DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR

μPA845TC

NPN SILICON RF TRANSISTOR (WITH 2 DIFFERENT ELEMENTS) IN A FLAT-LEAD 6-PIN THIN-TYPE ULTRA SUPER MINIMOLD

FEATURES

- Ideal for 3.6 to 4.2 GHz oscillation application
- 2 different built-in transistors (2SC5603, 2SC5668)
  Q1: 13.5 GHz f_T high-gain transistor
  f_T = 13.5 GHz TYP., $|S_{21e}|^2$ = 10.0 dB TYP. @ V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz
  Q2: 21.0 GHz f_T high-gain transistor
  f_T = 21.0 GHz TYP., $|S_{21e}|^2$ = 11.5 dB TYP. @ V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz
- Flat-lead 6-pin thin-type ultra super minimold package

BUILT-IN TRANSISTORS

	Q1	Q2
3-pin thin-type ultra super minimold part No.	2SC5603	2SC5668

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA845TC	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 6 (Q1 Base), Pin 5 (Q2 Emitter), Pin 4 (Q2 Base) face the perforation side of the tape
μPA845TC-T1	3 kpcs/reel	

Remark To order evaluation samples, consult your NEC sales representative.
Unit sample quantity is 50 pcs.

Because this product uses high-frequency technology, avoid excessive static electricity, etc.

Document No. P15281EJ1V0DS00 (1st edition)
Date Published February 2001 NS CP(K)
Printed in Japan

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings		Unit
		Q1	Q2	
Collector to Base Voltage	V_{CBO}	15	15	V
Collector to Emitter Voltage	V_{CEO}	6	3.3	V
Emitter to Base Voltage	V_{EBO}	2	1.5	V
Collector Current	I_C	35	35	mA
Total Power Dissipation	P_{tot} Note	200	115	mW
		230 in 2 elements		
Junction Temperature	T_j	150		°C
Storage Temperature	T_{stg}	−65 to +150		°C

Note Mounted on 1.08 $cm^2 \times$ 1.0 mm (t) glass epoxy substrate

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

(1) Q1

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	200	nA
Emitter Cut-off Current	I_{EBO}	V_{BE} = 1 V, I_C = 0 mA	–	–	200	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 1 V, I_C = 5 mA	60	90	120	–
Gain Bandwidth Product	f_T	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	12.0	13.5	–	GHz
Insertion Power Gain	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	8.5	10.0	–	dB
Noise Figure	NF	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.3	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 0.5 V, I_E = 0 mA, f = 1 MHz	–	0.25	0.5	pF

(2) Q2

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	100	nA
Emitter Cut-off Current	I_{EBO}	V_{BE} = 1 V, I_C = 0 mA	–	–	100	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 2 V, I_C = 5 mA	50	70	100	–
Gain Bandwidth Product	f_T	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	18.0	21.0	–	GHz
Insertion Power Gain (1)	$\|S_{21e}\|^2$	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	9.0	11.5	–	dB
Insertion Power Gain (2)	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 10 mA, f = 2 GHz	8.5	11.0	–	dB
Noise Figure	NF	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.1	1.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 2 V, I_E = 0 mA, f = 1 MHz	–	0.24	0.3	pF
Maximum Available Power Gain	MAG Note 3	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	–	12.5	–	dB
Maximum Stable Power Gain	MSG Note 4	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	–	13.5	–	dB

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

3. $MAG = \left|\frac{S_{21}}{S_{12}}\right| (K - \sqrt{(K^2 - 1)})$

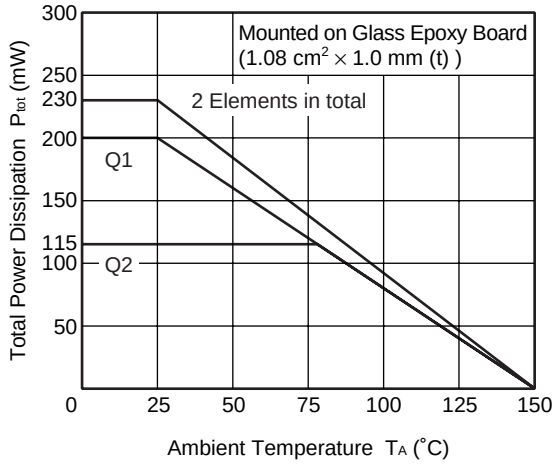
4. $MSG = \left|\frac{S_{21}}{S_{12}}\right|$

h_{FE} CLASSIFICATION

Rank	FB
Marking	2E
h_{FE} Value of Q1	60 to 120
h_{FE} Value of Q2	50 to 100

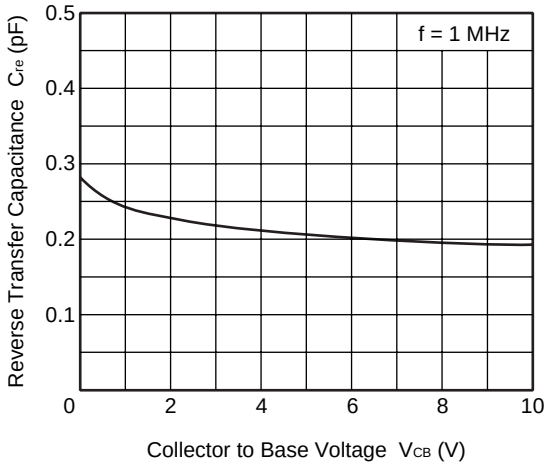
TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE

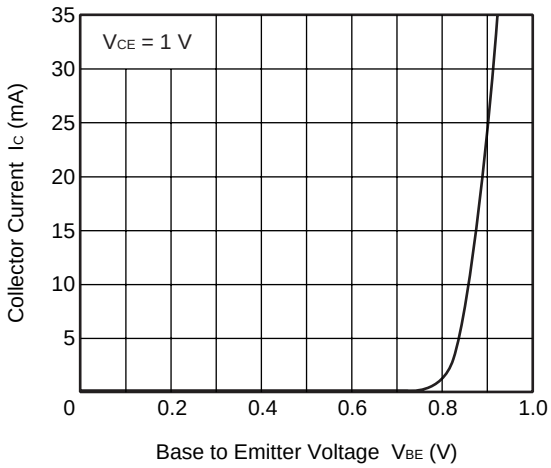


Q1

REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE

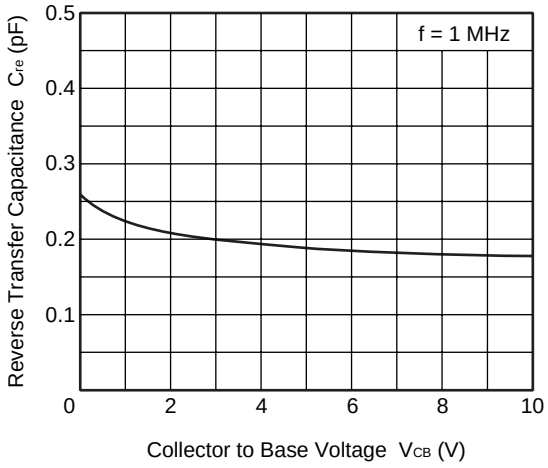


COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE

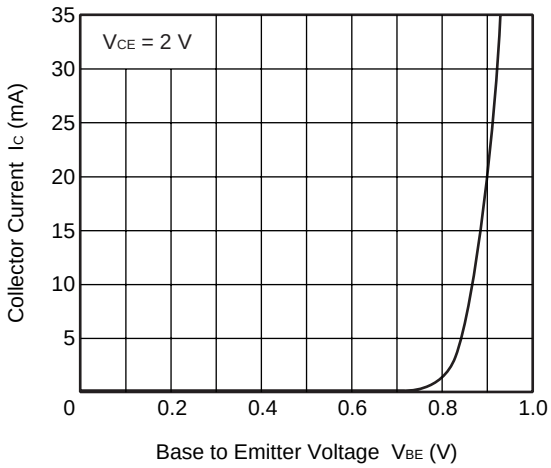


Q2

REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE

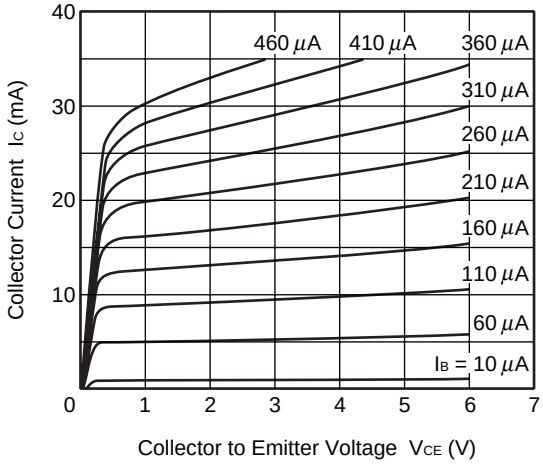


COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



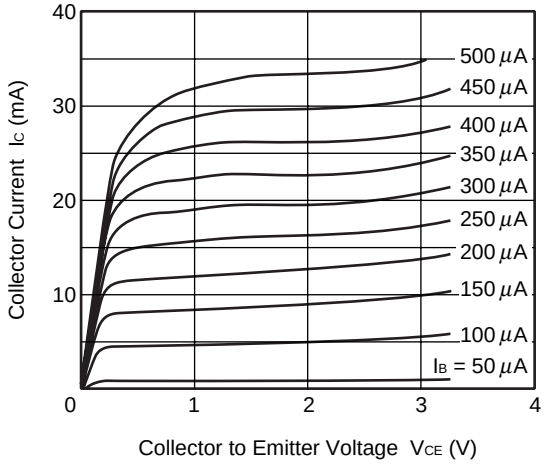
Q1

COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE

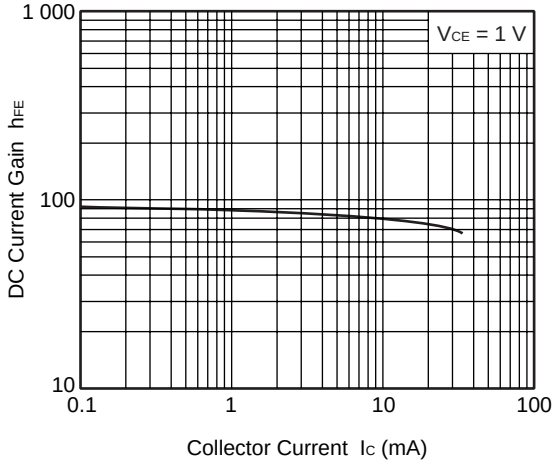


Q2

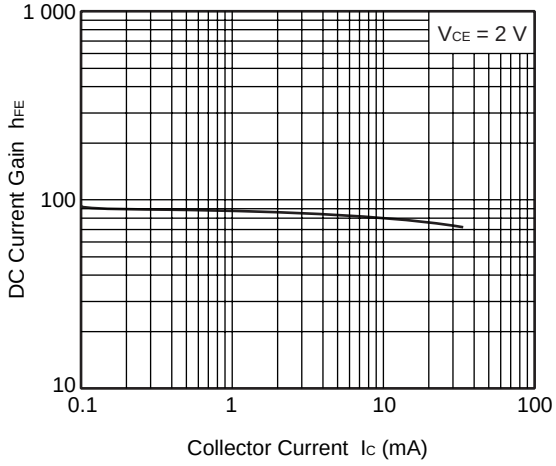
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs.
COLLECTOR CURRENT

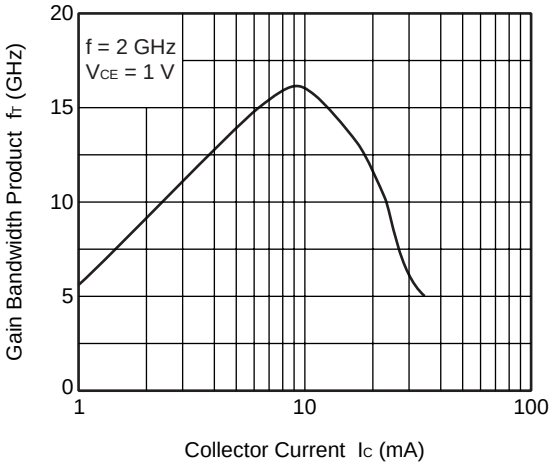


DC CURRENT GAIN vs.
COLLECTOR CURRENT



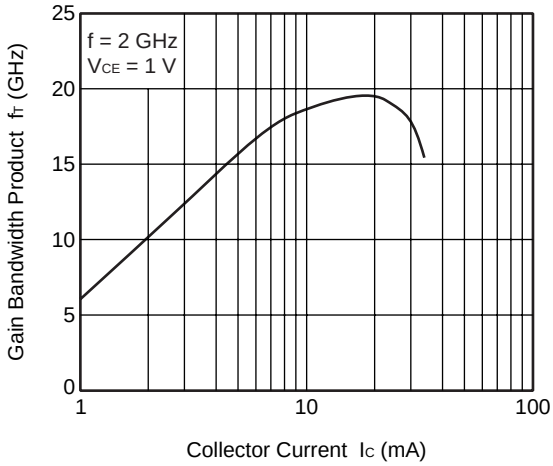
Q1

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

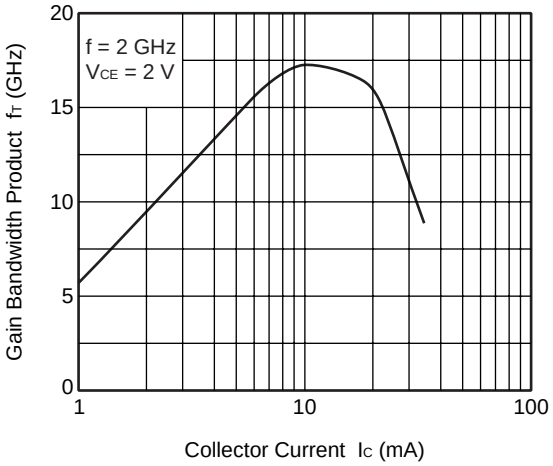


Q2

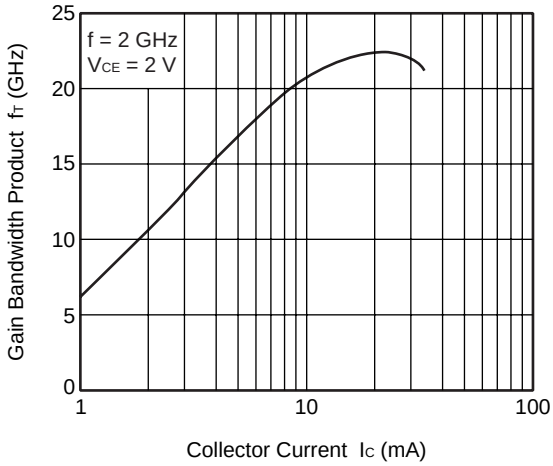
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

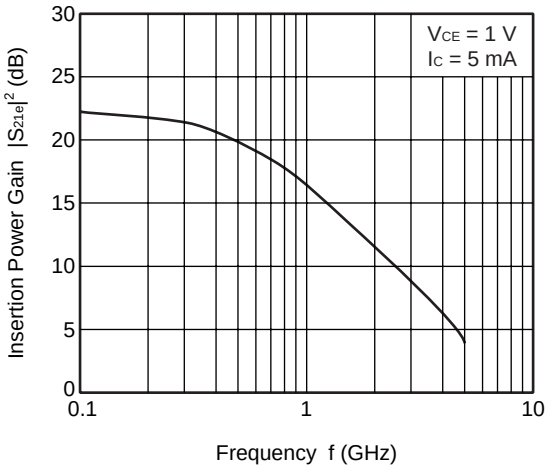


GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

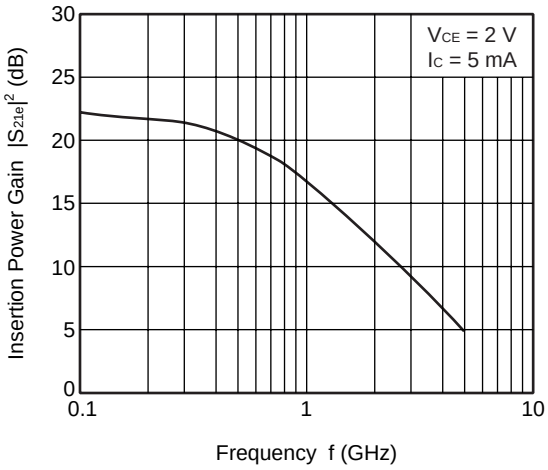


Q1

INSERTION POWER GAIN vs. FREQUENCY



INSERTION POWER GAIN vs. FREQUENCY



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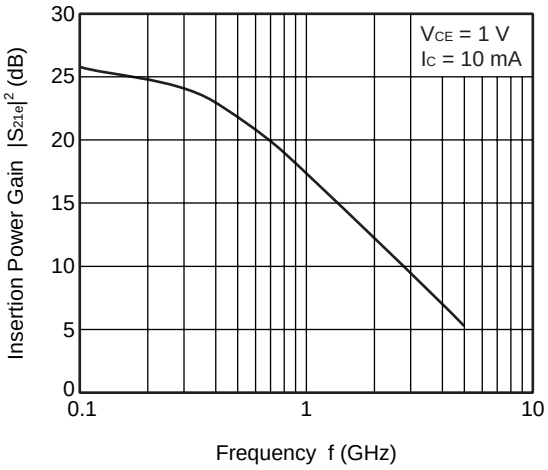
INSERTION POWER GAIN vs. FREQUENCY



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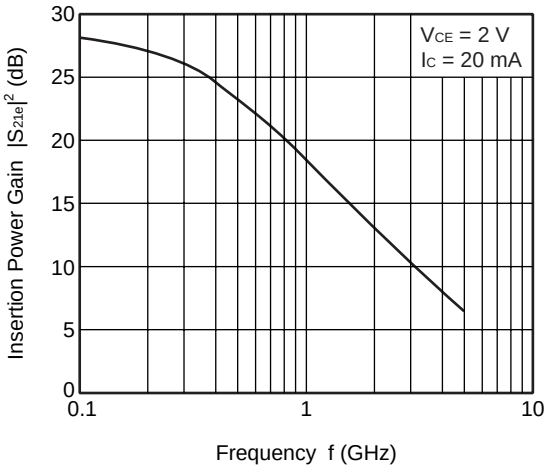
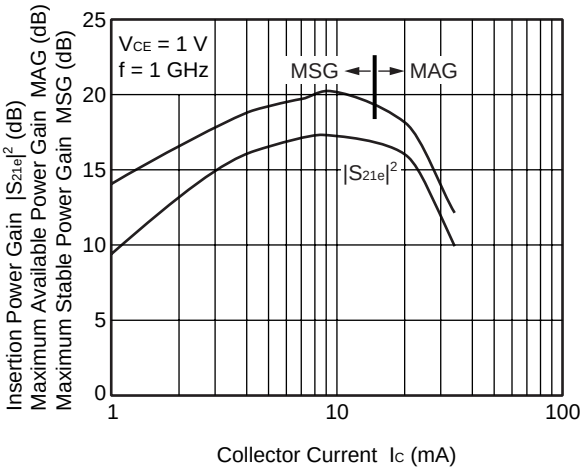


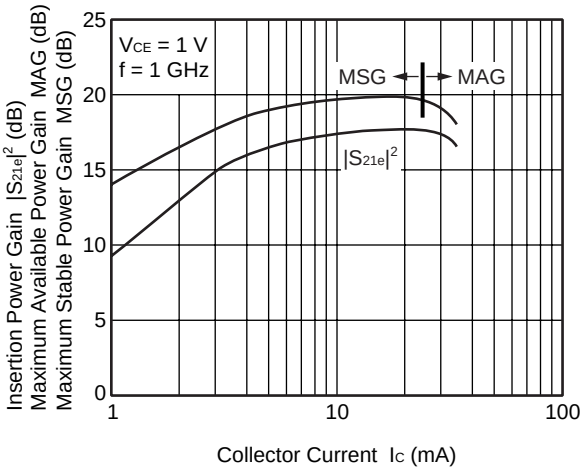
Q1

INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



Q2

INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



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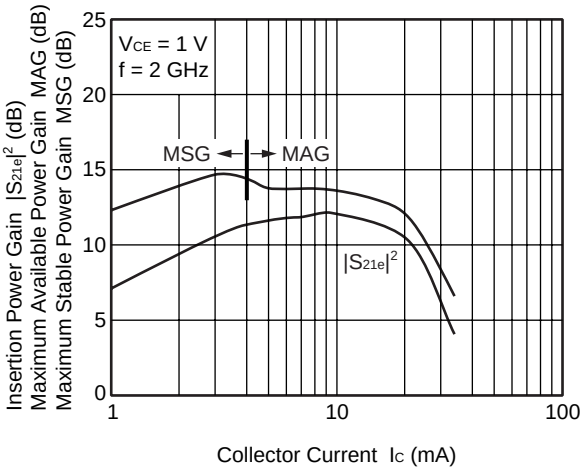
vs. COLLECTOR CURRENT



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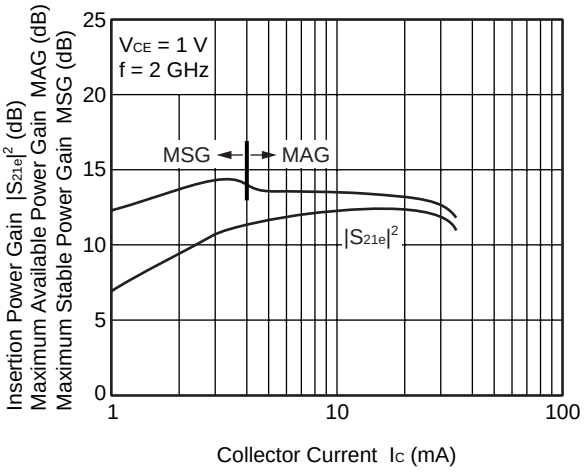

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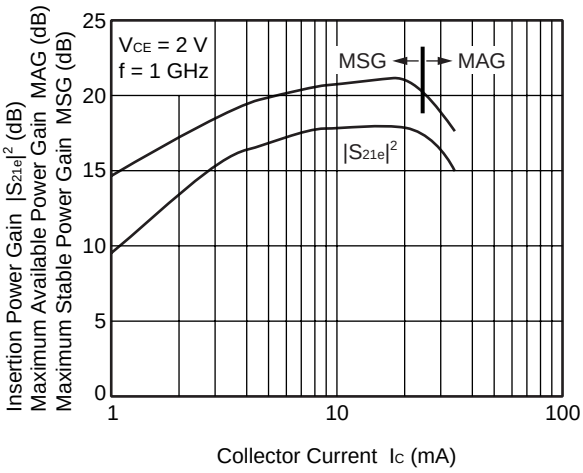

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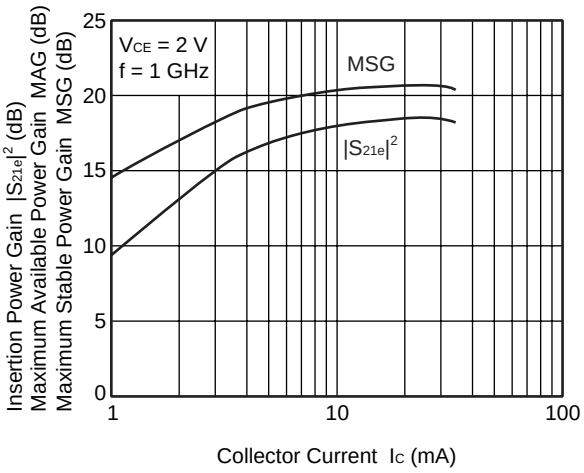

Q1

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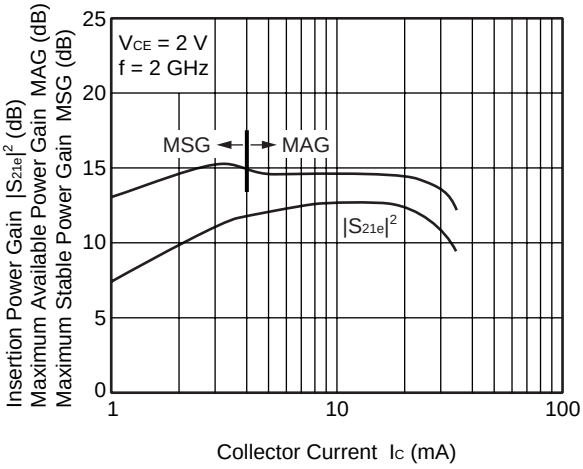
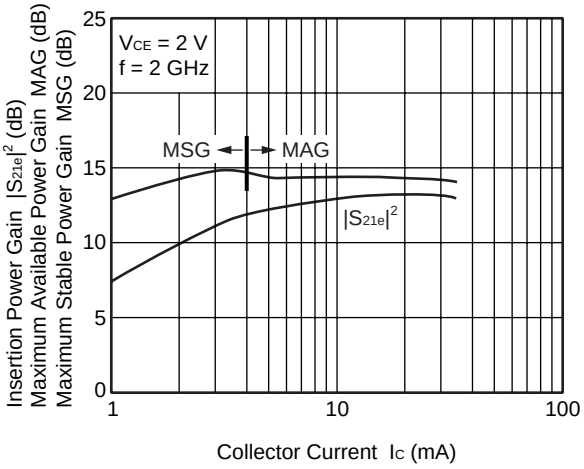


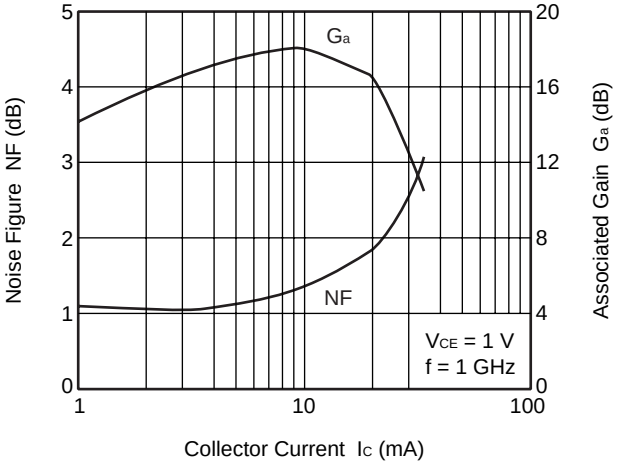
Q2

INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



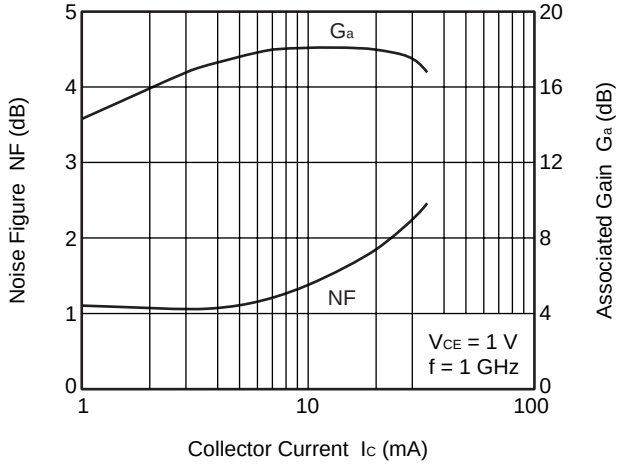
Q1

NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT

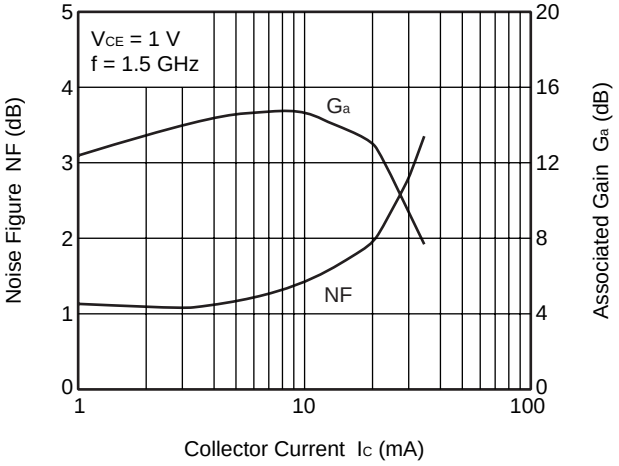


Q2

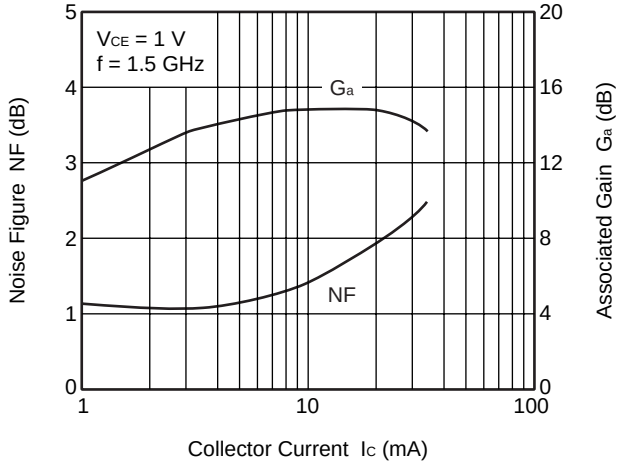
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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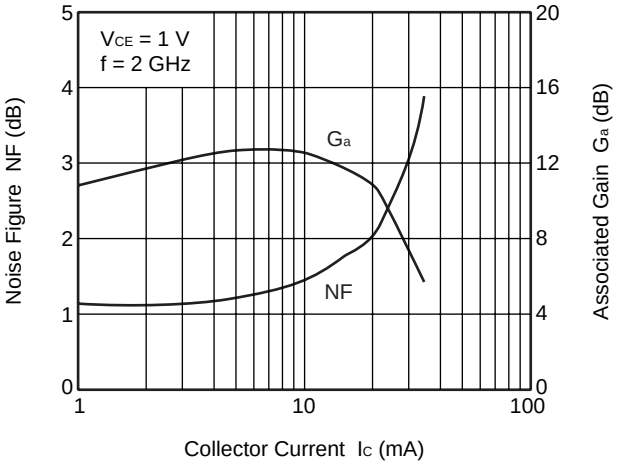
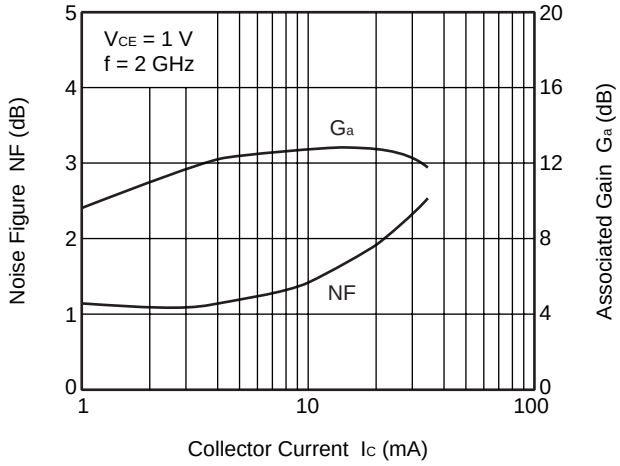
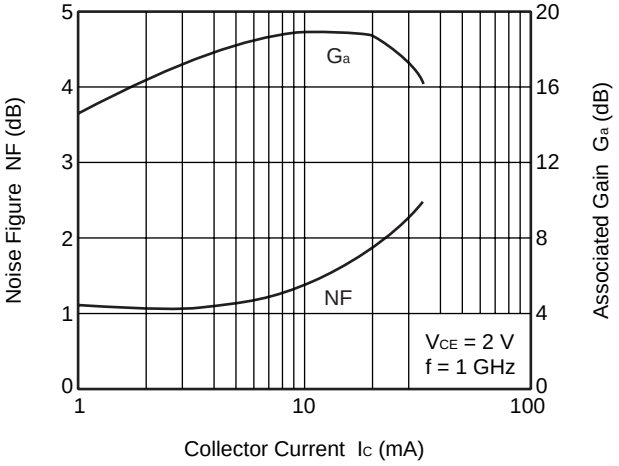


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



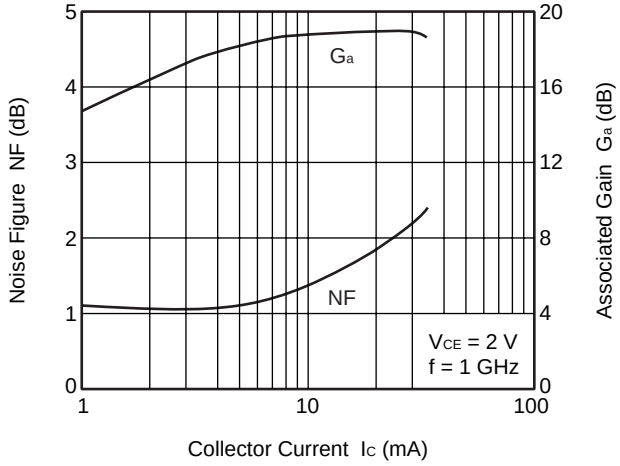
Q1

NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT

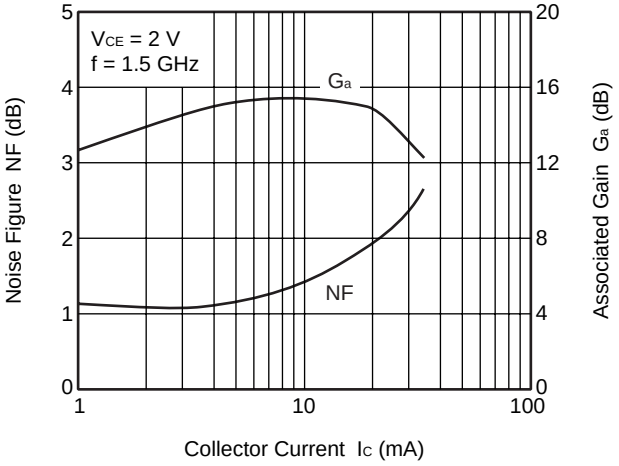


Q2

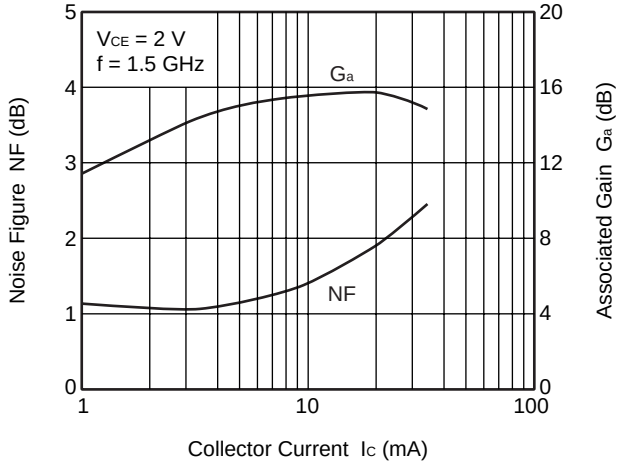
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



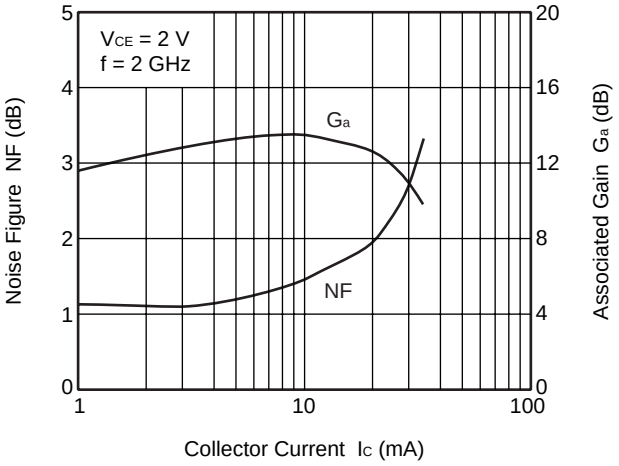
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



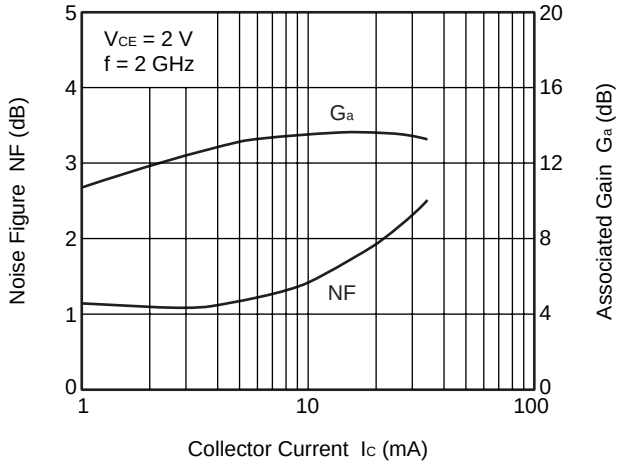
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS Q1

Note When K ≥ 1, the MAG (Maximum Available Gain) is used. $MAG = \left|\frac{S_{21}}{S_{12}}\right| (K - \sqrt{(K^2 - 1)})$

When K < 1, the MSG (Maximum Stable Gain) is used. $MSG = \left|\frac{S_{21}}{S_{12}}\right|$

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG Note
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.950	–6.3	3.367	173.2	0.014	85.7	0.990	–4.5	0.049	23.89
0.2	0.947	–12.0	3.295	168.0	0.029	81.8	0.983	–8.5	0.061	20.53
0.3	0.934	–17.3	3.320	162.5	0.043	76.9	0.971	–12.8	0.106	18.88
0.4	0.929	–23.0	3.260	156.4	0.056	72.4	0.958	–17.0	0.142	17.63
0.5	0.910	–28.5	3.220	151.1	0.069	68.6	0.946	–21.0	0.163	16.72
0.6	0.888	–34.0	3.173	145.7	0.080	64.8	0.928	–25.0	0.193	15.96
0.7	0.862	–39.9	3.111	139.7	0.091	61.1	0.908	–29.0	0.225	15.36
0.8	0.833	–44.8	3.060	134.8	0.100	57.5	0.887	–32.7	0.262	14.86
0.9	0.801	–50.6	2.998	129.5	0.108	54.1	0.865	–36.5	0.294	14.43
1.0	0.772	–55.6	2.933	124.5	0.115	50.7	0.843	–40.2	0.331	14.06
1.1	0.747	–61.4	2.857	119.9	0.121	47.6	0.821	–43.7	0.352	13.72
1.2	0.714	–67.0	2.788	114.7	0.126	44.5	0.798	–47.1	0.395	13.47
1.3	0.692	–72.5	2.729	110.3	0.129	41.8	0.774	–50.6	0.423	13.25
1.4	0.663	–77.7	2.650	105.8	0.132	39.3	0.751	–54.1	0.466	13.04
1.5	0.637	–83.4	2.595	101.2	0.133	37.1	0.730	–57.1	0.504	12.89
1.6	0.613	–88.5	2.511	97.0	0.134	35.2	0.710	–60.2	0.545	12.72
1.7	0.590	–94.0	2.436	92.5	0.135	33.4	0.693	–63.0	0.588	12.57
1.8	0.567	–100.1	2.400	89.2	0.133	31.9	0.672	–66.6	0.624	12.55
1.9	0.543	–105.5	2.322	84.6	0.133	30.7	0.657	–69.5	0.680	12.42
2.0	0.528	–110.5	2.261	80.6	0.131	29.9	0.641	–72.1	0.731	12.36
2.1	0.508	–117.0	2.197	76.6	0.129	29.8	0.627	–75.3	0.783	12.31
2.2	0.498	–122.3	2.148	72.9	0.126	30.3	0.613	–78.0	0.836	12.32
2.3	0.485	–128.2	2.073	69.3	0.123	31.0	0.601	–81.0	0.899	12.27
2.4	0.475	–133.2	2.009	65.7	0.120	32.1	0.593	–83.8	0.964	12.24
2.5	0.466	–139.0	1.970	62.4	0.117	33.7	0.580	–86.7	1.027	11.24
2.6	0.457	–144.2	1.901	58.7	0.115	35.8	0.574	–90.0	1.097	10.28
2.7	0.454	–149.8	1.858	56.0	0.114	38.1	0.569	–92.9	1.136	9.88
2.8	0.451	–155.1	1.807	53.0	0.114	41.4	0.566	–95.8	1.170	9.50
2.9	0.454	–160.3	1.758	50.3	0.115	44.2	0.558	–98.2	1.199	9.14
3.0	0.449	–165.4	1.685	47.2	0.118	47.4	0.551	–101.6	1.252	8.53
4.0	0.536	150.7	1.299	19.2	0.214	61.5	0.582	–137.0	0.866	7.84
5.0	0.646	120.2	0.940	0.0	0.333	47.5	0.658	–172.1	0.754	4.50

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.870	–11.3	8.868	168.9	0.014	78.0	0.978	–7.0	0.177	28.11
0.2	0.864	–18.3	8.486	162.2	0.027	78.8	0.957	–13.2	0.125	24.91
0.3	0.828	–27.1	8.367	153.4	0.040	73.1	0.923	–19.5	0.197	23.19
0.4	0.793	–35.7	7.941	145.2	0.051	68.0	0.884	–25.2	0.254	21.91
0.5	0.743	–43.1	7.528	138.1	0.060	64.0	0.842	–30.2	0.313	20.96
0.6	0.693	–50.6	7.166	131.3	0.068	60.4	0.800	–34.9	0.368	20.20
0.7	0.643	–57.7	6.701	124.7	0.075	57.3	0.755	–39.0	0.428	19.52
0.8	0.594	–64.0	6.347	119.2	0.081	55.1	0.714	–42.8	0.484	18.95
0.9	0.549	–70.5	5.980	113.8	0.086	53.2	0.678	–46.2	0.537	18.45
1.0	0.507	–76.7	5.647	108.8	0.090	51.6	0.644	–49.2	0.590	17.99
1.1	0.473	–82.5	5.310	104.4	0.093	50.6	0.610	–52.2	0.642	17.56
1.2	0.439	–88.8	5.015	99.8	0.096	49.5	0.583	–55.0	0.692	17.17
1.3	0.414	–94.3	4.763	96.1	0.099	48.9	0.556	–57.5	0.739	16.82
1.4	0.383	–100.1	4.525	92.2	0.102	48.7	0.532	–59.9	0.789	16.48
1.5	0.362	–106.0	4.316	88.5	0.104	48.6	0.512	–62.3	0.830	16.17
1.6	0.344	–111.8	4.099	85.1	0.107	48.8	0.493	–64.8	0.869	15.83
1.7	0.324	–117.8	3.915	81.7	0.110	49.0	0.478	–67.0	0.907	15.52
1.8	0.311	–124.3	3.755	78.9	0.113	49.5	0.462	–69.5	0.938	15.23
1.9	0.293	–131.3	3.601	75.4	0.116	49.7	0.449	–71.8	0.970	14.92
2.0	0.288	–136.7	3.457	72.3	0.119	50.2	0.437	–74.0	0.994	14.62
2.1	0.279	–143.6	3.313	69.3	0.122	51.0	0.425	–76.5	1.022	13.41
2.2	0.277	–149.4	3.206	66.5	0.126	51.9	0.416	–79.0	1.036	12.90
2.3	0.278	–155.0	3.073	63.7	0.129	52.6	0.408	–81.5	1.054	12.34
2.4	0.276	–160.1	2.961	61.0	0.133	53.3	0.401	–84.0	1.068	11.87
2.5	0.277	–166.1	2.877	58.4	0.137	53.9	0.392	–86.7	1.077	11.51
2.6	0.279	–171.4	2.770	55.5	0.142	54.6	0.388	–89.7	1.085	11.12
2.7	0.282	–176.2	2.686	53.4	0.147	54.9	0.384	–92.4	1.089	10.81
2.8	0.288	179.2	2.607	51.1	0.152	55.5	0.382	–95.4	1.084	10.57
2.9	0.294	174.9	2.521	49.0	0.157	55.7	0.378	–97.7	1.087	10.25
3.0	0.299	169.5	2.425	46.5	0.163	55.8	0.374	–101.1	1.095	9.84
4.0	0.423	137.5	1.893	22.9	0.245	53.4	0.412	–136.3	0.922	8.88
5.0	0.551	115.5	1.441	3.1	0.330	42.1	0.514	–169.3	0.820	6.40

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.813	–13.3	12.993	166.3	0.013	76.7	0.968	–8.8	0.214	29.89
0.2	0.790	–23.5	12.210	157.4	0.027	76.1	0.930	–16.6	0.195	26.58
0.3	0.733	–34.4	11.705	147.0	0.038	71.1	0.877	–23.9	0.271	24.92
0.4	0.678	–44.3	10.756	137.4	0.047	66.1	0.818	–30.2	0.352	23.62
0.5	0.616	–53.0	9.904	129.8	0.055	62.5	0.760	–35.2	0.428	22.59
0.6	0.560	–60.6	9.132	122.9	0.061	60.2	0.705	–39.4	0.499	21.74
0.7	0.504	–68.0	8.334	116.4	0.066	58.2	0.656	–43.2	0.570	20.98
0.8	0.455	–74.6	7.726	111.1	0.071	57.0	0.613	–46.2	0.635	20.34
0.9	0.413	–81.3	7.158	106.1	0.076	56.2	0.575	–48.9	0.693	19.77
1.0	0.376	–88.1	6.656	101.5	0.080	55.7	0.542	–51.4	0.745	19.21
1.1	0.347	–94.0	6.194	97.6	0.084	55.5	0.513	–53.7	0.792	18.68
1.2	0.317	–101.1	5.776	93.6	0.088	55.3	0.487	–55.8	0.841	18.19
1.3	0.299	–106.7	5.450	90.2	0.091	55.5	0.466	–57.9	0.875	17.75
1.4	0.276	–113.4	5.111	86.8	0.095	55.7	0.446	–60.1	0.915	17.29
1.5	0.261	–120.3	4.854	83.5	0.099	56.0	0.429	–62.0	0.941	16.89
1.6	0.247	–126.4	4.587	80.4	0.104	56.4	0.414	–64.2	0.970	16.46
1.7	0.235	–133.0	4.361	77.4	0.108	56.6	0.402	–66.0	0.992	16.05
1.8	0.230	–140.0	4.160	75.1	0.113	57.0	0.389	–68.4	1.008	15.14
1.9	0.220	–148.1	3.974	72.0	0.118	57.1	0.379	–70.7	1.025	14.33
2.0	0.218	–153.4	3.808	69.2	0.123	57.3	0.369	–72.7	1.035	13.78
2.1	0.220	–160.7	3.638	66.5	0.128	57.7	0.361	–75.3	1.044	13.27
2.2	0.225	–166.5	3.515	64.1	0.133	58.1	0.352	–77.9	1.047	12.91
2.3	0.228	–171.7	3.363	61.6	0.138	58.3	0.346	–80.4	1.055	12.44
2.4	0.231	–176.7	3.238	59.2	0.143	58.3	0.341	–83.0	1.059	12.06
2.5	0.238	178.2	3.131	57.0	0.148	58.5	0.334	–85.7	1.062	11.72
2.6	0.243	173.5	3.018	54.2	0.154	58.3	0.330	–88.8	1.063	11.39
2.7	0.249	169.5	2.928	52.4	0.160	58.2	0.327	–91.8	1.061	11.12
2.8	0.255	165.3	2.834	50.3	0.166	58.2	0.325	–94.8	1.058	10.85
2.9	0.265	161.7	2.742	48.4	0.172	57.9	0.321	–97.3	1.057	10.57
3.0	0.271	157.2	2.638	46.1	0.178	57.5	0.319	–101.0	1.062	10.19
4.0	0.404	131.2	2.063	24.3	0.257	51.5	0.359	–137.7	0.933	9.05
5.0	0.531	112.4	1.591	5.4	0.333	40.1	0.464	–170.1	0.852	6.79

V_{CE} = 1 V, I_C = 7 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.766	–16.1	16.147	164.6	0.012	76.9	0.957	–10.2	0.215	31.12
0.2	0.726	–27.4	14.889	153.7	0.026	74.9	0.904	–19.1	0.245	27.66
0.3	0.658	–40.2	13.930	142.1	0.036	69.1	0.835	–26.9	0.341	25.87
0.4	0.595	–50.9	12.489	132.2	0.044	65.5	0.764	–33.1	0.428	24.52
0.5	0.530	–59.7	11.260	124.4	0.051	62.7	0.699	–37.8	0.514	23.48
0.6	0.468	–68.0	10.194	117.6	0.056	60.7	0.642	–41.7	0.594	22.56
0.7	0.417	–75.3	9.170	111.3	0.062	59.8	0.590	–44.9	0.670	21.73
0.8	0.370	–82.9	8.401	106.2	0.067	59.2	0.549	–47.4	0.730	21.01
0.9	0.335	–89.4	7.702	101.6	0.071	59.2	0.515	–49.5	0.785	20.36
1.0	0.300	–96.9	7.114	97.4	0.075	59.2	0.485	–51.7	0.834	19.75
1.1	0.277	–103.2	6.567	93.8	0.080	59.3	0.459	–53.4	0.874	19.13
1.2	0.253	–110.5	6.112	90.1	0.084	59.3	0.437	–55.3	0.915	18.61
1.3	0.239	–117.0	5.735	86.9	0.089	59.6	0.419	–57.1	0.939	18.08
1.4	0.223	–124.0	5.358	84.0	0.094	59.8	0.401	–59.1	0.969	17.57
1.5	0.213	–131.4	5.077	80.9	0.098	60.1	0.387	–60.9	0.988	17.12
1.6	0.204	–138.3	4.783	77.9	0.104	60.4	0.375	–62.8	1.007	16.11
1.7	0.198	–145.9	4.547	75.2	0.109	60.5	0.364	–64.7	1.020	15.34
1.8	0.198	–152.5	4.315	73.0	0.114	60.7	0.354	–67.0	1.030	14.71
1.9	0.195	–161.0	4.126	70.1	0.120	60.5	0.345	–69.4	1.036	14.20
2.0	0.198	–166.0	3.954	67.6	0.125	60.6	0.337	–71.5	1.041	13.75
2.1	0.203	–173.9	3.775	65.1	0.131	60.7	0.329	–74.1	1.046	13.28
2.2	0.208	–178.0	3.635	62.7	0.137	60.8	0.322	–76.7	1.048	12.91
2.3	0.215	176.9	3.477	60.4	0.142	60.7	0.317	–79.4	1.052	12.49
2.4	0.219	172.7	3.341	58.1	0.148	60.6	0.312	–82.1	1.054	12.10
2.5	0.229	168.2	3.231	56.0	0.154	60.4	0.306	–84.8	1.052	11.82
2.6	0.235	164.1	3.112	53.4	0.161	59.9	0.303	–88.2	1.052	11.48
2.7	0.244	160.3	3.021	51.5	0.166	59.7	0.300	–91.1	1.048	11.25
2.8	0.250	156.9	2.927	49.6	0.173	59.4	0.299	–94.4	1.044	11.00
2.9	0.260	154.2	2.829	47.8	0.179	58.9	0.296	–97.1	1.043	10.72
3.0	0.268	149.9	2.721	45.6	0.186	58.2	0.294	–100.9	1.045	10.35
4.0	0.404	127.1	2.129	24.6	0.264	50.9	0.335	–138.8	0.935	9.07
5.0	0.528	110.4	1.646	6.3	0.336	39.2	0.442	–171.0	0.866	6.90

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.695	–19.2	19.540	162.2	0.012	74.2	0.942	–12.0	0.270	31.96
0.2	0.647	–33.2	17.557	149.6	0.024	73.7	0.870	–21.7	0.300	28.55
0.3	0.573	–47.4	15.968	136.9	0.033	68.5	0.785	–29.8	0.410	26.84
0.4	0.500	–58.7	13.929	126.6	0.041	65.3	0.704	–35.6	0.519	25.31
0.5	0.436	–68.3	12.269	118.9	0.047	63.1	0.637	–39.9	0.611	24.20
0.6	0.382	–77.2	10.937	112.5	0.053	62.3	0.578	–43.0	0.689	23.18
0.7	0.336	–85.1	9.707	106.5	0.058	61.9	0.531	–45.4	0.763	22.27
0.8	0.295	–93.2	8.808	101.9	0.063	62.2	0.492	–47.4	0.820	21.48
0.9	0.267	–100.6	8.026	97.5	0.067	62.4	0.462	–49.1	0.866	20.75
1.0	0.239	–109.4	7.351	93.7	0.072	62.6	0.436	–50.8	0.908	20.07
1.1	0.223	–115.8	6.774	90.3	0.078	62.8	0.415	–52.3	0.938	19.41
1.2	0.208	–124.5	6.270	86.8	0.082	63.0	0.397	–53.9	0.969	18.81
1.3	0.200	–131.1	5.867	83.9	0.088	63.3	0.381	–55.5	0.987	18.26
1.4	0.190	–139.5	5.474	81.0	0.093	63.5	0.366	–57.4	1.008	17.14
1.5	0.186	–146.6	5.174	78.1	0.098	63.5	0.355	–59.0	1.019	16.37
1.6	0.183	–154.0	4.867	75.6	0.104	63.7	0.345	–60.9	1.032	15.61
1.7	0.183	–161.1	4.622	72.8	0.110	63.7	0.336	–62.9	1.038	15.06
1.8	0.185	–167.8	4.384	70.8	0.116	63.7	0.327	–65.1	1.043	14.51
1.9	0.189	–175.8	4.186	68.1	0.122	63.4	0.320	–67.6	1.043	14.07
2.0	0.193	–179.8	4.001	65.6	0.128	63.1	0.313	–69.9	1.046	13.64
2.1	0.203	173.9	3.817	63.2	0.134	63.1	0.306	–72.5	1.048	13.20
2.2	0.210	170.3	3.680	61.0	0.140	63.1	0.300	–75.3	1.046	12.89
2.3	0.219	166.1	3.517	58.9	0.146	62.8	0.296	–78.1	1.048	12.48
2.4	0.226	162.5	3.376	56.6	0.153	62.4	0.292	–80.9	1.048	12.12
2.5	0.235	158.6	3.266	54.7	0.159	62.0	0.287	–83.8	1.045	11.84
2.6	0.244	155.4	3.144	52.0	0.166	61.3	0.284	–87.3	1.040	11.54
2.7	0.254	152.2	3.051	50.4	0.172	60.9	0.281	–90.5	1.038	11.30
2.8	0.263	149.7	2.955	48.5	0.179	60.4	0.280	–93.8	1.032	11.09
2.9	0.272	146.8	2.855	46.8	0.185	59.8	0.278	–96.7	1.031	10.79
3.0	0.279	143.2	2.741	44.7	0.192	58.8	0.276	–100.7	1.035	10.41
4.0	0.416	124.0	2.144	24.2	0.270	50.5	0.321	–140.0	0.932	9.00
5.0	0.534	108.1	1.661	6.3	0.340	38.5	0.429	–172.1	0.873	6.89

V_{CE} = 1 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.548	–35.2	23.507	155.4	0.015	74.4	0.861	–16.1	0.345	32.09
0.2	0.472	–57.4	19.533	138.3	0.024	68.5	0.743	–27.6	0.472	29.04
0.3	0.400	–79.7	16.410	124.3	0.032	65.1	0.634	–34.9	0.599	27.11
0.4	0.350	–96.4	13.500	114.3	0.038	63.2	0.551	–39.0	0.722	25.51
0.5	0.315	–110.1	11.428	107.0	0.043	63.3	0.492	–41.2	0.818	24.23
0.6	0.288	–123.0	9.895	101.4	0.049	63.7	0.447	–42.6	0.892	23.10
0.7	0.273	–133.7	8.613	96.4	0.054	64.2	0.414	–43.9	0.952	22.03
0.8	0.263	–144.4	7.705	92.0	0.059	65.3	0.388	–44.9	0.994	21.13
0.9	0.261	–152.2	6.944	88.2	0.065	65.8	0.369	–45.9	1.026	19.32
1.0	0.257	–161.0	6.316	84.7	0.070	66.4	0.353	–47.3	1.051	18.15
1.1	0.261	–166.4	5.781	81.7	0.076	66.8	0.341	–48.7	1.066	17.23
1.2	0.265	–173.7	5.317	78.5	0.082	67.0	0.330	–50.2	1.083	16.37
1.3	0.271	–178.5	4.954	75.8	0.088	67.3	0.320	–52.0	1.087	15.71
1.4	0.276	176.4	4.603	73.1	0.094	67.3	0.311	–54.1	1.097	14.99
1.5	0.283	171.8	4.343	70.3	0.100	67.4	0.304	–56.1	1.097	14.47
1.6	0.288	167.3	4.077	67.7	0.107	67.4	0.298	–58.4	1.101	13.89
1.7	0.295	163.7	3.862	65.2	0.113	67.1	0.293	–60.7	1.097	13.43
1.8	0.306	160.3	3.648	63.1	0.120	67.0	0.288	–63.4	1.095	12.95
1.9	0.316	155.8	3.481	60.4	0.127	66.5	0.284	–66.5	1.085	12.59
2.0	0.323	153.6	3.325	58.2	0.134	66.1	0.279	–69.2	1.081	12.21
2.1	0.336	150.3	3.164	55.6	0.141	65.8	0.275	–72.5	1.077	11.83
2.2	0.346	148.2	3.047	53.5	0.147	65.5	0.272	–75.8	1.067	11.57
2.3	0.357	145.8	2.908	51.3	0.155	64.9	0.269	–79.2	1.063	11.21
2.4	0.361	144.0	2.791	49.1	0.162	64.3	0.267	–82.6	1.061	10.86
2.5	0.372	141.2	2.690	47.2	0.169	63.8	0.265	–86.1	1.055	10.60
2.6	0.380	138.6	2.584	44.6	0.176	63.0	0.263	–90.2	1.050	10.29
2.7	0.391	136.9	2.508	42.9	0.183	62.4	0.263	–94.0	1.040	10.14
2.8	0.399	134.9	2.425	41.0	0.191	61.6	0.264	–97.9	1.033	9.93
2.9	0.409	133.0	2.343	39.3	0.198	60.8	0.264	–101.4	1.028	9.70
3.0	0.416	130.3	2.244	37.2	0.205	59.7	0.265	–105.8	1.033	9.29
4.0	0.545	114.1	1.727	16.7	0.288	49.3	0.330	–147.9	0.910	7.78
5.0	0.636	99.5	1.310	–0.5	0.355	36.0	0.449	–179.5	0.866	5.67

V_{CE} = 2 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.945	–6.0	3.352	173.8	0.012	82.6	0.992	–4.2	0.096	24.46
0.2	0.952	–11.1	3.285	168.3	0.026	81.5	0.985	–8.0	0.076	21.09
0.3	0.939	–16.2	3.318	163.3	0.038	77.7	0.974	–12.0	0.099	19.40
0.4	0.934	–21.8	3.259	157.4	0.050	73.6	0.962	–15.8	0.132	18.15
0.5	0.912	–26.8	3.223	152.2	0.060	69.6	0.953	–19.5	0.166	17.27
0.6	0.893	–32.3	3.185	147.1	0.071	66.1	0.936	–23.4	0.186	16.51
0.7	0.869	–37.7	3.129	141.3	0.080	62.5	0.916	–27.1	0.224	15.91
0.8	0.841	–42.6	3.087	136.4	0.088	59.1	0.897	–30.6	0.259	15.43
0.9	0.814	–47.9	3.025	131.3	0.096	55.9	0.878	–34.1	0.288	15.00
1.0	0.786	–53.0	2.974	126.5	0.102	52.6	0.859	–37.6	0.321	14.65
1.1	0.763	–58.2	2.894	122.0	0.107	49.6	0.836	–41.0	0.349	14.30
1.2	0.729	–63.8	2.834	116.9	0.111	46.7	0.815	–44.3	0.389	14.07
1.3	0.707	–68.9	2.777	112.7	0.114	44.2	0.793	–47.5	0.418	13.85
1.4	0.679	–74.1	2.706	108.3	0.117	41.8	0.772	–50.7	0.458	13.65
1.5	0.656	–79.5	2.656	103.6	0.118	39.8	0.752	–53.7	0.496	13.52
1.6	0.630	–84.3	2.573	99.4	0.119	38.1	0.733	–56.6	0.542	13.35
1.7	0.605	–89.5	2.501	95.1	0.119	36.5	0.716	–59.4	0.587	13.22
1.8	0.583	–95.5	2.472	91.7	0.118	35.3	0.696	–62.7	0.624	13.23
1.9	0.557	–100.8	2.394	87.2	0.117	34.4	0.681	–65.5	0.685	13.11
2.0	0.540	–105.9	2.332	83.1	0.116	34.1	0.667	–68.1	0.735	13.05
2.1	0.521	–111.9	2.269	79.1	0.113	34.3	0.653	–70.9	0.792	13.02
2.2	0.508	–117.3	2.219	75.4	0.110	35.3	0.639	–73.7	0.848	13.03
2.3	0.494	–122.4	2.153	72.0	0.108	36.6	0.628	–76.5	0.913	13.00
2.4	0.481	–127.6	2.089	68.2	0.105	38.5	0.619	–79.2	0.983	12.97
2.5	0.472	–133.4	2.049	64.9	0.103	40.7	0.605	–82.1	1.045	11.66
2.6	0.465	–138.9	1.986	61.1	0.102	43.5	0.599	–85.3	1.102	10.94
2.7	0.458	–144.2	1.938	58.4	0.102	46.6	0.596	–88.1	1.132	10.56
2.8	0.452	–149.4	1.884	55.3	0.104	50.4	0.592	–90.9	1.156	10.19
2.9	0.452	–154.9	1.829	52.8	0.106	53.8	0.585	–93.1	1.181	9.78
3.0	0.447	–160.1	1.760	49.5	0.111	57.1	0.577	–96.4	1.211	9.24
4.0	0.527	154.6	1.372	20.9	0.221	68.0	0.607	–131.6	0.773	7.92
5.0	0.642	122.5	0.989	0.6	0.348	50.8	0.676	–168.0	0.688	4.53

V_{CE} = 2 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.882	–10.4	8.868	169.0	0.010	88.9	0.982	–6.3	0.021	29.46
0.2	0.868	–16.9	8.512	163.0	0.025	79.9	0.963	–11.9	0.123	25.39
0.3	0.837	–25.4	8.409	154.5	0.035	74.0	0.933	–17.6	0.192	23.79
0.4	0.803	–33.1	8.015	146.6	0.045	69.3	0.895	–22.9	0.255	22.49
0.5	0.756	–40.0	7.641	139.8	0.053	65.5	0.860	–27.5	0.309	21.57
0.6	0.709	–47.0	7.272	133.1	0.061	62.2	0.818	–31.8	0.366	20.76
0.7	0.663	–53.6	6.852	126.7	0.067	59.6	0.780	–35.7	0.418	20.11
0.8	0.612	–59.4	6.510	121.1	0.072	57.3	0.740	–39.1	0.482	19.56
0.9	0.569	–65.5	6.150	115.8	0.076	55.4	0.706	–42.1	0.535	19.06
1.0	0.525	–71.1	5.813	110.9	0.080	54.1	0.672	–45.0	0.591	18.61
1.1	0.491	–76.5	5.489	106.6	0.084	53.0	0.642	–47.7	0.639	18.17
1.2	0.456	–82.4	5.197	102.0	0.086	52.1	0.616	–50.2	0.692	17.80
1.3	0.430	–87.7	4.949	98.3	0.089	51.8	0.590	–52.4	0.736	17.45
1.4	0.398	–92.7	4.701	94.5	0.092	51.7	0.566	–54.9	0.788	17.11
1.5	0.376	–98.1	4.498	90.8	0.094	51.8	0.546	–56.8	0.831	16.81
1.6	0.351	–103.4	4.285	87.3	0.097	52.1	0.529	–59.1	0.873	16.47
1.7	0.332	–108.9	4.082	83.8	0.099	52.6	0.514	–61.1	0.909	16.14
1.8	0.315	–115.1	3.926	81.2	0.102	53.4	0.498	–63.4	0.940	15.86
1.9	0.296	–121.1	3.768	77.6	0.105	53.7	0.486	–65.7	0.969	15.54
2.0	0.288	–126.5	3.624	74.5	0.108	54.6	0.474	–67.5	0.992	15.24
2.1	0.276	–133.7	3.485	71.4	0.112	55.5	0.464	–69.8	1.015	14.18
2.2	0.273	–139.1	3.370	68.6	0.115	56.7	0.453	–72.1	1.029	13.63
2.3	0.267	–144.7	3.237	65.9	0.119	57.6	0.446	–74.4	1.046	13.03
2.4	0.262	–150.1	3.122	63.1	0.123	58.4	0.439	–76.7	1.060	12.56
2.5	0.261	–156.2	3.030	60.6	0.127	59.2	0.431	–79.1	1.065	12.21
2.6	0.260	–161.6	2.920	57.6	0.132	60.0	0.426	–81.8	1.073	11.80
2.7	0.264	–166.4	2.841	55.5	0.137	60.4	0.422	–84.5	1.068	11.58
2.8	0.267	–171.7	2.763	53.2	0.143	61.2	0.420	–87.1	1.058	11.39
2.9	0.272	–176.5	2.670	51.1	0.148	61.5	0.415	–89.3	1.059	11.07
3.0	0.273	178.3	2.568	48.6	0.155	61.6	0.411	–92.6	1.065	10.64
4.0	0.398	143.1	2.027	24.6	0.243	59.1	0.443	–126.8	0.866	9.22
5.0	0.534	119.1	1.542	3.9	0.337	46.3	0.539	–162.0	0.762	6.61

V_{CE} = 2 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.820	–12.0	13.017	166.8	0.011	78.5	0.973	–7.9	0.198	30.82
0.2	0.797	–21.2	12.240	158.4	0.023	77.7	0.940	–14.9	0.186	27.26
0.3	0.752	–31.3	11.824	148.4	0.033	71.7	0.892	–21.5	0.275	25.53
0.4	0.697	–40.6	10.947	139.3	0.041	67.9	0.837	–27.0	0.349	24.22
0.5	0.637	–48.2	10.131	131.8	0.048	64.7	0.786	–31.5	0.424	23.22
0.6	0.578	–55.6	9.379	124.9	0.055	62.3	0.734	–35.5	0.494	22.36
0.7	0.526	–62.1	8.621	118.4	0.059	60.5	0.689	–38.8	0.566	21.63
0.8	0.472	–68.2	8.019	113.1	0.064	59.3	0.646	–41.7	0.633	20.99
0.9	0.433	–74.3	7.436	108.0	0.068	58.6	0.611	–44.1	0.688	20.39
1.0	0.390	–80.1	6.939	103.6	0.072	58.3	0.579	–46.4	0.743	19.84
1.1	0.360	–85.4	6.465	99.8	0.076	58.0	0.552	–48.3	0.791	19.32
1.2	0.329	–91.2	6.046	95.7	0.079	58.0	0.528	–50.1	0.838	18.84
1.3	0.307	–96.9	5.716	92.2	0.083	58.3	0.506	–52.0	0.873	18.39
1.4	0.281	–102.3	5.371	89.0	0.086	58.7	0.485	–54.0	0.915	17.94
1.5	0.264	–108.1	5.098	85.6	0.090	59.1	0.469	–55.7	0.942	17.53
1.6	0.246	–113.6	4.831	82.7	0.094	59.7	0.456	–57.4	0.968	17.10
1.7	0.232	–119.8	4.595	79.6	0.098	60.2	0.444	–59.2	0.988	16.69
1.8	0.223	–126.9	4.383	77.2	0.103	60.7	0.431	–61.2	1.003	15.96
1.9	0.210	–133.8	4.202	74.1	0.108	60.9	0.422	–63.2	1.016	15.13
2.0	0.207	–139.4	4.023	71.4	0.113	61.3	0.412	–65.1	1.025	14.57
2.1	0.202	–147.3	3.856	68.7	0.117	61.8	0.404	–67.3	1.034	14.04
2.2	0.202	–153.5	3.725	66.2	0.122	62.4	0.396	–69.5	1.037	13.66
2.3	0.202	–159.6	3.569	63.8	0.127	62.7	0.390	–71.8	1.044	13.20
2.4	0.204	–164.1	3.439	61.3	0.133	63.0	0.384	–74.1	1.046	12.83
2.5	0.207	–170.6	3.330	59.1	0.138	63.1	0.377	–76.5	1.047	12.50
2.6	0.210	–175.7	3.211	56.4	0.144	63.1	0.373	–79.5	1.045	12.18
2.7	0.217	179.5	3.118	54.5	0.149	63.1	0.369	–82.0	1.041	11.96
2.8	0.223	175.1	3.026	52.3	0.156	63.2	0.368	–84.8	1.032	11.78
2.9	0.230	170.5	2.928	50.6	0.162	62.9	0.363	–87.0	1.031	11.48
3.0	0.236	165.7	2.813	48.1	0.168	62.5	0.360	–90.5	1.034	11.09
4.0	0.369	136.8	2.227	26.1	0.252	57.0	0.390	–125.9	0.888	9.46
5.0	0.507	116.8	1.723	6.4	0.337	44.5	0.488	–160.8	0.799	7.09

V_{CE} = 2 V, I_C = 7 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.775	–14.4	16.201	165.1	0.010	77.4	0.965	–9.1	0.218	32.01
0.2	0.733	–24.8	15.032	155.0	0.022	76.5	0.919	–16.9	0.238	28.29
0.3	0.679	–35.9	14.146	143.9	0.031	70.8	0.856	–23.8	0.338	26.57
0.4	0.616	–45.7	12.789	134.2	0.039	67.6	0.792	–29.4	0.423	25.17
0.5	0.552	–53.8	11.592	126.4	0.045	64.4	0.733	–33.8	0.511	24.13
0.6	0.492	–61.3	10.552	119.7	0.051	63.1	0.677	–37.1	0.586	23.19
0.7	0.439	–68.0	9.547	113.5	0.055	62.2	0.630	–40.0	0.658	22.37
0.8	0.389	–73.9	8.789	108.3	0.060	61.8	0.591	–42.2	0.724	21.67
0.9	0.351	–79.9	8.075	103.7	0.064	61.6	0.558	–44.1	0.778	21.02
1.0	0.313	–86.1	7.462	99.5	0.068	61.4	0.528	–46.0	0.830	20.40
1.1	0.288	–91.2	6.914	95.9	0.072	61.9	0.503	–47.4	0.870	19.80
1.2	0.260	–98.0	6.435	92.3	0.076	62.1	0.483	–49.2	0.908	19.26
1.3	0.243	–103.5	6.057	89.1	0.081	62.4	0.464	–50.6	0.935	18.76
1.4	0.224	–109.5	5.677	86.0	0.085	62.9	0.447	–52.3	0.963	18.24
1.5	0.208	–115.7	5.370	83.0	0.089	63.3	0.433	–53.9	0.984	17.78
1.6	0.194	–121.6	5.074	80.1	0.094	63.6	0.421	–55.6	1.003	16.96
1.7	0.185	–129.1	4.823	77.5	0.099	63.9	0.412	–57.2	1.013	16.16
1.8	0.180	–136.2	4.592	75.1	0.104	64.3	0.401	–59.1	1.022	15.54
1.9	0.172	–144.7	4.391	72.3	0.110	64.3	0.393	–61.2	1.027	15.01
2.0	0.170	–150.9	4.208	69.7	0.115	64.5	0.385	–63.0	1.031	14.55
2.1	0.170	–158.3	4.020	67.2	0.121	64.7	0.378	–65.3	1.037	14.06
2.2	0.176	–164.3	3.882	64.8	0.126	64.9	0.370	–67.6	1.033	13.76
2.3	0.181	–170.4	3.713	62.6	0.132	65.0	0.365	–69.9	1.036	13.33
2.4	0.182	–174.7	3.579	60.3	0.138	64.9	0.360	–72.3	1.036	12.98
2.5	0.189	179.3	3.457	58.2	0.143	64.8	0.354	–74.7	1.035	12.67
2.6	0.192	174.8	3.342	55.6	0.150	64.5	0.350	–77.7	1.033	12.37
2.7	0.201	170.5	3.240	53.8	0.156	64.3	0.347	–80.2	1.027	12.17
2.8	0.209	166.5	3.141	51.8	0.162	64.1	0.345	–83.1	1.020	11.99
2.9	0.217	162.6	3.039	50.0	0.169	63.6	0.341	–85.5	1.018	11.73
3.0	0.224	157.9	2.922	47.7	0.175	63.0	0.338	–89.0	1.020	11.35
4.0	0.361	132.9	2.313	26.7	0.258	56.2	0.367	–125.4	0.896	9.53
5.0	0.499	114.7	1.802	7.4	0.339	43.7	0.466	–160.4	0.814	7.26

V_{CE} = 2 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.712	–16.6	19.733	163.1	0.009	75.6	0.954	–10.5	0.263	33.30
0.2	0.669	–28.8	17.864	151.1	0.022	75.3	0.893	–19.0	0.295	29.15
0.3	0.595	–41.5	16.408	139.0	0.029	70.5	0.815	–26.2	0.405	27.49
0.4	0.526	–51.9	14.487	128.9	0.036	67.3	0.741	–31.4	0.508	26.01
0.5	0.461	–60.1	12.844	121.3	0.042	65.4	0.680	–35.1	0.599	24.88
0.6	0.402	–67.5	11.479	114.8	0.047	64.6	0.623	–37.9	0.681	23.87
0.7	0.353	–74.1	10.257	108.9	0.051	64.4	0.578	–40.1	0.755	23.00
0.8	0.310	–80.4	9.349	104.1	0.056	64.6	0.540	–41.6	0.812	22.20
0.9	0.276	–86.5	8.516	99.9	0.060	64.9	0.512	–43.1	0.861	21.49
1.0	0.243	–93.2	7.839	95.9	0.065	65.1	0.485	–44.6	0.904	20.81
1.1	0.225	–98.7	7.226	92.5	0.070	65.5	0.465	–45.8	0.932	20.13
1.2	0.202	–106.0	6.707	89.2	0.074	65.9	0.449	–47.1	0.961	19.55
1.3	0.189	–112.7	6.265	86.2	0.079	66.1	0.432	–48.5	0.981	18.97
1.4	0.174	–119.2	5.877	83.4	0.084	66.5	0.418	–50.2	1.000	18.34
1.5	0.165	–126.5	5.557	80.5	0.089	66.8	0.407	–51.5	1.011	17.29
1.6	0.156	–133.8	5.234	77.8	0.095	67.1	0.397	–53.1	1.022	16.52
1.7	0.150	–141.1	4.974	75.3	0.100	67.2	0.389	–54.8	1.026	15.96
1.8	0.148	–149.1	4.724	73.2	0.106	67.3	0.381	–56.7	1.032	15.41
1.9	0.147	–158.5	4.512	70.5	0.112	67.1	0.374	–58.9	1.031	14.97
2.0	0.150	–164.0	4.319	68.1	0.118	67.0	0.367	–60.7	1.032	14.56
2.1	0.154	–172.3	4.127	65.7	0.123	67.2	0.360	–63.0	1.033	14.13
2.2	0.162	–177.2	3.980	63.5	0.129	67.1	0.354	–65.3	1.028	13.85
2.3	0.169	178.3	3.805	61.4	0.135	66.9	0.349	–67.7	1.030	13.43
2.4	0.174	173.7	3.665	59.1	0.141	66.6	0.345	–70.2	1.028	13.12
2.5	0.183	168.8	3.542	57.2	0.148	66.4	0.340	–72.7	1.024	12.85
2.6	0.189	164.3	3.412	54.6	0.154	65.8	0.336	–75.6	1.022	12.54
2.7	0.200	161.1	3.313	53.0	0.161	65.4	0.333	–78.4	1.015	12.40
2.8	0.207	158.3	3.212	51.1	0.167	65.0	0.331	–81.4	1.008	12.27
2.9	0.216	154.5	3.108	49.4	0.174	64.4	0.327	–83.8	1.006	12.05
3.0	0.224	150.7	2.993	47.2	0.181	63.7	0.324	–87.4	1.007	11.67
4.0	0.362	129.7	2.365	26.6	0.263	56.0	0.352	–124.8	0.896	9.54
5.0	0.499	113.0	1.844	7.9	0.341	43.0	0.450	–160.2	0.822	7.33

V_{CE} = 2 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.571	–24.2	25.447	158.5	0.010	71.7	0.924	–12.7	0.348	34.22
0.2	0.504	–40.5	21.885	143.2	0.019	73.4	0.829	–22.2	0.420	30.59
0.3	0.429	–56.4	18.984	129.8	0.026	69.8	0.732	–28.6	0.554	28.68
0.4	0.360	–68.5	15.960	119.8	0.031	68.0	0.652	–32.4	0.675	27.06
0.5	0.308	–79.4	13.698	112.5	0.036	67.8	0.594	–34.6	0.762	25.75
0.6	0.266	–88.3	11.985	106.6	0.042	68.3	0.545	–36.0	0.834	24.60
0.7	0.229	–97.6	10.506	101.3	0.046	68.8	0.510	–37.0	0.896	23.55
0.8	0.202	–106.0	9.448	97.2	0.051	69.6	0.482	–37.9	0.939	22.66
0.9	0.184	–115.4	8.546	93.2	0.056	70.4	0.463	–38.6	0.969	21.83
1.0	0.168	–125.1	7.810	89.7	0.061	70.9	0.446	–39.7	0.992	21.06
1.1	0.161	–132.5	7.159	86.8	0.067	71.4	0.432	–40.7	1.007	19.79
1.2	0.153	–142.1	6.606	83.7	0.072	71.4	0.420	–41.8	1.027	18.65
1.3	0.152	–148.7	6.160	81.0	0.077	71.8	0.409	–43.1	1.034	17.90
1.4	0.152	–157.2	5.737	78.5	0.083	72.1	0.401	–44.8	1.040	17.18
1.5	0.154	–164.5	5.418	75.7	0.088	72.1	0.393	–46.3	1.042	16.62
1.6	0.154	–171.1	5.095	73.4	0.094	72.2	0.387	–48.0	1.045	16.02
1.7	0.159	–176.7	4.830	71.0	0.100	72.0	0.381	–49.9	1.042	15.57
1.8	0.166	177.8	4.583	68.9	0.107	72.0	0.375	–51.8	1.040	15.12
1.9	0.175	170.9	4.375	66.4	0.113	71.6	0.370	–54.1	1.032	14.78
2.0	0.181	168.0	4.190	64.1	0.120	71.4	0.365	–56.2	1.026	14.46
2.1	0.195	162.9	3.997	61.8	0.126	71.3	0.361	–58.7	1.021	14.12
2.2	0.203	160.7	3.855	59.7	0.132	71.0	0.356	–61.2	1.014	13.92
2.3	0.213	157.9	3.682	57.7	0.139	70.7	0.352	–63.7	1.012	13.57
2.4	0.220	155.2	3.543	55.5	0.146	70.1	0.349	–66.4	1.005	13.41
2.5	0.231	152.2	3.421	53.7	0.152	69.8	0.345	–69.1	1.000	13.42
2.6	0.238	148.8	3.293	51.2	0.160	69.0	0.342	–72.3	0.996	13.14
2.7	0.249	147.2	3.201	49.6	0.166	68.5	0.339	–75.1	0.988	12.85
2.8	0.256	144.7	3.103	47.7	0.174	67.8	0.338	–78.3	0.980	12.52
2.9	0.266	142.7	2.996	46.0	0.181	67.0	0.335	–81.0	0.976	12.19
3.0	0.279	139.5	2.879	43.8	0.188	66.1	0.333	–84.8	0.974	11.85
4.0	0.419	123.6	2.271	23.4	0.275	56.8	0.366	–123.9	0.859	9.17
5.0	0.549	108.5	1.756	4.6	0.355	42.8	0.466	–160.7	0.793	6.95

S-PARAMETERS Q2

V_{CE} = 1 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.955	–6.3	3.322	173.7	0.014	81.6	0.996	–4.5	0.096	23.77
0.2	0.954	–11.1	3.261	168.0	0.030	82.2	0.987	–8.7	0.061	20.37
0.3	0.942	–16.5	3.284	162.5	0.044	77.1	0.975	–13.0	0.105	18.73
0.4	0.938	–22.0	3.227	156.6	0.057	72.9	0.964	–17.4	0.133	17.53
0.5	0.915	–27.1	3.181	151.1	0.069	68.7	0.947	–21.6	0.170	16.61
0.6	0.894	–32.6	3.137	145.7	0.081	65.1	0.928	–25.8	0.194	15.87
0.7	0.871	–38.0	3.068	139.9	0.091	61.2	0.907	–29.7	0.233	15.26
0.8	0.840	–42.9	3.024	134.8	0.101	57.8	0.884	–33.7	0.267	14.77
0.9	0.810	–48.3	2.957	129.5	0.109	54.5	0.861	–37.6	0.300	14.33
1.0	0.782	–53.1	2.899	124.6	0.116	51.3	0.837	–41.5	0.336	13.99
1.1	0.758	–58.0	2.823	120.0	0.122	48.2	0.814	–45.2	0.365	13.65
1.2	0.730	–63.3	2.763	114.9	0.126	45.6	0.788	–48.8	0.403	13.40
1.3	0.706	–68.0	2.707	110.6	0.130	43.0	0.763	–52.4	0.435	13.18
1.4	0.676	–72.8	2.634	106.1	0.133	40.7	0.737	–56.1	0.479	12.97
1.5	0.652	–78.1	2.580	101.5	0.135	38.5	0.716	–59.7	0.514	12.82
1.6	0.627	–82.7	2.504	97.2	0.136	36.7	0.694	–63.0	0.559	12.67
1.7	0.605	–87.5	2.432	92.7	0.136	35.1	0.674	–66.3	0.607	12.54
1.8	0.580	–93.1	2.394	89.3	0.134	33.9	0.650	–70.3	0.647	12.50
1.9	0.558	–97.8	2.322	84.9	0.134	32.8	0.633	–73.5	0.703	12.38
2.0	0.541	–102.5	2.257	80.9	0.133	32.4	0.615	–76.8	0.757	12.31
2.1	0.522	–107.8	2.194	77.0	0.130	32.6	0.599	–80.3	0.813	12.26
2.2	0.510	–112.6	2.149	73.3	0.128	33.5	0.582	–83.5	0.866	12.26
2.3	0.500	–117.0	2.081	69.9	0.126	34.7	0.570	–86.9	0.922	12.19
2.4	0.491	–121.6	2.026	66.1	0.124	36.2	0.558	–90.3	0.978	12.15
2.5	0.478	–126.2	1.988	62.8	0.122	38.2	0.545	–93.9	1.036	10.94
2.6	0.468	–131.0	1.925	59.1	0.121	40.7	0.535	–98.1	1.097	10.11
2.7	0.459	–135.2	1.884	56.2	0.122	43.2	0.528	–101.8	1.130	9.70
2.8	0.451	–139.9	1.836	52.9	0.125	46.2	0.524	–105.4	1.149	9.34
2.9	0.446	–144.4	1.787	50.2	0.127	48.6	0.516	–108.8	1.175	8.94
3.0	0.438	–149.2	1.714	46.9	0.132	51.0	0.507	–113.3	1.221	8.31
4.0	0.508	170.4	1.357	19.9	0.248	62.1	0.525	–155.7	0.864	7.38
5.0	0.625	141.5	1.019	–1.3	0.391	42.5	0.598	159.4	0.756	4.16

V_{CE} = 1 V, I_C = 3 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.881	–9.5	8.749	168.9	0.012	79.1	0.981	–6.9	0.177	28.48
0.2	0.868	–16.8	8.374	162.5	0.028	78.9	0.958	–13.3	0.141	24.69
0.3	0.836	–25.1	8.251	153.8	0.041	73.5	0.924	–19.6	0.205	23.09
0.4	0.802	–32.7	7.853	145.6	0.052	69.0	0.885	–25.4	0.265	21.78
0.5	0.751	–39.5	7.429	138.4	0.061	64.9	0.840	–30.7	0.329	20.83
0.6	0.704	–46.4	7.060	131.8	0.070	61.9	0.794	–35.4	0.383	20.04
0.7	0.659	–52.6	6.624	125.2	0.077	59.0	0.748	–39.7	0.443	19.35
0.8	0.609	–58.0	6.269	119.8	0.083	56.9	0.706	–43.7	0.500	18.77
0.9	0.566	–63.6	5.916	114.4	0.088	55.2	0.667	–47.1	0.555	18.27
1.0	0.523	–68.7	5.597	109.5	0.093	53.6	0.630	–50.3	0.611	17.80
1.1	0.492	–73.8	5.264	105.3	0.097	52.7	0.596	–53.3	0.658	17.34
1.2	0.458	–78.7	4.996	100.8	0.101	51.9	0.565	–56.1	0.708	16.95
1.3	0.431	–83.6	4.747	96.9	0.104	51.3	0.536	–58.9	0.752	16.57
1.4	0.403	–88.0	4.503	93.1	0.108	51.1	0.510	–61.7	0.797	16.20
1.5	0.380	–93.0	4.310	89.4	0.111	50.9	0.487	–64.5	0.833	15.88
1.6	0.357	–97.3	4.103	85.9	0.115	50.9	0.464	–67.0	0.876	15.53
1.7	0.338	–102.4	3.918	82.5	0.119	50.9	0.446	–69.5	0.909	15.19
1.8	0.320	–107.9	3.761	79.8	0.122	51.3	0.427	–72.5	0.939	14.89
1.9	0.303	–113.1	3.607	76.3	0.126	51.3	0.411	–75.0	0.968	14.56
2.0	0.296	–117.7	3.469	73.2	0.130	51.6	0.396	–77.6	0.989	14.26
2.1	0.285	–123.6	3.333	70.2	0.134	52.2	0.382	–80.4	1.011	13.32
2.2	0.280	–128.5	3.225	67.4	0.138	52.9	0.369	–83.1	1.024	12.73
2.3	0.276	–132.8	3.099	64.7	0.143	53.4	0.359	–86.1	1.040	12.14
2.4	0.271	–136.7	2.994	61.9	0.147	53.8	0.350	–89.0	1.052	11.68
2.5	0.267	–142.3	2.907	59.4	0.152	54.2	0.339	–92.3	1.060	11.30
2.6	0.263	–146.5	2.809	56.5	0.158	54.5	0.334	–95.9	1.067	10.92
2.7	0.263	–151.0	2.734	54.1	0.164	54.6	0.328	–99.7	1.065	10.67
2.8	0.260	–155.2	2.657	51.7	0.170	54.8	0.323	–103.6	1.066	10.36
2.9	0.261	–159.9	2.567	49.4	0.176	54.7	0.317	–107.3	1.072	10.00
3.0	0.258	–165.0	2.472	46.8	0.182	54.5	0.310	–112.2	1.085	9.54
4.0	0.359	160.6	1.975	24.6	0.270	51.8	0.332	–154.2	0.952	8.64
5.0	0.506	139.5	1.558	3.2	0.374	37.3	0.437	163.3	0.838	6.20

V_{CE} = 1 V, I_C = 5 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.808	–12.1	12.742	166.7	0.013	77.2	0.966	–8.7	0.225	29.80
0.2	0.794	–21.0	11.967	158.1	0.027	76.7	0.929	–16.6	0.209	26.43
0.3	0.745	–30.7	11.489	147.6	0.038	71.9	0.875	–23.9	0.291	24.76
0.4	0.694	–39.5	10.618	138.4	0.048	68.0	0.817	–30.2	0.364	23.43
0.5	0.631	–46.6	9.770	130.6	0.056	64.4	0.758	–35.4	0.449	22.40
0.6	0.578	–53.6	9.019	123.8	0.064	62.2	0.700	–40.1	0.516	21.51
0.7	0.524	–59.7	8.263	117.6	0.069	60.3	0.647	–43.7	0.588	20.75
0.8	0.474	–64.9	7.672	112.1	0.075	59.4	0.602	–47.1	0.650	20.10
0.9	0.434	–70.2	7.110	107.2	0.080	58.5	0.563	–49.9	0.705	19.48
1.0	0.395	–75.6	6.612	102.7	0.085	58.0	0.527	–52.6	0.755	18.91
1.1	0.368	–80.0	6.156	98.8	0.090	57.6	0.494	–55.0	0.800	18.35
1.2	0.338	–84.9	5.782	94.9	0.095	57.5	0.466	–57.2	0.843	17.87
1.3	0.316	–89.4	5.448	91.4	0.100	57.6	0.441	–59.3	0.875	17.38
1.4	0.292	–94.2	5.129	87.9	0.104	57.4	0.418	–61.9	0.909	16.91
1.5	0.275	–99.5	4.870	84.7	0.109	57.5	0.399	–64.0	0.934	16.50
1.6	0.257	–103.5	4.611	81.6	0.114	57.6	0.381	–66.3	0.960	16.06
1.7	0.243	–108.9	4.384	78.8	0.120	57.5	0.365	–68.5	0.978	15.64
1.8	0.231	–114.9	4.189	76.2	0.125	57.6	0.348	–71.2	0.995	15.25
1.9	0.219	–121.0	4.009	73.3	0.131	57.5	0.336	–73.6	1.008	14.33
2.0	0.215	–125.5	3.845	70.5	0.136	57.4	0.322	–75.9	1.019	13.67
2.1	0.208	–132.0	3.682	67.9	0.142	57.6	0.310	–78.7	1.029	13.09
2.2	0.208	–137.4	3.558	65.3	0.148	57.6	0.299	–81.4	1.032	12.72
2.3	0.208	–142.1	3.408	63.0	0.153	57.5	0.290	–84.4	1.040	12.24
2.4	0.204	–146.1	3.286	60.5	0.160	57.4	0.283	–87.3	1.045	11.84
2.5	0.204	–151.6	3.188	58.3	0.166	57.2	0.274	–90.7	1.047	11.51
2.6	0.204	–155.6	3.074	55.5	0.172	56.8	0.269	–94.4	1.049	11.16
2.7	0.206	–160.9	2.985	53.5	0.179	56.4	0.263	–98.6	1.048	10.88
2.8	0.208	–164.6	2.900	51.2	0.186	56.1	0.259	–103.0	1.046	10.62
2.9	0.213	–169.5	2.802	49.3	0.192	55.5	0.253	–107.0	1.049	10.29
3.0	0.211	–175.0	2.693	46.8	0.199	54.8	0.247	–112.5	1.060	9.82
4.0	0.325	154.2	2.151	26.6	0.281	49.0	0.272	–157.1	0.970	8.83
5.0	0.469	136.8	1.725	6.4	0.372	35.1	0.377	161.5	0.882	6.66

V_{CE} = 1 V, I_C = 7 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.764	–14.0	15.802	165.0	0.012	78.0	0.954	–10.1	0.231	31.24
0.2	0.736	–23.9	14.611	154.6	0.027	76.5	0.903	–18.9	0.258	27.41
0.3	0.673	–34.8	13.702	143.2	0.037	71.4	0.834	–26.9	0.355	25.72
0.4	0.612	–43.9	12.369	133.5	0.046	67.8	0.765	–33.2	0.444	24.32
0.5	0.546	–51.3	11.152	125.6	0.053	65.0	0.697	–38.3	0.533	23.26
0.6	0.488	–58.1	10.136	119.0	0.060	63.4	0.636	–42.5	0.607	22.29
0.7	0.441	–64.1	9.142	112.8	0.066	62.6	0.582	–45.7	0.677	21.44
0.8	0.392	–69.2	8.390	107.7	0.071	61.8	0.539	–48.5	0.738	20.71
0.9	0.357	–74.2	7.708	103.0	0.077	61.3	0.500	–50.8	0.790	20.02
1.0	0.320	–79.1	7.125	98.9	0.082	61.2	0.467	–53.0	0.837	19.39
1.1	0.297	–83.4	6.591	95.3	0.088	61.2	0.439	–55.0	0.872	18.77
1.2	0.269	–88.3	6.150	91.6	0.093	61.0	0.414	–56.8	0.907	18.22
1.3	0.253	–93.1	5.764	88.4	0.098	61.2	0.392	–58.9	0.931	17.68
1.4	0.232	–97.9	5.412	85.4	0.104	61.0	0.371	–61.1	0.955	17.15
1.5	0.220	–103.2	5.128	82.3	0.110	60.9	0.354	–63.1	0.971	16.69
1.6	0.205	–107.7	4.841	79.5	0.116	60.9	0.338	–65.2	0.991	16.22
1.7	0.196	–113.7	4.609	76.7	0.122	60.7	0.323	–67.3	1.001	15.62
1.8	0.186	–120.5	4.385	74.4	0.128	60.6	0.309	–69.9	1.011	14.71
1.9	0.175	–127.5	4.190	71.7	0.135	60.2	0.297	–72.3	1.020	14.07
2.0	0.174	–131.7	4.020	69.1	0.141	59.8	0.284	–74.7	1.026	13.58
2.1	0.172	–139.3	3.842	66.7	0.147	59.7	0.274	–77.4	1.032	13.08
2.2	0.174	–145.0	3.708	64.4	0.153	59.6	0.264	–80.2	1.033	12.73
2.3	0.176	–149.3	3.551	62.1	0.160	59.3	0.256	–83.2	1.037	12.29
2.4	0.177	–153.7	3.422	59.7	0.166	58.7	0.249	–86.3	1.039	11.93
2.5	0.178	–158.9	3.314	57.7	0.173	58.4	0.241	–89.7	1.040	11.61
2.6	0.177	–163.4	3.186	55.0	0.180	57.7	0.236	–93.7	1.044	11.21
2.7	0.183	–167.9	3.101	53.1	0.187	57.1	0.231	–98.1	1.039	10.99
2.8	0.184	–172.4	3.009	50.9	0.194	56.5	0.226	–102.9	1.039	10.70
2.9	0.192	–176.5	2.910	49.1	0.200	55.8	0.222	–107.3	1.040	10.40
3.0	0.191	177.4	2.795	46.7	0.207	54.9	0.215	–113.2	1.051	9.93
4.0	0.311	150.1	2.231	27.6	0.288	47.7	0.243	–160.1	0.977	8.90
5.0	0.455	134.5	1.794	8.1	0.373	33.9	0.349	159.3	0.905	6.82

V_{CE} = 1 V, I_C = 10 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.704	–15.1	19.149	162.9	0.012	76.4	0.938	–11.7	0.291	31.94
0.2	0.657	–27.9	17.352	150.9	0.025	75.6	0.869	–21.6	0.317	28.47
0.3	0.588	–39.1	15.831	138.6	0.035	71.1	0.786	–29.9	0.432	26.61
0.4	0.525	–48.7	13.968	128.6	0.043	68.1	0.706	–36.2	0.528	25.12
0.5	0.457	–55.9	12.321	120.8	0.050	66.0	0.634	–40.7	0.626	23.94
0.6	0.405	–62.5	11.025	114.4	0.057	65.3	0.572	–44.3	0.697	22.90
0.7	0.357	–68.0	9.834	108.5	0.062	64.7	0.521	–47.0	0.767	21.97
0.8	0.317	–72.9	8.933	103.8	0.069	64.5	0.479	–49.3	0.819	21.15
0.9	0.285	–77.8	8.157	99.4	0.074	64.5	0.445	–51.1	0.861	20.40
1.0	0.255	–82.8	7.489	95.6	0.080	64.2	0.416	–52.9	0.898	19.69
1.1	0.235	–87.2	6.894	92.2	0.087	64.3	0.390	–54.6	0.926	19.01
1.2	0.212	–92.7	6.421	88.9	0.092	64.2	0.368	–56.1	0.952	18.42
1.3	0.200	–97.4	6.006	86.0	0.099	64.1	0.349	–57.8	0.968	17.85
1.4	0.184	–102.7	5.617	83.2	0.105	64.0	0.331	–59.9	0.985	17.28
1.5	0.172	–108.5	5.314	80.1	0.111	63.7	0.316	–61.9	0.996	16.79
1.6	0.161	–114.2	5.018	77.7	0.118	63.4	0.301	–63.9	1.008	15.76
1.7	0.155	–120.2	4.755	75.2	0.125	63.1	0.289	–66.0	1.015	15.07
1.8	0.148	–128.0	4.516	72.9	0.131	62.8	0.276	–68.4	1.022	14.45
1.9	0.143	–135.1	4.323	70.3	0.138	62.1	0.265	–71.0	1.026	13.97
2.0	0.146	–141.1	4.142	67.8	0.145	61.6	0.253	–73.5	1.027	13.55
2.1	0.145	–148.8	3.955	65.5	0.152	61.3	0.244	–76.3	1.032	13.06
2.2	0.151	–153.6	3.809	63.3	0.159	60.9	0.235	–79.1	1.031	12.73
2.3	0.154	–158.4	3.646	61.2	0.165	60.4	0.227	–82.3	1.035	12.29
2.4	0.156	–162.2	3.514	58.9	0.172	59.7	0.220	–85.5	1.035	11.95
2.5	0.161	–168.0	3.398	56.9	0.179	59.1	0.213	–89.2	1.035	11.64
2.6	0.163	–171.8	3.272	54.4	0.186	58.3	0.209	–93.3	1.036	11.28
2.7	0.170	–176.0	3.182	52.7	0.193	57.5	0.203	–98.2	1.033	11.05
2.8	0.172	179.8	3.083	50.6	0.201	56.8	0.200	–103.4	1.033	10.75
2.9	0.178	176.0	2.978	48.8	0.207	55.9	0.195	–108.3	1.035	10.43
3.0	0.181	170.1	2.862	46.6	0.214	54.8	0.190	–114.8	1.044	9.99
4.0	0.306	145.7	2.277	28.2	0.293	46.6	0.222	–164.0	0.983	8.90
5.0	0.448	132.4	1.838	9.4	0.374	32.7	0.330	156.5	0.920	6.91

V_{CE} = 1 V, I_C = 20 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.547	–20.1	24.880	158.9	0.011	77.4	0.890	–14.6	0.394	33.48
0.2	0.501	–35.2	21.478	143.9	0.023	73.9	0.792	–26.3	0.466	29.63
0.3	0.428	–48.8	18.648	130.7	0.032	71.5	0.686	–34.7	0.581	27.66
0.4	0.366	–58.6	15.760	120.7	0.040	69.9	0.598	–40.2	0.684	25.97
0.5	0.310	–65.9	13.527	113.4	0.046	68.8	0.527	–43.8	0.773	24.65
0.6	0.269	–72.8	11.828	107.5	0.054	68.9	0.471	–46.3	0.832	23.44
0.7	0.234	–78.0	10.384	102.3	0.060	68.8	0.426	–48.2	0.887	22.38
0.8	0.204	–84.1	9.359	98.0	0.067	68.9	0.391	–49.6	0.921	21.46
0.9	0.181	–89.6	8.456	94.2	0.074	68.9	0.363	–50.8	0.950	20.60
1.0	0.159	–97.3	7.721	90.7	0.080	68.7	0.340	–52.2	0.970	19.82
1.1	0.149	–102.3	7.095	87.8	0.087	68.5	0.320	–53.5	0.986	19.10
1.2	0.138	–109.6	6.561	84.8	0.094	68.2	0.303	–54.9	0.999	18.43
1.3	0.130	–116.0	6.125	82.0	0.101	67.8	0.287	–56.5	1.008	17.28
1.4	0.123	–123.0	5.715	79.5	0.109	67.4	0.273	–58.5	1.016	16.44
1.5	0.121	–132.0	5.379	76.9	0.116	66.8	0.261	–60.5	1.020	15.80
1.6	0.115	–138.2	5.071	74.3	0.123	66.3	0.249	–62.7	1.027	15.15
1.7	0.117	–146.2	4.810	72.0	0.130	65.7	0.238	–64.9	1.029	14.64
1.8	0.119	–153.5	4.559	70.2	0.137	65.1	0.227	–67.5	1.032	14.10
1.9	0.122	–162.7	4.346	67.7	0.145	64.2	0.218	–70.5	1.032	13.66
2.0	0.130	–167.1	4.162	65.4	0.153	63.5	0.208	–73.1	1.031	13.28
2.1	0.137	–173.6	3.971	63.2	0.160	62.8	0.199	–76.3	1.033	12.84
2.2	0.145	–176.3	3.825	61.2	0.167	62.2	0.191	–79.6	1.030	12.52
2.3	0.153	–179.9	3.653	59.2	0.175	61.4	0.184	–83.5	1.032	12.10
2.4	0.157	177.3	3.515	57.0	0.182	60.5	0.179	–87.1	1.032	11.75
2.5	0.164	173.3	3.399	55.2	0.189	59.6	0.173	–91.4	1.031	11.46
2.6	0.170	170.2	3.272	52.8	0.197	58.6	0.170	–96.4	1.031	11.12
2.7	0.177	166.7	3.179	51.1	0.204	57.5	0.165	–102.2	1.029	10.87
2.8	0.181	163.9	3.075	49.2	0.212	56.7	0.163	–108.5	1.030	10.56
2.9	0.191	161.2	2.974	47.4	0.219	55.6	0.160	–114.4	1.030	10.27
3.0	0.197	155.6	2.855	45.3	0.225	54.4	0.157	–122.0	1.038	9.83
4.0	0.326	138.6	2.262	27.7	0.304	44.8	0.207	–174.0	0.987	8.72
5.0	0.461	127.3	1.827	9.7	0.379	30.8	0.319	149.9	0.938	6.83

V_{CE} = 2 V, I_C = 1 mA, Z_O = 50 Ω

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.949	–6.3	3.349	174.1	0.012	80.3	0.996	–4.1	0.114	24.51
0.2	0.958	–10.6	3.284	168.2	0.026	81.2	0.990	–8.1	0.084	21.09
0.3	0.950	–15.5	3.307	163.3	0.038	77.8	0.978	–12.2	0.101	19.34
0.4	0.942	–20.6	3.253	157.6	0.050	73.6	0.967	–16.3	0.134	18.11
0.5	0.921	–25.6	3.217	152.2	0.061	69.7	0.953	–20.2	0.168	17.20
0.6	0.899	–30.9	3.173	147.0	0.072	66.2	0.934	–24.2	0.193	16.45
0.7	0.878	–36.0	3.116	141.3	0.081	62.8	0.914	–27.9	0.229	15.86
0.8	0.853	–40.6	3.076	136.5	0.089	59.4	0.894	–31.6	0.262	15.38
0.9	0.822	–45.5	3.012	131.4	0.096	56.3	0.874	–35.3	0.296	14.95
1.0	0.794	–50.1	2.954	126.6	0.102	53.2	0.849	–39.0	0.333	14.60
1.1	0.771	–55.0	2.881	122.1	0.108	50.4	0.827	–42.6	0.361	14.27
1.2	0.741	–59.8	2.828	117.2	0.112	47.9	0.803	–46.0	0.402	14.04
1.3	0.720	–64.7	2.774	112.9	0.115	45.4	0.781	–49.4	0.429	13.82
1.4	0.692	–69.1	2.707	108.6	0.118	43.4	0.758	–53.0	0.470	13.62
1.5	0.669	–74.0	2.655	103.9	0.119	41.4	0.736	–56.2	0.512	13.49
1.6	0.639	–78.5	2.581	99.7	0.120	39.9	0.715	–59.6	0.561	13.33
1.7	0.619	–83.2	2.508	95.4	0.120	38.5	0.695	–62.7	0.606	13.20
1.8	0.597	–88.5	2.479	92.1	0.119	37.7	0.673	–66.4	0.644	13.20
1.9	0.570	–92.8	2.402	87.6	0.118	37.0	0.656	–69.5	0.709	13.08
2.0	0.554	–97.6	2.345	83.5	0.117	36.9	0.638	–72.5	0.762	13.02
2.1	0.535	–102.7	2.282	79.6	0.115	37.7	0.622	–75.8	0.821	12.98
2.2	0.519	–107.2	2.236	76.0	0.113	39.1	0.606	–79.0	0.879	12.97
2.3	0.508	–111.5	2.175	72.5	0.111	40.8	0.593	–82.2	0.933	12.92
2.4	0.498	–115.8	2.115	68.8	0.110	43.0	0.582	–85.5	0.988	12.84
2.5	0.484	–120.5	2.078	65.5	0.109	45.5	0.567	–88.9	1.045	11.49
2.6	0.473	–124.6	2.016	61.8	0.109	48.7	0.557	–92.7	1.098	10.74
2.7	0.465	–129.4	1.976	58.9	0.112	51.6	0.551	–96.4	1.111	10.45
2.8	0.453	–133.7	1.931	55.6	0.116	55.0	0.546	–99.9	1.120	10.11
2.9	0.448	–138.2	1.874	52.9	0.120	57.6	0.539	–103.1	1.135	9.70
3.0	0.437	–143.0	1.805	49.6	0.126	60.1	0.528	–107.5	1.167	9.09
4.0	0.497	175.7	1.439	22.2	0.256	68.2	0.538	–148.9	0.793	7.51
5.0	0.620	145.0	1.080	–0.3	0.406	45.8	0.607	164.1	0.705	4.25

V_{CE} = 2 V, I_C = 3 mA, Z_O = 50 Ω

Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.883	–9.0	8.743	169.2	0.012	78.7	0.984	–6.3	0.189	28.61
0.2	0.876	–15.5	8.392	163.3	0.025	78.9	0.963	–12.1	0.148	25.31
0.3	0.847	–23.1	8.290	154.9	0.036	74.4	0.932	–17.8	0.208	23.64
0.4	0.814	–30.2	7.918	147.1	0.046	70.6	0.898	–23.2	0.257	22.34
0.5	0.768	–36.6	7.557	140.2	0.055	66.6	0.858	–28.0	0.323	21.40
0.6	0.723	–42.9	7.176	133.6	0.062	63.7	0.814	–32.4	0.377	20.60
0.7	0.677	–48.6	6.752	127.2	0.069	61.0	0.773	–36.3	0.438	19.90
0.8	0.634	–53.5	6.441	121.8	0.074	59.0	0.733	–39.8	0.495	19.37
0.9	0.589	–58.4	6.083	116.8	0.079	57.5	0.695	–43.2	0.549	18.85
1.0	0.548	–63.2	5.767	111.9	0.083	56.1	0.661	–46.2	0.603	18.40
1.1	0.514	–67.6	5.454	107.5	0.087	55.2	0.627	–48.9	0.656	17.95
1.2	0.480	–72.5	5.171	103.1	0.091	54.5	0.597	–51.4	0.704	17.54
1.3	0.454	–76.4	4.932	99.3	0.094	54.1	0.570	–54.1	0.746	17.18
1.4	0.425	–80.4	4.701	95.5	0.098	53.9	0.544	–56.7	0.791	16.82
1.5	0.399	–85.0	4.496	91.6	0.101	54.0	0.522	–59.0	0.832	16.49
1.6	0.375	–88.8	4.282	88.3	0.104	54.1	0.499	–61.4	0.873	16.13
1.7	0.354	–93.2	4.100	84.9	0.108	54.4	0.481	–63.7	0.906	15.80
1.8	0.334	–97.9	3.940	82.2	0.111	54.9	0.463	–66.2	0.937	15.51
1.9	0.314	–102.6	3.786	78.8	0.115	55.1	0.448	–68.5	0.964	15.17
2.0	0.304	–106.9	3.647	75.7	0.119	55.7	0.432	–70.8	0.984	14.86
2.1	0.290	–111.9	3.513	72.6	0.123	56.3	0.418	–73.2	1.006	14.09
2.2	0.283	–116.8	3.399	69.9	0.127	57.3	0.406	–75.8	1.018	13.44
2.3	0.279	–121.0	3.268	67.1	0.131	57.9	0.395	–78.4	1.031	12.87
2.4	0.270	–124.5	3.160	64.3	0.136	58.5	0.386	–81.0	1.042	12.40
2.5	0.264	–129.6	3.070	61.8	0.141	59.0	0.376	–83.8	1.048	12.02
2.6	0.259	–133.6	2.968	58.9	0.147	59.5	0.369	–87.1	1.052	11.65
2.7	0.254	–138.0	2.894	56.7	0.153	59.6	0.362	–90.6	1.051	11.39
2.8	0.251	–142.4	2.813	54.2	0.160	59.9	0.357	–94.1	1.047	11.14
2.9	0.248	–147.0	2.723	52.0	0.166	59.9	0.350	–97.3	1.050	10.78
3.0	0.244	–152.3	2.622	49.2	0.173	59.6	0.341	–101.9	1.060	10.31
4.0	0.332	169.7	2.117	27.0	0.266	57.4	0.349	–142.1	0.912	9.02
5.0	0.491	145.8	1.684	4.7	0.379	41.8	0.443	172.5	0.790	6.48

V_{CE} = 2 V, I_C = 5 mA, Z_O = 50 Ω

Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.836	–10.9	12.756	167.2	0.012	77.0	0.971	–7.7	0.234	30.29
0.2	0.802	–18.8	12.044	159.0	0.023	78.1	0.938	–14.9	0.206	27.11
0.3	0.761	–28.1	11.614	149.1	0.034	73.4	0.889	–21.5	0.284	25.33
0.4	0.714	–35.6	10.808	140.2	0.043	69.5	0.837	–27.3	0.362	24.03
0.5	0.658	–42.2	9.995	132.8	0.050	66.2	0.782	–32.1	0.441	23.00
0.6	0.601	–48.5	9.266	126.0	0.057	64.0	0.730	–36.2	0.511	22.12
0.7	0.547	–54.0	8.532	119.5	0.062	62.6	0.679	–39.7	0.584	21.36
0.8	0.503	–58.8	7.960	114.4	0.068	61.6	0.636	–42.6	0.642	20.70
0.9	0.460	–63.2	7.386	109.4	0.072	61.0	0.597	–45.1	0.700	20.08
1.0	0.423	–67.3	6.901	104.9	0.077	60.4	0.564	–47.5	0.751	19.53
1.1	0.391	–71.4	6.442	100.9	0.082	60.2	0.533	–49.7	0.795	18.97
1.2	0.359	–75.4	6.048	97.0	0.086	60.0	0.506	–51.6	0.840	18.49
1.3	0.337	–79.1	5.712	93.7	0.090	60.1	0.482	–53.6	0.871	18.00
1.4	0.312	–82.9	5.396	90.3	0.095	60.3	0.459	–55.6	0.904	17.53
1.5	0.291	–87.2	5.127	87.0	0.100	60.4	0.440	–57.6	0.930	17.12
1.6	0.272	–90.8	4.851	84.0	0.104	60.6	0.422	–59.7	0.956	16.67
1.7	0.256	–95.4	4.613	81.1	0.109	60.7	0.407	–61.4	0.975	16.25
1.8	0.239	–100.0	4.425	78.7	0.115	61.0	0.390	–63.6	0.991	15.87
1.9	0.224	–105.2	4.238	75.7	0.120	60.9	0.377	–65.7	1.004	15.09
2.0	0.218	–109.6	4.071	72.9	0.126	60.9	0.364	–67.7	1.012	14.44
2.1	0.207	–115.1	3.904	70.3	0.131	61.2	0.352	–70.0	1.022	13.83
2.2	0.205	–120.4	3.774	67.8	0.137	61.4	0.341	–72.4	1.023	13.48
2.3	0.202	–124.7	3.620	65.4	0.142	61.6	0.332	–74.9	1.030	12.99
2.4	0.197	–129.0	3.495	62.9	0.148	61.4	0.324	–77.4	1.034	12.60
2.5	0.194	–133.7	3.390	60.7	0.154	61.3	0.315	–80.2	1.035	12.28
2.6	0.191	–138.6	3.272	58.1	0.161	61.1	0.309	–83.4	1.036	11.93
2.7	0.188	–143.2	3.183	56.0	0.167	60.8	0.303	–86.9	1.034	11.67
2.8	0.187	–147.6	3.088	53.8	0.174	60.5	0.297	–90.7	1.032	11.39
2.9	0.187	–152.2	2.991	51.8	0.181	60.0	0.290	–94.2	1.033	11.07
3.0	0.186	–158.4	2.882	49.3	0.188	59.3	0.282	–99.1	1.040	10.64
4.0	0.285	164.2	2.321	29.1	0.273	54.2	0.284	–141.0	0.942	9.29
5.0	0.442	144.2	1.878	8.1	0.373	39.6	0.377	173.4	0.843	7.02

V_{CE} = 2 V, I_C = 7 mA, Z_O = 50 Ω

Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.783	–11.7	15.876	165.6	0.012	80.1	0.961	–9.0	0.222	31.22
0.2	0.749	–21.4	14.757	155.8	0.023	76.3	0.916	–16.9	0.268	28.07
0.3	0.694	–30.8	13.937	145.0	0.032	73.4	0.854	–24.0	0.348	26.33
0.4	0.634	–39.2	12.673	135.4	0.041	69.3	0.791	–29.8	0.441	24.94
0.5	0.572	–45.5	11.501	127.6	0.047	66.8	0.727	–34.3	0.532	23.87
0.6	0.519	–51.7	10.499	121.1	0.054	65.5	0.672	–38.2	0.598	22.90
0.7	0.467	–56.7	9.521	115.0	0.059	64.3	0.620	–41.1	0.675	22.08
0.8	0.423	–61.3	8.773	109.9	0.064	64.1	0.578	–43.4	0.730	21.34
0.9	0.383	–64.9	8.079	105.3	0.069	63.6	0.541	–45.4	0.786	20.66
1.0	0.346	–68.7	7.474	101.0	0.074	63.6	0.510	–47.4	0.832	20.03
1.1	0.320	–72.0	6.943	97.4	0.080	63.5	0.480	–49.1	0.869	19.41
1.2	0.292	–76.2	6.485	93.8	0.084	63.6	0.456	–50.5	0.904	18.86
1.3	0.273	–79.8	6.096	90.7	0.090	63.7	0.436	–52.2	0.925	18.32
1.4	0.251	–83.2	5.724	87.7	0.095	63.8	0.416	–54.1	0.951	17.79
1.5	0.236	–87.4	5.433	84.6	0.100	63.8	0.398	–55.9	0.967	17.34
1.6	0.217	–90.7	5.142	81.8	0.106	63.8	0.383	–57.6	0.986	16.86
1.7	0.206	–95.5	4.883	79.0	0.112	63.7	0.369	–59.4	0.996	16.41
1.8	0.192	–100.7	4.657	76.8	0.118	63.8	0.355	–61.4	1.006	15.51
1.9	0.178	–106.1	4.458	74.1	0.124	63.4	0.343	–63.5	1.013	14.86
2.0	0.172	–111.0	4.275	71.5	0.130	63.2	0.331	–65.4	1.019	14.34
2.1	0.164	–117.6	4.092	69.0	0.136	63.3	0.320	–67.6	1.025	13.82
2.2	0.164	–122.6	3.954	66.7	0.142	63.2	0.310	–69.9	1.023	13.51
2.3	0.161	–127.4	3.790	64.5	0.148	62.9	0.302	–72.4	1.028	13.05
2.4	0.162	–131.5	3.659	62.2	0.155	62.6	0.294	–75.0	1.027	12.73
2.5	0.157	–137.1	3.542	60.2	0.161	62.2	0.286	–77.8	1.029	12.38
2.6	0.155	–142.3	3.416	57.6	0.168	61.7	0.280	–81.1	1.030	12.03
2.7	0.157	–146.6	3.324	55.7	0.174	61.2	0.274	–84.6	1.026	11.81
2.8	0.156	–152.2	3.228	53.6	0.182	60.8	0.268	–88.6	1.024	11.55
2.9	0.158	–156.8	3.123	51.7	0.188	60.0	0.261	–92.3	1.026	11.21
3.0	0.157	–163.9	3.007	49.4	0.195	59.1	0.252	–97.4	1.033	10.77
4.0	0.263	160.3	2.416	30.2	0.278	52.8	0.253	–141.1	0.955	9.39
5.0	0.421	142.8	1.966	10.1	0.372	38.5	0.343	172.9	0.869	7.23

V_{CE} = 2 V, I_C = 10 mA, Z_O = 50 Ω

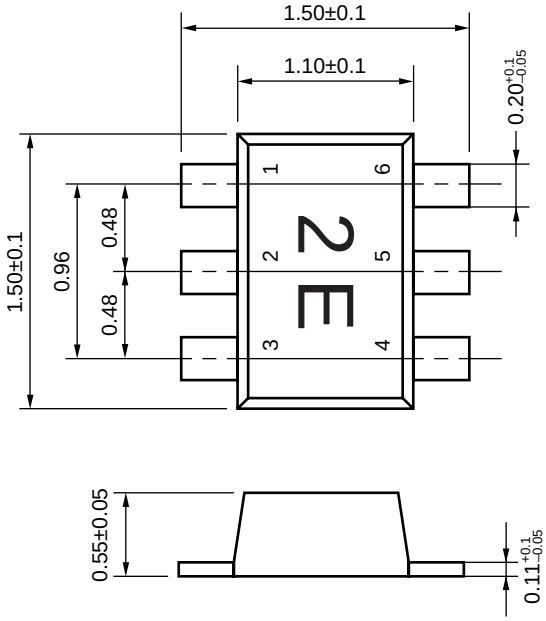
Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.728	–13.6	19.317	163.6	0.010	85.0	0.947	–10.2	0.193	32.74
0.2	0.682	–24.1	17.623	152.2	0.022	76.8	0.888	–19.1	0.316	29.06
0.3	0.615	–34.4	16.228	140.4	0.031	72.6	0.812	–26.5	0.427	27.23
0.4	0.554	–42.6	14.421	130.8	0.038	69.9	0.740	–32.0	0.523	25.75
0.5	0.489	–48.8	12.834	122.9	0.045	68.3	0.672	–36.2	0.616	24.60
0.6	0.435	–54.2	11.534	116.5	0.051	67.2	0.613	–39.3	0.691	23.55
0.7	0.390	–58.4	10.320	110.7	0.056	66.9	0.565	–41.6	0.758	22.63
0.8	0.345	–61.9	9.420	106.0	0.062	66.6	0.524	–43.6	0.814	21.82
0.9	0.311	–65.8	8.618	101.6	0.067	66.6	0.491	–45.2	0.857	21.08
1.0	0.281	–69.9	7.927	97.7	0.073	66.6	0.463	–46.5	0.891	20.37
1.1	0.260	–72.3	7.332	94.5	0.079	66.6	0.437	–47.8	0.920	19.70
1.2	0.237	–76.0	6.820	91.2	0.084	66.7	0.417	–49.2	0.946	19.10
1.3	0.221	–79.2	6.397	88.2	0.090	66.7	0.398	–50.6	0.962	18.53
1.4	0.203	–83.2	5.982	85.4	0.096	66.6	0.381	–52.3	0.978	17.95
1.5	0.187	–87.2	5.670	82.6	0.102	66.6	0.366	–53.8	0.989	17.46
1.6	0.171	–90.7	5.347	79.9	0.108	66.3	0.352	–55.4	1.004	16.59
1.7	0.161	–95.5	5.076	77.5	0.114	66.1	0.340	–57.1	1.010	15.89
1.8	0.151	–101.3	4.833	75.3	0.120	65.9	0.327	–59.1	1.015	15.29
1.9	0.140	–107.7	4.620	72.7	0.127	65.3	0.317	–61.1	1.018	14.78
2.0	0.138	–113.1	4.433	70.3	0.134	64.9	0.305	–63.0	1.019	14.35
2.1	0.131	–120.9	4.243	68.0	0.140	64.7	0.295	–65.2	1.023	13.89
2.2	0.131	–126.3	4.092	65.8	0.147	64.4	0.286	–67.5	1.022	13.55
2.3	0.132	–131.6	3.917	63.8	0.153	64.0	0.278	–69.9	1.025	13.12
2.4	0.131	–135.9	3.777	61.6	0.160	63.4	0.271	–72.5	1.025	12.77
2.5	0.132	–141.8	3.661	59.6	0.166	62.9	0.263	–75.4	1.023	12.50
2.6	0.131	–147.5	3.526	57.2	0.173	62.1	0.257	–78.8	1.024	12.14
2.7	0.134	–152.8	3.430	55.3	0.180	61.5	0.251	–82.5	1.020	11.93
2.8	0.133	–156.8	3.326	53.3	0.188	60.8	0.245	–86.6	1.019	11.63
2.9	0.136	–162.9	3.218	51.5	0.194	60.0	0.238	–90.5	1.021	11.31
3.0	0.138	–169.9	3.095	49.3	0.201	59.0	0.229	–95.9	1.027	10.86
4.0	0.250	157.0	2.490	31.0	0.282	51.7	0.227	–141.7	0.962	9.46
5.0	0.406	141.0	2.032	11.8	0.371	37.4	0.317	171.9	0.889	7.38

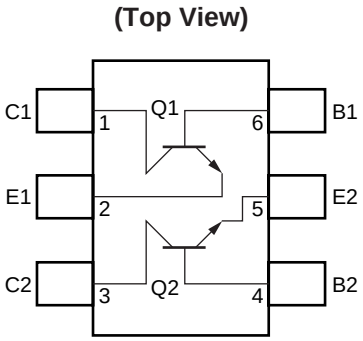
V_{CE} = 2 V, I_C = 20 mA, Z_O = 50 Ω

Frequency (GHz)	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.590	–15.7	25.430	160.0	0.011	79.0	0.915	–12.3	0.360	33.83
0.2	0.536	–29.0	22.234	145.8	0.020	76.1	0.830	–22.5	0.445	30.39
0.3	0.469	–39.3	19.543	133.1	0.028	73.6	0.733	–29.8	0.569	28.45
0.4	0.403	–46.9	16.685	123.2	0.035	72.2	0.651	–34.6	0.673	26.77
0.5	0.350	–52.9	14.440	115.8	0.041	71.0	0.583	–37.6	0.760	25.48
0.6	0.305	–57.4	12.702	110.0	0.047	71.3	0.528	–39.6	0.822	24.29
0.7	0.266	–61.1	11.192	104.7	0.053	71.2	0.486	–40.9	0.875	23.21
0.8	0.235	–64.5	10.105	100.5	0.060	71.3	0.452	–42.0	0.910	22.29
0.9	0.214	–66.8	9.165	96.6	0.066	71.3	0.425	–42.9	0.939	21.45
1.0	0.186	–69.6	8.370	93.2	0.072	71.1	0.403	–43.9	0.962	20.66
1.1	0.173	–72.5	7.703	90.2	0.079	71.1	0.384	–44.7	0.976	19.92
1.2	0.154	–76.7	7.119	87.3	0.084	70.9	0.367	–45.8	0.992	19.26
1.3	0.145	–80.2	6.663	84.7	0.091	70.6	0.353	–47.0	0.999	18.65
1.4	0.130	–84.2	6.225	82.1	0.098	70.3	0.339	–48.5	1.008	17.50
1.5	0.120	–89.9	5.873	79.5	0.104	69.9	0.327	–50.0	1.013	16.82
1.6	0.110	–93.4	5.538	77.2	0.111	69.4	0.316	–51.6	1.018	16.15
1.7	0.103	–100.6	5.259	74.9	0.118	68.9	0.305	–53.3	1.018	15.66
1.8	0.098	–108.1	4.991	73.0	0.125	68.5	0.295	–55.2	1.021	15.13
1.9	0.088	–117.3	4.776	70.6	0.132	67.7	0.286	–57.3	1.021	14.70
2.0	0.090	–122.7	4.562	68.4	0.139	67.0	0.275	–59.2	1.021	14.26
2.1	0.089	–134.1	4.364	66.2	0.146	66.5	0.266	–61.5	1.021	13.86
2.2	0.095	–140.5	4.208	64.3	0.153	66.0	0.258	–63.8	1.018	13.57
2.3	0.098	–146.7	4.025	62.3	0.160	65.4	0.250	–66.4	1.020	13.15
2.4	0.101	–151.5	3.882	60.3	0.167	64.6	0.244	–69.1	1.018	12.83
2.5	0.103	–158.8	3.751	58.5	0.174	63.8	0.237	–72.0	1.018	12.52
2.6	0.105	–162.8	3.613	56.2	0.181	62.8	0.231	–75.6	1.018	12.18
2.7	0.112	–167.9	3.509	54.4	0.188	61.9	0.224	–79.6	1.015	11.96
2.8	0.114	–172.6	3.412	52.6	0.196	61.1	0.218	–84.2	1.013	11.71
2.9	0.121	–177.1	3.294	50.8	0.203	60.1	0.211	–88.3	1.014	11.38
3.0	0.126	175.3	3.170	48.7	0.210	59.0	0.202	–94.1	1.020	10.94
4.0	0.248	149.7	2.543	31.4	0.290	50.5	0.202	–143.6	0.967	9.43
5.0	0.403	136.9	2.078	12.9	0.375	36.1	0.291	169.3	0.907	7.44

PACKAGE DIMENSIONS

FLAT-LEAD 6-PIN THIN-TYPE ULTRA SUPER MINIMOLD (UNIT: mm)





PIN CONNECTIONS

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

[MEMO]

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