107.7
1100.00	0.353	171.9	3.049	69.0	0.191	53.3	0.167	–110.5
1200.00	0.360	166.4	2.806	65.7	0.201	54.7	0.157	–116.5
1300.00	0.351	161.2	2.610	62.6	0.218	53.0	0.161	–120.6
1400.00	0.361	156.0	2.434	60.1	0.240	53.4	0.150	–128.5
1500.00	0.351	150.0	2.296	57.6	0.255	50.8	0.140	–131.4
1600.00	0.378	149.4	2.154	55.4	0.269	52.3	0.160	–137.6
1700.00	0.356	146.5	2.090	52.4	0.279	50.8	0.166	–136.0
1800.00	0.386	141.6	1.942	50.7	0.295	49.8	0.139	–138.1
1900.00	0.379	139.0	1.844	47.8	0.297	48.5	0.143	–138.2
2000.00	0.404	135.6	1.787	45.7	0.309	47.5	0.148	–148.3

V_{CE} = 3 V, I_C = 1 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.963	–15.6	3.352	167.4	0.039	69.0	0.987	–7.2
200.00	0.935	–31.4	3.268	155.2	0.077	70.7	0.966	–14.3
300.00	0.889	–45.5	3.121	143.4	0.110	63.1	0.912	–20.7
400.00	0.846	–59.2	2.893	133.6	0.133	52.8	0.872	–26.2
500.00	0.791	–71.9	2.735	124.1	0.152	50.6	0.824	–30.9
600.00	0.734	–83.7	2.517	115.0	0.163	43.2	0.782	–34.5
700.00	0.694	–96.2	2.371	106.7	0.156	39.1	0.737	–38.5
800.00	0.668	–105.7	2.182	99.9	0.184	35.4	0.689	–40.8
900.00	0.633	–117.2	2.022	92.6	0.183	33.0	0.660	–45.4
1000.00	0.611	–127.2	1.927	86.7	0.181	32.4	0.648	–46.8
1100.00	0.597	–135.2	1.796	81.0	0.183	30.1	0.610	–48.9
1200.00	0.564	–143.3	1.681	76.1	0.171	29.2	0.590	–50.7
1300.00	0.544	–151.2	1.601	71.1	0.180	29.4	0.587	–53.7
1400.00	0.543	–159.7	1.510	66.8	0.169	29.2	0.581	–55.6
1500.00	0.531	–165.5	1.410	61.6	0.173	30.4	0.565	–58.4
1600.00	0.542	–173.1	1.336	58.9	0.172	32.6	0.552	–60.9
1700.00	0.535	–178.3	1.314	56.0	0.178	34.3	0.541	–63.7
1800.00	0.529	174.4	1.244	52.3	0.161	36.6	0.545	–66.0
1900.00	0.515	169.5	1.163	48.4	0.171	38.1	0.548	–68.1
2000.00	0.531	164.3	1.136	46.0	0.183	40.1	0.530	–71.4

V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.896	–23.6	8.711	160.8	0.040	74.9	0.949	–13.8
200.00	0.812	–45.2	7.884	144.2	0.071	66.3	0.877	–24.9
300.00	0.715	–63.9	6.914	130.2	0.092	59.1	0.757	–34.5
400.00	0.636	–79.4	5.959	119.9	0.103	51.9	0.673	–40.1
500.00	0.566	–92.8	5.241	111.0	0.116	48.4	0.609	–44.6
600.00	0.516	–104.7	4.591	103.1	0.124	45.4	0.546	–47.4
700.00	0.464	–117.5	4.116	96.5	0.131	42.4	0.499	–50.0
800.00	0.428	–127.4	3.676	91.1	0.149	44.5	0.465	–52.8
900.00	0.427	–138.6	3.330	85.4	0.144	44.9	0.433	–55.1
1000.00	0.389	–147.0	3.073	81.1	0.155	45.7	0.420	–55.8
1100.00	0.384	–154.9	2.843	76.8	0.162	45.7	0.389	–57.5
1200.00	0.380	–162.2	2.638	72.7	0.168	46.5	0.363	–57.4
1300.00	0.364	–170.0	2.470	68.8	0.176	47.0	0.367	–60.1
1400.00	0.378	–177.8	2.325	65.7	0.191	49.7	0.360	–62.3
1500.00	0.361	178.3	2.162	61.6	0.190	46.6	0.333	–64.2
1600.00	0.382	172.1	2.045	59.6	0.203	47.2	0.320	–65.9
1700.00	0.371	169.0	1.973	56.6	0.210	49.3	0.328	–70.4
1800.00	0.386	162.2	1.854	53.8	0.217	48.5	0.311	–72.5
1900.00	0.373	156.8	1.749	50.6	0.230	50.1	0.321	–73.1
2000.00	0.387	153.1	1.703	48.6	0.236	50.1	0.299	–75.8

V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.847	–29.5	12.405	156.1	0.040	66.7	0.922	–18.5
200.00	0.718	–54.0	10.551	137.2	0.064	65.1	0.805	–31.9
300.00	0.607	–74.5	8.790	122.8	0.083	59.2	0.662	–41.3
400.00	0.525	–89.4	7.304	113.1	0.097	53.0	0.566	–47.1
500.00	0.454	–103.9	6.251	104.8	0.102	51.9	0.494	–50.6
600.00	0.402	–115.9	5.383	97.9	0.115	51.6	0.445	–52.2
700.00	0.379	–127.6	4.744	92.2	0.124	53.4	0.401	–55.5
800.00	0.349	–137.8	4.216	87.5	0.127	51.1	0.377	–56.2
900.00	0.347	–148.2	3.784	82.7	0.145	52.8	0.348	–59.2
1000.00	0.318	–155.9	3.477	78.6	0.157	53.3	0.326	–59.1
1100.00	0.323	–163.8	3.202	75.0	0.162	52.3	0.293	–63.5
1200.00	0.320	–171.7	2.963	71.4	0.175	52.8	0.288	–63.2
1300.00	0.313	–177.4	2.751	67.9	0.191	53.5	0.294	–66.9
1400.00	0.320	175.0	2.589	65.1	0.192	50.9	0.281	–68.0
1500.00	0.305	169.8	2.421	61.2	0.195	51.4	0.263	–68.7
1600.00	0.327	163.6	2.276	59.4	0.210	53.1	0.245	–71.4
1700.00	0.308	162.5	2.203	56.8	0.226	51.8	0.248	–75.4
1800.00	0.341	156.8	2.069	53.9	0.230	51.2	0.236	–76.9
1900.00	0.327	148.3	1.951	51.1	0.239	51.3	0.241	–78.1
2000.00	0.333	147.6	1.891	49.4	0.254	50.4	0.226	–83.2

V_{CE} = 3 V, I_C = 7 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.780	–33.5	15.604	151.8	0.034	75.0	0.889	–22.4
200.00	0.639	–61.9	12.605	131.6	0.059	62.9	0.738	–37.1
300.00	0.520	–82.6	10.059	117.5	0.080	59.3	0.580	–46.6
400.00	0.442	–97.6	8.162	108.4	0.085	56.6	0.494	–52.5
500.00	0.382	–112.6	6.855	100.9	0.098	55.7	0.427	–54.4
600.00	0.346	–124.7	5.848	94.6	0.108	56.5	0.373	–55.5
700.00	0.318	–136.6	5.125	89.5	0.118	57.5	0.344	–58.1
800.00	0.295	–144.5	4.525	85.3	0.131	57.5	0.314	–60.2
900.00	0.297	–156.6	4.059	80.8	0.134	55.0	0.290	–63.1
1000.00	0.282	–164.9	3.730	77.0	0.153	56.6	0.284	–62.8
1100.00	0.285	–170.0	3.414	73.7	0.164	58.3	0.269	–64.7
1200.00	0.279	–177.0	3.152	70.5	0.178	56.0	0.247	–67.7
1300.00	0.269	176.0	2.945	67.1	0.188	55.8	0.234	–70.3
1400.00	0.295	169.7	2.762	64.6	0.204	57.0	0.224	–70.8
1500.00	0.278	163.5	2.572	61.2	0.213	54.7	0.222	–73.1
1600.00	0.297	161.3	2.427	59.6	0.225	53.1	0.225	–74.4
1700.00	0.281	156.8	2.331	56.8	0.240	53.9	0.212	–82.0
1800.00	0.318	151.6	2.194	54.5	0.247	52.9	0.198	82.6
1900.00	0.293	144.1	2.073	51.3	0.263	52.6	0.210	–82.6
2000.00	0.307	144.2	2.009	49.7	0.266	51.3	0.183	–89.8

V_{CE} = 3 V, I_C = 10 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.731	–39.7	18.468	148.0	0.036	64.3	0.857	–27.2
200.00	0.570	–68.3	14.160	127.2	0.055	62.0	0.676	–41.8
300.00	0.453	–88.8	10.931	113.5	0.070	57.7	0.530	–50.0
400.00	0.381	–104.3	8.738	105.0	0.085	59.4	0.432	–56.4
500.00	0.334	–119.4	7.284	98.1	0.093	58.9	0.380	–57.7
600.00	0.297	–131.4	6.170	92.4	0.103	60.7	0.332	–60.1
700.00	0.285	–145.7	5.377	87.6	0.121	57.6	0.297	–61.5
800.00	0.254	–151.0	4.738	83.8	0.133	61.4	0.278	–62.8
900.00	0.274	–161.8	4.232	79.8	0.142	62.0	0.248	–65.8
1000.00	0.250	–169.5	3.882	76.2	0.158	60.6	0.237	–65.0
1100.00	0.263	–176.4	3.572	72.8	0.164	58.0	0.228	–68.8
1200.00	0.260	176.4	3.289	70.0	0.182	58.9	0.198	–70.3
1300.00	0.251	170.1	3.069	66.6	0.192	56.8	0.211	–71.3
1400.00	0.259	166.9	2.885	64.3	0.201	56.1	0.202	–75.4
1500.00	0.253	161.3	2.685	60.9	0.214	54.6	0.186	–80.0
1600.00	0.283	155.7	2.519	59.4	0.230	55.9	0.180	–80.6
1700.00	0.270	152.5	2.427	56.9	0.243	56.3	0.171	–81.9
1800.00	0.310	146.5	2.278	54.8	0.256	52.8	0.175	–86.6
1900.00	0.281	141.1	2.145	51.8	0.268	54.0	0.169	–86.4
2000.00	0.306	139.5	2.088	50.1	0.281	51.6	0.160	–98.9

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