

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

FEATURES

- Low noise operation
- 2 different built-in transistors (2SC5603, 2SC5676)
 - Q1: Built-in high gain transistor
 $f_T = 13.5 \text{ GHz TYP.}$, $|S_{21e}|^2 = 10.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_C = 5 \text{ mA, } f = 2 \text{ GHz}$
 - Q2: Built-in low phase distortion transistor suited for OSC operation
 $f_T = 5.5 \text{ GHz TYP.}$, $|S_{21e}|^2 = 4.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_C = 10 \text{ mA, } f = 2 \text{ GHz}$
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

	Q1	Q2
3-pin thin-type ultra super minimold part No.	2SC5603	2SC5676

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA846TD	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 1 (Q1 Collector), Pin 6 (Q1 Base) face the perforation side of the tape
μ PA846TD-T3	10 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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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 cm² × 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} = 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	–	–	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} = 1 V, I _C = 10 mA	100	–	145	–
Gain Bandwidth Product	f _T	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	4.0	5.5	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	2.5	4.0	–	dB
Noise Figure	NF	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.8	3.0	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz	–	0.9	1.2	pF

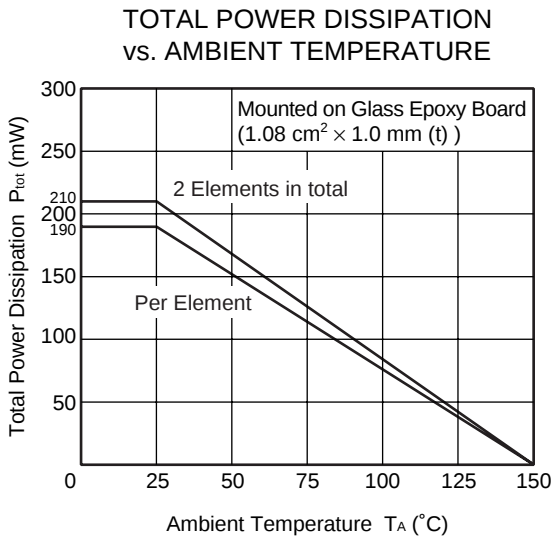
Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

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

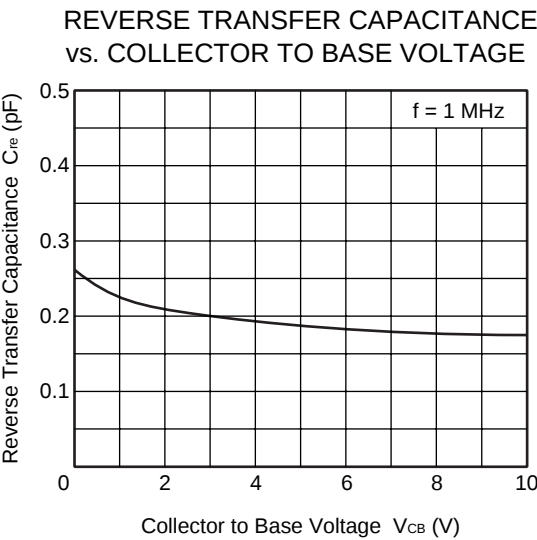
h_{FE} CLASSIFICATION

Rank	FB
Marking	nY
h _{FE} Value of Q1	60 to 120
h _{FE} Value of Q2	100 to 145

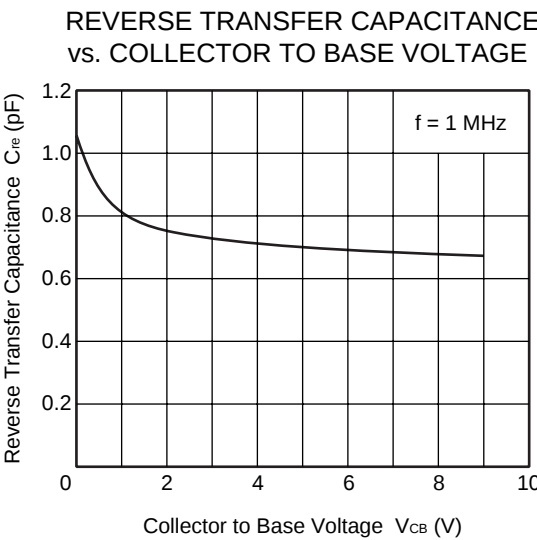
TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^{\circ}\text{C}$)



Q1

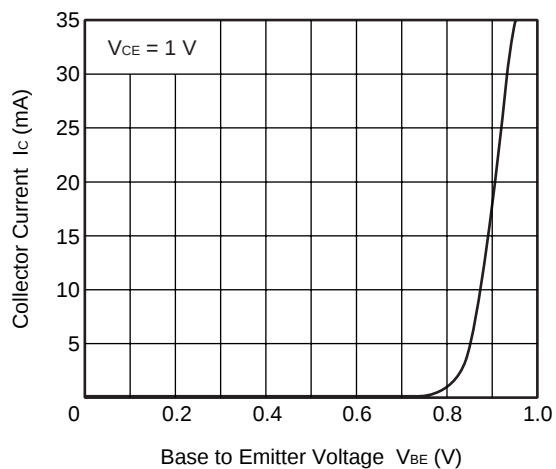


Q2



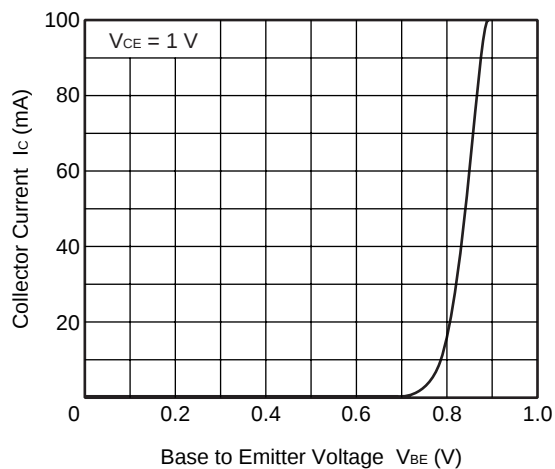
Q1

COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE

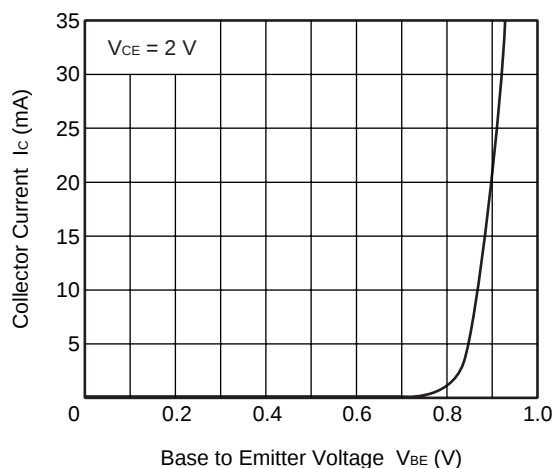


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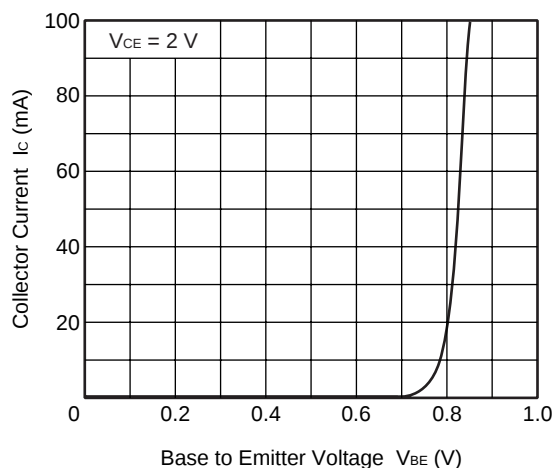
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



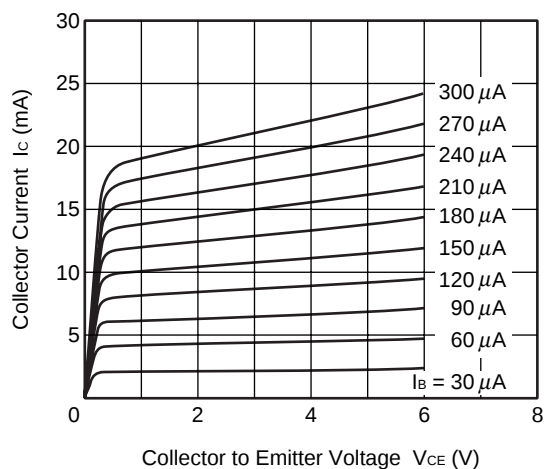
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



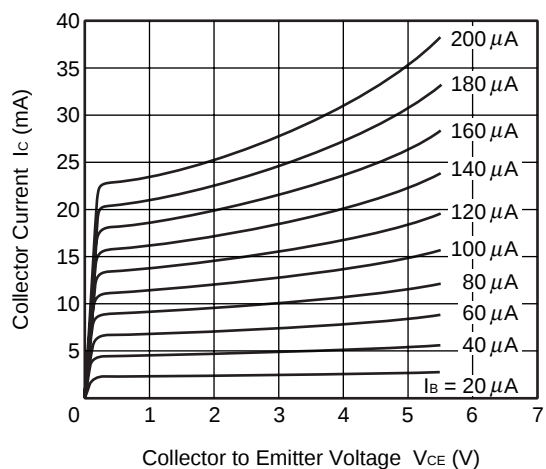
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE

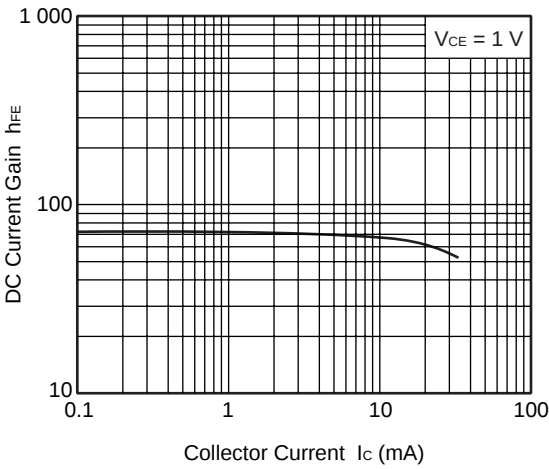


COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



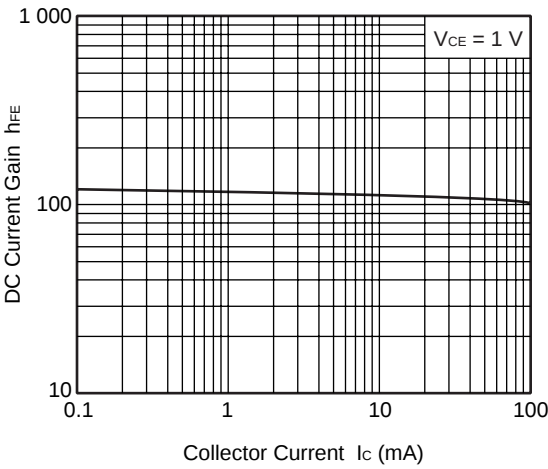
Q1

DC CURRENT GAIN vs.
COLLECTOR CURRENT

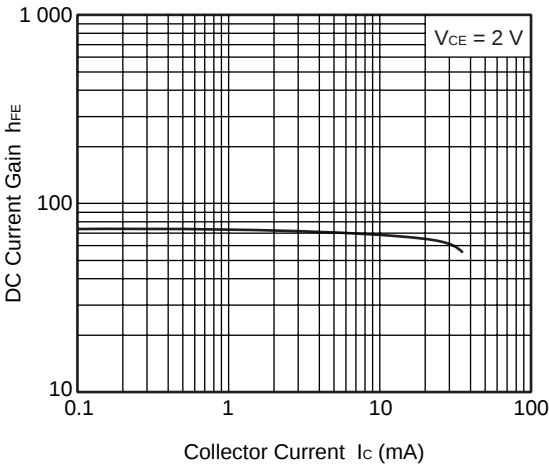


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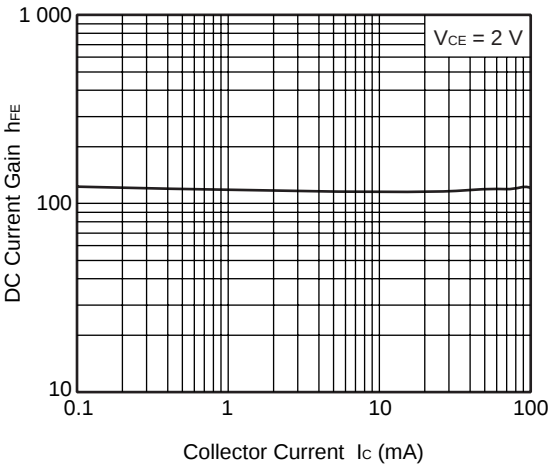
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT

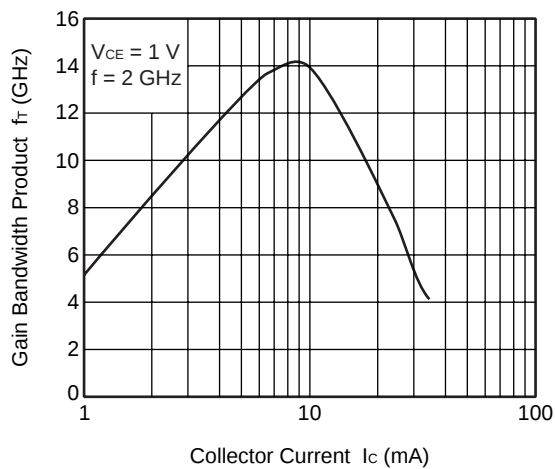


DC CURRENT GAIN vs.
COLLECTOR CURRENT



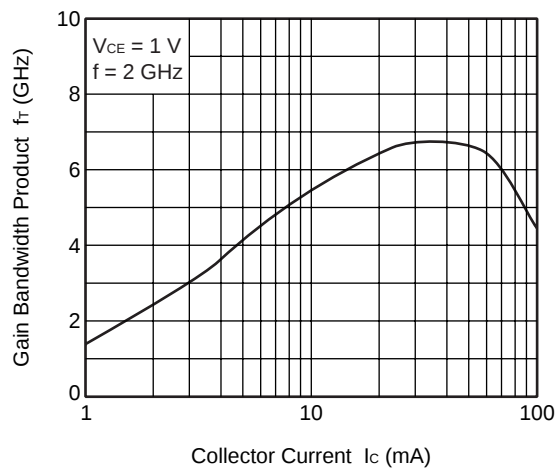
Q1

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

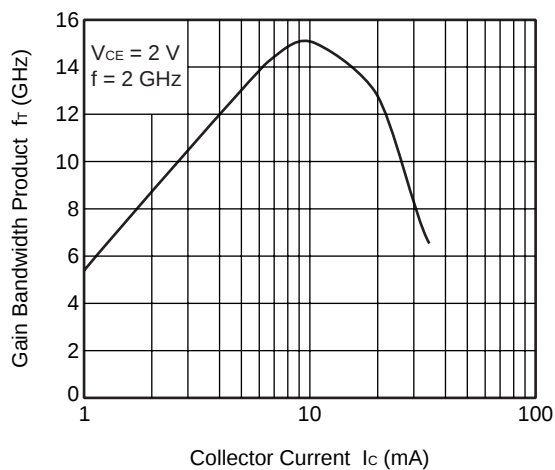


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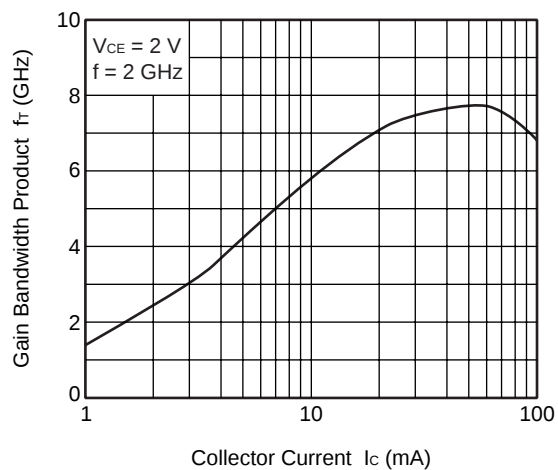
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



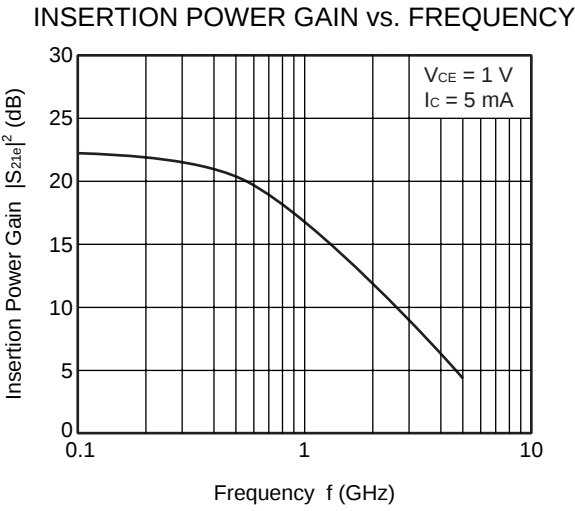
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



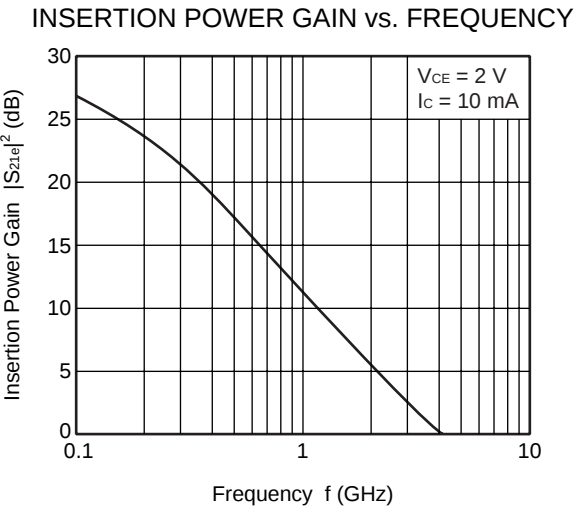
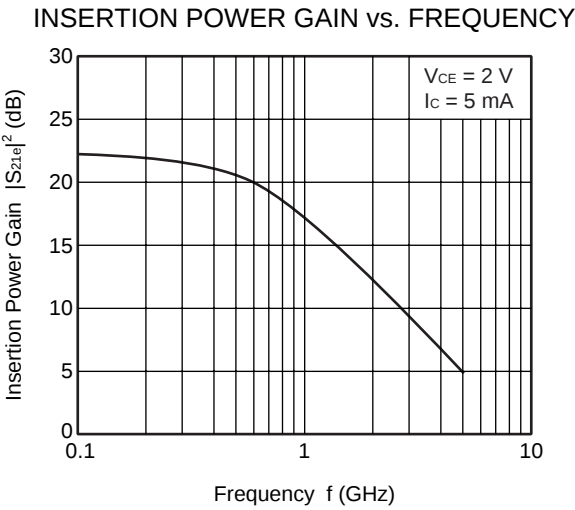
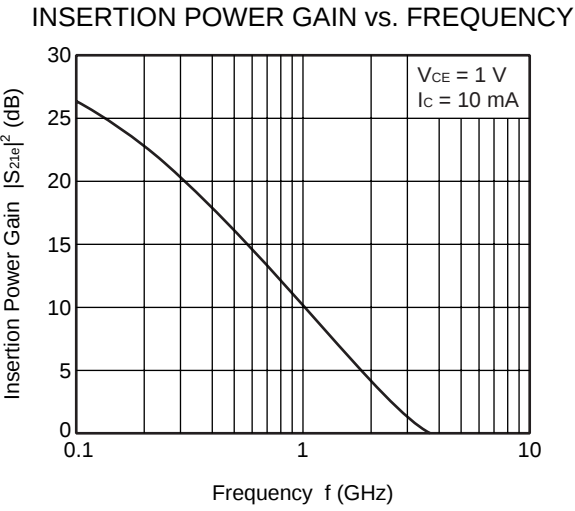
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



Q1

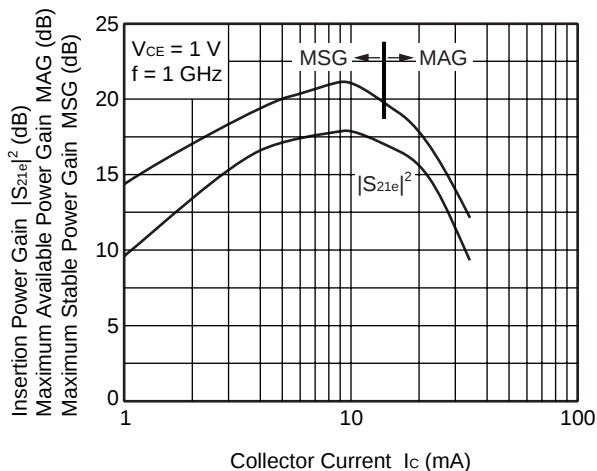


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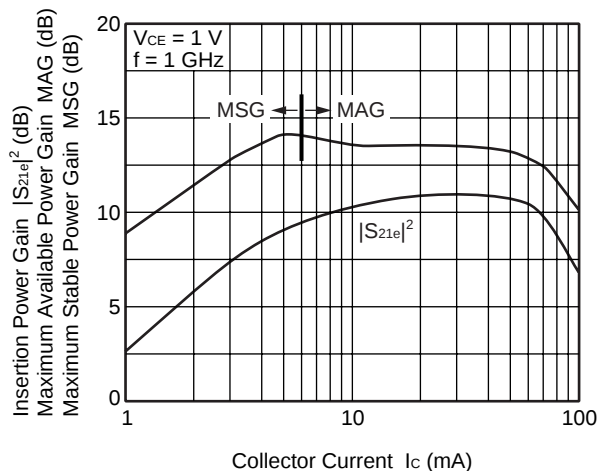
Q1

INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

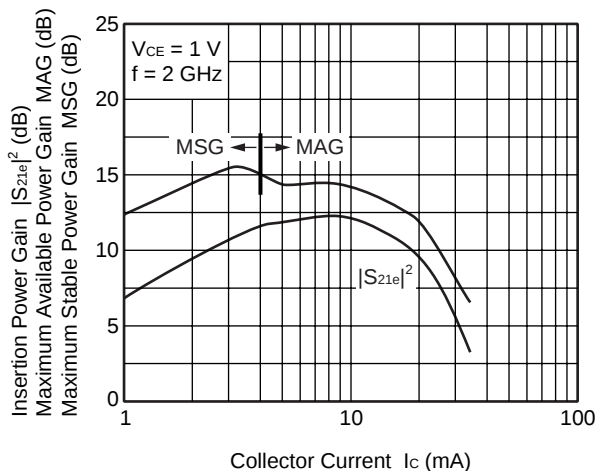


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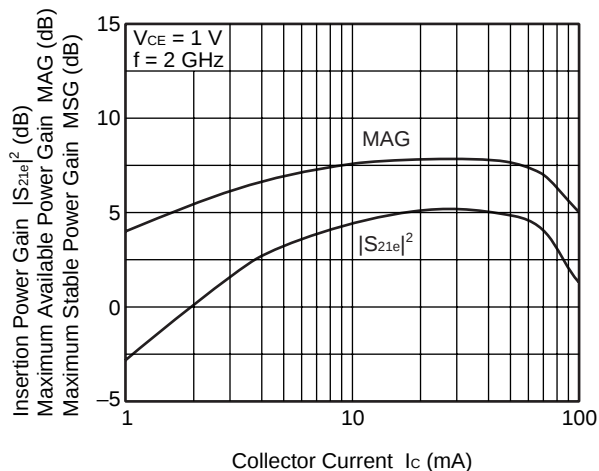
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



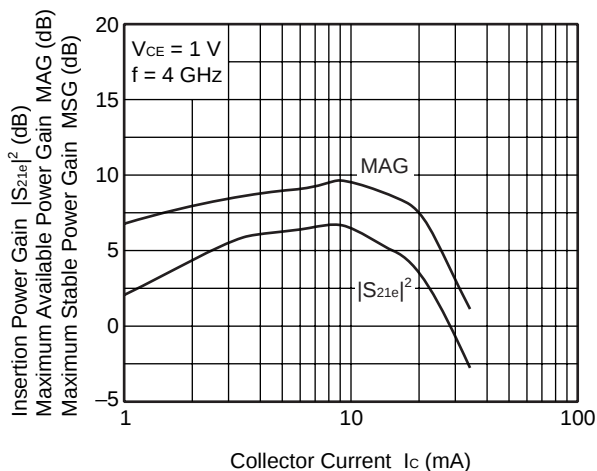
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



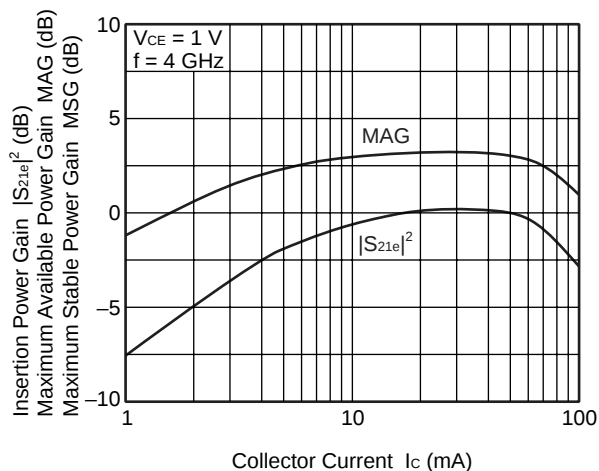
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



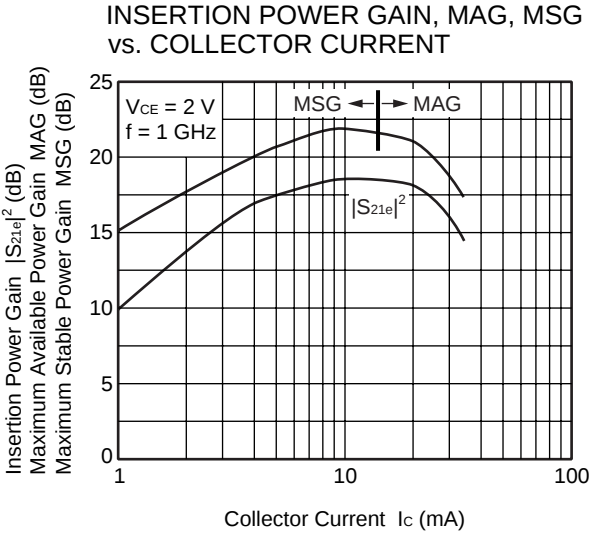
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



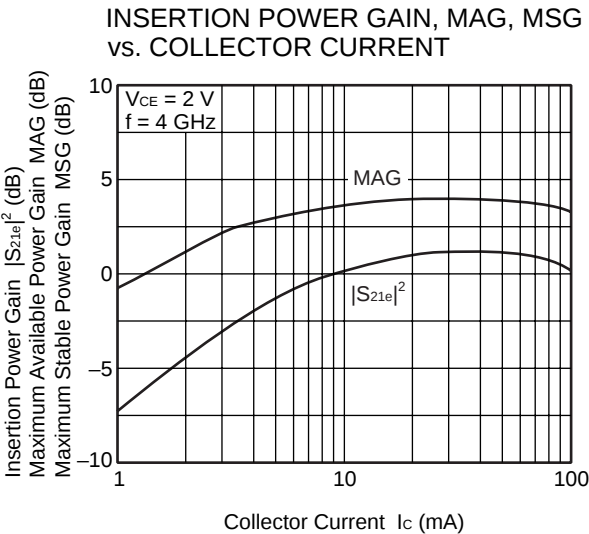
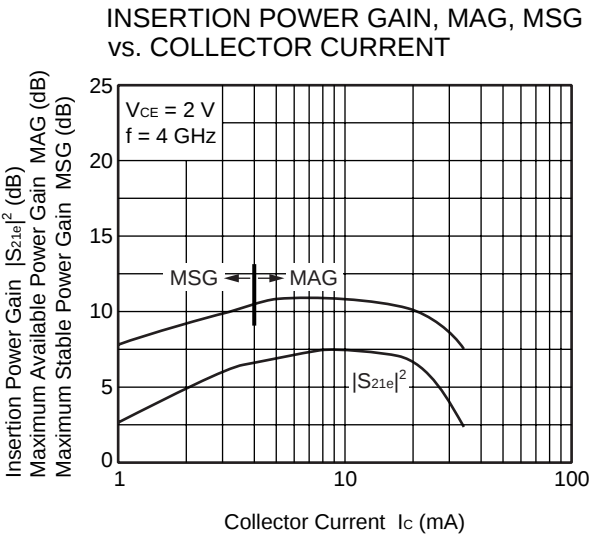
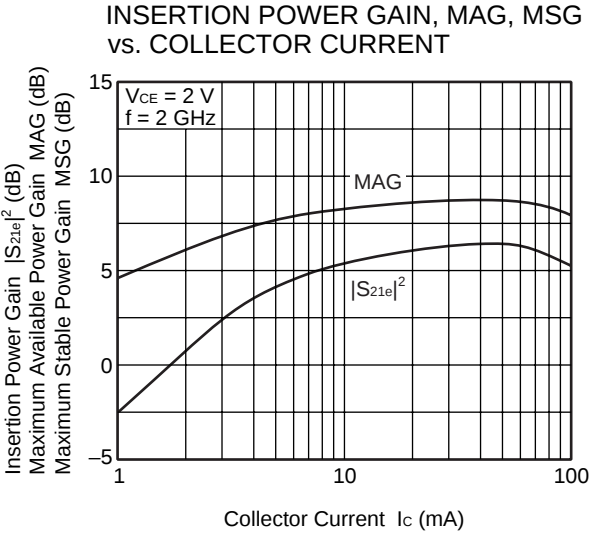
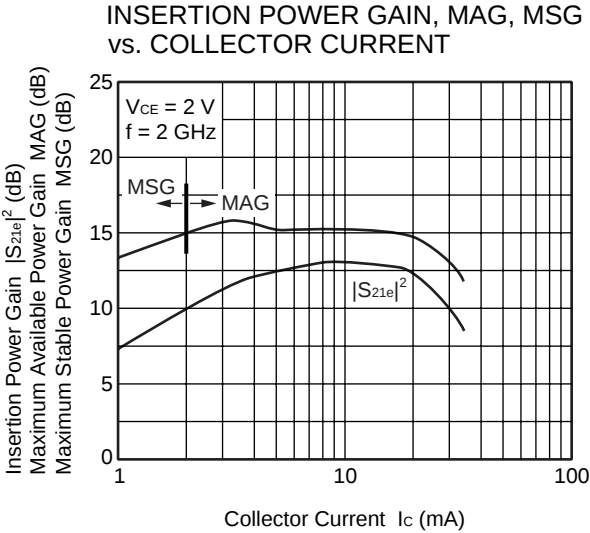
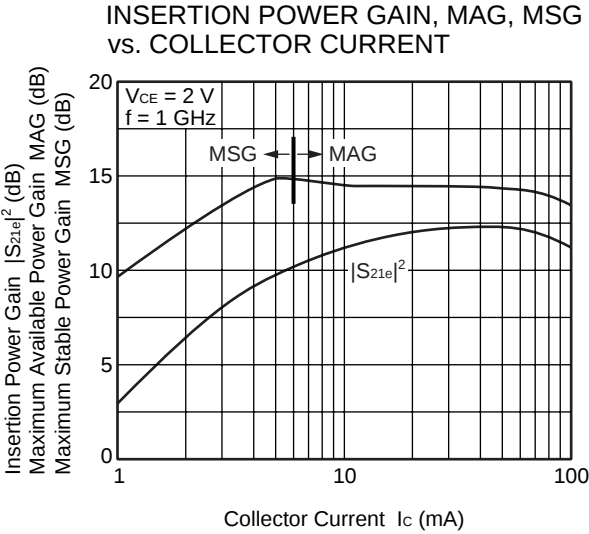
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



Q1

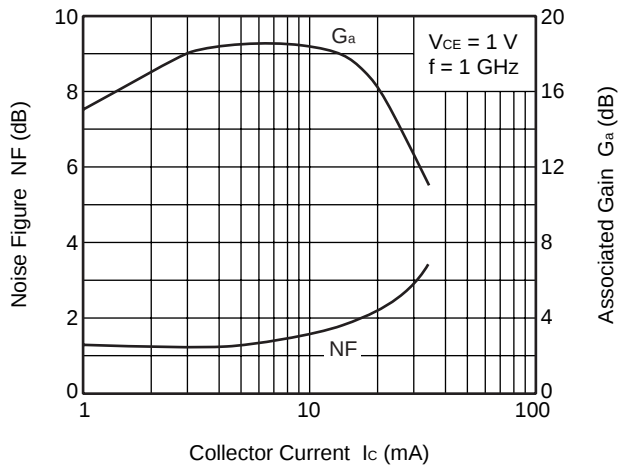


Q2



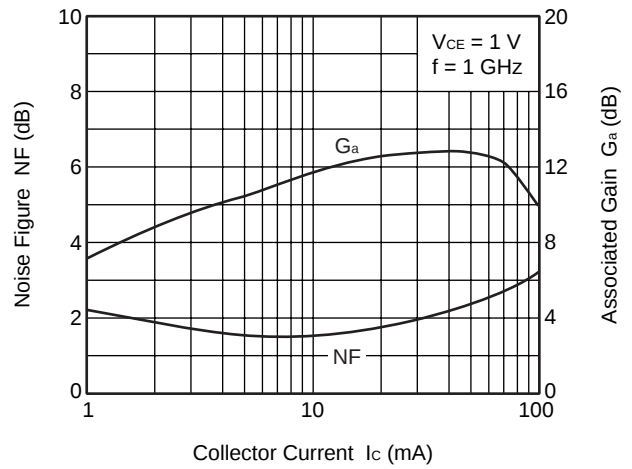
Q1

NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT

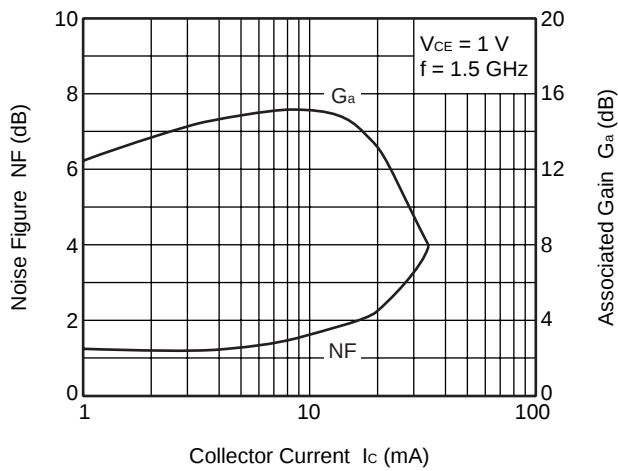


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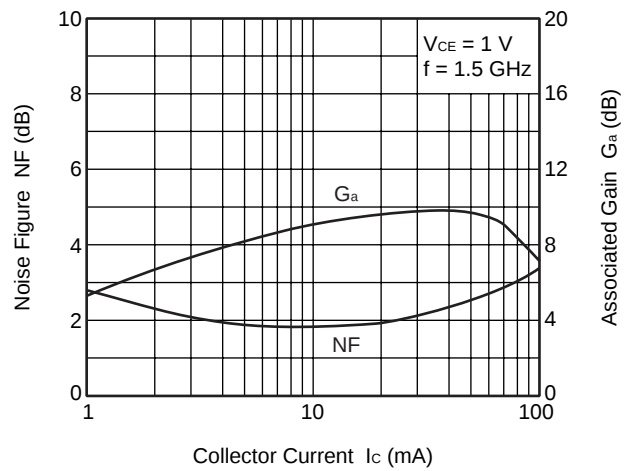
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



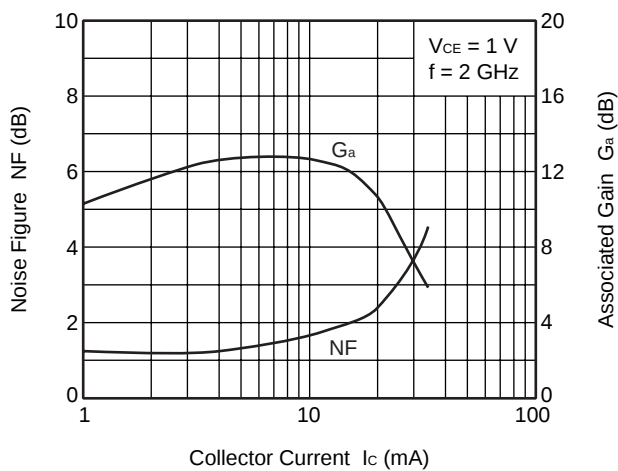
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



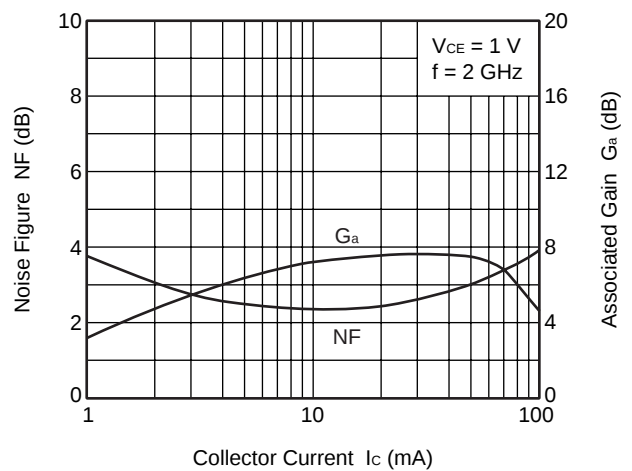
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT

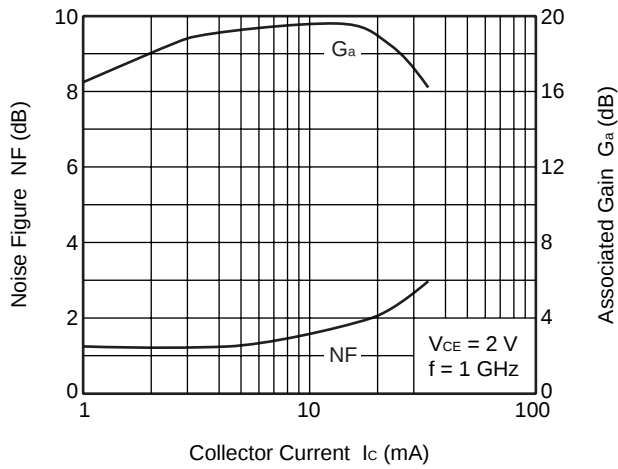


NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



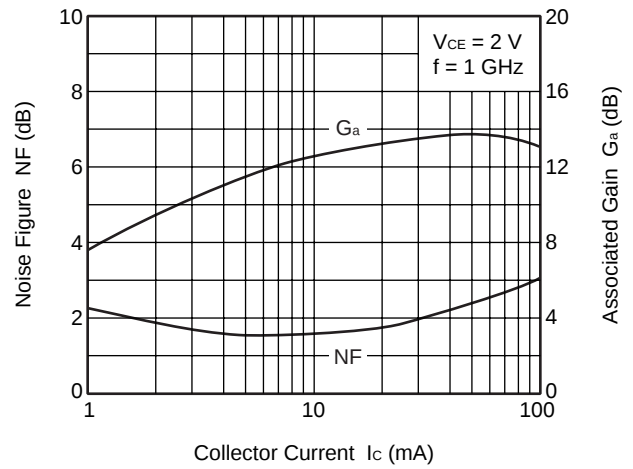
Q1

NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT

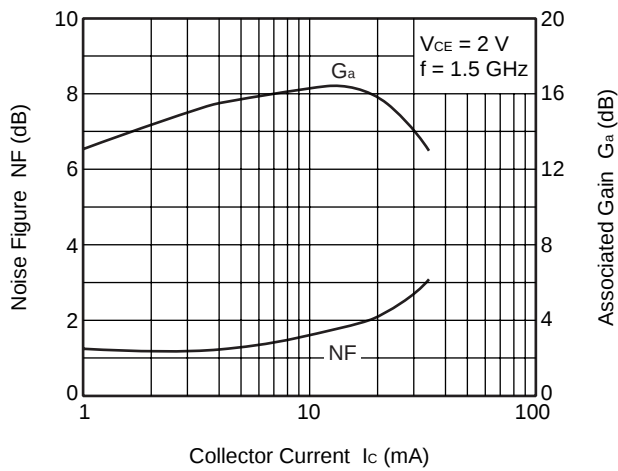


Q2

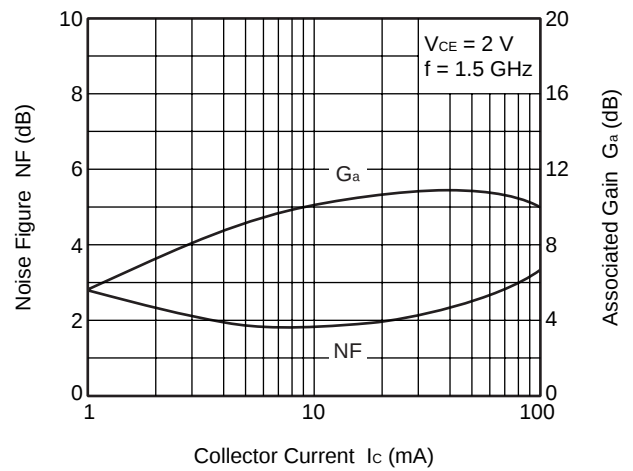
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



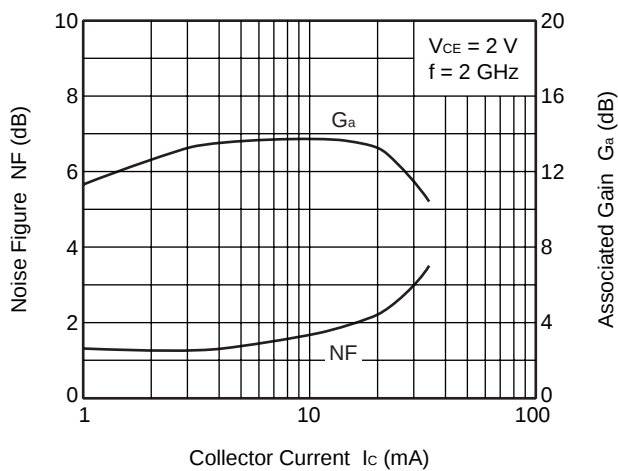
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



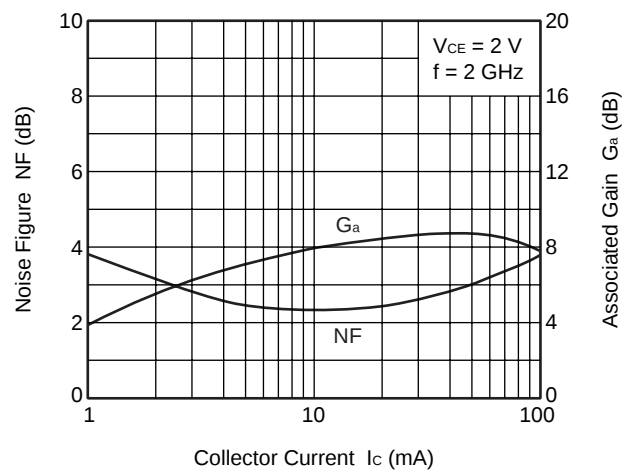
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



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 $K \geq 1$, 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. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

$V_{CE} = 1 \text{ V}$, $I_C = 1 \text{ mA}$, $Z_O = 50 \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	Note MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
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 (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	0.860	-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 (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	0.796	-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 (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	0.722	-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 (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	0.651	-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		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.464	-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		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.951	-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 (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	0.865	-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 (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	0.793	-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		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.740	-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		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.664	-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, Z₀ = 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	0.489	-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 (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	0.955	-28.0	3.642	161.3	0.056	74.0	0.971	-9.5	0.068	18.16
0.2	0.908	-52.8	3.329	144.4	0.101	60.3	0.914	-18.1	0.130	15.18
0.3	0.874	-74.3	2.953	131.0	0.134	48.3	0.840	-24.7	0.178	13.44
0.4	0.836	-92.6	2.596	119.2	0.155	38.9	0.772	-29.8	0.235	12.23
0.5	0.810	-107.9	2.292	108.9	0.169	31.2	0.714	-33.9	0.293	11.33
0.6	0.789	-120.4	2.033	100.3	0.175	24.9	0.668	-37.4	0.353	10.64
0.7	0.773	-130.9	1.809	93.0	0.179	20.0	0.632	-40.5	0.414	10.06
0.8	0.762	-139.5	1.630	86.4	0.178	15.8	0.604	-43.7	0.481	9.61
0.9	0.757	-147.1	1.474	80.5	0.176	12.4	0.582	-46.9	0.546	9.23
1.0	0.754	-153.4	1.349	75.0	0.172	9.8	0.567	-50.3	0.611	8.94
1.1	0.751	-159.1	1.243	70.1	0.167	7.5	0.553	-54.0	0.684	8.70
1.2	0.754	-164.0	1.151	65.7	0.162	5.8	0.546	-57.6	0.746	8.52
1.3	0.752	-168.3	1.068	61.6	0.155	4.5	0.540	-61.4	0.836	8.38
1.4	0.755	-172.1	1.000	57.7	0.148	3.7	0.538	-65.2	0.911	8.29
1.5	0.758	-175.6	0.939	54.0	0.142	3.5	0.537	-69.0	0.988	8.22
1.6	0.760	-178.6	0.882	50.5	0.134	3.9	0.536	-72.9	1.091	6.34
1.7	0.764	178.5	0.836	47.4	0.127	5.1	0.537	-76.7	1.182	5.60
1.8	0.766	176.0	0.790	44.4	0.120	7.0	0.540	-80.6	1.292	4.93
1.9	0.767	173.6	0.756	41.7	0.114	9.5	0.540	-84.3	1.406	4.42
2.0	0.773	171.1	0.718	39.1	0.109	13.0	0.542	-88.2	1.500	4.01
2.1	0.774	169.2	0.690	36.9	0.105	17.4	0.545	-92.0	1.598	3.65
2.2	0.775	167.0	0.660	35.1	0.102	22.3	0.549	-96.0	1.697	3.26
2.3	0.779	165.0	0.634	33.1	0.101	27.6	0.553	-99.8	1.742	2.98
2.4	0.782	163.0	0.611	31.8	0.102	33.2	0.554	-103.9	1.753	2.73
2.5	0.783	161.1	0.589	29.9	0.106	38.8	0.557	-108.2	1.759	2.40
2.6	0.786	159.1	0.570	28.8	0.110	44.0	0.561	-112.6	1.715	2.20
2.7	0.787	157.3	0.548	27.8	0.117	47.9	0.565	-116.7	1.686	1.86
2.8	0.788	155.3	0.528	26.8	0.125	51.2	0.572	-120.5	1.633	1.58
2.9	0.782	153.2	0.504	25.2	0.137	53.4	0.570	-124.6	1.649	0.96
3.0	0.785	150.8	0.491	24.3	0.148	55.9	0.573	-129.0	1.573	0.74
4.0	0.790	130.9	0.421	20.9	0.283	54.2	0.606	-167.4	1.233	-1.20
5.0	0.777	119.1	0.438	11.4	0.406	26.0	0.527	138.7	1.205	-2.41

V_{CE} = 1 V, I_C = 3 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	0.871	-41.4	9.276	153.5	0.051	67.6	0.914	-20.2	0.103	22.61
0.2	0.800	-75.6	7.730	133.6	0.085	51.7	0.764	-35.0	0.175	19.59
0.3	0.754	-100.6	6.334	119.6	0.103	40.9	0.627	-44.4	0.252	17.89
0.4	0.722	-119.0	5.212	108.9	0.113	34.1	0.527	-50.4	0.332	16.64
0.5	0.701	-132.8	4.386	100.6	0.118	29.7	0.452	-54.7	0.416	15.70
0.6	0.689	-143.4	3.761	94.0	0.121	26.8	0.398	-58.0	0.498	14.94
0.7	0.683	-151.8	3.275	88.5	0.122	25.0	0.358	-61.1	0.579	14.29
0.8	0.679	-158.5	2.894	83.6	0.122	24.1	0.328	-64.1	0.662	13.74
0.9	0.678	-164.2	2.590	79.2	0.122	23.8	0.306	-67.6	0.743	13.25
1.0	0.678	-169.0	2.345	75.0	0.122	24.0	0.291	-71.0	0.821	12.83
1.1	0.681	-173.3	2.148	71.3	0.122	24.4	0.280	-74.7	0.891	12.45
1.2	0.685	-176.9	1.972	68.0	0.122	25.3	0.274	-78.4	0.955	12.08
1.3	0.685	-180.0	1.824	64.9	0.122	26.4	0.270	-82.3	1.034	10.62
1.4	0.689	-177.1	1.700	61.8	0.122	27.7	0.269	-85.8	1.091	9.59
1.5	0.694	-174.5	1.596	58.8	0.123	29.2	0.269	-89.7	1.137	8.89
1.6	0.696	-172.2	1.496	55.9	0.124	30.9	0.271	-93.3	1.198	8.14
1.7	0.699	-170.1	1.418	53.4	0.125	32.8	0.273	-96.6	1.237	7.61
1.8	0.701	-168.2	1.342	50.7	0.127	34.8	0.277	-100.0	1.280	7.07
1.9	0.703	-166.4	1.281	48.2	0.130	36.8	0.280	-103.5	1.303	6.65
2.0	0.707	-164.6	1.220	45.9	0.133	38.7	0.284	-106.9	1.319	6.25
2.1	0.711	-163.0	1.174	43.7	0.136	40.8	0.287	-110.4	1.326	5.93
2.2	0.711	-161.5	1.128	41.9	0.141	42.5	0.291	-114.0	1.341	5.55
2.3	0.714	-159.8	1.082	39.8	0.146	44.1	0.295	-117.5	1.338	5.22
2.4	0.718	-158.2	1.045	38.1	0.152	45.5	0.300	-121.1	1.322	4.98
2.5	0.719	-156.7	1.008	36.0	0.158	46.9	0.305	-124.9	1.320	4.66
2.6	0.722	-155.1	0.978	34.2	0.164	48.2	0.313	-128.7	1.299	4.48
2.7	0.724	-153.7	0.945	32.5	0.171	49.0	0.320	-132.4	1.291	4.20
2.8	0.726	-152.1	0.910	31.1	0.178	49.4	0.329	-135.8	1.283	3.90
2.9	0.719	-150.3	0.874	28.8	0.187	49.5	0.334	-139.3	1.301	3.41
3.0	0.723	-148.2	0.851	27.0	0.196	50.3	0.342	-143.0	1.269	3.25
4.0	0.743	-131.1	0.672	12.9	0.292	46.8	0.420	-175.9	1.117	1.54
5.0	0.767	-120.2	0.555	0.9	0.396	24.3	0.425	-133.7	1.093	-0.39

V_{CE} = 1 V, I_C = 5 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	0.797	-53.2	13.654	147.6	0.047	62.1	0.856	-29.1	0.140	24.63
0.2	0.724	-92.2	10.554	126.1	0.072	47.1	0.652	-47.8	0.238	21.64
0.3	0.690	-116.9	8.178	112.7	0.084	39.1	0.498	-58.9	0.340	19.88
0.4	0.669	-133.8	6.515	103.2	0.090	34.8	0.397	-66.4	0.443	18.57
0.5	0.657	-145.9	5.372	96.1	0.094	32.8	0.328	-72.0	0.544	17.55
0.6	0.650	-154.8	4.553	90.5	0.098	32.2	0.280	-77.1	0.640	16.69
0.7	0.651	-161.7	3.931	85.8	0.100	32.3	0.245	-81.8	0.725	15.93
0.8	0.650	-167.3	3.465	81.6	0.103	32.9	0.221	-86.6	0.807	15.28
0.9	0.652	-172.0	3.085	78.0	0.105	33.8	0.203	-91.9	0.883	14.66
1.0	0.653	-176.0	2.781	74.4	0.108	35.0	0.193	-96.8	0.952	14.10
1.1	0.657	-179.6	2.540	71.2	0.111	36.2	0.186	-101.8	1.007	13.09
1.2	0.662	-177.4	2.333	68.2	0.114	37.5	0.183	-106.2	1.049	11.74
1.3	0.663	-174.6	2.154	65.4	0.118	38.8	0.182	-110.6	1.104	10.67
1.4	0.667	-172.2	2.006	62.7	0.121	40.1	0.184	-114.3	1.136	9.94
1.5	0.674	-169.9	1.878	60.0	0.125	41.2	0.186	-118.0	1.156	9.36
1.6	0.675	-168.1	1.761	57.3	0.129	42.4	0.190	-121.3	1.191	8.70
1.7	0.677	-166.3	1.669	55.0	0.134	43.7	0.193	-124.3	1.206	8.21
1.8	0.679	-164.7	1.582	52.7	0.138	44.8	0.197	-127.3	1.225	7.72
1.9	0.682	-163.1	1.510	50.4	0.144	45.7	0.201	-130.0	1.231	7.32
2.0	0.685	-161.5	1.436	48.1	0.149	46.6	0.205	-132.9	1.236	6.91
2.1	0.687	-160.1	1.382	46.2	0.155	47.5	0.208	-135.9	1.239	6.57
2.2	0.691	-158.6	1.330	44.4	0.161	48.1	0.213	-138.8	1.232	6.28
2.3	0.692	-157.3	1.277	42.4	0.167	48.5	0.218	-141.9	1.230	5.93
2.4	0.695	-155.9	1.233	40.6	0.174	48.9	0.224	-144.8	1.219	5.67
2.5	0.695	-154.5	1.189	38.7	0.181	49.4	0.230	-147.8	1.219	5.35
2.6	0.698	-153.1	1.154	37.0	0.188	49.7	0.238	-150.7	1.208	5.14
2.7	0.700	-151.8	1.115	35.3	0.195	49.6	0.245	-153.8	1.203	4.86
2.8	0.702	-150.3	1.079	33.8	0.201	49.4	0.254	-156.4	1.199	4.59
2.9	0.693	-148.7	1.034	31.5	0.211	48.9	0.262	-158.9	1.221	4.07
3.0	0.698	-146.7	1.010	29.7	0.219	49.1	0.270	-161.8	1.197	3.95
4.0	0.721	-130.9	0.797	13.8	0.301	43.5	0.354	-172.5	1.098	2.32
5.0	0.757	-120.7	0.638	-0.5	0.392	22.9	0.385	-126.6	1.060	0.62

V_{CE} = 1 V, I_C = 7 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	0.746	-63.1	17.039	142.8	0.044	58.2	0.804	-36.5	0.173	25.90
0.2	0.678	-104.5	12.394	120.8	0.064	45.4	0.572	-58.1	0.293	22.90
0.3	0.655	-128.2	9.265	108.3	0.072	39.2	0.422	-70.7	0.417	21.09
0.4	0.640	-143.2	7.254	99.8	0.078	37.1	0.329	-80.0	0.539	19.71
0.5	0.636	-153.7	5.930	93.4	0.082	36.9	0.268	-87.7	0.644	18.59
0.6	0.634	-161.5	4.994	88.4	0.086	37.6	0.227	-95.1	0.742	17.64
0.7	0.634	-167.7	4.295	84.2	0.090	38.5	0.200	-102.2	0.828	16.78
0.8	0.637	-172.4	3.776	80.5	0.094	39.9	0.182	-109.2	0.899	16.02
0.9	0.639	-176.6	3.354	77.0	0.099	41.1	0.172	-116.4	0.963	15.31
1.0	0.642	-179.9	3.029	73.8	0.103	42.4	0.167	-122.4	1.014	13.94
1.1	0.646	-176.7	2.758	71.0	0.108	43.7	0.165	-128.0	1.056	12.62
1.2	0.650	-174.0	2.528	68.2	0.113	44.8	0.166	-132.5	1.089	11.67
1.3	0.652	-171.7	2.331	65.7	0.118	45.8	0.168	-136.8	1.125	10.80
1.4	0.657	-169.5	2.175	63.1	0.124	46.7	0.171	-140.0	1.142	10.17
1.5	0.662	-167.5	2.037	60.5	0.129	47.5	0.175	-143.3	1.153	9.61
1.6	0.663	-165.6	1.910	58.1	0.135	48.2	0.179	-145.9	1.177	8.97
1.7	0.667	-164.1	1.808	56.0	0.141	49.0	0.182	-148.3	1.180	8.52
1.8	0.669	-162.7	1.713	53.7	0.146	49.5	0.187	-150.8	1.192	8.03
1.9	0.671	-161.1	1.635	51.5	0.153	49.9	0.190	-152.9	1.193	7.64
2.0	0.675	-159.6	1.558	49.4	0.159	50.2	0.194	-155.2	1.193	7.25
2.1	0.677	-158.4	1.499	47.5	0.165	50.6	0.198	-157.5	1.192	6.92
2.2	0.679	-157.1	1.439	45.7	0.172	50.7	0.202	-159.9	1.188	6.60
2.3	0.681	-155.8	1.383	43.8	0.180	50.7	0.208	-162.3	1.185	6.26
2.4	0.684	-154.5	1.335	42.2	0.187	50.6	0.213	-164.6	1.175	6.00
2.5	0.684	-153.2	1.289	40.2	0.194	50.6	0.218	-166.9	1.174	5.69
2.6	0.688	-151.8	1.252	38.6	0.201	50.5	0.225	-169.0	1.164	5.49
2.7	0.688	-150.6	1.210	36.9	0.208	50.2	0.232	-171.6	1.165	5.18
2.8	0.689	-149.2	1.168	35.5	0.215	49.6	0.241	-173.3	1.166	4.89
2.9	0.680	-147.6	1.123	33.2	0.224	48.8	0.248	-175.1	1.184	4.40
3.0	0.686	-145.5	1.098	31.4	0.233	48.9	0.255	-177.1	1.162	4.30
4.0	0.709	-130.5	0.870	15.0	0.308	41.7	0.333	-162.8	1.088	2.69
5.0	0.750	-121.0	0.688	0.0	0.390	22.0	0.372	-120.7	1.050	1.09

V_{CE} = 1 V, I_C = 10 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	0.682	-76.0	20.942	137.2	0.039	56.9	0.737	-45.6	0.195	27.35
0.2	0.635	-118.3	14.138	115.5	0.054	44.6	0.491	-70.1	0.373	24.15
0.3	0.624	-139.1	10.231	104.1	0.061	41.5	0.355	-85.1	0.521	22.24
0.4	0.620	-152.1	7.900	96.6	0.067	41.5	0.278	-97.0	0.648	20.72
0.5	0.620	-161.1	6.402	91.0	0.072	42.6	0.231	-107.6	0.756	19.48
0.6	0.620	-167.7	5.379	86.5	0.077	44.1	0.203	-117.5	0.846	18.42
0.7	0.624	-172.9	4.617	82.9	0.083	45.5	0.186	-126.7	0.916	17.44
0.8	0.627	-177.0	4.050	79.5	0.089	47.0	0.178	-134.8	0.972	16.57
0.9	0.629	-179.3	3.593	76.3	0.095	48.4	0.175	-142.1	1.023	14.85
1.0	0.633	-176.4	3.235	73.3	0.101	49.5	0.176	-147.9	1.058	13.57
1.1	0.638	-173.5	2.942	70.8	0.108	50.4	0.179	-152.8	1.086	12.58
1.2	0.643	-171.0	2.694	68.1	0.114	51.1	0.183	-156.5	1.105	11.74
1.3	0.645	-169.0	2.493	65.8	0.121	51.8	0.187	-159.8	1.125	11.00
1.4	0.649	-166.9	2.322	63.4	0.127	52.3	0.192	-162.4	1.136	10.37
1.5	0.655	-165.1	2.173	61.0	0.134	52.6	0.196	-164.9	1.138	9.84
1.6	0.656	-163.5	2.037	58.8	0.140	52.9	0.200	-166.9	1.154	9.23
1.7	0.660	-162.0	1.929	56.7	0.147	53.1	0.203	-168.9	1.154	8.79
1.8	0.662	-160.7	1.826	54.6	0.154	53.3	0.207	-170.9	1.160	8.31
1.9	0.664	-159.3	1.743	52.5	0.161	53.2	0.210	-172.7	1.159	7.92
2.0	0.667	-158.1	1.663	50.5	0.168	53.1	0.213	-174.5	1.157	7.54
2.1	0.668	-156.9	1.598	48.7	0.175	53.1	0.217	-176.5	1.157	7.20
2.2	0.670	-155.6	1.535	47.0	0.183	52.7	0.220	-178.4	1.154	6.86
2.3	0.672	-154.4	1.475	45.0	0.191	52.4	0.225	-179.6	1.150	6.54
2.4	0.676	-153.2	1.423	43.5	0.198	52.0	0.229	-177.9	1.140	6.29
2.5	0.675	-151.9	1.373	41.6	0.206	51.7	0.234	-176.1	1.141	5.96
2.6	0.678	-150.5	1.332	40.0	0.213	51.3	0.239	-174.4	1.136	5.72
2.7	0.679	-149.5	1.289	38.5	0.220	50.7	0.247	-172.6	1.135	5.45
2.8	0.679	-148.0	1.247	36.9	0.227	49.9	0.253	-171.2	1.138	5.15
2.9	0.672	-146.5	1.199	34.8	0.236	49.0	0.260	-170.0	1.151	4.70
3.0	0.675	-144.6	1.171	33.0	0.245	48.8	0.265	-168.4	1.138	4.54
4.0	0.697	-130.2	0.930	16.5	0.317	40.2	0.332	-152.7	1.084	2.91
5.0	0.744	-121.1	0.733	0.9	0.390	21.0	0.370	-114.7	1.045	1.44

V_{CE} = 1 V, I_C = 20 mA, Z₀ = 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	0.577	-105.5	27.459	126.2	0.031	52.8	0.601	-65.1	0.333	29.51
0.2	0.588	-141.5	16.403	107.2	0.040	48.0	0.380	-95.3	0.565	26.12
0.3	0.597	-156.5	11.431	98.1	0.047	49.8	0.289	-114.8	0.730	23.87
0.4	0.601	-165.6	8.683	92.1	0.054	52.1	0.249	-129.8	0.843	22.03
0.5	0.605	-171.8	6.985	87.6	0.062	54.2	0.230	-141.9	0.924	20.52
0.6	0.609	-176.5	5.835	83.9	0.070	56.1	0.223	-151.7	0.980	19.23
0.7	0.614	-179.6	4.999	80.8	0.078	57.3	0.223	-159.2	1.020	17.22
0.8	0.618	-176.4	4.370	77.9	0.086	58.1	0.226	-165.3	1.050	15.71
0.9	0.622	-173.6	3.881	75.2	0.094	58.8	0.232	-170.2	1.071	14.53
1.0	0.627	-171.2	3.486	72.6	0.102	59.1	0.237	-174.0	1.087	13.54
1.1	0.633	-169.0	3.174	70.2	0.110	59.4	0.244	-176.9	1.095	12.72
1.2	0.638	-166.9	2.905	67.9	0.119	59.3	0.249	-179.5	1.100	11.96
1.3	0.639	-165.2	2.678	65.8	0.127	59.3	0.255	-178.3	1.113	11.21
1.4	0.644	-163.4	2.492	63.6	0.134	59.1	0.259	-176.5	1.115	10.62
1.5	0.650	-161.9	2.331	61.5	0.143	58.7	0.264	-174.7	1.113	10.09
1.6	0.651	-160.5	2.191	59.4	0.150	58.4	0.267	-173.2	1.119	9.54
1.7	0.653	-159.2	2.073	57.5	0.158	58.1	0.270	-171.5	1.118	9.08
1.8	0.656	-158.0	1.962	55.6	0.166	57.7	0.273	-169.8	1.120	8.62
1.9	0.657	-156.6	1.872	53.6	0.174	57.1	0.276	-168.3	1.120	8.22
2.0	0.660	-155.6	1.785	51.8	0.182	56.5	0.277	-166.7	1.117	7.84
2.1	0.663	-154.7	1.716	50.1	0.189	56.0	0.280	-164.8	1.112	7.53
2.2	0.663	-153.4	1.649	48.6	0.197	55.2	0.282	-163.0	1.112	7.18
2.3	0.665	-152.3	1.583	46.7	0.206	54.4	0.286	-161.4	1.108	6.85
2.4	0.668	-151.2	1.527	45.2	0.214	53.6	0.289	-159.8	1.103	6.57
2.5	0.668	-150.0	1.474	43.4	0.222	53.0	0.292	-158.3	1.103	6.26
2.6	0.671	-148.8	1.430	41.9	0.230	52.3	0.296	-156.9	1.097	6.04
2.7	0.670	-147.8	1.383	40.4	0.237	51.4	0.302	-155.3	1.101	5.72
2.8	0.671	-146.4	1.338	38.9	0.244	50.4	0.307	-154.3	1.102	5.44
2.9	0.662	-144.9	1.286	36.9	0.254	49.1	0.311	-153.4	1.115	4.99
3.0	0.666	-143.1	1.260	35.2	0.262	48.7	0.313	-152.1	1.104	4.86
4.0	0.686	-129.4	1.003	18.8	0.329	38.5	0.360	-139.6	1.073	3.19
5.0	0.736	-121.1	0.786	3.0	0.391	19.5	0.389	-106.1	1.045	1.73

V_{CE} = 2 V, I_C = 1 mA, Z₀ = 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	0.954	-25.8	3.637	162.4	0.046	75.7	0.977	-7.9	0.066	18.97
0.2	0.919	-50.0	3.349	146.6	0.086	62.3	0.928	-15.1	0.122	15.91
0.3	0.882	-70.7	3.007	133.7	0.115	50.7	0.866	-21.0	0.172	14.17
0.4	0.846	-88.6	2.666	122.2	0.135	41.5	0.807	-25.5	0.226	12.95
0.5	0.817	-103.9	2.369	112.2	0.148	33.9	0.754	-29.1	0.282	12.05
0.6	0.794	-116.8	2.114	103.6	0.155	27.7	0.713	-32.2	0.341	11.36
0.7	0.778	-127.4	1.886	96.4	0.158	22.7	0.677	-34.9	0.404	10.77
0.8	0.767	-136.4	1.702	89.9	0.158	18.6	0.651	-37.7	0.466	10.32
0.9	0.759	-144.1	1.544	84.0	0.157	15.2	0.629	-40.7	0.534	9.94
1.0	0.755	-150.9	1.414	78.5	0.154	12.6	0.614	-43.7	0.600	9.64
1.1	0.753	-156.8	1.304	73.8	0.149	10.3	0.600	-46.9	0.669	9.41
1.2	0.753	-162.0	1.208	69.3	0.144	8.7	0.592	-50.1	0.740	9.23
1.3	0.752	-166.4	1.122	65.4	0.138	7.5	0.585	-53.7	0.826	9.09
1.4	0.754	-170.5	1.049	61.4	0.132	6.9	0.581	-57.1	0.908	8.98
1.5	0.759	-174.1	0.988	57.8	0.127	6.8	0.579	-60.6	0.972	8.93
1.6	0.758	-177.4	0.926	54.3	0.120	7.5	0.577	-64.2	1.092	7.03
1.7	0.761	-179.8	0.878	51.3	0.114	8.8	0.575	-67.6	1.190	6.25
1.8	0.763	-177.0	0.831	48.3	0.107	11.0	0.577	-71.2	1.304	5.57
1.9	0.765	-174.4	0.793	45.6	0.102	14.0	0.577	-74.8	1.411	5.08
2.0	0.769	-172.0	0.754	43.0	0.098	17.9	0.576	-78.3	1.516	4.64
2.1	0.771	-169.9	0.726	40.8	0.094	22.7	0.577	-81.9	1.611	4.29
2.2	0.771	-167.7	0.696	39.0	0.092	27.9	0.580	-85.6	1.699	3.92
2.3	0.775	-165.6	0.668	36.9	0.092	33.6	0.582	-89.2	1.739	3.62
2.4	0.779	-163.5	0.645	35.5	0.094	39.4	0.581	-93.1	1.731	3.39
2.5	0.779	-161.5	0.620	33.6	0.098	45.2	0.581	-97.0	1.733	3.03
2.6	0.780	-159.5	0.600	32.4	0.103	50.5	0.584	-101.2	1.697	2.76
2.7	0.782	-157.7	0.579	31.1	0.111	54.3	0.585	-105.3	1.633	2.52
2.8	0.783	-155.7	0.558	30.1	0.119	57.4	0.590	-109.0	1.578	2.23
2.9	0.776	-153.6	0.532	28.5	0.131	59.4	0.587	-112.9	1.597	1.55
3.0	0.780	-151.1	0.518	27.1	0.143	61.7	0.585	-117.3	1.519	1.34
4.0	0.784	-130.9	0.436	22.4	0.279	59.0	0.603	-156.3	1.202	-0.78
5.0	0.772	-119.1	0.450	12.7	0.412	29.5	0.514	-147.7	1.178	-2.17

$V_{CE} = 2\text{ V}$, $I_C = 3\text{ mA}$, $Z_o = 50\ \Omega$

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	0.877	-37.4	9.369	155.5	0.043	69.6	0.929	-16.7	0.110	23.37
0.2	0.807	-70.2	7.989	136.5	0.073	54.6	0.799	-29.4	0.173	20.37
0.3	0.759	-94.4	6.646	122.7	0.091	43.9	0.675	-37.3	0.250	18.65
0.4	0.721	-113.1	5.548	111.9	0.101	36.9	0.578	-42.4	0.331	17.42
0.5	0.698	-127.6	4.701	103.5	0.106	32.4	0.505	-45.7	0.410	16.47
0.6	0.683	-138.6	4.052	96.7	0.109	29.4	0.451	-48.3	0.493	15.72
0.7	0.675	-147.6	3.539	91.1	0.110	27.6	0.411	-50.3	0.574	15.07
0.8	0.671	-154.9	3.141	86.3	0.111	26.7	0.380	-52.5	0.653	14.52
0.9	0.667	-160.9	2.805	81.7	0.111	26.2	0.357	-55.0	0.740	14.02
1.0	0.667	-166.1	2.548	77.6	0.111	26.5	0.341	-57.7	0.816	13.61
1.1	0.670	-170.6	2.324	73.9	0.111	27.0	0.327	-60.6	0.889	13.21
1.2	0.673	-174.4	2.139	70.6	0.111	27.9	0.319	-63.5	0.954	12.84
1.3	0.673	-177.9	1.979	67.5	0.111	29.0	0.313	-66.8	1.034	11.38
1.4	0.678	-179.1	1.846	64.4	0.112	30.4	0.309	-70.0	1.088	10.38
1.5	0.682	-176.3	1.733	61.3	0.112	32.1	0.307	-73.3	1.137	9.63
1.6	0.683	-173.9	1.622	58.4	0.113	33.9	0.306	-76.6	1.202	8.85
1.7	0.687	-171.8	1.536	55.9	0.115	35.9	0.306	-79.7	1.237	8.33
1.8	0.689	-169.7	1.456	53.3	0.116	38.1	0.306	-83.1	1.278	7.80
1.9	0.690	-167.8	1.387	50.8	0.119	40.1	0.308	-86.2	1.305	7.34
2.0	0.694	-165.8	1.321	48.4	0.122	42.2	0.308	-89.4	1.326	6.92
2.1	0.698	-164.2	1.271	46.2	0.126	44.3	0.310	-92.8	1.323	6.64
2.2	0.700	-162.6	1.220	44.4	0.130	46.2	0.312	-96.2	1.331	6.28
2.3	0.701	-160.9	1.172	42.3	0.135	47.9	0.314	-99.7	1.331	5.93
2.4	0.706	-159.3	1.132	40.6	0.141	49.4	0.315	-103.4	1.312	5.70
2.5	0.706	-157.7	1.091	38.4	0.147	50.9	0.318	-107.1	1.308	5.37
2.6	0.710	-156.1	1.056	36.7	0.153	52.3	0.323	-111.0	1.287	5.16
2.7	0.713	-154.7	1.023	34.9	0.160	53.1	0.326	-114.8	1.268	4.94
2.8	0.713	-152.9	0.984	33.4	0.167	53.5	0.333	-118.4	1.270	4.58
2.9	0.706	-151.3	0.943	31.1	0.176	53.6	0.335	-122.2	1.291	4.05
3.0	0.710	-149.1	0.919	29.2	0.186	54.5	0.341	-126.2	1.250	3.94
4.0	0.734	-131.7	0.717	14.3	0.283	51.2	0.400	-162.1	1.086	2.25
5.0	0.762	-120.8	0.587	1.2	0.396	27.9	0.395	-143.7	1.048	0.37

$V_{CE} = 2\text{ V}$, $I_C = 5\text{ mA}$, $Z_o = 50\ \Omega$

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	0.815	-48.1	13.938	150.2	0.040	66.4	0.880	-24.1	0.115	25.41
0.2	0.728	-85.1	11.099	129.3	0.064	50.4	0.696	-40.1	0.236	22.41
0.3	0.684	-110.0	8.760	115.8	0.075	41.8	0.548	-49.2	0.339	20.67
0.4	0.659	-127.6	7.070	106.0	0.082	37.5	0.446	-54.6	0.439	19.37
0.5	0.644	-140.5	5.859	98.8	0.086	35.3	0.374	-58.3	0.537	18.33
0.6	0.635	-149.9	4.991	92.9	0.089	34.5	0.323	-61.2	0.632	17.49
0.7	0.631	-157.6	4.318	88.2	0.092	34.5	0.285	-63.9	0.722	16.73
0.8	0.631	-163.7	3.803	83.9	0.094	35.2	0.257	-66.6	0.805	16.07
0.9	0.632	-168.8	3.391	80.1	0.097	35.9	0.236	-69.9	0.881	15.45
1.0	0.633	-173.1	3.066	76.6	0.099	37.2	0.221	-73.2	0.948	14.90
1.1	0.637	-177.0	2.795	73.4	0.102	38.4	0.211	-76.9	1.004	13.99
1.2	0.641	-179.7	2.565	70.3	0.105	39.7	0.204	-80.4	1.051	12.48
1.3	0.642	-177.0	2.371	67.6	0.108	41.0	0.199	-84.2	1.102	11.45
1.4	0.647	-174.3	2.209	64.8	0.112	42.3	0.197	-87.7	1.136	10.72
1.5	0.653	-171.9	2.071	62.1	0.116	43.6	0.196	-91.2	1.155	10.14
1.6	0.654	-169.8	1.941	59.6	0.119	44.9	0.196	-94.7	1.191	9.47
1.7	0.657	-167.9	1.835	57.2	0.124	46.2	0.196	-97.8	1.206	8.96
1.8	0.661	-166.3	1.738	54.9	0.128	47.4	0.198	-101.1	1.221	8.48
1.9	0.662	-164.5	1.656	52.6	0.133	48.4	0.200	-104.1	1.230	8.05
2.0	0.666	-163.1	1.579	50.3	0.138	49.4	0.201	-107.4	1.234	7.66
2.1	0.668	-161.5	1.518	48.3	0.144	50.3	0.203	-110.6	1.233	7.33
2.2	0.669	-160.0	1.456	46.5	0.150	51.0	0.206	-113.9	1.236	6.95
2.3	0.673	-158.6	1.399	44.4	0.156	51.5	0.208	-117.3	1.227	6.66
2.4	0.677	-157.1	1.350	42.9	0.163	52.0	0.212	-120.7	1.214	6.40
2.5	0.677	-155.7	1.303	40.7	0.170	52.6	0.215	-124.3	1.210	6.09
2.6	0.681	-154.2	1.263	39.0	0.176	52.9	0.221	-127.9	1.197	5.88
2.7	0.684	-153.0	1.224	37.5	0.183	53.0	0.225	-131.6	1.186	5.65
2.8	0.683	-151.5	1.176	35.8	0.189	52.8	0.232	-134.8	1.197	5.25
2.9	0.677	-149.8	1.130	33.6	0.199	52.2	0.238	-138.3	1.207	4.80
3.0	0.681	-147.8	1.105	31.6	0.207	52.6	0.245	-141.7	1.181	4.69
4.0	0.707	-131.8	0.863	15.0	0.290	47.4	0.317	-173.0	1.076	3.05
5.0	0.749	-121.7	0.683	-0.1	0.389	26.5	0.343	-136.1	1.021	1.56

V_{CE} = 2 V, I_C = 7 mA, Z₀ = 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	0.759	-55.9	17.551	145.9	0.037	62.6	0.835	-30.2	0.161	26.74
0.2	0.675	-96.2	13.198	124.2	0.057	48.5	0.619	-48.4	0.291	23.68
0.3	0.642	-120.7	10.045	111.4	0.065	42.1	0.466	-58.2	0.414	21.86
0.4	0.622	-136.9	7.947	102.5	0.071	39.7	0.368	-64.4	0.532	20.49
0.5	0.613	-148.3	6.520	95.9	0.075	39.1	0.301	-69.1	0.640	19.37
0.6	0.610	-156.9	5.518	90.7	0.079	39.5	0.254	-73.1	0.734	18.42
0.7	0.609	-163.5	4.761	86.4	0.083	40.4	0.220	-77.1	0.820	17.57
0.8	0.610	-169.0	4.181	82.6	0.087	41.6	0.196	-81.3	0.895	16.81
0.9	0.613	-173.5	3.720	79.1	0.091	42.9	0.178	-86.1	0.959	16.10
1.0	0.616	-177.2	3.360	75.9	0.096	44.3	0.166	-90.8	1.010	14.85
1.1	0.620	179.3	3.057	72.9	0.100	45.4	0.158	-95.7	1.052	13.45
1.2	0.626	176.4	2.807	70.2	0.105	46.7	0.154	-100.2	1.083	12.52
1.3	0.628	174.0	2.589	67.6	0.110	47.7	0.151	-104.7	1.120	11.63
1.4	0.632	171.4	2.406	65.1	0.115	48.7	0.151	-108.7	1.142	10.94
1.5	0.637	169.4	2.258	62.5	0.120	49.4	0.152	-112.5	1.153	10.38
1.6	0.639	167.5	2.116	60.1	0.125	50.3	0.153	-116.0	1.174	9.76
1.7	0.642	165.9	2.003	57.9	0.131	51.0	0.155	-119.1	1.180	9.28
1.8	0.646	164.3	1.896	55.7	0.136	51.7	0.157	-122.3	1.187	8.82
1.9	0.647	162.6	1.808	53.5	0.142	52.2	0.159	-125.1	1.193	8.39
2.0	0.651	161.2	1.722	51.3	0.148	52.7	0.161	-128.0	1.193	7.99
2.1	0.655	159.9	1.657	49.5	0.154	53.1	0.163	-131.1	1.185	7.70
2.2	0.655	158.6	1.589	47.7	0.161	53.2	0.166	-134.0	1.191	7.31
2.3	0.658	157.1	1.526	45.7	0.168	53.3	0.170	-137.2	1.183	7.00
2.4	0.661	155.8	1.473	44.1	0.175	53.3	0.174	-140.3	1.173	6.73
2.5	0.662	154.5	1.419	42.2	0.182	53.4	0.178	-143.4	1.169	6.43
2.6	0.665	153.1	1.377	40.6	0.188	53.4	0.184	-146.3	1.163	6.19
2.7	0.667	151.9	1.330	38.9	0.196	53.1	0.189	-149.7	1.157	5.92
2.8	0.667	150.4	1.286	37.2	0.202	52.6	0.197	-152.1	1.160	5.61
2.9	0.660	149.0	1.233	35.1	0.211	51.8	0.203	-155.0	1.175	5.13
3.0	0.664	146.9	1.205	33.1	0.220	51.9	0.210	-157.8	1.155	5.00
4.0	0.692	131.7	0.945	16.3	0.296	45.3	0.286	176.6	1.074	3.38
5.0	0.743	122.2	0.742	0.4	0.386	25.3	0.323	129.3	1.012	2.17

V_{CE} = 2 V, I_C = 10 mA, Z₀ = 50 Ω

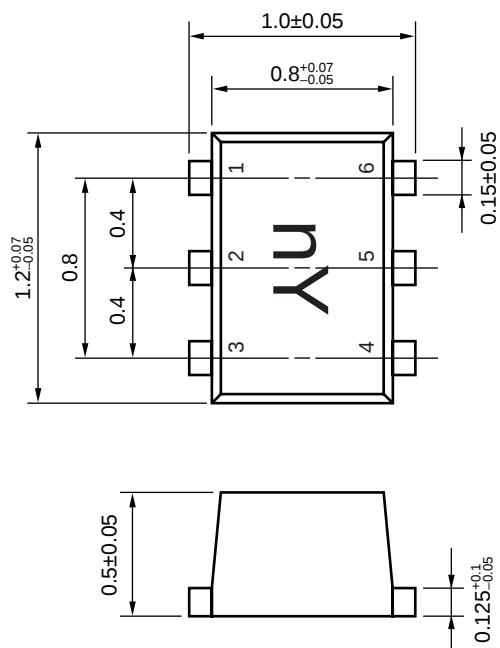
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.685	-67.3	21.836	140.6	0.034	59.2	0.775	-37.8	0.212	28.05
0.2	0.622	-109.4	15.335	118.8	0.049	47.4	0.534	-58.2	0.369	24.97
0.3	0.604	-131.9	11.275	107.0	0.056	43.9	0.387	-69.4	0.512	23.05
0.4	0.593	-146.2	8.776	99.2	0.061	43.7	0.298	-77.3	0.642	21.55
0.5	0.590	-156.2	7.141	93.3	0.067	44.4	0.240	-84.0	0.748	20.29
0.6	0.589	-163.5	6.006	88.6	0.072	45.8	0.200	-90.5	0.839	19.23
0.7	0.591	-169.3	5.166	84.8	0.077	47.2	0.173	-97.1	0.911	18.26
0.8	0.594	-173.7	4.534	81.4	0.082	48.7	0.155	-104.1	0.970	17.40
0.9	0.598	-177.8	4.026	78.2	0.088	49.9	0.144	-111.4	1.017	15.78
1.0	0.602	178.9	3.628	75.2	0.094	51.1	0.137	-118.0	1.052	14.46
1.1	0.606	175.9	3.303	72.6	0.100	52.0	0.135	-124.1	1.080	13.46
1.2	0.613	173.4	3.026	70.0	0.106	52.9	0.134	-129.1	1.098	12.64
1.3	0.615	171.1	2.793	67.7	0.112	53.4	0.136	-133.9	1.121	11.84
1.4	0.619	168.9	2.597	65.2	0.118	54.0	0.138	-137.7	1.134	11.19
1.5	0.625	167.0	2.432	62.9	0.125	54.4	0.141	-141.3	1.138	10.64
1.6	0.626	165.2	2.279	60.6	0.131	54.7	0.144	-144.2	1.152	10.04
1.7	0.631	163.8	2.157	58.5	0.138	55.0	0.146	-146.9	1.150	9.60
1.8	0.633	162.3	2.043	56.4	0.144	55.2	0.149	-149.5	1.157	9.11
1.9	0.637	160.8	1.947	54.3	0.151	55.3	0.151	-151.9	1.154	8.73
2.0	0.639	159.4	1.854	52.3	0.158	55.2	0.154	-154.3	1.156	8.31
2.1	0.640	158.3	1.782	50.4	0.164	55.2	0.156	-156.8	1.154	7.97
2.2	0.644	157.2	1.711	48.8	0.171	54.9	0.160	-159.4	1.148	7.67
2.3	0.645	156.0	1.643	46.8	0.179	54.6	0.163	-161.9	1.146	7.32
2.4	0.648	154.5	1.585	45.3	0.186	54.4	0.167	-164.2	1.138	7.04
2.5	0.649	153.3	1.528	43.4	0.194	54.1	0.172	-166.6	1.136	6.73
2.6	0.652	152.0	1.481	41.8	0.200	53.8	0.177	-168.7	1.131	6.49
2.7	0.654	150.9	1.432	40.2	0.208	53.2	0.184	-171.4	1.128	6.21
2.8	0.655	149.4	1.383	38.7	0.214	52.5	0.190	-173.0	1.129	5.92
2.9	0.647	148.0	1.328	36.4	0.223	51.5	0.196	-175.0	1.145	5.43
3.0	0.652	146.0	1.299	34.6	0.232	51.4	0.202	-176.8	1.127	5.32
4.0	0.677	131.5	1.020	17.7	0.303	43.6	0.274	164.1	1.072	3.63
5.0	0.734	122.6	0.796	1.5	0.384	24.1	0.316	121.3	1.014	2.44

$V_{CE} = 2\text{ V}$, $I_C = 20\text{ mA}$, $Z_O = 50\ \Omega$

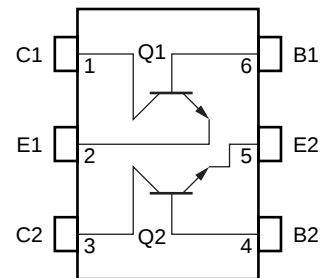
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.567	-93.5	29.706	130.2	0.027	56.1	0.642	-53.8	0.322	30.44
0.2	0.551	-132.7	18.343	110.3	0.037	50.0	0.400	-78.4	0.555	26.98
0.3	0.555	-150.2	12.903	100.5	0.044	51.0	0.283	-93.6	0.718	24.70
0.4	0.557	-160.5	9.865	94.2	0.051	53.5	0.222	-106.3	0.834	22.90
0.5	0.562	-167.8	7.953	89.6	0.058	55.6	0.187	-118.0	0.913	21.39
0.6	0.566	-173.1	6.644	85.7	0.065	57.3	0.168	-129.0	0.972	20.10
0.7	0.571	-177.3	5.703	82.5	0.072	58.5	0.159	-138.8	1.012	18.29
0.8	0.577	179.1	4.997	79.6	0.080	59.3	0.157	-147.3	1.041	16.72
0.9	0.580	175.9	4.430	76.8	0.088	59.9	0.158	-154.5	1.065	15.47
1.0	0.585	173.5	3.987	74.2	0.095	60.4	0.162	-159.9	1.082	14.47
1.1	0.591	171.0	3.627	71.8	0.103	60.6	0.167	-164.3	1.091	13.62
1.2	0.597	168.9	3.316	69.6	0.111	60.6	0.171	-167.7	1.098	12.85
1.3	0.599	167.1	3.061	67.5	0.118	60.7	0.177	-170.7	1.109	12.11
1.4	0.604	165.3	2.845	65.3	0.126	60.5	0.181	-173.0	1.112	11.51
1.5	0.611	163.6	2.663	63.1	0.134	60.2	0.186	-175.4	1.109	10.99
1.6	0.613	162.2	2.489	61.2	0.141	59.9	0.189	-177.2	1.117	10.39
1.7	0.615	160.9	2.359	59.2	0.149	59.6	0.192	-179.3	1.116	9.94
1.8	0.619	159.7	2.234	57.3	0.156	59.2	0.195	-178.8	1.116	9.49
1.9	0.620	158.4	2.130	55.3	0.163	58.8	0.198	177.1	1.116	9.08
2.0	0.623	157.3	2.027	53.4	0.171	58.2	0.200	175.3	1.116	8.67
2.1	0.626	156.1	1.946	51.7	0.178	57.8	0.202	173.2	1.110	8.35
2.2	0.628	155.0	1.868	50.2	0.186	57.0	0.204	171.2	1.110	8.01
2.3	0.630	153.9	1.791	48.3	0.194	56.3	0.208	169.3	1.105	7.67
2.4	0.633	152.7	1.729	46.9	0.202	55.6	0.211	167.7	1.099	7.41
2.5	0.634	151.6	1.667	45.0	0.210	55.0	0.215	166.0	1.098	7.09
2.6	0.636	150.4	1.614	43.6	0.217	54.3	0.219	164.4	1.096	6.83
2.7	0.637	149.2	1.562	42.0	0.224	53.5	0.225	162.7	1.096	6.55
2.8	0.638	147.9	1.509	40.5	0.231	52.5	0.230	161.7	1.098	6.24
2.9	0.631	146.5	1.451	38.4	0.240	51.3	0.235	160.7	1.107	5.82
3.0	0.634	144.7	1.418	36.7	0.248	51.0	0.238	159.4	1.098	5.66
4.0	0.660	130.9	1.116	20.0	0.316	41.3	0.293	146.9	1.063	3.95
5.0	0.721	122.8	0.866	3.7	0.385	22.2	0.332	110.3	1.020	2.65

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)

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