DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR

μPA843TD

NPN SILICON RF TRANSISTOR (WITH 2 DIFFERENT ELEMENTS) IN A 6-PIN LEAD-LESS MINIMOLD

FEATURES

- Low noise operation
- 6-pin lead-less minimold package
- 2 different built-in transistors (2SC5603, 2SC5600)

  Q1: Built-in 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: Built-in low phase distortion transistor suited for OSC operation

  f_T = 5.0 GHz TYP., $|S_{21e}|^2$ = 4.0 dB TYP. @ V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz

BUILT-IN TRANSISTORS

	Q1	Q2
3-pin thin-type ultra super minimold part No.	2SC5603	2SC5600

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA843TD	50 pcs (Non reel)	• 8 mm wide embossed taping
μPA843TD-T3	10 kpcs/reel	• Pin 1 (Q1 Collector), Pin 6 (Q1 Base) face the perforation side of the tape

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.

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ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings		Unit
		Q1	Q2	
Collector to Base Voltage	V_{CBO}	15	9	V
Collector to Emitter Voltage	V_{CEO}	6	5.5	V
Emitter to Base Voltage	V_{EBO}	2	1.5	V
Collector Current	I_C	35	100	mA
Total Power Dissipation	P_{tot} Note	190 in 1 element 210 in 2 elements		mW
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	$\lvert S_{21e} \rvert^2$	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} = 1 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	–	–	600	nA
Emitter Cut-off Current	I_{EBO}	V_{BE} = 1 V, I_C = 0 mA	–	–	600	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 1 V, I_C = 5 mA	100	–	160	–
Gain Bandwidth Product (1)	f_T	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	3.5	5.0	–	GHz
Gain Bandwidth Product (2)	f_T	V_{CE} = 1 V, I_C = 15 mA, f = 2 GHz	5.5	6.5	–	GHz
Insertion Power Gain (1)	$\lvert S_{21e} \rvert^2$	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz	3.5	4.0	–	dB
Insertion Power Gain (2)	$\lvert S_{21e} \rvert^2$	V_{CE} = 1 V, I_C = 15 mA, f = 2 GHz	4.5	5.5	–	dB
Noise Figure	NF	V_{CE} = 1 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.5	2.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 0.5 V, I_E = 0 mA, f = 1 MHz	–	0.8	1.0	pF

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

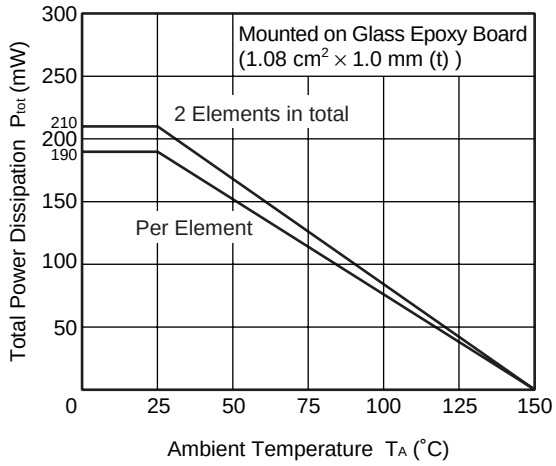
2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

h_{FE} CLASSIFICATION

Rank	FB
Marking	nT
h_{FE} Value of Q1	60 to 120
h_{FE} Value of Q2	100 to 160

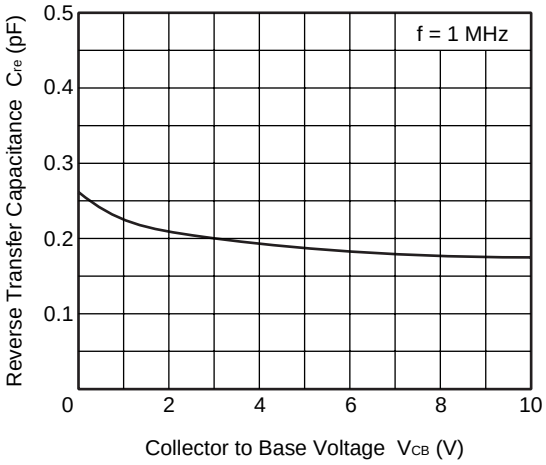
TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



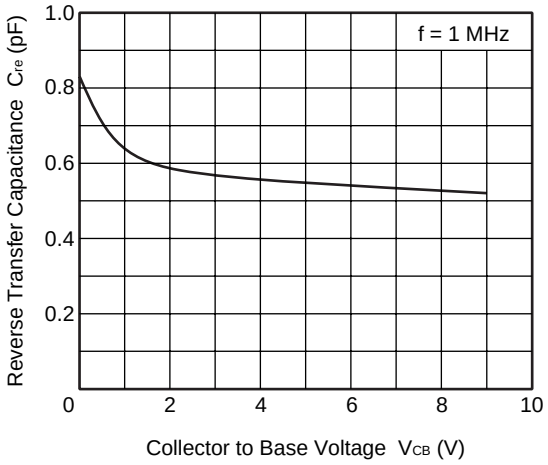
Q1

REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



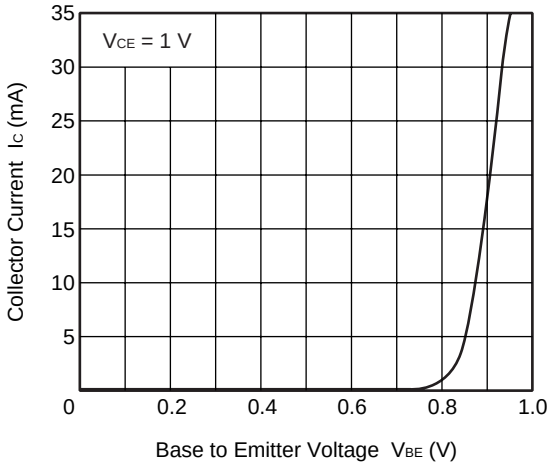
Q2

REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



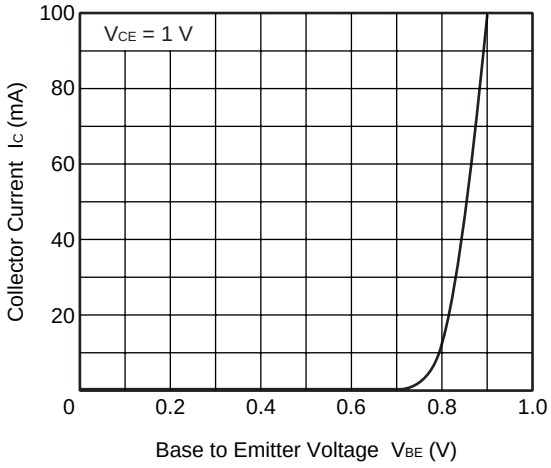
Q1

COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE

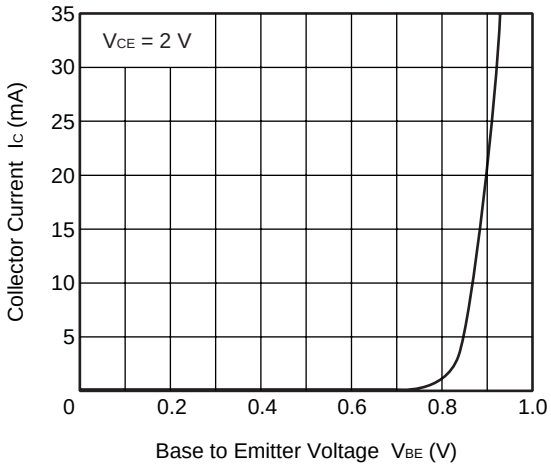


Q2

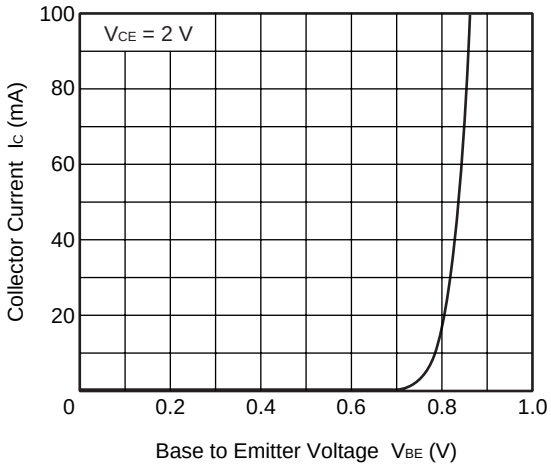
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



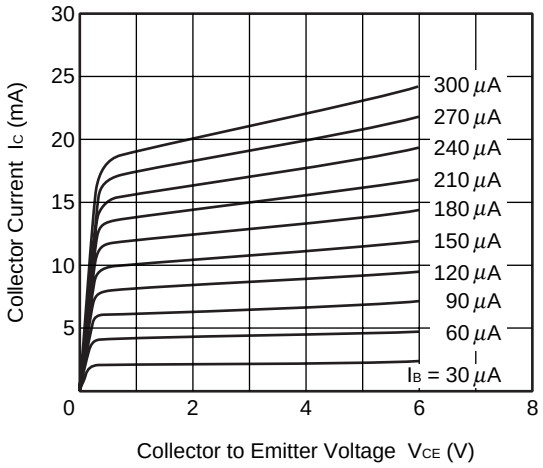
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



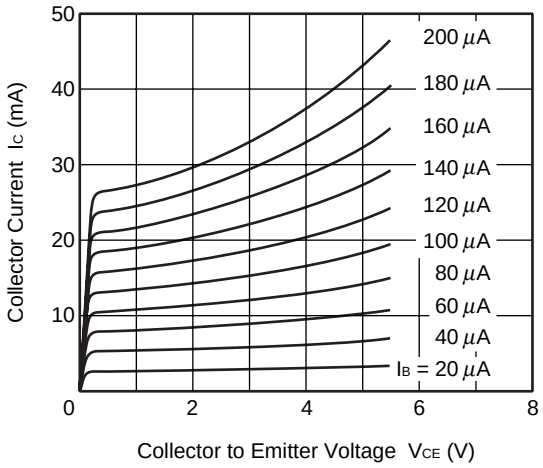
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE

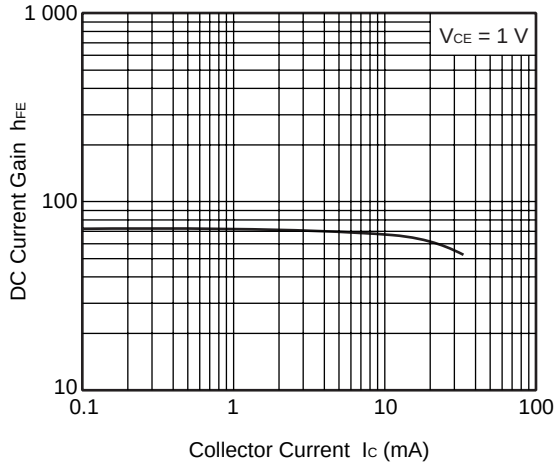


COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



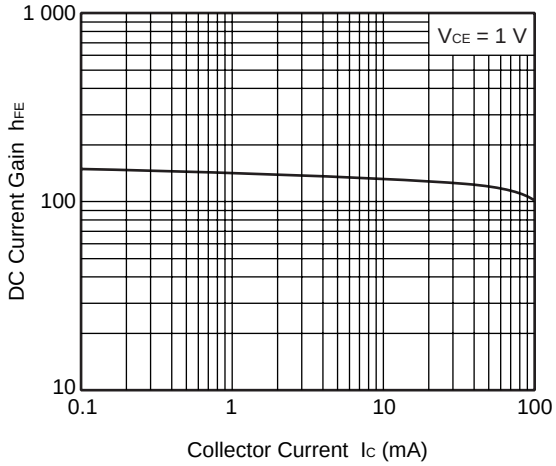
Q1

DC CURRENT GAIN vs.
COLLECTOR CURRENT

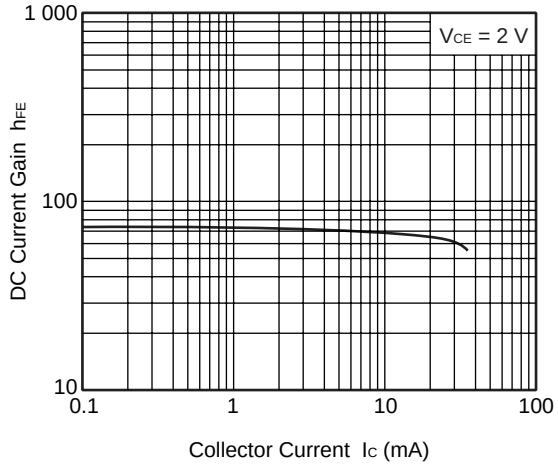


Q2

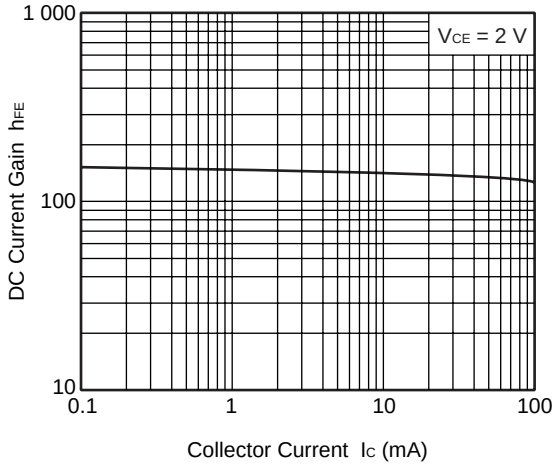
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT

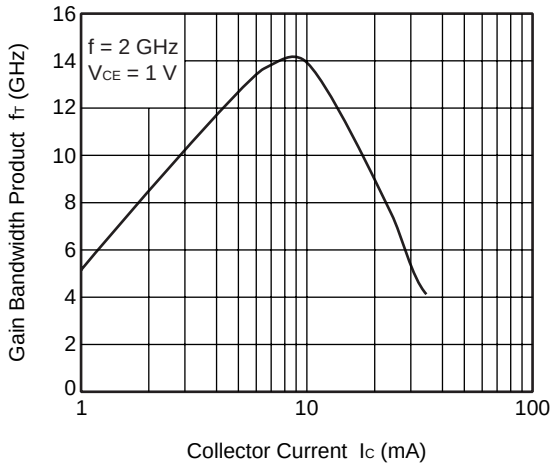


DC CURRENT GAIN vs.
COLLECTOR CURRENT



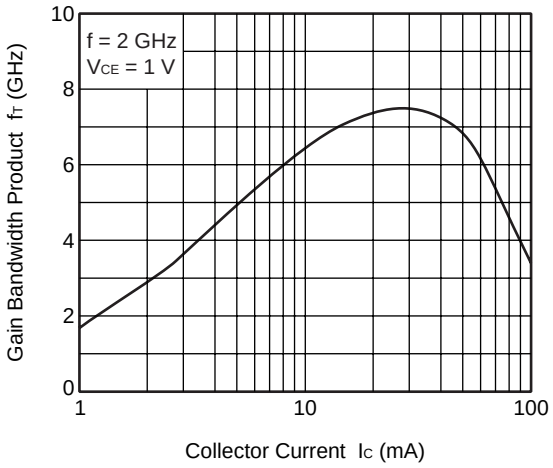
Q1

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



Q2

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
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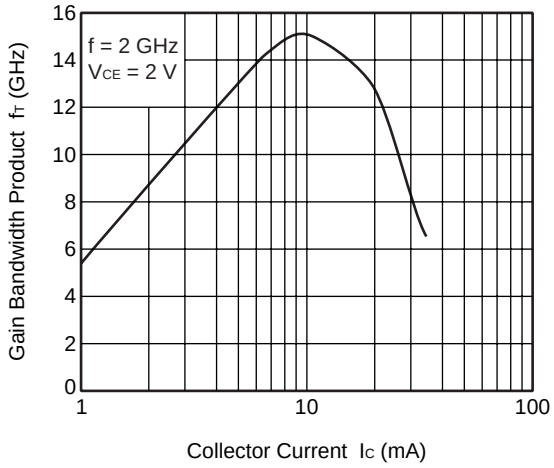

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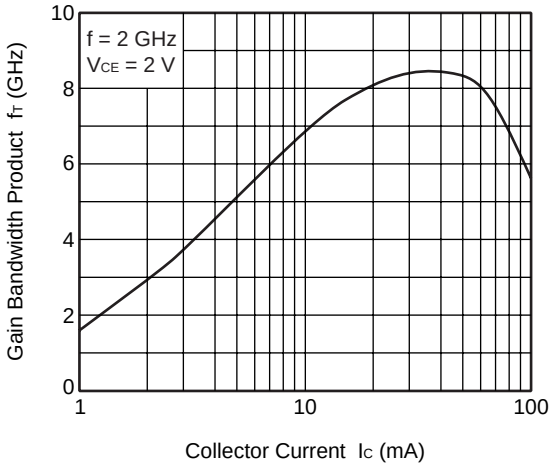
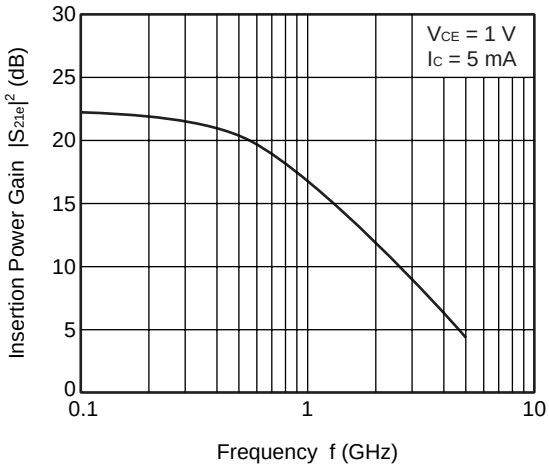


Q1

INSERTION POWER GAIN vs. FREQUENCY



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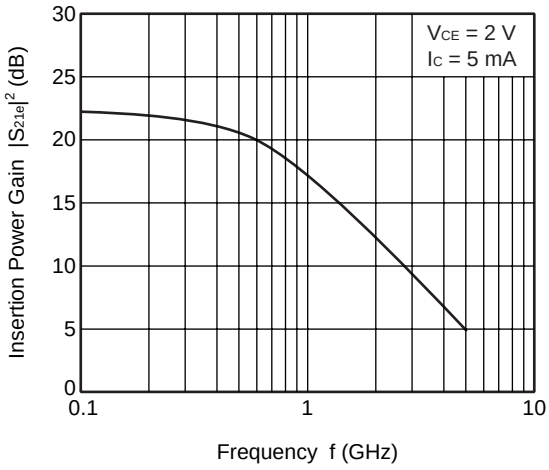
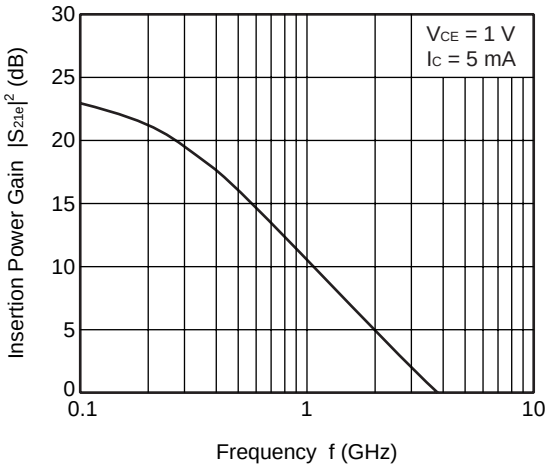


Q2

INSERTION POWER GAIN vs. FREQUENCY



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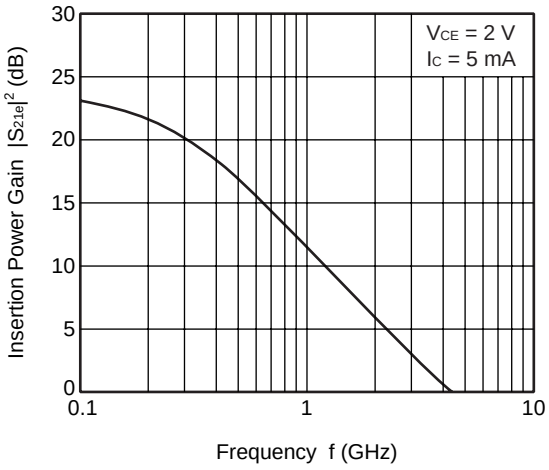

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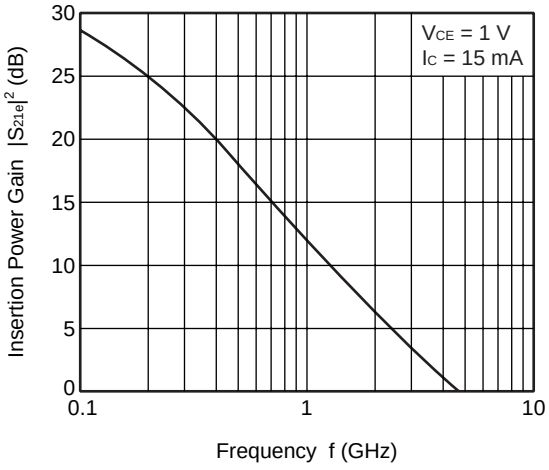
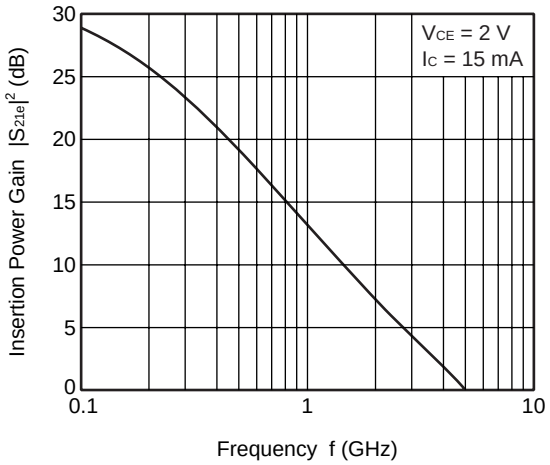


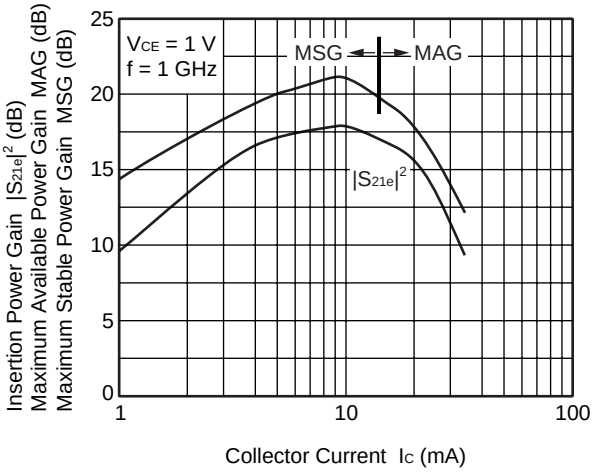
Q2

INSERTION POWER GAIN vs. FREQUENCY



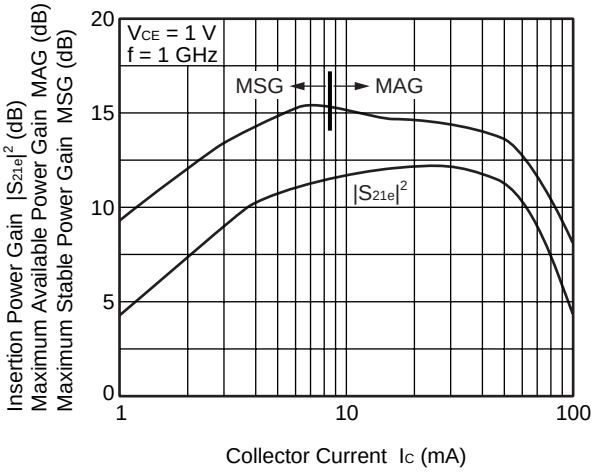
Q1

INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



Q2

INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



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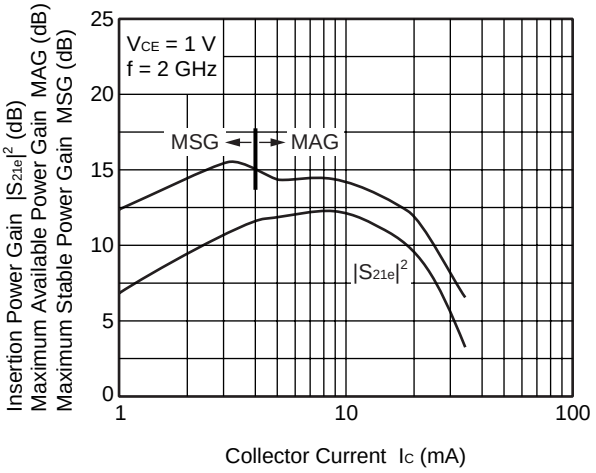

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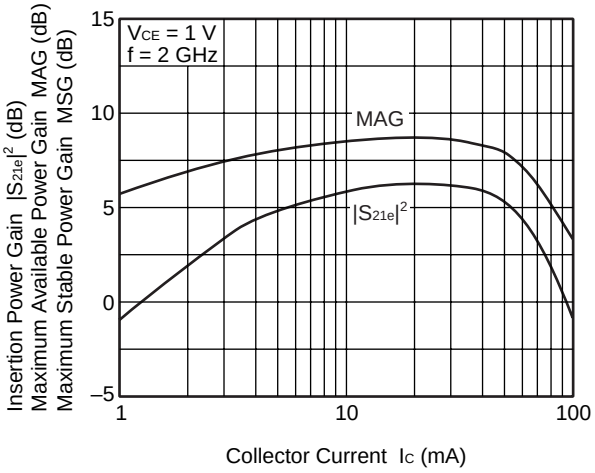

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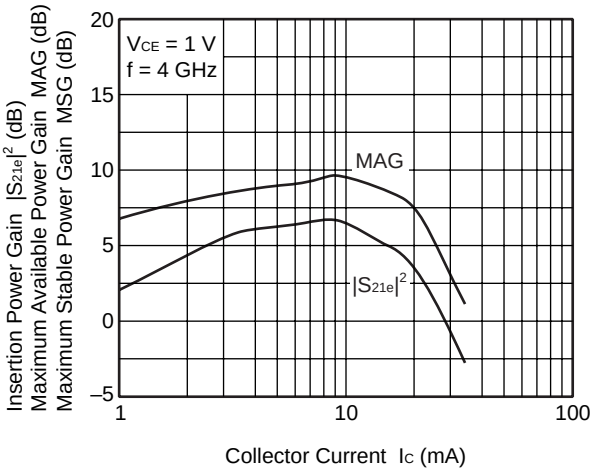

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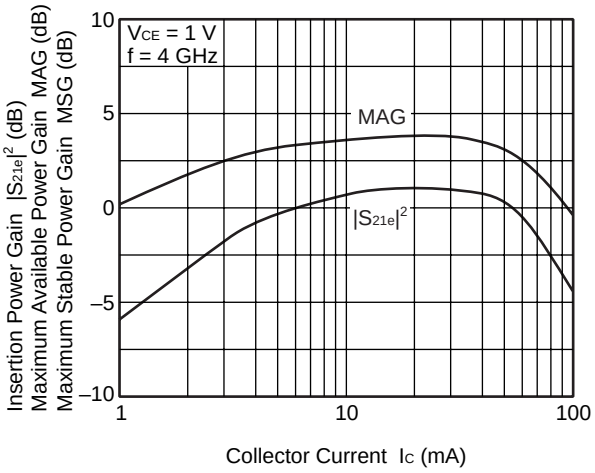

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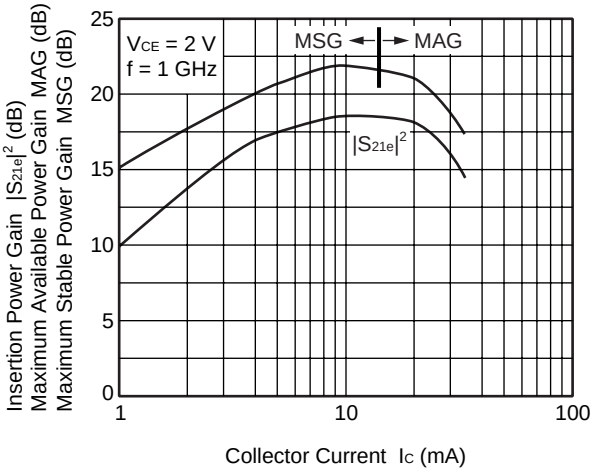
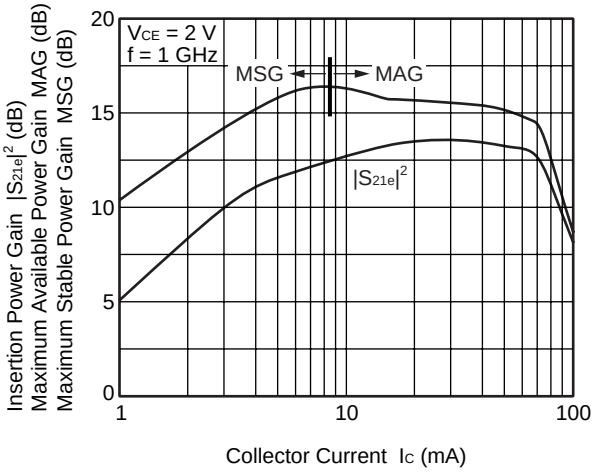


Q2

INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



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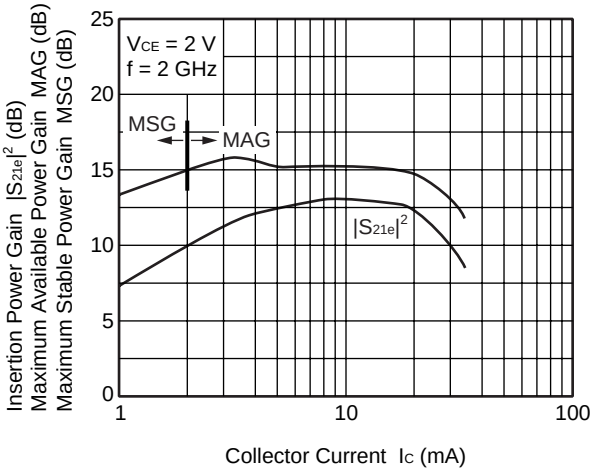

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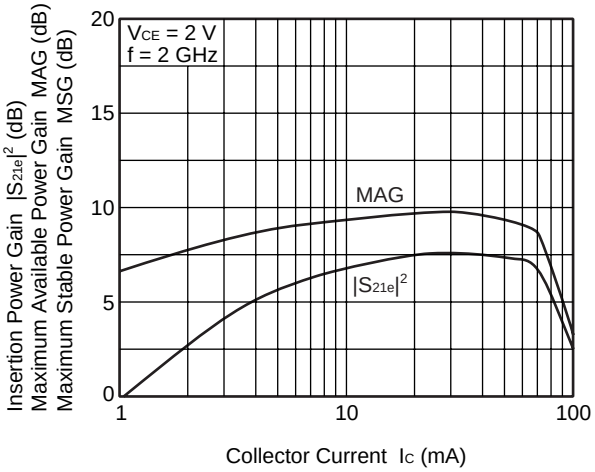

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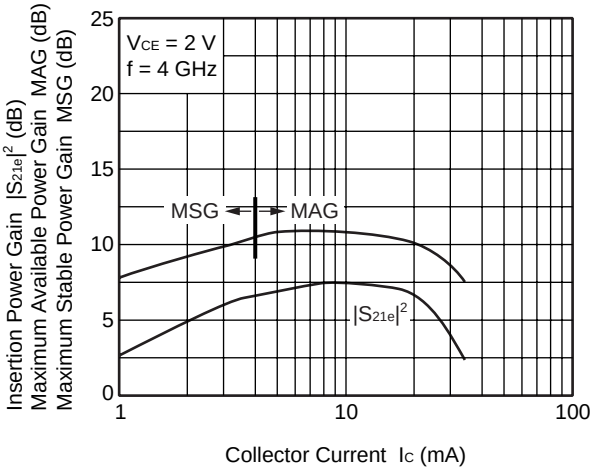

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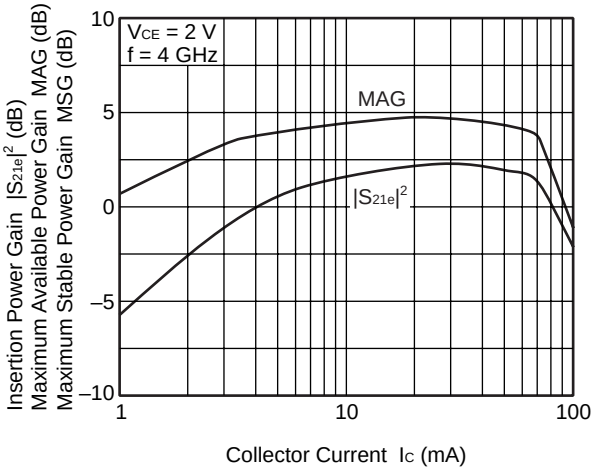
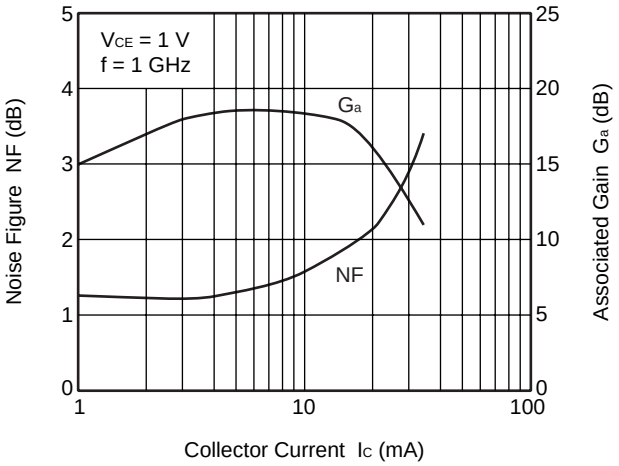


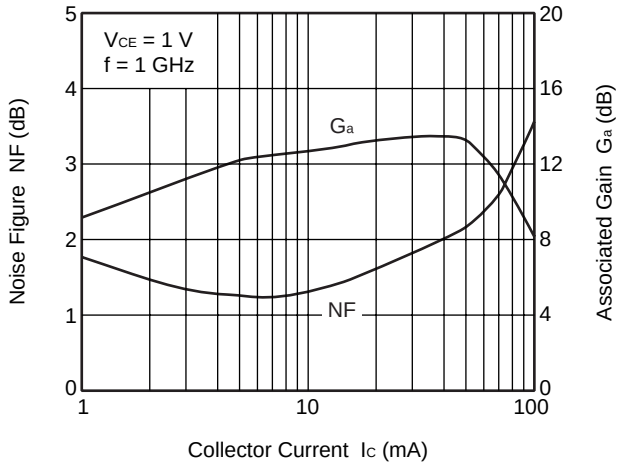
Q1

NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT

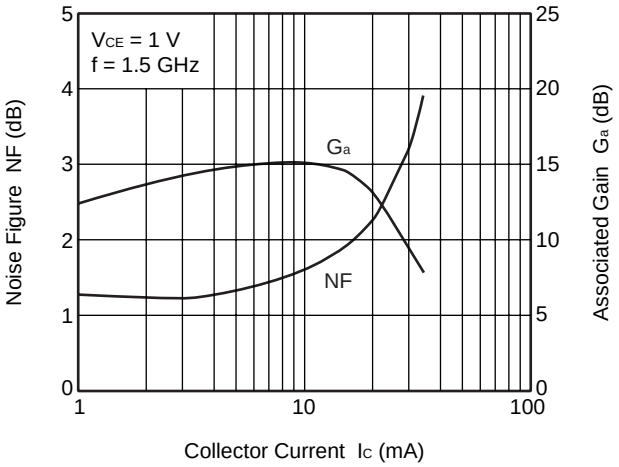


Q2

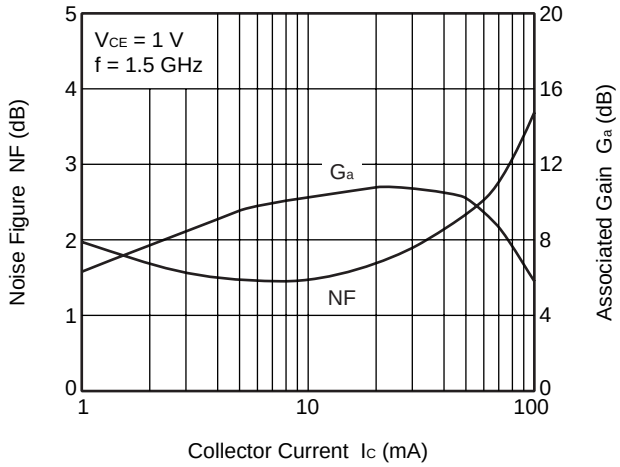
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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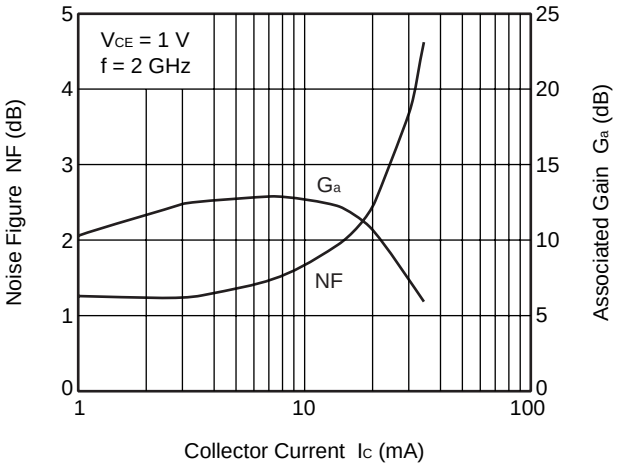

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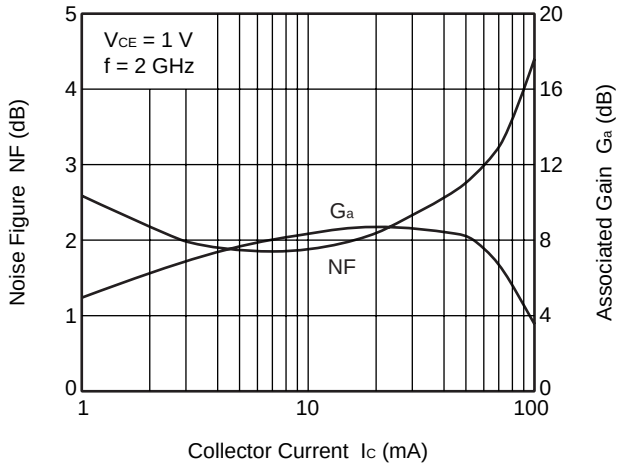

Q1

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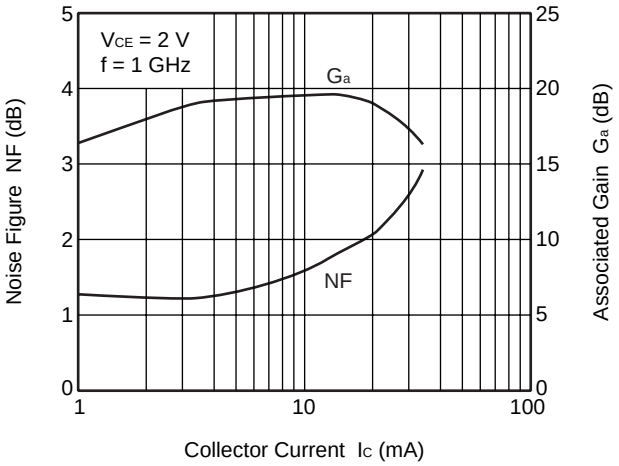
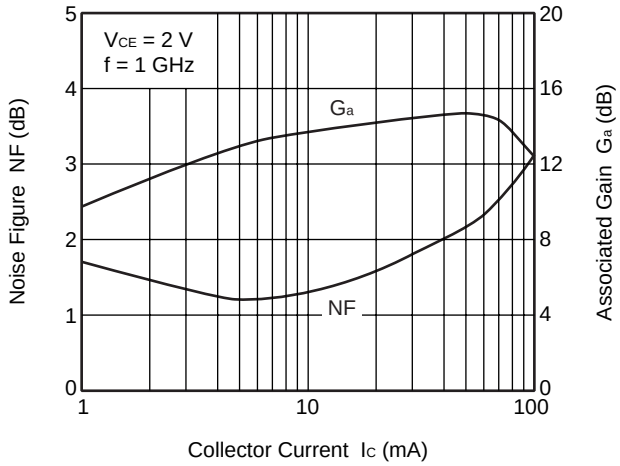
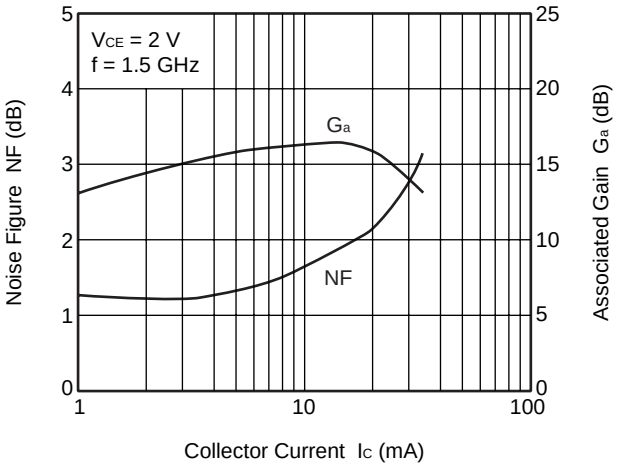


Q2

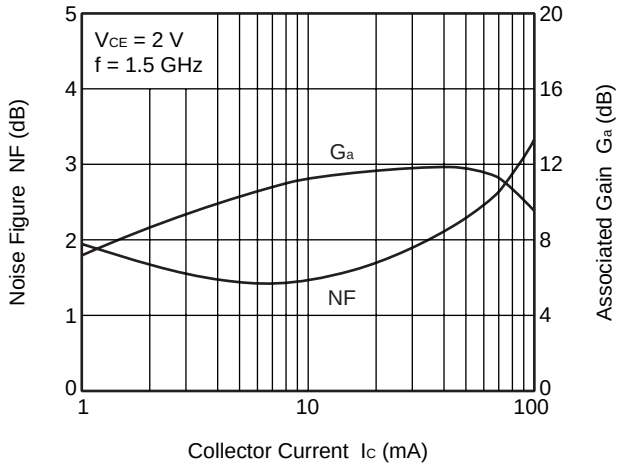
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



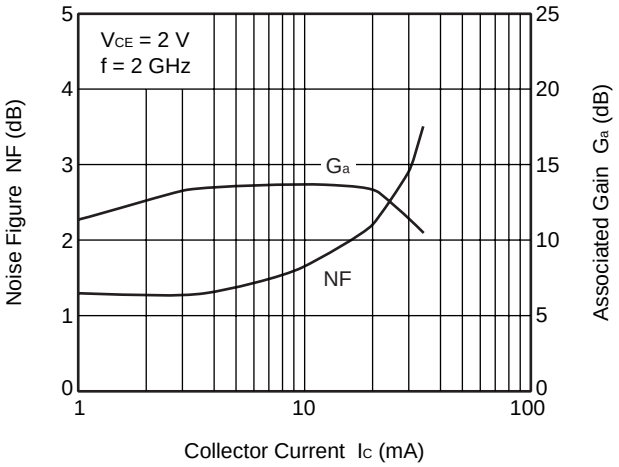
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



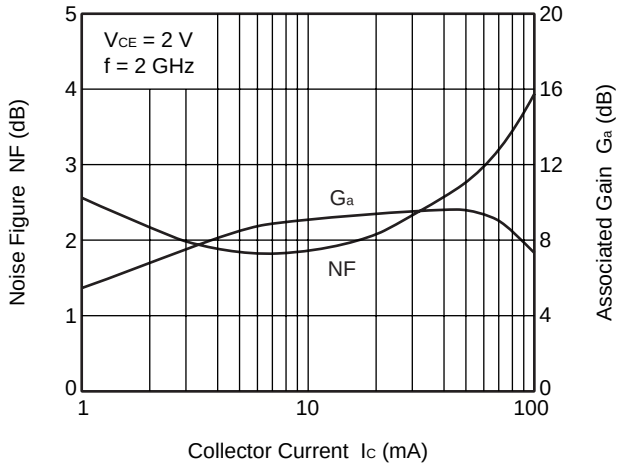
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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 $K \geq 1$, 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	–5.9	3.450	173.9	0.014	86.4	0.995	–3.5	0.040	24.00
0.2	0.938	–10.7	3.471	168.9	0.027	82.0	0.992	–7.4	0.074	21.12
0.3	0.930	–16.1	3.431	163.9	0.040	77.9	0.980	–11.1	0.104	19.37
0.4	0.916	–21.6	3.404	158.3	0.053	73.8	0.970	–15.1	0.135	18.09
0.5	0.899	–27.1	3.369	152.9	0.065	69.9	0.955	–19.1	0.162	17.14
0.6	0.880	–32.8	3.330	147.6	0.077	65.7	0.936	–23.3	0.190	16.38
0.7	0.857	–38.5	3.257	142.2	0.087	61.5	0.914	–27.3	0.225	15.72
0.8	0.832	–44.4	3.193	136.9	0.097	57.6	0.891	–31.5	0.253	15.19
0.9	0.804	–49.9	3.122	131.7	0.105	53.8	0.867	–35.7	0.285	14.75
1.0	0.777	–55.7	3.048	126.6	0.111	50.1	0.843	–39.8	0.314	14.37
1.1	0.749	–61.5	2.981	121.5	0.117	46.4	0.818	–43.7	0.349	14.06
1.2	0.722	–67.4	2.893	116.8	0.121	43.1	0.796	–47.5	0.376	13.78
1.3	0.698	–72.9	2.799	112.3	0.125	39.8	0.775	–51.2	0.410	13.51
1.4	0.673	–78.5	2.715	107.8	0.127	36.9	0.755	–54.6	0.443	13.29
1.5	0.653	–84.1	2.631	103.5	0.129	34.2	0.738	–58.0	0.473	13.10
1.6	0.632	–89.6	2.541	99.4	0.129	31.7	0.720	–61.0	0.512	12.93
1.7	0.615	–94.8	2.453	95.4	0.129	29.7	0.704	–63.8	0.552	12.79
1.8	0.598	–100.1	2.367	91.8	0.128	27.8	0.691	–66.5	0.591	12.68
1.9	0.585	–105.0	2.295	88.2	0.126	26.1	0.677	–69.0	0.634	12.59
2.0	0.575	–109.7	2.211	84.6	0.125	24.9	0.666	–71.5	0.678	12.49
2.1	0.567	–114.3	2.146	81.4	0.122	24.1	0.655	–73.7	0.724	12.46
2.2	0.555	–118.9	2.069	78.3	0.119	23.6	0.646	–76.1	0.781	12.41
2.3	0.549	–123.2	2.003	75.1	0.116	23.5	0.638	–78.2	0.836	12.38
2.4	0.543	–127.5	1.946	72.3	0.112	23.5	0.629	–80.5	0.892	12.38
2.5	0.538	–131.3	1.889	69.2	0.109	24.1	0.622	–82.9	0.959	12.40
2.6	0.535	–135.1	1.829	66.8	0.105	24.4	0.618	–85.5	1.027	11.42
2.7	0.534	–138.7	1.778	64.0	0.102	25.6	0.612	–88.0	1.092	10.58
2.8	0.528	–142.4	1.718	61.4	0.099	27.1	0.610	–90.1	1.173	9.90
2.9	0.523	–145.6	1.664	58.2	0.096	28.9	0.600	–92.4	1.272	9.23
3.0	0.520	–149.4	1.625	55.6	0.094	31.8	0.594	–95.3	1.347	8.85
4.0	0.530	174.4	1.278	32.4	0.127	62.9	0.590	–119.5	1.289	6.81
5.0	0.609	142.6	0.969	11.1	0.222	60.2	0.650	–149.0	0.867	6.39

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	0.860	–9.6	8.792	171.3	0.013	82.0	0.987	–5.8	0.106	28.21
0.2	0.839	–17.8	8.656	163.0	0.025	78.7	0.969	–11.9	0.132	25.32
0.3	0.811	–26.4	8.376	155.6	0.037	73.5	0.940	–17.6	0.178	23.54
0.4	0.773	–35.0	8.097	148.1	0.048	68.7	0.904	–23.3	0.225	22.31
0.5	0.732	–43.5	7.784	141.0	0.057	64.0	0.861	–28.6	0.280	21.36
0.6	0.691	–51.6	7.433	134.4	0.065	59.9	0.817	–33.6	0.328	20.60
0.7	0.646	–59.6	7.029	128.1	0.071	56.3	0.771	–38.2	0.381	19.94
0.8	0.601	–67.3	6.651	122.2	0.077	53.0	0.727	–42.6	0.437	19.39
0.9	0.558	–74.5	6.273	116.7	0.081	50.5	0.687	–46.7	0.491	18.90
1.0	0.523	–81.8	5.932	111.7	0.084	48.3	0.651	–50.5	0.540	18.50
1.1	0.491	–88.9	5.608	107.0	0.087	46.6	0.617	–54.1	0.591	18.11
1.2	0.463	–95.8	5.290	102.8	0.089	45.2	0.589	–57.2	0.641	17.76
1.3	0.440	–102.3	4.984	98.9	0.090	44.0	0.565	–60.3	0.690	17.42
1.4	0.420	–108.9	4.721	95.0	0.092	43.4	0.544	–63.1	0.737	17.11
1.5	0.406	–115.2	4.482	91.4	0.093	43.0	0.526	–65.8	0.780	16.83
1.6	0.393	–121.0	4.239	88.0	0.094	42.8	0.510	–68.2	0.830	16.54
1.7	0.383	–126.3	4.045	85.1	0.095	42.9	0.496	–70.2	0.874	16.30
1.8	0.376	–131.6	3.851	81.9	0.096	43.2	0.485	–72.2	0.918	16.04
1.9	0.371	–136.4	3.682	79.1	0.097	43.7	0.475	–74.1	0.955	15.79
2.0	0.369	–141.2	3.510	76.3	0.098	44.5	0.465	–75.9	0.997	15.54
2.1	0.367	–145.1	3.375	73.9	0.099	45.5	0.457	–77.7	1.030	14.26
2.2	0.366	–149.4	3.238	71.5	0.100	46.5	0.451	–79.4	1.064	13.54
2.3	0.367	–152.9	3.111	69.0	0.102	47.7	0.445	–81.1	1.091	13.00
2.4	0.368	–156.6	3.005	66.9	0.104	48.8	0.439	–83.0	1.112	12.57
2.5	0.369	–159.8	2.894	64.4	0.106	50.0	0.434	–84.9	1.138	12.12
2.6	0.370	–163.2	2.800	62.5	0.108	51.0	0.431	–87.0	1.159	11.74
2.7	0.373	–165.9	2.710	60.2	0.110	52.0	0.428	–89.2	1.171	11.42
2.8	0.372	–169.1	2.608	58.2	0.113	52.8	0.427	–91.0	1.191	11.00
2.9	0.370	–171.9	2.515	55.5	0.116	53.6	0.422	–93.2	1.210	10.59
3.0	0.371	–175.4	2.453	53.5	0.120	55.0	0.421	–95.7	1.205	10.37
4.0	0.417	155.4	1.888	33.5	0.172	61.3	0.441	–118.9	1.088	8.59
5.0	0.523	132.3	1.480	13.9	0.245	53.2	0.513	–147.0	0.881	7.82

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	0.796	–12.2	12.837	169.0	0.012	80.7	0.977	–7.6	0.139	30.18
0.2	0.751	–23.7	12.446	158.6	0.024	76.7	0.945	–15.3	0.174	27.11
0.3	0.710	–34.8	11.796	149.7	0.034	70.9	0.896	–22.1	0.241	25.35
0.4	0.659	–45.3	11.099	140.9	0.043	65.9	0.840	–28.5	0.311	24.08
0.5	0.606	–55.7	10.389	133.0	0.051	61.7	0.781	–34.0	0.380	23.12
0.6	0.556	–65.3	9.648	126.0	0.057	58.4	0.723	–39.0	0.447	22.32
0.7	0.508	–74.4	8.901	119.7	0.062	55.8	0.670	–43.2	0.514	21.60
0.8	0.464	–82.9	8.229	114.0	0.066	53.8	0.622	–47.1	0.581	20.99
0.9	0.428	–91.2	7.621	108.8	0.069	52.5	0.579	–50.7	0.644	20.45
1.0	0.399	–99.3	7.082	104.1	0.072	51.6	0.545	–54.0	0.700	19.95
1.1	0.373	–107.2	6.601	100.0	0.074	51.0	0.514	–57.0	0.755	19.50
1.2	0.356	–114.9	6.162	96.2	0.077	50.7	0.489	–59.8	0.804	19.06
1.3	0.339	–121.6	5.757	92.7	0.079	50.5	0.468	–62.5	0.855	18.63
1.4	0.330	–128.6	5.402	89.4	0.081	50.8	0.451	–64.8	0.894	18.23
1.5	0.324	–135.0	5.099	86.2	0.084	51.1	0.437	–67.1	0.929	17.85
1.6	0.319	–140.6	4.797	83.2	0.086	51.6	0.424	–69.3	0.971	17.48
1.7	0.318	–145.8	4.559	80.6	0.088	52.3	0.414	–71.1	0.998	17.13
1.8	0.317	–150.8	4.322	77.9	0.091	53.0	0.406	–73.0	1.027	15.77
1.9	0.317	–155.1	4.125	75.4	0.093	53.6	0.398	–74.5	1.049	15.10
2.0	0.318	–159.2	3.918	73.0	0.096	54.5	0.391	–76.2	1.076	14.42
2.1	0.322	–162.7	3.761	70.9	0.099	55.3	0.385	–77.9	1.091	13.97
2.2	0.323	–166.2	3.599	68.6	0.102	56.1	0.380	–79.5	1.107	13.49
2.3	0.326	–169.2	3.458	66.4	0.105	56.8	0.377	–81.1	1.116	13.09
2.4	0.331	–172.1	3.330	64.5	0.109	57.6	0.371	–82.8	1.123	12.72
2.5	0.333	–174.8	3.206	62.4	0.112	58.3	0.368	–84.6	1.133	12.34
2.6	0.336	–177.6	3.106	60.5	0.116	58.8	0.366	–86.6	1.138	12.04
2.7	0.342	–180.0	3.000	58.7	0.120	59.2	0.364	–88.8	1.136	11.76
2.8	0.342	177.2	2.883	56.8	0.123	59.5	0.364	–90.6	1.148	11.36
2.9	0.341	175.0	2.776	54.3	0.128	59.5	0.361	–92.8	1.153	10.98
3.0	0.345	171.7	2.707	52.3	0.133	60.1	0.362	–95.3	1.142	10.79
4.0	0.400	146.7	2.070	33.7	0.188	61.2	0.392	–119.1	1.048	9.07
5.0	0.509	127.2	1.636	15.2	0.255	51.4	0.466	–147.2	0.889	8.07

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	0.722	–15.2	15.956	167.2	0.012	79.2	0.968	–9.0	0.166	31.40
0.2	0.678	–28.9	15.198	155.1	0.023	75.2	0.920	–17.7	0.218	28.17
0.3	0.635	–41.8	14.118	145.0	0.032	69.3	0.856	–25.2	0.295	26.38
0.4	0.573	–54.2	13.006	135.7	0.040	64.6	0.788	–31.7	0.379	25.10
0.5	0.518	–65.7	11.882	127.4	0.046	61.1	0.720	–37.0	0.460	24.07
0.6	0.467	–76.1	10.820	120.4	0.051	58.5	0.657	–41.6	0.541	23.24
0.7	0.423	–86.1	9.815	114.3	0.056	56.7	0.602	–45.5	0.615	22.45
0.8	0.387	–95.5	8.972	108.9	0.059	55.5	0.555	–48.8	0.684	21.79
0.9	0.357	–104.5	8.207	104.1	0.063	55.1	0.516	–52.0	0.747	21.17
1.0	0.336	–113.0	7.569	99.8	0.066	54.9	0.484	–54.9	0.803	20.62
1.1	0.319	–121.4	7.018	96.0	0.069	54.9	0.457	–57.6	0.853	20.10
1.2	0.309	–129.3	6.508	92.4	0.071	55.1	0.435	–60.0	0.898	19.60
1.3	0.302	–136.0	6.058	89.3	0.074	55.5	0.417	–62.6	0.940	19.12
1.4	0.297	–142.9	5.669	86.2	0.077	56.0	0.403	–64.7	0.974	18.66
1.5	0.298	–148.8	5.326	83.3	0.080	56.4	0.391	–66.9	1.000	18.16
1.6	0.297	–154.2	5.014	80.6	0.083	57.0	0.381	–68.9	1.030	16.74
1.7	0.298	–159.1	4.748	78.1	0.086	57.6	0.373	–70.6	1.050	16.03
1.8	0.301	–163.1	4.499	75.6	0.090	58.3	0.367	–72.5	1.068	15.41
1.9	0.304	–167.0	4.282	73.3	0.093	58.9	0.361	–74.0	1.083	14.87
2.0	0.308	–170.4	4.075	71.0	0.097	59.5	0.355	–75.6	1.097	14.35
2.1	0.313	–173.6	3.908	69.0	0.100	60.3	0.350	–77.2	1.102	13.96
2.2	0.317	–176.3	3.741	66.9	0.104	60.8	0.347	–78.9	1.110	13.54
2.3	0.320	–179.0	3.581	64.7	0.108	61.2	0.344	–80.2	1.116	13.13
2.4	0.326	178.4	3.453	63.1	0.112	61.6	0.341	–82.1	1.114	12.82
2.5	0.330	176.2	3.328	60.9	0.116	62.1	0.339	–84.0	1.116	12.49
2.6	0.334	173.8	3.210	59.4	0.120	62.3	0.336	–85.9	1.120	12.16
2.7	0.337	172.0	3.107	57.4	0.125	62.5	0.335	–88.2	1.118	11.88
2.8	0.340	169.3	2.989	55.7	0.129	62.3	0.336	–90.0	1.121	11.53
2.9	0.339	167.2	2.871	53.3	0.135	62.1	0.334	–92.3	1.126	11.14
3.0	0.343	164.2	2.797	51.5	0.140	62.4	0.335	–94.7	1.114	10.95
4.0	0.402	141.7	2.132	33.3	0.196	61.4	0.370	–119.2	1.030	9.31
5.0	0.511	124.4	1.689	15.5	0.262	50.7	0.445	–147.7	0.889	8.10

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	0.651	–19.0	19.251	164.5	0.011	80.8	0.952	–10.6	0.179	32.42
0.2	0.594	–36.6	17.957	150.7	0.022	73.3	0.888	–20.5	0.269	29.14
0.3	0.540	–51.9	16.203	139.5	0.030	67.9	0.806	–28.3	0.367	27.27
0.4	0.481	–66.1	14.506	129.6	0.037	63.4	0.726	–34.6	0.467	25.94
0.5	0.428	–79.3	12.946	121.5	0.042	60.8	0.651	–39.4	0.559	24.85
0.6	0.385	–91.2	11.569	114.7	0.047	59.3	0.589	–43.3	0.644	23.93
0.7	0.352	–102.0	10.348	109.0	0.051	58.3	0.536	–46.5	0.722	23.10
0.8	0.328	–112.4	9.357	103.9	0.054	58.2	0.493	–49.3	0.789	22.37
0.9	0.310	–121.8	8.483	99.5	0.058	58.3	0.458	–51.9	0.850	21.68
1.0	0.298	–130.5	7.768	95.5	0.061	58.6	0.430	–54.4	0.902	21.06
1.1	0.292	–138.8	7.162	92.0	0.064	59.1	0.407	–56.9	0.943	20.47
1.2	0.290	–146.2	6.619	88.8	0.068	59.5	0.389	–59.1	0.980	19.91
1.3	0.289	–152.4	6.150	85.9	0.071	60.1	0.376	–61.4	1.012	18.70
1.4	0.291	–158.1	5.738	83.1	0.074	60.7	0.364	–63.5	1.037	17.68
1.5	0.296	–163.4	5.384	80.3	0.078	61.1	0.355	–65.6	1.054	16.95
1.6	0.299	–168.0	5.054	77.8	0.082	61.7	0.348	–67.5	1.074	16.25
1.7	0.303	–171.9	4.780	75.5	0.086	62.3	0.342	–69.2	1.087	15.68
1.8	0.309	–175.3	4.523	73.1	0.089	62.9	0.337	–71.1	1.097	15.14
1.9	0.312	–178.3	4.297	70.8	0.094	63.2	0.334	–72.5	1.104	14.66
2.0	0.318	178.6	4.087	68.7	0.098	63.7	0.330	–74.2	1.108	14.20
2.1	0.325	176.5	3.922	66.7	0.102	64.3	0.326	–75.9	1.110	13.85
2.2	0.328	174.1	3.750	64.8	0.106	64.5	0.324	–77.6	1.113	13.43
2.3	0.333	171.9	3.596	62.8	0.111	64.8	0.322	–79.1	1.112	13.08
2.4	0.339	169.8	3.460	61.1	0.115	65.0	0.320	–80.8	1.109	12.77
2.5	0.343	167.9	3.331	59.1	0.120	65.1	0.318	–82.8	1.108	12.44
2.6	0.347	165.9	3.219	57.5	0.124	65.2	0.317	–84.8	1.106	12.14
2.7	0.352	164.3	3.108	55.8	0.129	65.1	0.316	–87.1	1.103	11.86
2.8	0.356	162.0	2.989	54.1	0.134	64.9	0.318	–89.0	1.103	11.54
2.9	0.355	160.1	2.877	51.8	0.140	64.3	0.316	–91.5	1.104	11.18
3.0	0.360	157.4	2.798	49.9	0.146	64.5	0.319	–93.9	1.092	10.99
4.0	0.421	137.1	2.125	32.1	0.203	61.8	0.359	–119.3	1.010	9.59
5.0	0.529	121.2	1.681	14.7	0.269	50.3	0.436	–148.2	0.879	7.96

V_{CE} = 1 V, I_C = 20 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	0.464	–42.2	22.623	155.8	0.013	73.3	0.853	–16.0	0.388	32.33
0.2	0.424	–74.5	19.118	137.2	0.023	65.5	0.733	–27.9	0.474	29.25
0.3	0.403	–99.1	15.762	124.1	0.029	60.4	0.621	–34.7	0.605	27.37
0.4	0.390	–117.8	13.136	114.5	0.034	58.6	0.537	–38.7	0.721	25.89
0.5	0.384	–132.6	11.113	107.0	0.038	58.2	0.474	–41.2	0.824	24.67
0.6	0.383	–143.9	9.575	101.0	0.042	58.6	0.427	–43.1	0.916	23.62
0.7	0.385	–153.3	8.355	96.2	0.045	59.3	0.392	–44.6	0.991	22.66
0.8	0.388	–160.6	7.411	91.9	0.049	60.5	0.365	–46.3	1.054	20.38
0.9	0.394	–167.2	6.627	88.1	0.053	61.7	0.344	–48.3	1.104	19.02
1.0	0.401	–172.4	6.006	84.7	0.056	62.8	0.329	–50.3	1.142	17.98
1.1	0.409	–177.1	5.483	81.6	0.061	63.8	0.318	–52.6	1.166	17.09
1.2	0.418	178.8	5.042	78.7	0.065	64.6	0.309	–55.0	1.186	16.31
1.3	0.422	175.4	4.650	76.1	0.069	65.4	0.304	–57.5	1.209	15.54
1.4	0.431	172.2	4.323	73.6	0.073	66.1	0.300	–59.9	1.216	14.91
1.5	0.440	169.3	4.042	70.9	0.078	66.7	0.298	–62.4	1.216	14.36
1.6	0.445	166.9	3.780	68.5	0.082	67.3	0.297	–64.9	1.227	13.77
1.7	0.452	164.8	3.568	66.3	0.087	67.9	0.296	–67.1	1.220	13.31
1.8	0.458	162.8	3.372	64.0	0.091	68.3	0.296	–69.2	1.221	12.85
1.9	0.464	160.6	3.200	61.7	0.096	68.6	0.296	–71.4	1.212	12.44
2.0	0.470	159.0	3.035	59.7	0.101	69.0	0.297	–73.5	1.208	12.01
2.1	0.475	157.5	2.909	57.8	0.106	69.3	0.298	–75.5	1.197	11.70
2.2	0.479	155.9	2.784	56.0	0.111	69.4	0.299	–77.9	1.191	11.34
2.3	0.484	154.5	2.661	53.9	0.117	69.3	0.300	–80.0	1.180	11.01
2.4	0.490	152.9	2.564	52.5	0.122	69.3	0.301	–82.2	1.166	10.75
2.5	0.492	151.4	2.465	50.3	0.128	69.2	0.302	–84.6	1.160	10.42
2.6	0.498	149.8	2.385	48.7	0.133	69.0	0.303	–87.2	1.146	10.21
2.7	0.502	148.6	2.297	46.9	0.139	68.7	0.305	–89.9	1.139	9.92
2.8	0.506	146.8	2.205	45.3	0.144	68.1	0.308	–92.5	1.136	9.60
2.9	0.503	145.2	2.115	43.0	0.151	67.2	0.310	–95.5	1.138	9.20
3.0	0.508	142.9	2.055	41.1	0.159	67.1	0.313	–98.4	1.118	9.03
4.0	0.565	125.0	1.536	22.8	0.221	61.9	0.370	–126.0	1.018	7.58
5.0	0.647	110.9	1.177	6.5	0.289	48.3	0.457	–156.1	0.898	6.10

V_{CE} = 2 V, I_C = 1 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	0.951	–5.7	3.491	174.2	0.011	81.6	0.996	–3.2	0.119	24.90
0.2	0.939	–10.2	3.508	169.4	0.023	82.6	0.991	–6.7	0.072	21.80
0.3	0.933	–15.2	3.474	164.6	0.035	78.6	0.983	–10.2	0.102	20.02
0.4	0.918	–20.4	3.447	159.3	0.046	74.9	0.973	–13.9	0.130	18.78
0.5	0.905	–25.8	3.419	154.0	0.056	71.0	0.960	–17.6	0.157	17.83
0.6	0.887	–31.1	3.381	148.9	0.067	67.1	0.943	–21.5	0.186	17.06
0.7	0.865	–36.6	3.321	143.6	0.076	63.2	0.923	–25.3	0.218	16.43
0.8	0.841	–42.0	3.253	138.5	0.084	59.2	0.901	–29.3	0.251	15.88
0.9	0.814	–47.3	3.193	133.4	0.091	55.7	0.879	–33.2	0.283	15.45
1.0	0.789	–53.1	3.126	128.4	0.097	52.1	0.857	–37.0	0.310	15.08
1.1	0.761	–58.6	3.061	123.6	0.102	48.6	0.834	–40.9	0.342	14.77
1.2	0.734	–64.0	2.983	119.0	0.106	45.4	0.813	–44.5	0.375	14.50
1.3	0.710	–69.6	2.892	114.4	0.109	42.2	0.793	–48.0	0.408	14.24
1.4	0.687	–75.0	2.805	110.0	0.111	39.6	0.774	–51.3	0.441	14.03
1.5	0.666	–80.6	2.726	105.7	0.112	36.9	0.757	–54.5	0.473	13.85
1.6	0.645	–85.8	2.637	101.6	0.113	34.6	0.741	–57.4	0.514	13.69
1.7	0.627	–90.9	2.549	97.7	0.112	32.6	0.724	–60.2	0.556	13.56
1.8	0.611	–96.1	2.466	94.0	0.111	31.1	0.712	–62.8	0.595	13.47
1.9	0.597	–100.9	2.393	90.5	0.110	29.6	0.700	–65.2	0.640	13.39
2.0	0.586	–105.8	2.309	86.9	0.108	28.6	0.688	–67.6	0.689	13.31
2.1	0.575	–110.2	2.244	83.7	0.105	28.1	0.677	–69.8	0.744	13.30
2.2	0.564	–114.7	2.166	80.6	0.102	28.0	0.669	–72.1	0.799	13.25
2.3	0.556	–119.0	2.096	77.4	0.099	28.2	0.661	–74.2	0.861	13.25
2.4	0.550	–123.3	2.038	74.5	0.097	28.8	0.653	–76.5	0.919	13.24
2.5	0.546	–127.1	1.981	71.5	0.093	30.0	0.645	–78.8	0.990	13.28
2.6	0.540	–131.0	1.920	69.0	0.089	31.1	0.640	–81.3	1.073	11.67
2.7	0.538	–134.7	1.867	66.2	0.087	33.0	0.636	–83.8	1.133	11.11
2.8	0.532	–138.2	1.803	63.5	0.085	35.3	0.631	–85.7	1.219	10.46
2.9	0.527	–141.4	1.750	60.3	0.084	38.1	0.622	–88.1	1.311	9.87
3.0	0.522	–145.5	1.709	57.7	0.082	41.8	0.615	–91.0	1.384	9.47
4.0	0.525	178.0	1.351	34.2	0.130	72.1	0.610	–115.1	1.147	7.83
5.0	0.605	145.2	1.026	12.2	0.234	65.2	0.669	–144.9	0.759	6.42

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	0.865	–8.6	8.788	171.7	0.011	84.6	0.990	–5.1	0.074	29.18
0.2	0.844	–16.2	8.667	164.0	0.022	80.0	0.973	–10.5	0.127	25.98
0.3	0.820	–24.2	8.427	156.9	0.032	74.7	0.948	–15.6	0.175	24.23
0.4	0.786	–32.3	8.160	149.6	0.041	70.3	0.917	–20.7	0.224	22.97
0.5	0.747	–40.1	7.890	142.7	0.050	65.8	0.879	–25.5	0.276	22.02
0.6	0.706	–47.7	7.561	136.3	0.057	61.9	0.838	–30.2	0.325	21.26
0.7	0.661	–55.0	7.187	130.2	0.062	58.6	0.796	–34.4	0.379	20.61
0.8	0.617	–62.2	6.831	124.4	0.067	55.4	0.756	–38.4	0.434	20.06
0.9	0.576	–69.0	6.469	119.0	0.071	53.1	0.717	–42.2	0.487	19.58
1.0	0.540	–76.0	6.138	113.9	0.074	51.0	0.682	–45.7	0.539	19.18
1.1	0.506	–82.5	5.827	109.2	0.077	49.4	0.650	–49.0	0.591	18.81
1.2	0.476	–89.2	5.513	105.0	0.079	48.1	0.622	–52.0	0.641	18.46
1.3	0.450	–95.4	5.215	101.0	0.080	47.0	0.599	–54.9	0.693	18.14
1.4	0.429	–101.6	4.949	97.1	0.082	46.5	0.579	–57.6	0.740	17.83
1.5	0.412	–107.6	4.701	93.5	0.083	46.1	0.561	–60.0	0.786	17.54
1.6	0.397	–113.4	4.459	90.0	0.084	46.2	0.545	–62.2	0.837	17.27
1.7	0.384	–118.6	4.254	87.0	0.085	46.5	0.532	–64.2	0.882	17.02
1.8	0.376	–124.0	4.055	83.9	0.085	47.1	0.521	–66.2	0.925	16.78
1.9	0.369	–128.6	3.880	81.1	0.087	47.7	0.510	–67.8	0.964	16.51
2.0	0.363	–133.5	3.703	78.2	0.088	48.7	0.501	–69.7	1.008	15.73
2.1	0.361	–137.5	3.565	75.8	0.089	50.0	0.493	–71.4	1.037	14.86
2.2	0.358	–141.7	3.422	73.4	0.090	51.3	0.487	–73.0	1.071	14.17
2.3	0.357	–145.6	3.285	70.8	0.092	52.6	0.481	–74.6	1.099	13.62
2.4	0.359	–149.4	3.178	68.7	0.094	54.1	0.475	–76.4	1.114	13.25
2.5	0.358	–152.7	3.071	66.2	0.096	55.5	0.470	–78.2	1.134	12.83
2.6	0.359	–156.3	2.965	64.2	0.098	56.7	0.466	–80.2	1.155	12.44
2.7	0.361	–159.0	2.874	61.9	0.100	58.0	0.463	–82.3	1.159	12.14
2.8	0.359	–162.5	2.768	59.8	0.103	59.1	0.462	–84.1	1.176	11.74
2.9	0.356	–165.1	2.667	57.3	0.107	59.9	0.457	–86.1	1.188	11.33
3.0	0.357	–168.8	2.606	55.0	0.111	61.4	0.455	–88.6	1.179	11.13
4.0	0.400	160.6	2.010	34.9	0.169	67.5	0.471	–111.7	1.020	9.88
5.0	0.508	136.2	1.584	14.6	0.248	58.3	0.542	–140.4	0.802	8.06

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	0.793	–11.1	12.849	169.7	0.011	81.9	0.982	–6.6	0.128	30.69
0.2	0.761	–21.3	12.489	159.8	0.021	78.5	0.954	–13.3	0.166	27.84
0.3	0.725	–31.4	11.904	151.3	0.029	72.4	0.911	–19.3	0.239	26.08
0.4	0.677	–41.0	11.288	142.9	0.038	67.8	0.863	–25.0	0.307	24.77
0.5	0.626	–50.4	10.626	135.2	0.044	64.0	0.810	–29.9	0.374	23.80
0.6	0.575	–59.2	9.924	128.3	0.050	60.8	0.756	–34.5	0.441	23.01
0.7	0.526	–67.5	9.210	122.1	0.054	58.3	0.705	–38.3	0.510	22.29
0.8	0.480	–75.4	8.559	116.4	0.058	56.4	0.660	–41.9	0.576	21.69
0.9	0.440	–83.0	7.962	111.1	0.061	55.2	0.619	–45.2	0.640	21.14
1.0	0.409	–90.5	7.420	106.4	0.064	54.4	0.585	–48.1	0.698	20.66
1.1	0.379	–97.9	6.942	102.2	0.066	53.9	0.555	–50.9	0.754	20.20
1.2	0.357	–105.2	6.498	98.4	0.068	53.8	0.530	–53.3	0.804	19.77
1.3	0.340	–111.7	6.082	94.9	0.071	53.7	0.509	–55.8	0.853	19.36
1.4	0.326	–118.4	5.725	91.4	0.073	54.0	0.493	–58.0	0.895	18.96
1.5	0.316	–124.8	5.403	88.2	0.075	54.4	0.478	–60.1	0.931	18.58
1.6	0.307	–130.7	5.097	85.3	0.077	55.0	0.466	–62.1	0.971	18.20
1.7	0.303	–136.0	4.840	82.5	0.079	55.8	0.455	–63.8	1.001	17.67
1.8	0.301	–141.3	4.601	79.8	0.082	56.7	0.447	–65.5	1.029	16.48
1.9	0.300	–145.6	4.386	77.3	0.084	57.4	0.439	–67.0	1.050	15.80
2.0	0.300	–150.4	4.174	74.8	0.087	58.5	0.432	–68.6	1.072	15.17
2.1	0.301	–154.4	4.002	72.5	0.090	59.5	0.426	–70.1	1.087	14.69
2.2	0.302	–157.8	3.844	70.4	0.093	60.4	0.422	–71.7	1.099	14.26
2.3	0.303	–161.0	3.699	68.1	0.096	61.5	0.418	–73.1	1.108	13.87
2.4	0.308	–164.4	3.557	66.3	0.100	62.3	0.414	–74.7	1.110	13.51
2.5	0.310	–167.0	3.427	64.0	0.103	63.2	0.410	–76.5	1.117	13.14
2.6	0.312	–170.1	3.313	62.3	0.106	63.8	0.407	–78.4	1.122	12.81
2.7	0.317	–172.5	3.203	60.3	0.110	64.4	0.404	–80.3	1.119	12.53
2.8	0.317	–175.5	3.081	58.4	0.114	64.6	0.405	–82.1	1.125	12.16
2.9	0.315	–178.0	2.971	56.0	0.119	64.8	0.401	–84.3	1.127	11.80
3.0	0.319	178.6	2.896	53.9	0.124	65.5	0.402	–86.6	1.113	11.63
4.0	0.372	152.0	2.222	35.1	0.182	66.7	0.425	–110.3	0.995	10.86
5.0	0.488	131.4	1.768	16.0	0.256	56.4	0.497	–139.1	0.819	8.40

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	0.740	–13.3	16.001	167.9	0.010	80.9	0.975	–7.7	0.153	31.87
0.2	0.693	–25.3	15.385	156.6	0.019	76.1	0.936	–15.4	0.219	29.00
0.3	0.650	–37.2	14.376	147.0	0.028	71.4	0.879	–21.8	0.291	27.07
0.4	0.592	–48.2	13.373	137.9	0.035	67.1	0.818	–27.7	0.372	25.83
0.5	0.535	–58.7	12.312	129.9	0.041	63.6	0.756	–32.4	0.454	24.80
0.6	0.484	–68.0	11.289	123.0	0.045	61.1	0.697	–36.5	0.533	23.96
0.7	0.436	–77.2	10.313	116.8	0.049	59.3	0.645	–39.9	0.608	23.21
0.8	0.396	–85.7	9.461	111.5	0.053	58.4	0.600	–43.0	0.677	22.54
0.9	0.361	–93.8	8.694	106.5	0.056	57.9	0.561	–45.9	0.742	21.92
1.0	0.335	–101.9	8.043	102.1	0.058	57.9	0.530	–48.4	0.799	21.38
1.1	0.314	–109.7	7.473	98.2	0.061	57.8	0.503	–50.8	0.850	20.86
1.2	0.298	–117.5	6.951	94.6	0.064	58.2	0.481	–52.9	0.895	20.36
1.3	0.286	–124.4	6.484	91.5	0.067	58.5	0.463	–55.2	0.937	19.88
1.4	0.278	–131.4	6.078	88.3	0.069	59.1	0.448	–57.1	0.971	19.43
1.5	0.275	–137.8	5.719	85.3	0.072	59.7	0.437	–59.1	0.996	18.98
1.6	0.272	–143.4	5.384	82.6	0.075	60.4	0.427	–61.0	1.025	17.58
1.7	0.271	–148.4	5.106	80.2	0.078	61.3	0.418	–62.5	1.046	16.84
1.8	0.272	–153.3	4.833	77.6	0.081	62.0	0.412	–64.2	1.066	16.18
1.9	0.273	–157.7	4.608	75.2	0.085	62.7	0.406	–65.6	1.075	15.69
2.0	0.276	–161.7	4.384	72.8	0.088	63.4	0.400	–67.2	1.088	15.16
2.1	0.280	–165.0	4.204	70.8	0.092	64.3	0.395	–68.6	1.094	14.75
2.2	0.283	–168.0	4.029	68.7	0.095	65.1	0.392	–70.1	1.098	14.36
2.3	0.287	–170.8	3.867	66.7	0.099	65.6	0.389	–71.5	1.100	13.99
2.4	0.292	–173.8	3.727	64.8	0.103	66.1	0.386	–73.2	1.098	13.68
2.5	0.296	–176.0	3.590	62.8	0.107	66.6	0.383	–75.0	1.098	13.34
2.6	0.299	–178.8	3.467	61.2	0.111	66.9	0.381	–76.7	1.098	13.03
2.7	0.304	179.1	3.349	59.2	0.115	67.2	0.379	–78.8	1.095	12.75
2.8	0.305	176.3	3.224	57.4	0.120	67.2	0.380	–80.5	1.095	12.41
2.9	0.305	174.2	3.100	55.0	0.125	67.0	0.377	–82.7	1.097	12.04
3.0	0.308	171.1	3.026	53.1	0.131	67.4	0.377	–85.0	1.082	11.89
4.0	0.368	147.1	2.311	34.9	0.189	66.5	0.405	–109.3	0.979	10.87
5.0	0.484	128.6	1.846	16.5	0.260	55.6	0.476	–138.5	0.824	8.51

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	0.664	–15.9	19.506	166.0	0.009	79.9	0.965	–9.0	0.188	33.39
0.2	0.616	–30.7	18.356	153.0	0.019	75.6	0.911	–17.3	0.259	29.91
0.3	0.563	–44.3	16.782	142.4	0.026	70.1	0.842	–24.1	0.357	28.12
0.4	0.501	–56.6	15.216	132.8	0.032	66.4	0.768	–29.8	0.455	26.74
0.5	0.445	–68.2	13.691	124.6	0.037	63.8	0.702	–34.1	0.544	25.67
0.6	0.397	–78.7	12.342	117.7	0.041	62.1	0.641	–37.6	0.630	24.77
0.7	0.356	–88.5	11.107	111.9	0.045	61.4	0.590	–40.4	0.708	23.93
0.8	0.324	–98.0	10.074	106.9	0.048	61.0	0.548	–42.9	0.777	23.20
0.9	0.297	–106.9	9.171	102.3	0.052	61.3	0.513	–45.3	0.837	22.50
1.0	0.281	–115.6	8.434	98.2	0.055	61.7	0.485	–47.4	0.887	21.89
1.1	0.266	–124.2	7.793	94.7	0.058	62.1	0.461	–49.5	0.931	21.31
1.2	0.260	–131.9	7.219	91.4	0.061	62.8	0.443	–51.4	0.968	20.75
1.3	0.253	–139.0	6.708	88.4	0.064	63.2	0.428	–53.5	1.001	20.00
1.4	0.253	–145.5	6.282	85.5	0.067	64.0	0.417	–55.2	1.023	18.77
1.5	0.255	–151.7	5.908	82.7	0.071	64.5	0.407	–57.2	1.038	18.02
1.6	0.254	–156.8	5.535	80.1	0.074	65.2	0.399	–59.1	1.061	17.22
1.7	0.258	–161.5	5.243	77.8	0.078	65.9	0.392	–60.6	1.073	16.65
1.8	0.263	–165.3	4.973	75.4	0.081	66.5	0.387	–62.3	1.081	16.14
1.9	0.265	–169.3	4.729	73.2	0.085	67.0	0.384	–63.6	1.084	15.66
2.0	0.271	–172.4	4.493	70.9	0.089	67.7	0.379	–65.3	1.090	15.18
2.1	0.274	–175.1	4.313	69.0	0.093	68.2	0.375	–66.7	1.092	14.80
2.2	0.280	–177.7	4.129	67.1	0.097	68.6	0.373	–68.2	1.091	14.44
2.3	0.284	180.0	3.964	65.0	0.102	68.9	0.371	–69.6	1.089	14.09
2.4	0.289	177.6	3.811	63.4	0.106	69.2	0.369	–71.3	1.084	13.78
2.5	0.294	175.6	3.671	61.4	0.111	69.5	0.367	–73.0	1.082	13.46
2.6	0.298	173.2	3.551	59.7	0.115	69.6	0.365	–74.8	1.078	13.20
2.7	0.303	171.6	3.430	58.0	0.120	69.6	0.364	–76.9	1.072	12.93
2.8	0.308	169.1	3.301	56.2	0.124	69.4	0.364	–78.7	1.070	12.63
2.9	0.306	167.4	3.172	54.0	0.130	68.9	0.362	–81.0	1.071	12.25
3.0	0.311	164.3	3.093	52.1	0.136	69.1	0.364	–83.4	1.057	12.12
4.0	0.372	142.7	2.357	34.3	0.195	66.9	0.394	–108.5	0.963	10.82
5.0	0.490	126.1	1.884	16.3	0.266	55.3	0.466	–138.1	0.819	8.50

V_{CE} = 2 V, I_C = 20 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	0.489	–26.0	24.982	160.6	0.009	80.5	0.929	–11.3	0.273	34.29
0.2	0.439	–49.8	22.217	144.2	0.017	71.9	0.842	–20.7	0.395	31.17
0.3	0.392	–69.5	19.135	131.8	0.022	68.5	0.747	–26.9	0.519	29.31
0.4	0.349	–86.8	16.425	122.0	0.027	65.6	0.667	–30.9	0.635	27.81
0.5	0.314	–101.9	14.204	114.1	0.031	64.8	0.602	–33.5	0.738	26.58
0.6	0.295	–114.9	12.420	107.9	0.035	65.2	0.551	–35.4	0.821	25.53
0.7	0.281	–126.3	10.960	102.7	0.038	65.5	0.511	–37.0	0.891	24.55
0.8	0.275	–136.5	9.777	98.3	0.042	66.6	0.480	–38.4	0.951	23.69
0.9	0.271	–145.7	8.807	94.3	0.045	67.5	0.456	–40.1	0.999	22.89
1.0	0.272	–153.0	8.014	90.8	0.049	68.5	0.437	–41.6	1.036	21.00
1.1	0.276	–159.8	7.363	87.6	0.052	69.2	0.422	–43.5	1.060	19.98
1.2	0.282	–165.6	6.779	84.7	0.056	70.0	0.410	–45.3	1.081	19.08
1.3	0.288	–170.4	6.270	82.0	0.060	70.8	0.401	–47.2	1.100	18.28
1.4	0.296	–174.6	5.849	79.3	0.064	71.5	0.395	–49.2	1.105	17.65
1.5	0.303	–178.4	5.481	76.7	0.068	72.0	0.391	–51.2	1.107	17.08
1.6	0.307	178.3	5.132	74.3	0.072	72.6	0.387	–53.1	1.115	16.46
1.7	0.316	175.5	4.853	72.2	0.076	73.2	0.384	–54.9	1.112	16.00
1.8	0.323	173.2	4.591	69.9	0.080	73.7	0.382	–56.8	1.110	15.54
1.9	0.326	171.0	4.362	67.7	0.085	74.0	0.381	–58.4	1.105	15.12
2.0	0.334	168.8	4.140	65.6	0.090	74.4	0.380	–60.3	1.099	14.72
2.1	0.341	167.2	3.973	63.8	0.094	74.7	0.379	–62.0	1.088	14.43
2.2	0.346	165.7	3.802	61.9	0.099	75.0	0.378	–63.8	1.083	14.08
2.3	0.352	163.9	3.646	60.0	0.104	75.1	0.379	–65.4	1.072	13.81
2.4	0.358	162.3	3.503	58.4	0.109	75.1	0.378	–67.5	1.061	13.55
2.5	0.362	160.9	3.382	56.4	0.115	75.1	0.378	–69.4	1.050	13.33
2.6	0.367	159.2	3.262	54.9	0.120	75.0	0.377	–71.4	1.042	13.09
2.7	0.372	158.1	3.153	53.1	0.125	74.7	0.377	–73.7	1.032	12.92
2.8	0.376	156.1	3.027	51.4	0.130	74.2	0.380	–75.8	1.028	12.63
2.9	0.376	154.6	2.902	49.2	0.137	73.4	0.378	–78.4	1.027	12.25
3.0	0.382	152.1	2.829	47.1	0.144	73.4	0.381	–81.1	1.007	12.43
4.0	0.447	134.1	2.138	29.1	0.208	68.9	0.417	–108.0	0.906	10.11
5.0	0.560	119.4	1.680	11.3	0.284	55.4	0.494	–139.2	0.766	7.73

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	0.968	–20.0	3.515	165.3	0.045	77.6	0.981	–7.5	0.081	18.90
0.2	0.930	–39.4	3.332	152.0	0.086	67.4	0.945	–14.7	0.115	15.89
0.3	0.898	–56.7	3.087	140.6	0.120	57.2	0.890	–21.0	0.162	14.12
0.4	0.864	–72.9	2.826	129.8	0.145	48.4	0.834	–26.4	0.205	12.88
0.5	0.829	–87.5	2.580	120.1	0.164	40.8	0.777	–30.9	0.253	11.96
0.6	0.802	–100.2	2.353	111.7	0.177	34.2	0.726	–34.9	0.300	11.24
0.7	0.779	–111.4	2.136	104.2	0.185	28.7	0.680	–38.3	0.351	10.63
0.8	0.758	–121.3	1.953	97.3	0.189	24.0	0.643	–41.3	0.406	10.14
0.9	0.745	–129.8	1.786	91.2	0.191	19.9	0.612	–44.4	0.459	9.71
1.0	0.736	–137.4	1.652	85.4	0.190	16.6	0.588	–47.2	0.509	9.39
1.1	0.730	–144.1	1.531	80.3	0.188	13.5	0.567	–50.2	0.565	9.10
1.2	0.727	–150.2	1.425	75.6	0.185	11.1	0.552	–53.1	0.616	8.86
1.3	0.724	–155.3	1.328	71.4	0.181	8.9	0.540	–56.2	0.679	8.67
1.4	0.724	–160.0	1.246	67.2	0.176	7.2	0.532	–59.3	0.734	8.50
1.5	0.725	–164.3	1.175	63.3	0.171	5.8	0.526	–62.3	0.787	8.37
1.6	0.723	–168.1	1.106	59.7	0.165	4.9	0.521	–65.4	0.865	8.26
1.7	0.727	–171.4	1.052	56.5	0.159	4.5	0.516	–68.3	0.927	8.21
1.8	0.728	–174.6	1.000	53.2	0.152	4.5	0.514	–71.5	1.004	7.76
1.9	0.730	–177.6	0.957	50.2	0.146	4.7	0.512	–74.6	1.076	6.47
2.0	0.734	179.7	0.910	47.3	0.140	5.6	0.511	–77.7	1.153	5.75
2.1	0.737	177.4	0.877	44.9	0.134	7.1	0.511	–80.9	1.226	5.29
2.2	0.737	175.0	0.843	42.7	0.128	8.7	0.511	–84.0	1.321	4.78
2.3	0.741	172.7	0.810	40.3	0.124	11.0	0.511	–87.2	1.401	4.40
2.4	0.743	170.4	0.783	38.5	0.120	13.9	0.510	–90.8	1.478	4.06
2.5	0.744	168.3	0.754	36.2	0.117	17.5	0.510	–94.3	1.567	3.68
2.6	0.746	166.1	0.730	34.5	0.113	21.4	0.511	–98.5	1.650	3.37
2.7	0.748	164.1	0.704	32.7	0.113	25.3	0.512	–102.1	1.703	3.06
2.8	0.749	162.0	0.677	31.3	0.114	29.3	0.515	–105.4	1.744	2.73
2.9	0.743	159.8	0.649	29.0	0.117	33.1	0.513	–109.0	1.832	2.15
3.0	0.748	157.2	0.632	27.2	0.122	37.5	0.513	–113.2	1.789	2.01
4.0	0.768	136.0	0.501	16.8	0.221	54.0	0.540	–149.7	1.327	0.13
5.0	0.772	121.9	0.458	9.7	0.360	33.7	0.519	160.3	1.184	–1.55

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	0.895	–31.6	9.324	158.3	0.043	72.1	0.940	–16.2	0.109	23.38
0.2	0.824	–60.0	8.202	141.0	0.075	58.8	0.829	–29.7	0.163	20.36
0.3	0.772	–82.8	7.031	127.8	0.096	48.1	0.708	–39.3	0.232	18.63
0.4	0.726	–101.6	6.016	117.0	0.110	40.7	0.607	–46.3	0.299	17.40
0.5	0.693	–116.6	5.172	108.3	0.118	35.5	0.523	–51.5	0.373	16.43
0.6	0.671	–128.7	4.507	101.3	0.122	32.0	0.458	–55.5	0.444	15.67
0.7	0.656	–138.5	3.953	95.4	0.125	29.4	0.408	–58.9	0.516	15.00
0.8	0.646	–146.6	3.524	90.3	0.127	27.6	0.369	–61.8	0.587	14.44
0.9	0.643	–153.5	3.163	85.7	0.128	26.6	0.338	–64.9	0.655	13.93
1.0	0.640	–159.3	2.877	81.5	0.129	26.1	0.315	–68.0	0.722	13.50
1.1	0.639	–164.5	2.631	77.8	0.129	26.0	0.296	–71.0	0.788	13.09
1.2	0.642	–169.0	2.422	74.4	0.129	26.2	0.282	–74.1	0.847	12.72
1.3	0.640	–172.7	2.240	71.2	0.130	26.4	0.273	–77.1	0.915	12.38
1.4	0.644	–176.2	2.089	68.1	0.130	27.1	0.266	–80.3	0.968	12.06
1.5	0.649	–179.3	1.960	65.1	0.131	27.8	0.261	–83.3	1.013	11.07
1.6	0.648	177.9	1.840	62.2	0.131	28.8	0.258	–86.4	1.075	9.80
1.7	0.653	175.5	1.742	59.7	0.132	30.1	0.255	–89.2	1.112	9.15
1.8	0.654	173.4	1.651	57.1	0.134	31.3	0.254	–92.0	1.160	8.49
1.9	0.657	171.1	1.574	54.6	0.135	32.6	0.253	–94.8	1.191	8.01
2.0	0.661	169.3	1.501	52.3	0.137	34.0	0.253	–97.8	1.221	7.55
2.1	0.663	167.5	1.445	50.2	0.140	35.5	0.252	–100.7	1.243	7.18
2.2	0.665	165.7	1.386	48.2	0.142	36.9	0.252	–103.9	1.268	6.77
2.3	0.667	164.1	1.331	46.1	0.146	38.1	0.252	–106.9	1.285	6.39
2.4	0.671	162.2	1.285	44.3	0.150	39.3	0.253	–110.4	1.285	6.12
2.5	0.672	160.7	1.240	42.1	0.154	40.7	0.255	–113.9	1.299	5.77
2.6	0.673	158.9	1.203	40.4	0.158	41.9	0.259	–117.6	1.307	5.50
2.7	0.675	157.5	1.163	38.7	0.163	42.6	0.262	–121.4	1.310	5.20
2.8	0.676	155.6	1.120	36.9	0.168	43.3	0.266	–124.5	1.317	4.87
2.9	0.670	154.0	1.076	34.6	0.175	43.6	0.269	–127.9	1.343	4.39
3.0	0.675	151.8	1.050	32.6	0.182	44.7	0.274	–131.7	1.313	4.27
4.0	0.705	134.4	0.824	16.2	0.257	45.4	0.333	–164.2	1.169	2.57
5.0	0.742	122.6	0.663	2.2	0.358	29.4	0.374	150.0	1.067	1.09

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	0.830	–42.2	14.116	152.6	0.040	67.6	0.891	–23.9	0.133	25.46
0.2	0.740	–76.4	11.624	132.8	0.066	53.4	0.722	–41.3	0.226	22.47
0.3	0.689	–101.1	9.374	119.3	0.080	44.5	0.574	–52.6	0.316	20.71
0.4	0.651	–119.5	7.666	109.3	0.088	39.6	0.466	–60.5	0.412	19.40
0.5	0.628	–133.4	6.407	101.8	0.093	36.8	0.385	–66.4	0.505	18.38
0.6	0.617	–143.7	5.480	95.8	0.097	35.4	0.327	–71.3	0.590	17.52
0.7	0.611	–152.1	4.749	90.9	0.100	34.8	0.283	–75.7	0.672	16.75
0.8	0.607	–158.9	4.204	86.6	0.103	34.9	0.250	–80.1	0.746	16.10
0.9	0.606	–164.5	3.745	82.7	0.106	35.3	0.226	–84.8	0.817	15.47
1.0	0.607	–169.3	3.385	79.2	0.109	36.1	0.208	–89.3	0.880	14.92
1.1	0.610	–173.5	3.089	76.0	0.112	36.8	0.195	–93.9	0.932	14.40
1.2	0.613	–177.2	2.832	73.1	0.116	37.7	0.187	–98.1	0.982	13.89
1.3	0.615	179.8	2.614	70.3	0.119	38.6	0.180	–102.4	1.031	12.35
1.4	0.619	176.8	2.437	67.6	0.122	39.5	0.177	–106.2	1.064	11.45
1.5	0.624	174.3	2.280	65.0	0.126	40.4	0.174	–109.9	1.092	10.73
1.6	0.626	172.0	2.143	62.5	0.130	41.3	0.173	–113.4	1.125	10.03
1.7	0.629	170.0	2.025	60.2	0.134	42.2	0.172	–116.4	1.145	9.48
1.8	0.632	168.0	1.920	57.9	0.138	43.0	0.173	–119.5	1.167	8.96
1.9	0.634	166.3	1.832	55.6	0.143	43.7	0.173	–122.4	1.180	8.52
2.0	0.637	164.7	1.744	53.5	0.147	44.4	0.173	–125.2	1.193	8.08
2.1	0.641	163.1	1.677	51.5	0.152	45.2	0.173	–128.3	1.195	7.76
2.2	0.642	161.6	1.608	49.9	0.157	45.6	0.175	–131.3	1.207	7.35
2.3	0.644	160.2	1.543	47.8	0.163	46.1	0.177	–134.4	1.210	6.99
2.4	0.647	158.6	1.490	46.2	0.169	46.4	0.179	–137.7	1.207	6.71
2.5	0.648	157.2	1.437	44.1	0.175	46.8	0.182	–140.9	1.212	6.37
2.6	0.651	155.6	1.395	42.5	0.180	47.1	0.187	–143.8	1.206	6.14
2.7	0.651	154.3	1.347	40.7	0.186	47.0	0.192	–147.4	1.211	5.82
2.8	0.653	152.7	1.302	39.1	0.192	46.9	0.198	–150.0	1.214	5.52
2.9	0.647	151.3	1.250	36.9	0.200	46.4	0.203	–153.0	1.229	5.08
3.0	0.652	149.0	1.221	35.0	0.207	46.8	0.209	–155.8	1.211	4.93
4.0	0.677	133.1	0.960	18.1	0.276	42.9	0.278	178.6	1.138	3.17
5.0	0.726	122.8	0.765	3.2	0.361	27.2	0.334	138.3	1.052	1.85

V_{CE} = 1 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	0.772	–50.2	17.771	148.2	0.038	65.7	0.847	–30.2	0.151	26.76
0.2	0.684	–88.9	13.789	127.1	0.059	50.8	0.642	–50.0	0.277	23.72
0.3	0.639	–113.6	10.703	114.0	0.069	43.8	0.488	–62.2	0.394	21.91
0.4	0.611	–130.8	8.543	104.9	0.076	40.8	0.386	–70.8	0.506	20.53
0.5	0.598	–143.1	7.038	98.1	0.081	39.7	0.313	–77.9	0.607	19.41
0.6	0.591	–152.3	5.965	92.8	0.085	39.6	0.263	–84.2	0.698	18.47
0.7	0.591	–159.8	5.155	88.4	0.089	40.2	0.226	–90.4	0.775	17.62
0.8	0.591	–165.5	4.535	84.6	0.093	41.0	0.200	–96.5	0.845	16.86
0.9	0.590	–170.5	4.040	81.1	0.098	41.8	0.182	–103.2	0.909	16.16
1.0	0.594	–174.7	3.635	78.0	0.102	42.9	0.170	–109.2	0.961	15.52
1.1	0.597	–178.4	3.317	75.0	0.107	43.8	0.162	–115.1	1.003	14.57
1.2	0.602	178.5	3.042	72.3	0.112	44.7	0.158	–120.2	1.036	13.19
1.3	0.604	175.6	2.804	69.8	0.116	45.6	0.155	–125.3	1.072	12.17
1.4	0.608	173.2	2.610	67.4	0.121	46.2	0.155	–129.4	1.095	11.44
1.5	0.613	170.9	2.445	64.9	0.127	46.9	0.155	–133.4	1.112	10.82
1.6	0.616	168.8	2.291	62.5	0.132	47.5	0.156	–136.7	1.134	10.18
1.7	0.619	167.1	2.170	60.4	0.137	48.1	0.157	–139.7	1.144	9.68
1.8	0.622	165.5	2.055	58.2	0.143	48.5	0.158	–142.7	1.157	9.18
1.9	0.624	163.7	1.957	56.1	0.148	48.8	0.159	–145.4	1.164	8.75
2.0	0.627	162.2	1.865	54.0	0.154	49.1	0.160	–148.0	1.170	8.33
2.1	0.631	160.8	1.793	52.1	0.160	49.4	0.161	–150.8	1.168	8.01
2.2	0.631	159.5	1.718	50.5	0.166	49.4	0.164	–153.6	1.176	7.61
2.3	0.634	158.0	1.649	48.6	0.173	49.4	0.166	–156.5	1.174	7.27
2.4	0.637	156.7	1.592	47.0	0.179	49.3	0.170	–159.2	1.171	6.98
2.5	0.638	155.3	1.535	45.0	0.186	49.3	0.173	–161.9	1.172	6.65
2.6	0.640	154.0	1.487	43.5	0.192	49.3	0.178	–164.3	1.171	6.39
2.7	0.641	152.7	1.438	41.8	0.198	48.9	0.184	–167.2	1.172	6.10
2.8	0.643	151.2	1.387	40.4	0.204	48.5	0.190	–169.1	1.176	5.79
2.9	0.635	149.7	1.335	38.0	0.213	47.7	0.196	–171.3	1.190	5.35
3.0	0.639	147.6	1.304	36.3	0.220	47.8	0.201	–173.3	1.175	5.19
4.0	0.667	132.5	1.027	19.6	0.286	41.8	0.268	166.9	1.119	3.45
5.0	0.716	122.6	0.816	4.3	0.364	26.1	0.328	130.5	1.052	2.10

V_{CE} = 1 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	0.709	–61.8	22.009	142.7	0.035	61.3	0.787	–37.6	0.197	28.04
0.2	0.626	–103.1	15.862	121.1	0.050	48.9	0.556	–59.8	0.353	24.97
0.3	0.596	–126.3	11.823	109.0	0.059	44.8	0.407	–73.3	0.493	23.03
0.4	0.582	–141.5	9.258	100.8	0.065	43.7	0.316	–83.3	0.614	21.53
0.5	0.577	–152.2	7.553	94.9	0.070	44.2	0.256	–92.1	0.717	20.30
0.6	0.575	–160.3	6.362	90.2	0.076	45.2	0.216	–100.7	0.803	19.24
0.7	0.576	–166.6	5.481	86.3	0.081	46.2	0.189	–109.0	0.874	18.29
0.8	0.579	–171.6	4.814	83.0	0.087	47.5	0.172	–117.2	0.931	17.45
0.9	0.582	–175.7	4.269	79.7	0.093	48.5	0.162	–125.3	0.980	16.64
1.0	0.585	–179.3	3.852	76.7	0.098	49.5	0.157	–132.3	1.018	15.12
1.1	0.589	177.4	3.500	74.2	0.104	50.3	0.156	–138.6	1.049	13.91
1.2	0.594	174.7	3.207	71.7	0.110	51.0	0.156	–143.5	1.070	13.01
1.3	0.597	172.2	2.961	69.4	0.116	51.5	0.158	–148.3	1.095	12.18
1.4	0.601	169.9	2.752	67.0	0.123	51.9	0.160	–151.8	1.109	11.50
1.5	0.607	167.9	2.572	64.7	0.129	52.2	0.162	–155.3	1.118	10.91
1.6	0.608	166.0	2.412	62.5	0.135	52.5	0.165	–158.1	1.132	10.31
1.7	0.614	164.5	2.283	60.5	0.142	52.7	0.167	–160.8	1.134	9.86
1.8	0.616	163.0	2.163	58.4	0.148	52.8	0.169	–163.3	1.140	9.38
1.9	0.617	161.5	2.061	56.4	0.154	52.7	0.171	–165.6	1.144	8.95
2.0	0.622	160.0	1.963	54.4	0.161	52.6	0.173	–167.9	1.145	8.55
2.1	0.624	158.8	1.885	52.7	0.167	52.6	0.174	–170.5	1.145	8.20
2.2	0.626	157.6	1.808	51.2	0.174	52.3	0.177	–172.8	1.146	7.85
2.3	0.628	156.3	1.735	49.2	0.181	51.9	0.180	–175.3	1.145	7.49
2.4	0.630	154.9	1.673	47.7	0.189	51.6	0.183	–177.4	1.142	7.20
2.5	0.630	153.8	1.613	45.8	0.196	51.3	0.187	–179.7	1.144	6.86
2.6	0.633	152.4	1.565	44.3	0.202	50.9	0.192	178.4	1.140	6.62
2.7	0.634	151.3	1.514	42.7	0.209	50.4	0.198	176.1	1.141	6.33
2.8	0.635	149.7	1.458	41.2	0.215	49.6	0.203	174.7	1.146	6.00
2.9	0.628	148.3	1.405	39.0	0.224	48.7	0.209	173.2	1.157	5.58
3.0	0.633	146.3	1.375	37.2	0.231	48.5	0.213	171.7	1.141	5.47
4.0	0.658	131.6	1.082	20.8	0.296	41.0	0.274	156.4	1.104	3.67
5.0	0.710	122.4	0.858	5.5	0.368	25.1	0.334	123.6	1.048	2.33

V_{CE} = 1 V, I_C = 20 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	0.589	–88.7	29.360	131.7	0.028	56.9	0.649	–53.5	0.308	30.21
0.2	0.556	–129.2	18.492	111.5	0.039	49.8	0.412	–79.6	0.533	26.80
0.3	0.554	–146.9	13.089	101.5	0.045	50.6	0.296	–96.2	0.695	24.59
0.4	0.555	–158.2	10.033	95.1	0.052	52.6	0.236	–109.9	0.811	22.83
0.5	0.557	–166.0	8.091	90.4	0.060	54.4	0.203	–122.2	0.894	21.33
0.6	0.561	–171.7	6.780	86.5	0.067	56.0	0.185	–133.3	0.954	20.07
0.7	0.566	–176.1	5.811	83.3	0.074	57.1	0.178	–143.0	0.997	18.95
0.8	0.572	–179.9	5.089	80.4	0.081	57.9	0.176	–151.1	1.028	16.94
0.9	0.577	176.8	4.507	77.7	0.089	58.5	0.178	–158.0	1.053	15.63
1.0	0.581	174.2	4.059	75.1	0.097	59.0	0.182	–163.3	1.070	14.61
1.1	0.586	171.5	3.697	72.8	0.104	59.2	0.187	–167.5	1.082	13.75
1.2	0.591	169.3	3.380	70.5	0.112	59.2	0.192	–170.9	1.092	12.95
1.3	0.594	167.4	3.116	68.4	0.119	59.2	0.197	–173.9	1.104	12.21
1.4	0.599	165.5	2.900	66.3	0.127	59.1	0.201	–176.3	1.106	11.61
1.5	0.605	163.8	2.707	64.2	0.134	58.8	0.206	–178.7	1.109	11.03
1.6	0.607	162.4	2.535	62.3	0.142	58.6	0.209	179.4	1.117	10.45
1.7	0.611	161.0	2.401	60.4	0.149	58.3	0.212	177.4	1.114	10.01
1.8	0.614	159.7	2.270	58.4	0.156	57.8	0.215	175.4	1.118	9.53
1.9	0.616	158.4	2.166	56.5	0.164	57.3	0.217	173.6	1.117	9.13
2.0	0.619	157.1	2.065	54.7	0.171	56.8	0.219	171.8	1.116	8.75
2.1	0.621	155.9	1.981	53.0	0.178	56.3	0.221	169.5	1.114	8.40
2.2	0.623	154.9	1.898	51.5	0.186	55.6	0.223	167.7	1.115	8.03
2.3	0.624	153.7	1.822	49.8	0.194	54.9	0.227	165.7	1.113	7.69
2.4	0.628	152.5	1.756	48.3	0.201	54.2	0.230	164.0	1.108	7.41
2.5	0.628	151.3	1.693	46.5	0.209	53.6	0.233	162.3	1.108	7.08
2.6	0.630	150.1	1.640	45.1	0.216	52.9	0.237	160.6	1.107	6.82
2.7	0.632	149.1	1.588	43.5	0.223	52.1	0.243	158.9	1.105	6.56
2.8	0.632	147.7	1.531	42.1	0.230	51.1	0.248	158.0	1.109	6.23
2.9	0.625	146.2	1.475	40.0	0.238	49.9	0.252	156.9	1.119	5.81
3.0	0.627	144.2	1.440	38.4	0.246	49.5	0.255	155.6	1.112	5.63
4.0	0.653	130.4	1.134	22.1	0.309	40.1	0.304	143.8	1.085	3.86
5.0	0.706	121.9	0.898	7.0	0.373	23.9	0.359	115.0	1.047	2.49

V_{CE} = 2 V, I_C = 1 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	0.968	–18.8	3.417	166.7	0.037	77.5	0.985	–5.9	0.089	19.67
0.2	0.938	–36.1	3.265	154.3	0.071	69.4	0.957	–11.8	0.112	16.64
0.3	0.910	–52.8	3.053	143.7	0.100	59.8	0.915	–17.0	0.151	14.85
0.4	0.878	–68.2	2.828	133.4	0.123	51.5	0.868	–21.6	0.193	13.61
0.5	0.845	–82.3	2.605	124.0	0.140	44.1	0.820	–25.6	0.239	12.69
0.6	0.818	–94.9	2.396	115.7	0.153	37.6	0.775	–29.0	0.284	11.96
0.7	0.793	–106.2	2.191	108.3	0.161	32.1	0.734	–32.0	0.332	11.34
0.8	0.772	–116.1	2.012	101.7	0.165	27.3	0.700	–34.8	0.384	10.85
0.9	0.756	–125.0	1.851	95.3	0.168	23.3	0.671	–37.4	0.437	10.43
1.0	0.747	–132.9	1.713	89.6	0.167	19.8	0.648	–40.1	0.486	10.10
1.1	0.738	–139.9	1.593	84.6	0.166	16.7	0.627	–42.7	0.543	9.82
1.2	0.734	–146.3	1.483	79.8	0.163	14.3	0.612	–45.2	0.595	9.58
1.3	0.729	–151.8	1.383	75.7	0.160	12.1	0.599	–48.1	0.659	9.38
1.4	0.727	–156.7	1.300	71.5	0.156	10.4	0.591	–50.8	0.715	9.22
1.5	0.729	–161.2	1.228	67.6	0.151	9.0	0.584	–53.5	0.770	9.10
1.6	0.727	–165.4	1.157	63.9	0.146	8.1	0.578	–56.3	0.847	9.00
1.7	0.730	–168.9	1.100	60.7	0.140	7.8	0.572	–59.0	0.908	8.94
1.8	0.732	–172.2	1.044	57.4	0.135	7.9	0.570	–61.7	0.983	8.90
1.9	0.731	–175.4	0.999	54.4	0.129	8.5	0.566	–64.5	1.067	7.31
2.0	0.735	–178.3	0.952	51.5	0.123	9.6	0.564	–67.3	1.146	6.55
2.1	0.737	179.2	0.918	49.1	0.118	11.3	0.563	–70.3	1.224	6.07
2.2	0.737	176.7	0.882	47.0	0.113	13.3	0.563	–73.2	1.318	5.56
2.3	0.738	174.2	0.846	44.6	0.108	15.9	0.561	–76.1	1.423	5.07
2.4	0.742	171.9	0.818	42.8	0.105	19.3	0.559	–79.3	1.487	4.79
2.5	0.742	169.6	0.788	40.5	0.102	23.4	0.557	–82.6	1.582	4.38
2.6	0.744	167.3	0.764	38.7	0.100	28.0	0.556	–86.3	1.650	4.10
2.7	0.745	165.3	0.738	36.9	0.100	32.3	0.555	–89.7	1.702	3.78
2.8	0.747	163.0	0.710	35.3	0.102	36.7	0.556	–92.8	1.727	3.46
2.9	0.741	160.8	0.679	32.9	0.106	40.7	0.550	–96.2	1.807	2.85
3.0	0.745	158.2	0.662	31.1	0.112	45.4	0.548	–100.2	1.753	2.69
4.0	0.762	136.5	0.523	19.8	0.216	60.7	0.553	–136.0	1.273	0.70
5.0	0.764	122.3	0.476	11.9	0.364	38.9	0.510	173.0	1.143	–1.13

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	0.899	–28.7	9.545	160.1	0.035	74.6	0.951	–13.2	0.094	24.36
0.2	0.834	–54.8	8.548	143.7	0.063	61.4	0.857	–24.6	0.166	21.32
0.3	0.783	–76.7	7.449	131.0	0.082	51.2	0.751	–32.6	0.228	19.59
0.4	0.731	–94.9	6.443	120.3	0.094	44.1	0.657	–38.5	0.298	18.34
0.5	0.692	–110.2	5.605	111.6	0.102	39.0	0.577	–42.6	0.370	17.39
0.6	0.667	–122.4	4.916	104.5	0.107	35.2	0.514	–45.7	0.441	16.63
0.7	0.649	–132.7	4.334	98.6	0.110	32.7	0.464	–48.1	0.514	15.95
0.8	0.637	–141.4	3.874	93.4	0.112	30.9	0.425	–50.2	0.583	15.39
0.9	0.628	–148.7	3.482	88.7	0.113	29.9	0.393	–52.4	0.657	14.88
1.0	0.626	–154.9	3.169	84.4	0.114	29.4	0.369	–54.4	0.722	14.43
1.1	0.624	–160.4	2.906	80.7	0.115	29.2	0.349	–56.7	0.788	14.03
1.2	0.626	–165.3	2.677	77.3	0.116	29.5	0.335	–58.9	0.844	13.65
1.3	0.625	–169.3	2.477	74.1	0.116	29.9	0.322	–61.4	0.914	13.30
1.4	0.627	–173.0	2.306	71.1	0.117	30.6	0.315	–63.7	0.968	12.96
1.5	0.631	–176.4	2.168	68.0	0.117	31.5	0.308	–66.2	1.012	11.98
1.6	0.632	–179.4	2.035	65.2	0.118	32.5	0.302	–68.7	1.071	10.74
1.7	0.636	178.2	1.927	62.7	0.119	33.9	0.298	–70.9	1.109	10.07
1.8	0.637	175.7	1.827	60.0	0.121	35.3	0.295	–73.5	1.153	9.43
1.9	0.640	173.4	1.742	57.6	0.123	36.6	0.292	–75.9	1.185	8.92
2.0	0.644	171.3	1.657	55.2	0.125	38.2	0.290	–78.4	1.214	8.44
2.1	0.646	169.5	1.596	53.2	0.127	39.9	0.287	–81.0	1.235	8.06
2.2	0.647	167.8	1.529	51.2	0.130	41.3	0.286	–83.8	1.260	7.64
2.3	0.649	165.9	1.470	49.1	0.134	42.6	0.284	–86.5	1.272	7.28
2.4	0.652	164.0	1.417	47.4	0.138	44.0	0.283	–89.5	1.279	6.95
2.5	0.654	162.3	1.368	45.2	0.142	45.4	0.281	–92.7	1.284	6.64
2.6	0.656	160.7	1.325	43.5	0.146	46.6	0.283	–96.2	1.288	6.36
2.7	0.658	159.1	1.282	41.7	0.151	47.5	0.282	–99.7	1.287	6.08
2.8	0.658	157.2	1.234	39.9	0.156	48.1	0.284	–102.8	1.297	5.72
2.9	0.652	155.5	1.183	37.5	0.163	48.4	0.283	–106.3	1.320	5.23
3.0	0.658	153.2	1.157	35.4	0.170	49.5	0.285	–110.2	1.286	5.13
4.0	0.687	135.6	0.904	18.4	0.246	50.6	0.317	–145.3	1.138	3.39
5.0	0.731	124.1	0.723	3.6	0.355	34.3	0.335	165.0	1.014	2.36

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	0.838	–37.3	14.389	155.1	0.033	70.1	0.912	–19.3	0.134	26.41
0.2	0.752	–68.8	12.153	136.2	0.056	56.8	0.766	–33.8	0.222	23.39
0.3	0.690	–92.8	10.026	123.0	0.069	48.1	0.628	–42.9	0.316	21.61
0.4	0.646	–111.3	8.340	112.7	0.078	42.8	0.523	–49.1	0.408	20.31
0.5	0.617	–125.6	7.018	105.0	0.083	40.0	0.442	–53.0	0.500	19.28
0.6	0.600	–136.9	6.043	98.8	0.087	38.4	0.381	–56.1	0.585	18.42
0.7	0.591	–146.0	5.265	93.8	0.090	37.8	0.335	–58.6	0.665	17.66
0.8	0.584	–153.3	4.666	89.4	0.093	37.7	0.300	–60.8	0.742	17.01
0.9	0.582	–159.5	4.164	85.4	0.096	38.0	0.272	–63.4	0.811	16.37
1.0	0.583	–164.8	3.766	81.8	0.099	38.8	0.251	–65.8	0.874	15.82
1.1	0.584	–169.5	3.440	78.5	0.102	39.6	0.234	–68.7	0.930	15.29
1.2	0.588	–173.5	3.158	75.6	0.105	40.4	0.222	–71.3	0.976	14.79
1.3	0.588	–176.8	2.921	72.9	0.108	41.3	0.212	–74.2	1.026	13.35
1.4	0.593	–179.9	2.715	70.2	0.111	42.2	0.205	–76.9	1.060	12.39
1.5	0.597	177.3	2.547	67.5	0.115	43.1	0.200	–79.8	1.087	11.66
1.6	0.599	174.8	2.387	64.9	0.118	44.1	0.196	–82.6	1.122	10.93
1.7	0.604	172.6	2.257	62.7	0.122	45.0	0.192	–85.1	1.139	10.41
1.8	0.606	170.8	2.141	60.4	0.126	46.0	0.190	–87.8	1.160	9.88
1.9	0.608	168.8	2.041	58.1	0.130	46.8	0.187	–90.3	1.175	9.41
2.0	0.612	167.0	1.942	56.1	0.135	47.7	0.186	–93.0	1.185	8.98
2.1	0.614	165.5	1.865	54.1	0.139	48.5	0.183	–95.7	1.194	8.60
2.2	0.616	163.8	1.788	52.3	0.144	49.0	0.182	–98.6	1.202	8.22
2.3	0.618	162.2	1.716	50.2	0.150	49.5	0.181	–101.6	1.203	7.87
2.4	0.623	160.7	1.656	48.7	0.156	49.9	0.180	–104.8	1.195	7.60
2.5	0.622	159.2	1.597	46.6	0.161	50.4	0.180	–108.2	1.203	7.24
2.6	0.625	157.7	1.547	45.0	0.166	50.7	0.182	–111.9	1.200	6.98
2.7	0.627	156.3	1.496	43.3	0.172	50.8	0.182	–115.7	1.201	6.68
2.8	0.628	154.6	1.443	41.6	0.178	50.6	0.186	–118.9	1.202	6.37
2.9	0.622	153.1	1.384	39.3	0.186	50.2	0.187	–122.8	1.219	5.90
3.0	0.626	150.9	1.352	37.4	0.193	50.7	0.191	–126.3	1.200	5.75
4.0	0.657	134.8	1.057	20.3	0.262	47.4	0.240	–160.0	1.114	4.00
5.0	0.710	124.4	0.839	4.5	0.354	31.8	0.279	152.5	1.015	2.99

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	0.786	–43.6	18.044	151.2	0.031	67.8	0.878	–24.0	0.162	27.61
0.2	0.691	–79.1	14.557	131.0	0.051	54.5	0.697	–40.3	0.275	24.59
0.3	0.637	–103.8	11.546	117.9	0.061	47.2	0.547	–50.0	0.385	22.76
0.4	0.599	–121.7	9.362	108.4	0.068	43.7	0.441	–56.1	0.496	21.40
0.5	0.579	–135.2	7.789	101.3	0.073	42.4	0.365	–60.2	0.593	20.29
0.6	0.567	–145.4	6.631	95.8	0.077	42.1	0.310	–63.6	0.685	19.35
0.7	0.562	–153.6	5.742	91.2	0.081	42.4	0.268	–66.4	0.765	18.51
0.8	0.562	–160.1	5.065	87.3	0.085	43.1	0.236	–69.5	0.832	17.74
0.9	0.560	–165.5	4.505	83.7	0.089	43.9	0.212	–72.8	0.897	17.03
1.0	0.563	–170.1	4.076	80.4	0.093	45.0	0.194	–76.1	0.948	16.41
1.1	0.566	–174.3	3.721	77.4	0.097	45.9	0.179	–79.7	0.992	15.82
1.2	0.570	–177.8	3.412	74.7	0.102	46.8	0.169	–83.2	1.027	14.23
1.3	0.572	179.2	3.150	72.2	0.106	47.6	0.161	–87.0	1.064	13.17
1.4	0.577	176.5	2.930	69.7	0.111	48.4	0.156	–90.4	1.088	12.41
1.5	0.582	174.0	2.741	67.1	0.116	49.1	0.152	–94.0	1.105	11.76
1.6	0.585	171.7	2.564	64.8	0.120	49.8	0.149	–97.3	1.129	11.09
1.7	0.589	169.7	2.426	62.7	0.126	50.4	0.146	–100.1	1.138	10.60
1.8	0.591	168.0	2.299	60.5	0.131	50.9	0.144	–103.2	1.152	10.09
1.9	0.593	166.4	2.192	58.4	0.136	51.3	0.143	–106.0	1.158	9.66
2.0	0.597	164.6	2.087	56.3	0.142	51.8	0.142	–108.9	1.163	9.24
2.1	0.600	163.2	2.005	54.6	0.147	52.1	0.140	–112.0	1.164	8.89
2.2	0.602	161.9	1.921	52.9	0.153	52.2	0.140	–115.1	1.167	8.52
2.3	0.603	160.4	1.842	50.9	0.159	52.3	0.139	–118.4	1.171	8.14
2.4	0.608	158.9	1.776	49.3	0.165	52.4	0.140	–121.9	1.164	7.86
2.5	0.608	157.6	1.714	47.4	0.172	52.4	0.140	–125.4	1.165	7.54
2.6	0.610	156.0	1.658	45.8	0.177	52.4	0.143	–128.9	1.164	7.25
2.7	0.613	154.8	1.603	44.1	0.183	52.1	0.145	–132.9	1.162	6.97
2.8	0.613	153.3	1.544	42.6	0.189	51.7	0.149	–136.1	1.169	6.62
2.9	0.608	151.6	1.487	40.3	0.197	51.0	0.153	–139.8	1.178	6.21
3.0	0.613	149.6	1.451	38.4	0.205	51.1	0.157	–142.9	1.163	6.06
4.0	0.641	134.2	1.134	21.5	0.271	46.1	0.215	–172.7	1.104	4.24
5.0	0.700	124.6	0.899	5.5	0.356	30.4	0.265	143.2	1.017	3.23

V_{CE} = 2 V, I_C = 10 mA, Z_O = 50 Ω

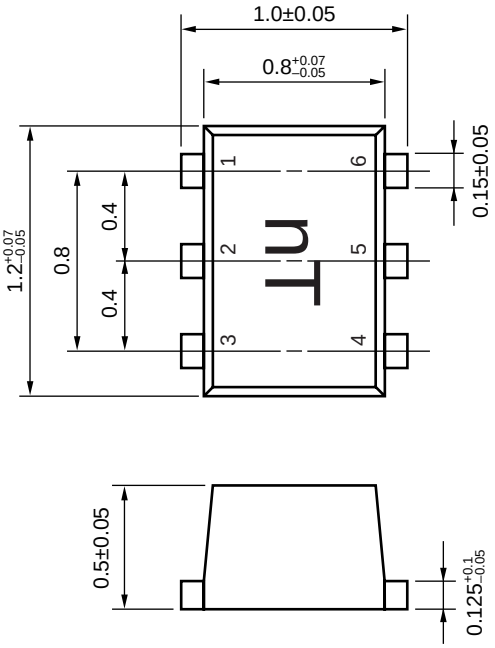
Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB)
0.1	0.722	–53.3	22.716	146.3	0.029	64.3	0.826	–30.1	0.204	28.90
0.2	0.625	–92.1	17.099	125.0	0.044	53.0	0.612	–48.2	0.345	25.86
0.3	0.582	–116.4	13.026	112.5	0.053	47.7	0.459	–58.1	0.482	23.94
0.4	0.556	–132.9	10.314	104.0	0.059	46.4	0.360	–64.6	0.603	22.43
0.5	0.544	–145.0	8.463	97.7	0.064	46.6	0.292	–69.3	0.706	21.21
0.6	0.539	–153.9	7.157	92.8	0.069	47.3	0.243	–73.4	0.793	20.16
0.7	0.538	–161.0	6.183	88.7	0.074	48.4	0.207	–77.5	0.862	19.20
0.8	0.540	–166.5	5.436	85.3	0.079	49.5	0.180	–81.9	0.921	18.36
0.9	0.542	–171.3	4.831	81.9	0.085	50.4	0.160	–87.0	0.971	17.56
1.0	0.546	–175.3	4.358	79.0	0.090	51.4	0.146	–92.1	1.009	16.28
1.1	0.549	–179.0	3.970	76.3	0.096	52.2	0.136	–97.5	1.040	14.96
1.2	0.555	178.0	3.632	73.9	0.101	53.0	0.129	–102.4	1.064	14.01
1.3	0.558	175.5	3.355	71.6	0.107	53.5	0.125	–107.6	1.088	13.17
1.4	0.564	172.9	3.122	69.2	0.113	54.0	0.122	–111.9	1.100	12.51
1.5	0.569	170.7	2.918	66.9	0.119	54.3	0.120	–116.4	1.108	11.90
1.6	0.571	168.7	2.734	64.8	0.124	54.6	0.120	–120.3	1.126	11.27
1.7	0.575	167.0	2.581	62.6	0.130	54.9	0.119	–123.7	1.130	10.78
1.8	0.578	165.4	2.444	60.6	0.136	55.1	0.119	–127.2	1.139	10.28
1.9	0.581	163.9	2.332	58.5	0.142	55.1	0.118	–130.1	1.138	9.89
2.0	0.584	162.4	2.219	56.6	0.149	55.1	0.118	–133.4	1.141	9.46
2.1	0.589	161.2	2.130	54.8	0.155	55.1	0.118	–136.6	1.136	9.15
2.2	0.590	159.9	2.042	53.3	0.161	54.9	0.118	–139.8	1.141	8.76
2.3	0.592	158.5	1.961	51.4	0.168	54.6	0.119	–143.3	1.139	8.41
2.4	0.595	157.2	1.887	50.0	0.174	54.3	0.121	–146.6	1.136	8.10
2.5	0.597	155.9	1.820	48.0	0.181	54.1	0.123	–149.9	1.134	7.79
2.6	0.599	154.6	1.760	46.5	0.187	53.8	0.127	–153.0	1.134	7.51
2.7	0.600	153.4	1.704	44.9	0.194	53.3	0.130	–156.6	1.134	7.22
2.8	0.601	151.9	1.640	43.4	0.200	52.6	0.135	–159.0	1.138	6.88
2.9	0.596	150.4	1.577	41.2	0.208	51.8	0.140	–161.9	1.148	6.46
3.0	0.600	148.4	1.541	39.4	0.216	51.6	0.145	–164.2	1.133	6.32
4.0	0.630	133.6	1.203	22.7	0.280	44.9	0.207	173.2	1.092	4.48
5.0	0.690	124.5	0.952	6.8	0.358	29.1	0.265	133.5	1.021	3.37

V_{CE} = 2 V, I_C = 20 mA, Z_O = 50 Ω

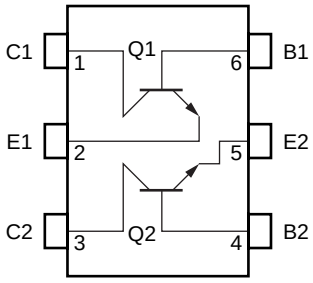
Frequency	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG/MSG
(GHz)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		(dB)
0.1	0.595	–75.2	31.322	136.2	0.024	59.2	0.705	–42.5	0.306	31.16
0.2	0.525	–116.8	20.629	115.3	0.035	53.3	0.460	–62.7	0.521	27.76
0.3	0.512	–137.5	14.847	104.7	0.042	52.8	0.325	–73.5	0.679	25.53
0.4	0.506	–150.4	11.446	97.8	0.048	54.2	0.247	–81.6	0.797	23.79
0.5	0.507	–159.4	9.279	92.8	0.055	55.8	0.196	–89.0	0.879	22.30
0.6	0.508	–166.2	7.772	88.8	0.061	57.4	0.163	–96.7	0.944	21.04
0.7	0.512	–171.4	6.692	85.5	0.068	58.4	0.140	–104.9	0.986	19.93
0.8	0.518	–175.8	5.864	82.6	0.075	59.3	0.125	–113.7	1.019	18.10
0.9	0.521	–179.4	5.205	79.7	0.082	60.0	0.117	–122.6	1.049	16.68
1.0	0.527	177.6	4.683	77.2	0.089	60.4	0.113	–130.6	1.067	15.65
1.1	0.532	174.6	4.262	74.8	0.096	60.6	0.113	–137.8	1.080	14.76
1.2	0.539	172.1	3.903	72.6	0.103	60.8	0.114	–143.6	1.088	13.98
1.3	0.543	170.1	3.592	70.6	0.110	60.8	0.116	–148.9	1.101	13.21
1.4	0.548	168.2	3.344	68.4	0.117	60.7	0.119	–152.9	1.106	12.59
1.5	0.554	166.4	3.127	66.2	0.124	60.5	0.122	–156.7	1.106	12.04
1.6	0.556	164.7	2.922	64.3	0.130	60.3	0.125	–159.7	1.117	11.42
1.7	0.561	163.4	2.765	62.4	0.138	60.1	0.126	–162.7	1.115	10.97
1.8	0.564	162.0	2.614	60.4	0.144	59.8	0.129	–165.6	1.118	10.50
1.9	0.566	160.6	2.491	58.6	0.151	59.4	0.130	–168.2	1.118	10.08
2.0	0.572	159.3	2.374	56.8	0.158	58.9	0.132	–170.8	1.113	9.71
2.1	0.574	158.3	2.277	55.3	0.165	58.5	0.133	–173.6	1.113	9.35
2.2	0.575	157.1	2.181	53.7	0.172	57.8	0.135	–176.1	1.114	8.97
2.3	0.577	155.9	2.091	51.9	0.179	57.2	0.138	–178.9	1.113	8.62
2.4	0.581	154.7	2.015	50.5	0.187	56.6	0.140	178.9	1.107	8.34
2.5	0.581	153.6	1.943	48.6	0.194	56.0	0.144	176.6	1.108	8.01
2.6	0.584	152.5	1.878	47.3	0.200	55.4	0.148	174.5	1.106	7.73
2.7	0.586	151.3	1.818	45.6	0.207	54.7	0.153	172.2	1.106	7.45
2.8	0.586	149.9	1.749	44.3	0.213	53.7	0.158	171.0	1.112	7.09
2.9	0.581	148.4	1.682	42.2	0.222	52.6	0.163	169.6	1.119	6.69
3.0	0.585	146.5	1.643	40.4	0.230	52.3	0.166	168.2	1.108	6.54
4.0	0.614	132.7	1.282	24.2	0.293	43.6	0.223	154.6	1.082	4.66
5.0	0.678	124.4	1.009	8.5	0.362	27.5	0.283	121.6	1.028	3.42

PACKAGE DIMENSIONS

6-PIN LEAD-LESS MINIMOLD (UNIT: mm)



(Top View)



PIN CONNECTIONS

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

[MEMO]

[MEMO]

[MEMO]

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