

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA829TD

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

FEATURES

- Low voltage operation, low noise
NF = 1.5 dB TYP. @ $V_{CE} = 3$ V, $I_c = 7$ mA, $f = 2$ GHz
NF = 1.7 dB TYP. @ $V_{CE} = 1$ V, $I_c = 3$ mA, $f = 2$ GHz
- Built-in 2 transistors ($2 \times 2SC5437$)
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

	Q1, Q2
3-pin thin-type ultra super minimold part No.	2SC5437

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA829TD	50 pcs (Non reel)	• 8 mm wide embossed taping
μ PA829TD-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.

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
Collector to Base Voltage	V _{CBO}	9	V
Collector to Emitter Voltage	V _{CEO}	6	V
Emitter to Base Voltage	V _{EBO}	2	V
Collector Current	I _C	100	mA
Total Power Dissipation	P _{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)

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 = 3 mA	80	–	160	–
Gain Bandwidth Product (1)	f _T	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz	4.0	4.5	–	GHz
Gain Bandwidth Product (2)	f _T	V _{CE} = 3 V, I _C = 20 mA, f = 2 GHz	–	9.0	–	GHz
Insertion Power Gain (1)	S _{21e} ²	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz	2.5	3.5	–	dB
Insertion Power Gain (2)	S _{21e} ²	V _{CE} = 3 V, I _C = 20 mA, f = 2 GHz	–	6.5	–	dB
Noise Figure (1)	NF	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.7	2.5	dB
Noise Figure (2)	NF	V _{CE} = 3 V, I _C = 7 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.5	–	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 1 V, I _E = 0 mA, f = 1 MHz	–	0.75	0.85	pF

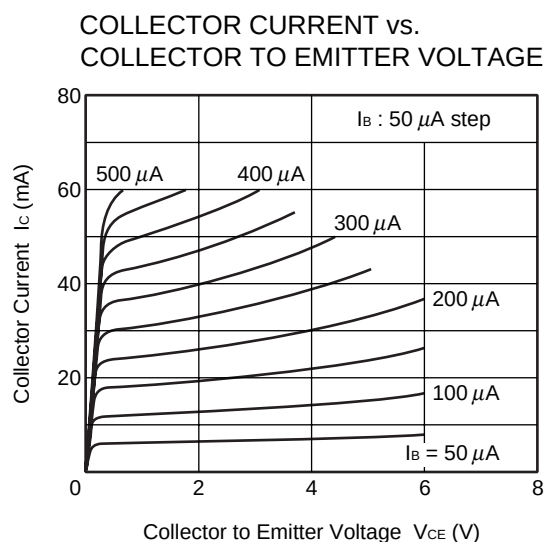
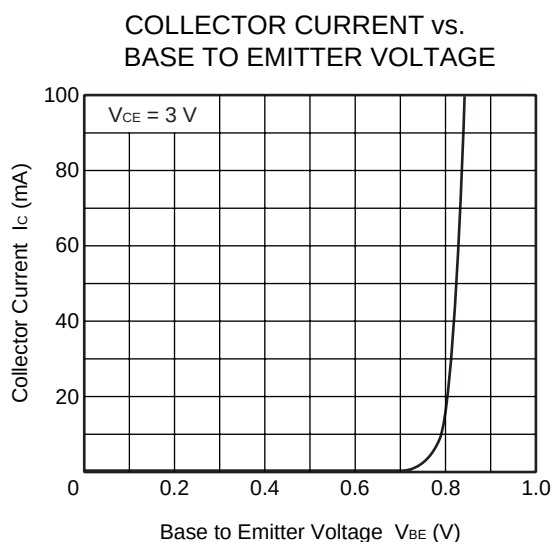
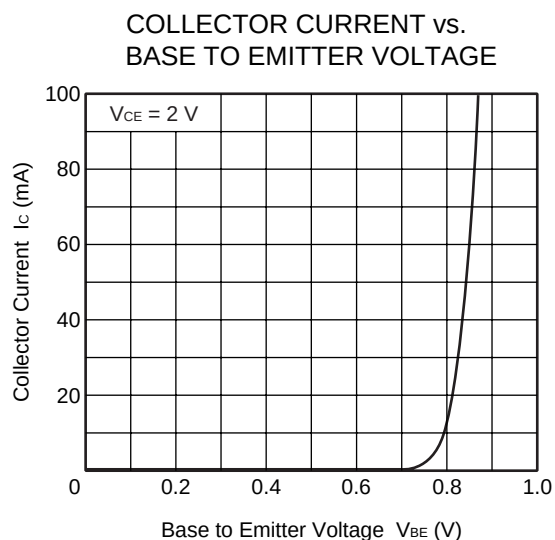
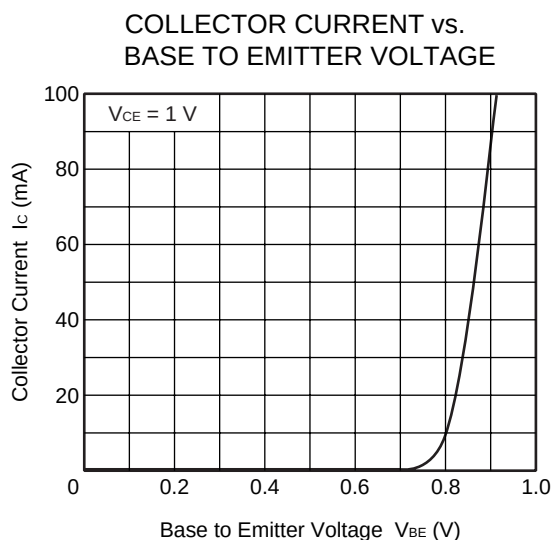
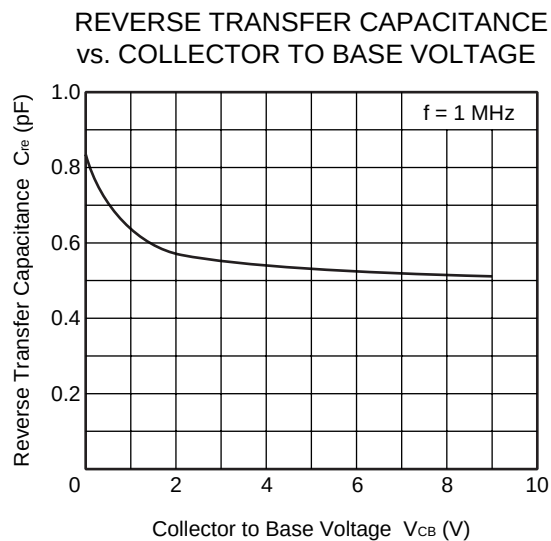
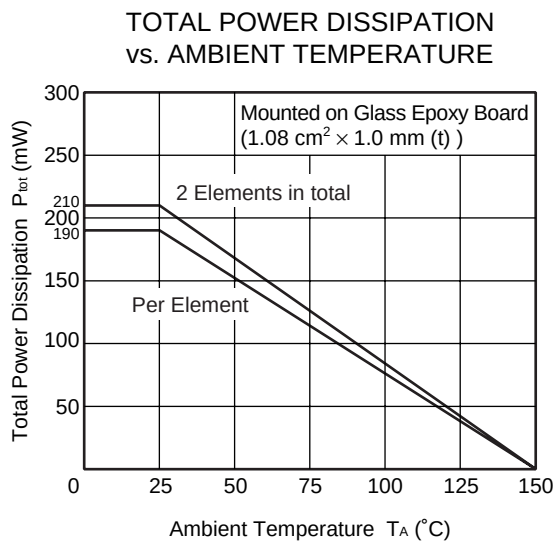
Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

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

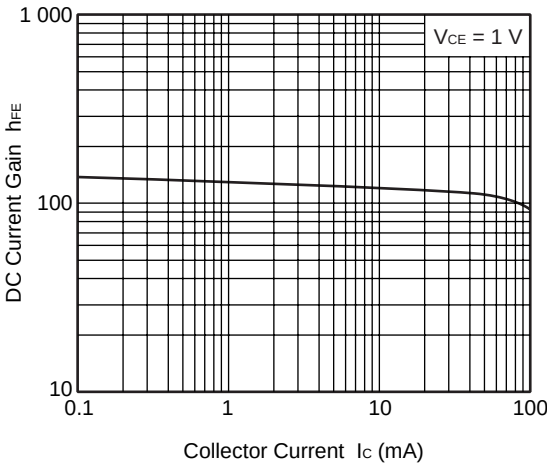
h_{FE} CLASSIFICATION

Rank	FB
Marking	kF
h _{FE} Value	80 to 160

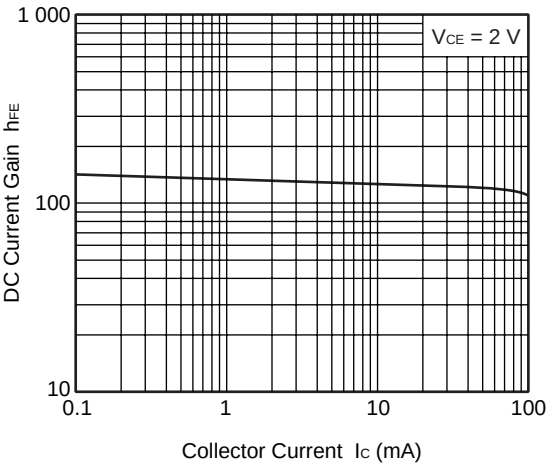
TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^\circ\text{C}$)



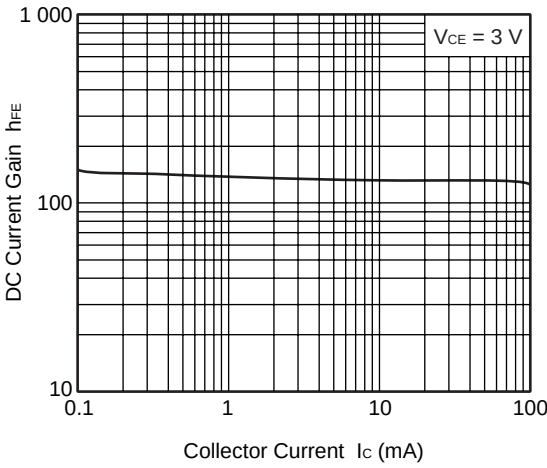
DC CURRENT GAIN vs.
COLLECTOR CURRENT



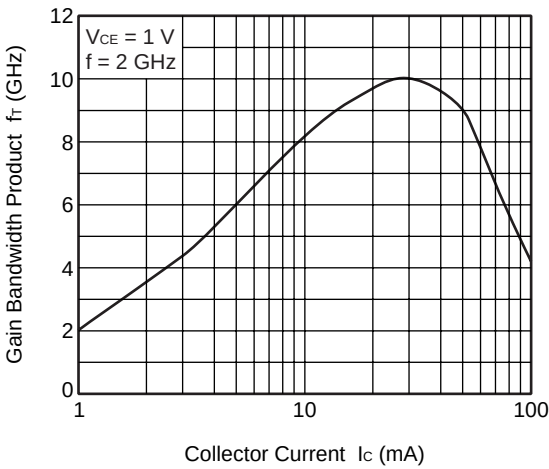
DC CURRENT GAIN vs.
COLLECTOR CURRENT



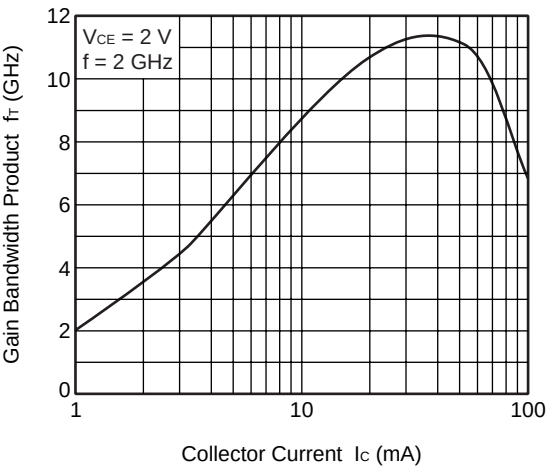
DC CURRENT GAIN vs.
COLLECTOR CURRENT



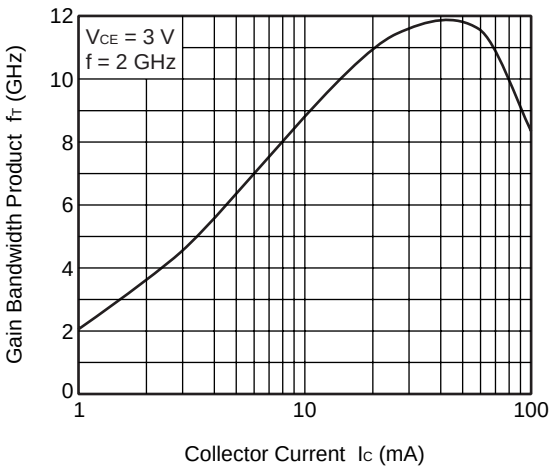
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



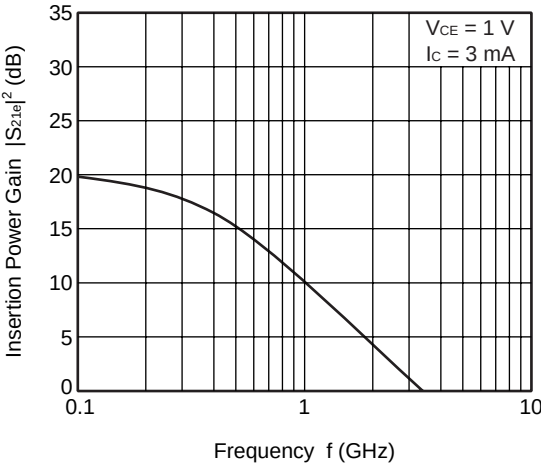
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



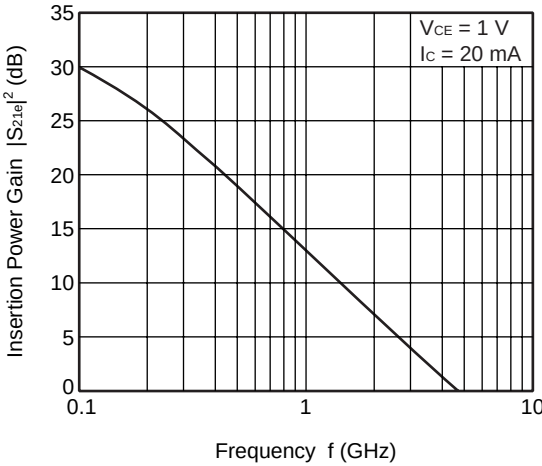
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



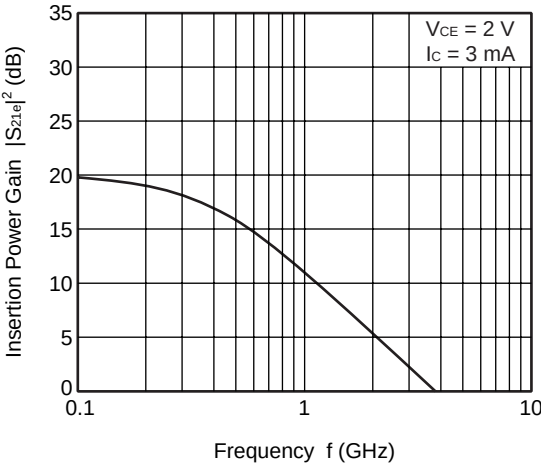
INSERTION POWER GAIN vs. FREQUENCY



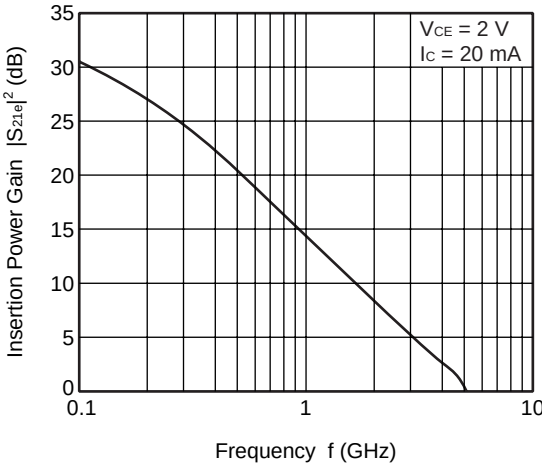
INSERTION POWER GAIN vs. FREQUENCY



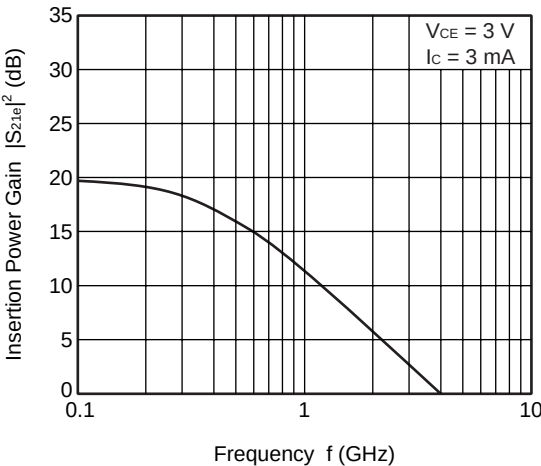
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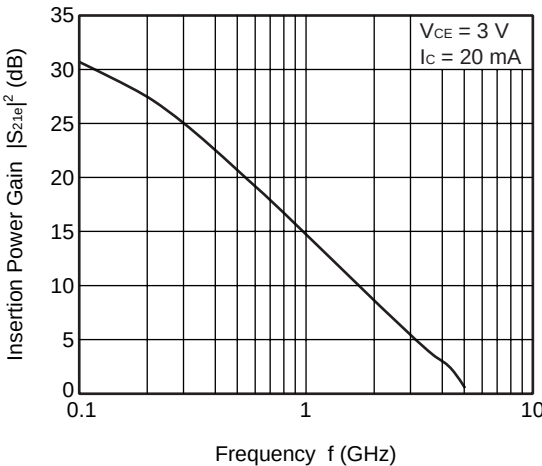
INSERTION POWER GAIN vs. FREQUENCY



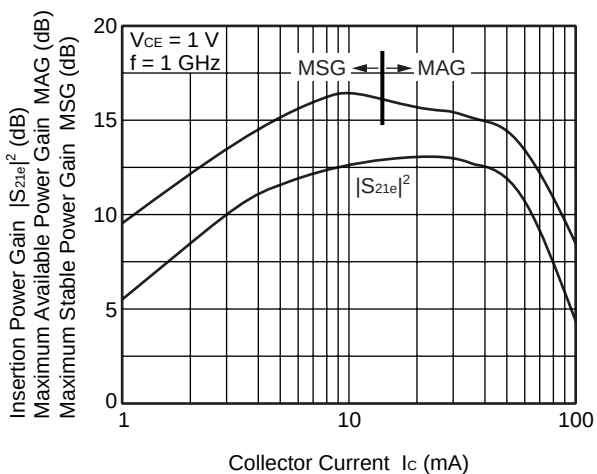
INSERTION POWER GAIN vs. FREQUENCY



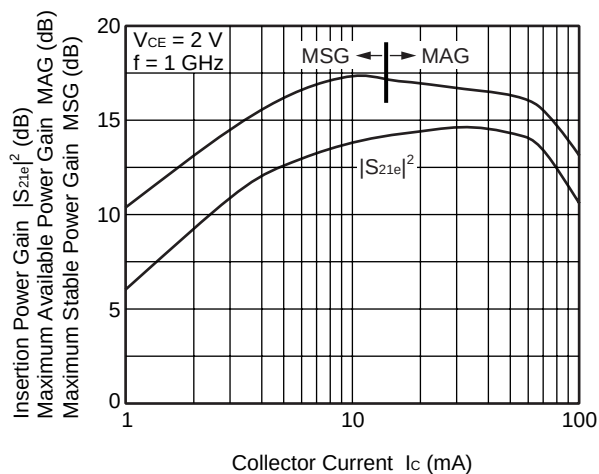
INSERTION POWER GAIN vs. FREQUENCY



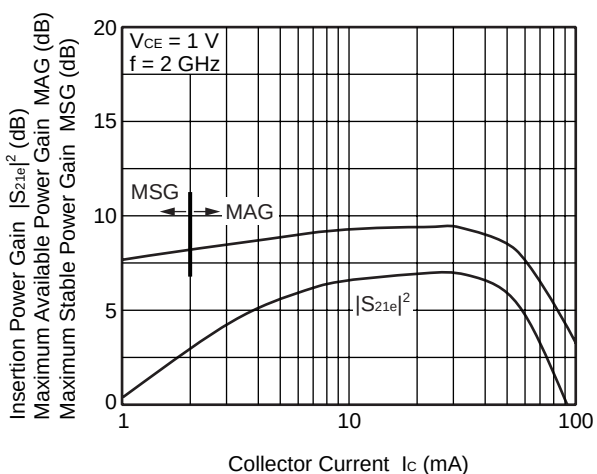
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



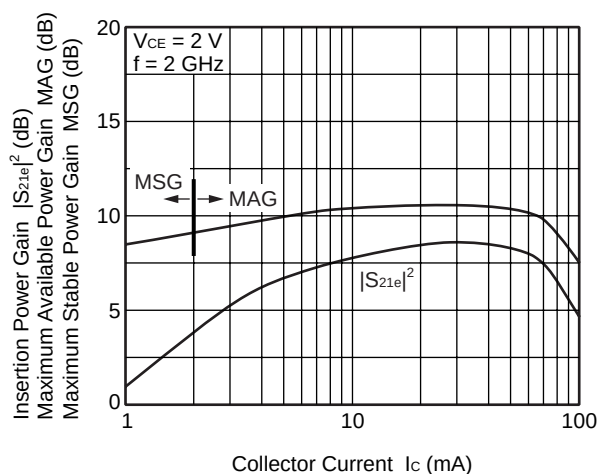
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



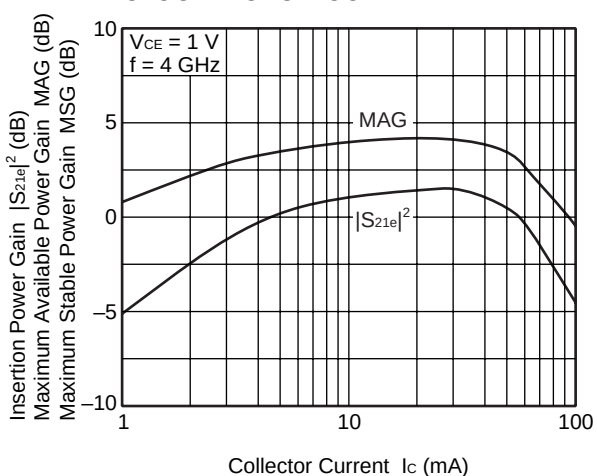
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



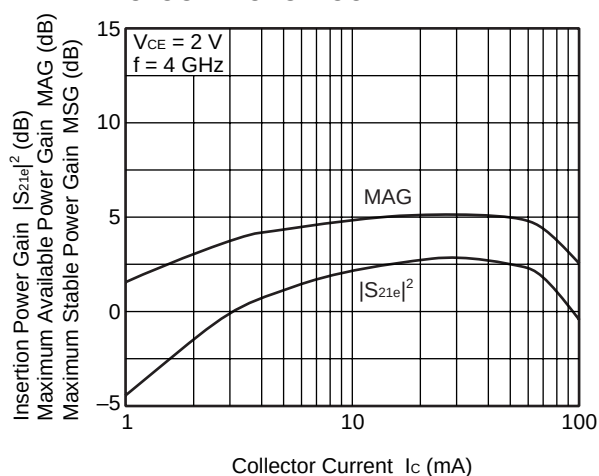
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



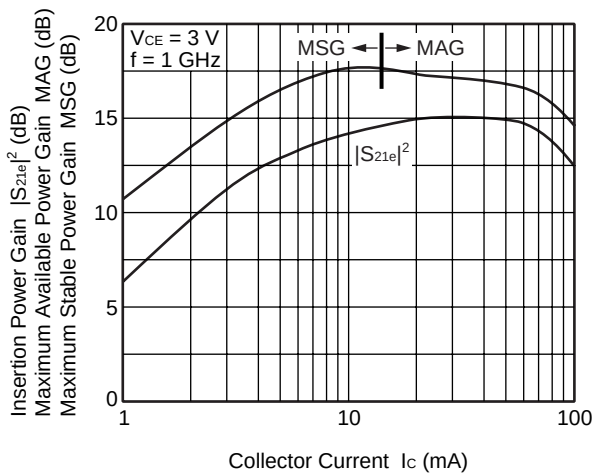
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



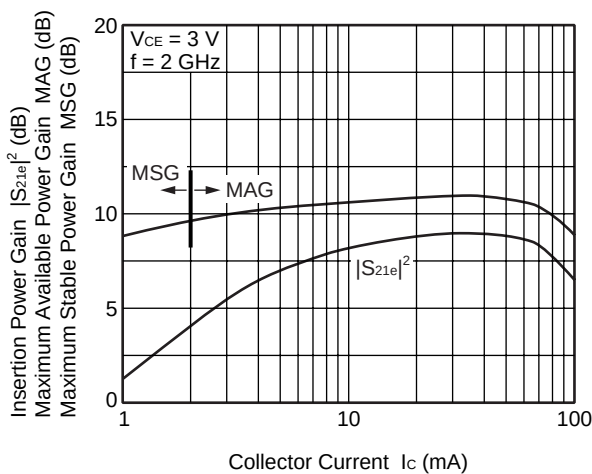
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



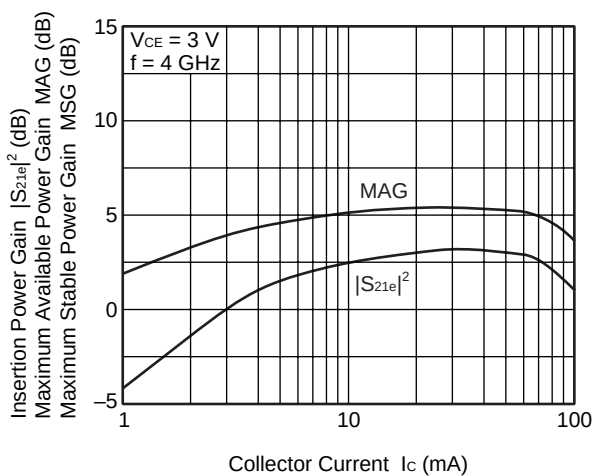
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



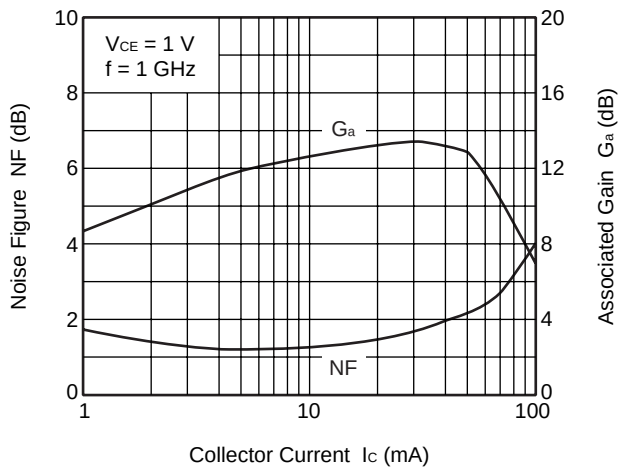
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



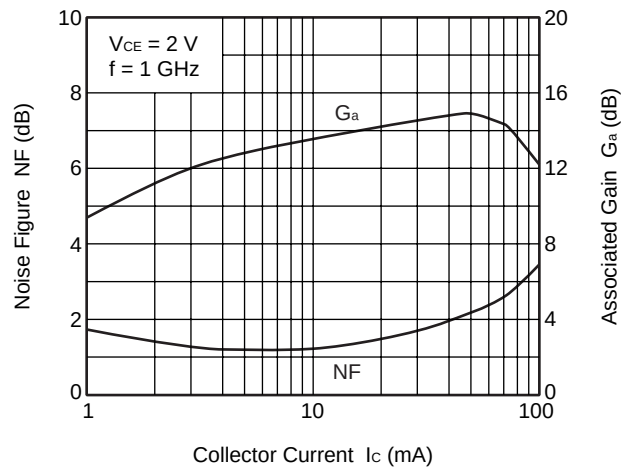
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



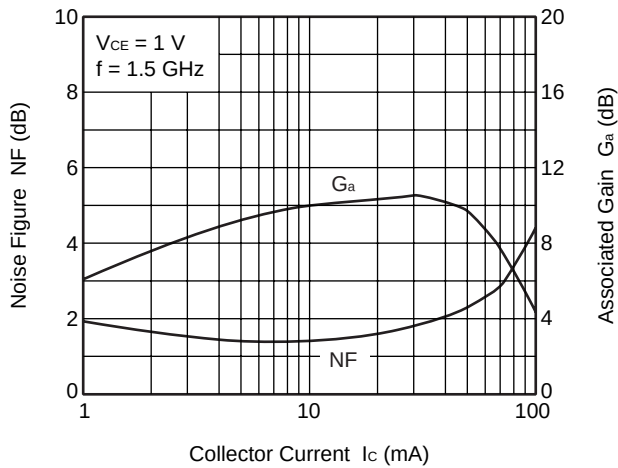
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



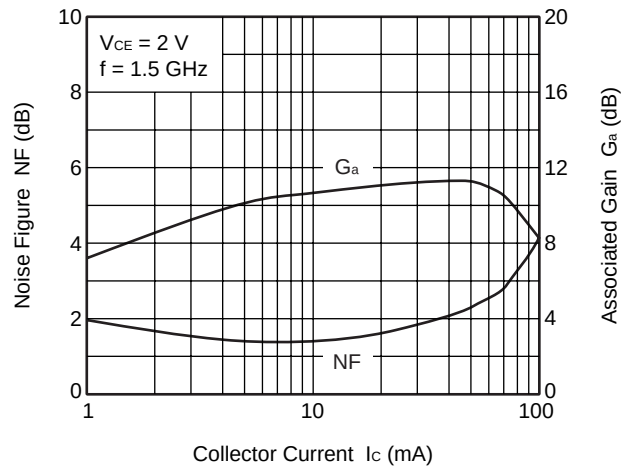
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



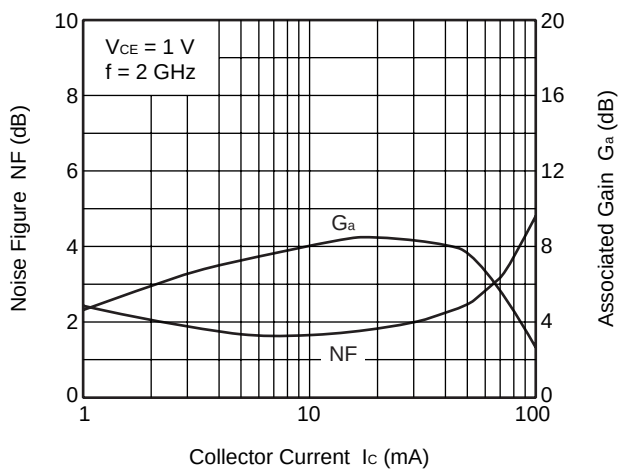
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



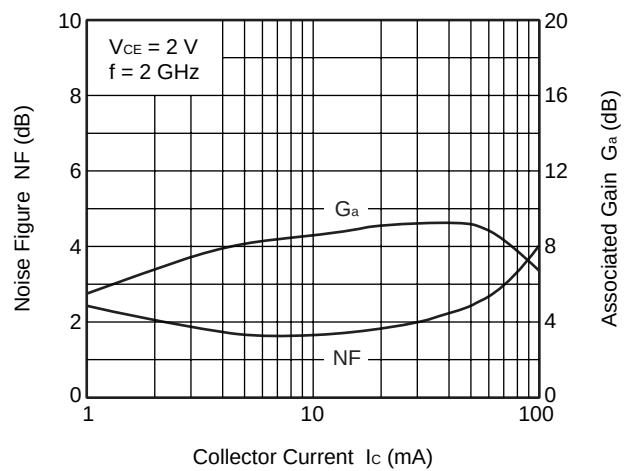
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



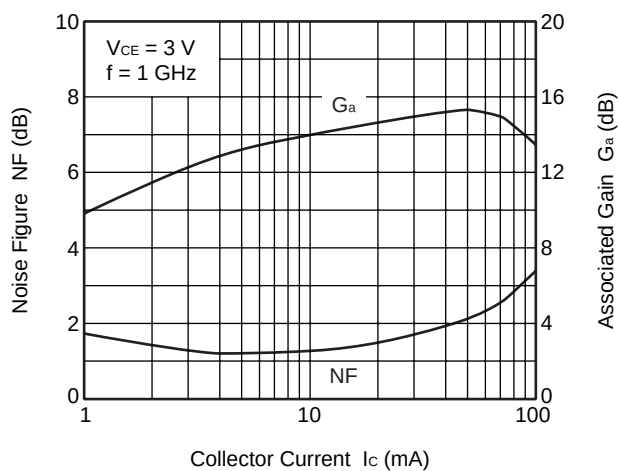
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



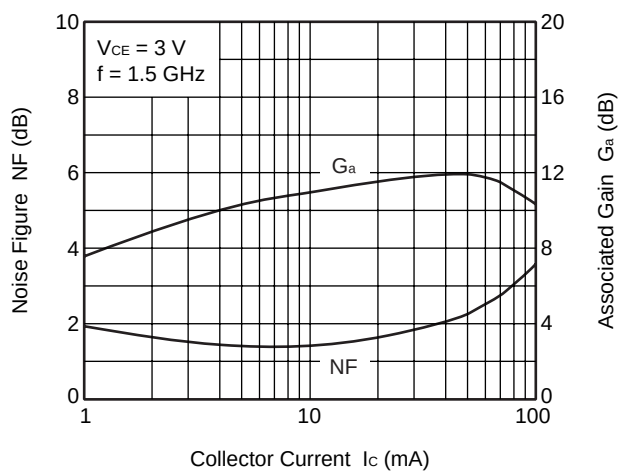
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



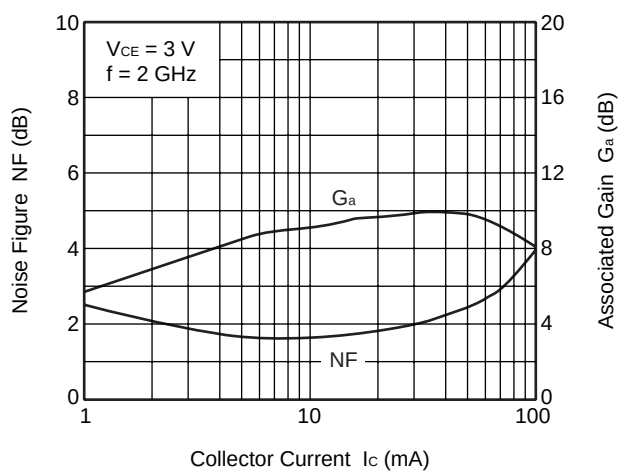
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

$V_{CE} = 1 \text{ V}$, $I_C = 1 \text{ mA}$, $Z_0 = 50 \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)	Note
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)			
0.1	0.954	-18.3	3.604	167.3	0.045	79.3	0.983	-7.9	0.044	19.07	
0.2	0.943	-34.7	3.487	155.5	0.086	69.6	0.956	-15.3	0.086	16.09	
0.3	0.910	-50.4	3.289	144.5	0.121	60.6	0.903	-21.7	0.134	14.34	
0.4	0.870	-64.8	3.065	134.4	0.150	52.1	0.851	-27.8	0.185	13.11	
0.5	0.830	-79.3	2.841	124.7	0.172	44.7	0.794	-33.0	0.228	12.18	
0.6	0.793	-92.0	2.620	116.0	0.188	38.0	0.738	-37.7	0.278	11.44	
0.7	0.762	-103.5	2.409	108.9	0.200	32.4	0.689	-41.6	0.321	10.81	
0.8	0.736	-113.9	2.213	101.8	0.207	27.4	0.646	-45.2	0.371	10.29	
0.9	0.715	-123.4	2.036	95.4	0.211	23.0	0.611	-48.7	0.419	9.84	
1.0	0.700	-131.9	1.891	89.6	0.213	19.4	0.582	-51.8	0.462	9.48	
1.1	0.693	-139.7	1.756	84.4	0.213	16.0	0.559	-54.6	0.502	9.15	
1.2	0.687	-146.5	1.629	79.7	0.212	13.3	0.541	-57.3	0.544	8.85	
1.3	0.682	-152.9	1.526	75.1	0.210	10.7	0.528	-60.0	0.589	8.61	
1.4	0.683	-158.2	1.426	71.0	0.207	8.7	0.518	-62.6	0.630	8.37	
1.5	0.681	-163.0	1.345	66.8	0.203	6.8	0.510	-65.0	0.680	8.20	
1.6	0.687	-167.6	1.275	63.1	0.199	5.3	0.504	-67.3	0.715	8.07	
1.7	0.684	-171.8	1.202	59.8	0.194	4.2	0.499	-69.6	0.774	7.91	
1.8	0.686	-175.5	1.143	56.3	0.189	3.3	0.495	-71.6	0.831	7.82	
1.9	0.694	-179.0	1.089	53.5	0.184	2.6	0.493	-73.8	0.866	7.73	
2.0	0.690	178.0	1.047	50.5	0.179	2.3	0.488	-75.8	0.941	7.68	
2.1	0.702	174.9	1.005	48.0	0.173	2.2	0.491	-78.5	0.955	7.63	
2.2	0.694	172.4	0.963	45.6	0.168	2.5	0.487	-80.7	1.058	6.11	
2.3	0.707	169.6	0.931	43.6	0.163	2.8	0.494	-82.9	1.055	6.14	
2.4	0.704	167.1	0.900	41.5	0.159	3.6	0.491	-85.6	1.135	5.30	
2.5	0.709	164.5	0.863	39.4	0.154	4.5	0.493	-87.8	1.189	4.85	
2.6	0.711	162.1	0.840	37.8	0.150	5.7	0.496	-91.0	1.235	4.57	
2.7	0.715	160.3	0.808	35.8	0.146	7.1	0.498	-93.0	1.294	4.18	
2.8	0.714	157.7	0.778	34.4	0.142	8.9	0.505	-95.9	1.360	3.79	
2.9	0.704	155.6	0.736	32.0	0.139	10.6	0.495	-98.1	1.566	2.80	
3.0	0.708	152.2	0.714	29.7	0.138	13.1	0.497	-101.5	1.611	2.56	
4.0	0.736	125.6	0.557	13.2	0.168	37.1	0.543	-131.4	1.554	0.83	
5.0	0.760	103.6	0.436	7.9	0.256	35.7	0.592	-160.3	1.367	-1.29	

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	0.898	-29.2	9.720	160.9	0.041	74.5	0.947	-16.7	0.060	23.70
0.2	0.838	-55.1	8.827	144.4	0.076	61.2	0.857	-31.0	0.131	20.63
0.3	0.777	-77.3	7.706	131.2	0.099	50.8	0.743	-42.0	0.199	18.89
0.4	0.725	-95.3	6.654	120.5	0.115	43.1	0.641	-51.0	0.268	17.63
0.5	0.686	-111.1	5.738	111.6	0.124	37.5	0.554	-58.0	0.331	16.64
0.6	0.655	-124.2	5.040	104.4	0.130	33.4	0.483	-64.0	0.399	15.87
0.7	0.639	-134.7	4.458	98.7	0.135	30.4	0.429	-69.0	0.459	15.20
0.8	0.624	-144.2	3.970	93.3	0.137	28.2	0.385	-73.6	0.525	14.61
0.9	0.617	-152.0	3.556	88.7	0.139	26.5	0.352	-78.0	0.586	14.08
1.0	0.612	-158.9	3.235	84.5	0.140	25.6	0.327	-82.3	0.646	13.64
1.1	0.614	-164.8	2.956	80.7	0.141	24.9	0.308	-85.9	0.697	13.22
1.2	0.616	-169.9	2.709	77.5	0.142	24.7	0.295	-89.4	0.748	12.81
1.3	0.616	-174.7	2.512	74.1	0.142	24.6	0.286	-92.3	0.799	12.46
1.4	0.620	-178.6	2.333	71.2	0.143	24.6	0.280	-95.1	0.844	12.12
1.5	0.621	177.7	2.186	68.1	0.144	24.8	0.274	-97.6	0.894	11.81
1.6	0.625	174.5	2.060	65.3	0.145	25.3	0.271	-99.7	0.932	11.53
1.7	0.626	171.4	1.935	62.7	0.146	25.6	0.268	-101.8	0.982	11.23
1.8	0.630	168.8	1.836	60.1	0.147	26.3	0.265	-103.6	1.021	10.08
1.9	0.635	165.9	1.744	58.0	0.148	26.9	0.265	-105.5	1.053	9.30
2.0	0.631	163.7	1.671	55.6	0.150	27.8	0.261	-107.3	1.100	8.55
2.1	0.644	161.2	1.603	53.5	0.151	28.7	0.263	-109.3	1.098	8.35
2.2	0.640	159.3	1.535	51.8	0.153	29.5	0.259	-111.5	1.153	7.65
2.3	0.651	157.6	1.477	50.0	0.155	30.3	0.262	-113.1	1.147	7.45
2.4	0.648	155.6	1.423	48.0	0.158	31.1	0.260	-116.0	1.184	6.95
2.5	0.654	153.8	1.367	46.3	0.161	31.8	0.262	-117.6	1.193	6.63
2.6	0.657	151.8	1.330	44.8	0.163	32.6	0.269	-120.5	1.201	6.40
2.7	0.660	150.5	1.281	43.2	0.167	33.3	0.267	-122.0	1.215	6.05
2.8	0.660	148.5	1.237	41.9	0.170	33.9	0.276	-124.7	1.234	5.70
2.9	0.647	146.9	1.174	39.5	0.174	34.0	0.272	-127.4	1.318	4.91
3.0	0.649	143.5	1.144	37.4	0.178	34.8	0.281	-129.8	1.313	4.72
4.0	0.679	121.4	0.890	18.5	0.226	36.7	0.351	-153.0	1.259	2.89
5.0	0.716	101.9	0.686	6.9	0.285	29.7	0.427	-175.2	1.221	0.97

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	0.818	-38.5	14.773	155.4	0.040	70.7	0.907	-24.2	0.107	25.64
0.2	0.755	-71.5	12.503	136.1	0.067	55.6	0.765	-43.3	0.182	22.70
0.3	0.693	-96.3	10.248	122.5	0.083	46.3	0.622	-56.9	0.273	20.90
0.4	0.650	-114.6	8.455	112.3	0.093	40.6	0.514	-67.4	0.361	19.60
0.5	0.622	-129.6	7.095	104.6	0.099	37.2	0.431	-75.8	0.445	18.56
0.6	0.604	-141.4	6.076	98.3	0.103	35.2	0.370	-83.2	0.527	17.70
0.7	0.598	-150.6	5.304	93.6	0.106	34.0	0.325	-89.7	0.598	16.97
0.8	0.591	-158.5	4.675	89.1	0.110	33.8	0.293	-96.1	0.672	16.30
0.9	0.591	-165.1	4.165	85.4	0.113	33.5	0.270	-102.1	0.735	15.68
1.0	0.592	-170.9	3.769	81.8	0.115	33.8	0.255	-107.8	0.793	15.15
1.1	0.595	-175.7	3.435	78.6	0.118	34.1	0.245	-112.4	0.842	14.64
1.2	0.600	-179.8	3.133	75.9	0.121	34.7	0.238	-116.7	0.888	14.13
1.3	0.601	176.1	2.901	73.0	0.124	35.3	0.234	-120.1	0.931	13.68
1.4	0.606	173.0	2.690	70.5	0.128	35.8	0.232	-123.0	0.964	13.24
1.5	0.608	170.0	2.518	67.7	0.131	36.4	0.230	-125.7	1.001	12.65
1.6	0.614	167.2	2.369	65.3	0.134	37.0	0.229	-127.8	1.023	11.52
1.7	0.617	164.6	2.223	63.1	0.138	37.6	0.227	-130.0	1.055	10.64
1.8	0.617	162.1	2.107	60.8	0.142	38.2	0.226	-132.0	1.084	9.96
1.9	0.622	159.8	2.004	59.0	0.146	38.7	0.227	-133.4	1.097	9.49
2.0	0.621	157.8	1.911	56.9	0.150	39.2	0.224	-135.6	1.125	8.92
2.1	0.632	155.9	1.840	55.0	0.154	39.7	0.226	-136.8	1.112	8.74
2.2	0.627	154.2	1.756	53.4	0.158	40.2	0.222	-139.6	1.152	8.09
2.3	0.638	152.7	1.691	51.7	0.163	40.4	0.224	-140.7	1.136	7.92
2.4	0.636	150.9	1.633	49.9	0.168	40.7	0.226	-143.8	1.153	7.52
2.5	0.642	149.2	1.565	48.3	0.172	40.9	0.226	-145.0	1.157	7.18
2.6	0.642	147.2	1.521	46.8	0.177	41.2	0.233	-147.1	1.162	6.91
2.7	0.645	146.2	1.465	45.3	0.182	41.2	0.231	-148.7	1.169	6.57
2.8	0.647	144.4	1.417	44.0	0.187	41.2	0.241	-150.7	1.171	6.30
2.9	0.632	143.1	1.347	41.8	0.192	40.8	0.240	-153.8	1.232	5.56
3.0	0.634	139.7	1.313	39.9	0.198	41.0	0.250	-154.6	1.225	5.36
4.0	0.662	119.0	1.019	21.5	0.250	37.4	0.322	-170.5	1.190	3.47
5.0	0.702	100.8	0.789	9.4	0.302	28.0	0.397	171.8	1.176	1.63

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	0.753	-47.6	18.808	151.0	0.038	67.4	0.869	-30.6	0.138	26.93
0.2	0.694	-84.7	14.984	130.0	0.060	52.4	0.692	-53.0	0.233	23.95
0.3	0.638	-109.4	11.754	116.7	0.072	44.8	0.543	-68.0	0.347	22.14
0.4	0.610	-127.4	9.457	107.4	0.080	40.6	0.439	-79.7	0.447	20.75
0.5	0.592	-141.1	7.785	100.6	0.084	39.0	0.367	-89.4	0.542	19.65
0.6	0.582	-151.5	6.614	94.9	0.089	38.4	0.317	-98.0	0.631	18.73
0.7	0.583	-159.7	5.744	90.9	0.093	38.3	0.283	-105.6	0.699	17.91
0.8	0.582	-166.7	5.048	86.8	0.097	38.9	0.261	-113.1	0.769	17.18
0.9	0.582	-172.3	4.475	83.4	0.101	39.4	0.247	-119.8	0.832	16.48
1.0	0.585	-177.4	4.035	80.4	0.105	40.2	0.239	-126.0	0.883	15.85
1.1	0.591	178.4	3.678	77.4	0.109	41.0	0.235	-130.6	0.922	15.29
1.2	0.595	175.0	3.351	75.0	0.113	41.7	0.233	-134.8	0.961	14.70
1.3	0.597	171.3	3.097	72.4	0.118	42.3	0.232	-138.0	0.996	14.20
1.4	0.603	168.5	2.876	70.1	0.123	42.9	0.233	-140.6	1.017	12.90
1.5	0.604	165.7	2.685	67.6	0.128	43.4	0.233	-143.1	1.045	11.93
1.6	0.608	163.1	2.527	65.4	0.132	43.9	0.233	-144.9	1.062	11.30
1.7	0.610	160.8	2.371	63.3	0.137	44.3	0.233	-147.0	1.085	10.60
1.8	0.612	158.9	2.246	61.1	0.142	44.6	0.232	-148.8	1.100	10.07
1.9	0.618	156.5	2.135	59.2	0.147	44.9	0.234	-150.0	1.106	9.64
2.0	0.617	154.8	2.042	57.4	0.153	45.0	0.232	-152.2	1.122	9.14
2.1	0.627	152.9	1.957	55.5	0.158	45.3	0.233	-153.2	1.113	8.89
2.2	0.624	151.1	1.870	54.0	0.163	45.5	0.230	-156.1	1.138	8.35
2.3	0.634	150.1	1.800	52.4	0.168	45.4	0.232	-157.0	1.122	8.17
2.4	0.629	148.2	1.736	50.7	0.174	45.2	0.234	-160.0	1.139	7.72
2.5	0.638	146.7	1.667	49.1	0.180	45.2	0.235	-161.0	1.133	7.46
2.6	0.638	145.1	1.620	48.0	0.185	45.1	0.242	-162.8	1.136	7.18
2.7	0.643	144.2	1.559	46.7	0.191	44.8	0.240	-164.6	1.137	6.88
2.8	0.642	142.4	1.506	45.3	0.196	44.4	0.250	-165.9	1.144	6.55
2.9	0.627	141.0	1.435	43.3	0.202	43.7	0.251	-168.7	1.190	5.87
3.0	0.628	137.9	1.397	41.4	0.208	43.7	0.260	-168.9	1.187	5.65
4.0	0.654	117.7	1.084	23.1	0.262	37.9	0.327	179.3	1.162	3.73
5.0	0.697	100.0	0.841	11.1	0.311	27.5	0.400	164.2	1.151	1.96

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	0.695	-60.3	23.420	145.8	0.035	63.8	0.816	-38.5	0.164	28.23
0.2	0.636	-99.6	17.364	123.7	0.052	49.5	0.610	-64.0	0.302	25.22
0.3	0.599	-123.9	13.037	111.3	0.061	44.6	0.466	-80.7	0.434	23.30
0.4	0.581	-139.8	10.285	102.9	0.067	42.8	0.377	-93.7	0.549	21.83
0.5	0.573	-152.1	8.365	96.9	0.072	42.8	0.321	-104.6	0.652	20.63
0.6	0.571	-161.1	7.052	92.0	0.077	43.3	0.284	-114.4	0.738	19.61
0.7	0.574	-167.7	6.094	88.4	0.082	44.2	0.263	-122.7	0.804	18.69
0.8	0.575	-173.9	5.341	84.8	0.087	45.3	0.250	-130.4	0.866	17.86
0.9	0.578	-178.6	4.730	81.8	0.092	46.0	0.244	-136.8	0.918	17.09
1.0	0.582	176.9	4.258	79.0	0.098	46.9	0.243	-142.4	0.957	16.38
1.1	0.587	173.5	3.870	76.4	0.103	47.6	0.244	-146.5	0.987	15.73
1.2	0.593	170.2	3.526	74.1	0.109	48.4	0.246	-150.0	1.016	14.33
1.3	0.598	167.0	3.259	71.7	0.115	48.8	0.247	-152.7	1.035	13.39
1.4	0.604	164.6	3.024	69.6	0.121	49.1	0.250	-154.8	1.048	12.65
1.5	0.603	162.0	2.825	67.3	0.126	49.5	0.251	-156.9	1.070	11.89
1.6	0.609	159.9	2.655	65.2	0.132	49.6	0.252	-158.5	1.075	11.35
1.7	0.611	157.8	2.493	63.3	0.138	49.8	0.253	-160.4	1.091	10.72
1.8	0.613	155.7	2.360	61.3	0.144	49.9	0.253	-162.0	1.102	10.20
1.9	0.618	153.7	2.244	59.6	0.150	49.9	0.255	-162.8	1.102	9.80
2.0	0.614	151.9	2.142	57.9	0.156	49.8	0.254	-164.9	1.118	9.28
2.1	0.627	150.5	2.055	56.1	0.162	49.7	0.254	-165.7	1.101	9.10
2.2	0.622	148.8	1.966	54.7	0.168	49.6	0.253	-168.5	1.123	8.55
2.3	0.635	147.7	1.889	53.2	0.174	49.3	0.254	-169.5	1.103	8.40
2.4	0.630	146.2	1.820	51.5	0.180	48.8	0.257	-172.2	1.117	7.95
2.5	0.636	144.8	1.748	50.1	0.187	48.5	0.257	-173.1	1.115	7.66
2.6	0.638	142.9	1.697	48.9	0.193	48.3	0.265	-174.6	1.113	7.40
2.7	0.641	142.3	1.636	47.6	0.199	47.7	0.262	-176.4	1.113	7.11
2.8	0.642	140.5	1.578	46.3	0.204	47.1	0.272	-177.3	1.118	6.79
2.9	0.624	139.3	1.502	44.3	0.211	46.2	0.275	-179.7	1.162	6.09
3.0	0.625	136.2	1.469	42.6	0.218	45.9	0.283	-179.7	1.155	5.90
4.0	0.649	116.5	1.134	24.6	0.272	38.4	0.343	171.2	1.139	3.93
5.0	0.691	99.1	0.884	12.7	0.319	27.2	0.413	157.8	1.136	2.18

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	0.551	-88.1	31.618	134.6	0.028	58.8	0.689	-55.9	0.297	30.55
0.2	0.565	-128.5	20.413	113.3	0.039	49.2	0.472	-86.4	0.476	27.21
0.3	0.557	-147.6	14.491	103.1	0.045	49.5	0.365	-105.5	0.641	25.05
0.4	0.562	-159.3	11.132	96.4	0.052	50.6	0.312	-120.0	0.753	23.31
0.5	0.563	-167.7	8.930	91.8	0.058	52.6	0.284	-131.4	0.846	21.86
0.6	0.566	-174.4	7.487	87.8	0.065	54.2	0.271	-140.7	0.909	20.62
0.7	0.574	-179.2	6.444	85.0	0.072	55.5	0.266	-148.0	0.951	19.52
0.8	0.576	176.1	5.620	82.0	0.079	56.4	0.266	-154.1	0.992	18.55
0.9	0.584	172.7	4.975	79.6	0.085	56.9	0.270	-158.7	1.016	16.87
1.0	0.590	169.1	4.471	77.1	0.093	57.5	0.275	-162.6	1.035	15.69
1.1	0.594	166.4	4.064	74.8	0.100	57.9	0.279	-165.2	1.049	14.75
1.2	0.601	164.0	3.698	73.0	0.107	58.0	0.285	-167.3	1.061	13.89
1.3	0.606	161.4	3.414	70.8	0.114	58.0	0.288	-169.2	1.068	13.18
1.4	0.609	159.4	3.166	68.9	0.121	57.9	0.292	-170.5	1.075	12.51
1.5	0.612	157.0	2.955	66.8	0.128	57.7	0.295	-172.0	1.084	11.88
1.6	0.614	155.3	2.778	64.9	0.135	57.5	0.297	-173.0	1.085	11.36
1.7	0.618	153.4	2.607	63.2	0.142	57.0	0.299	-174.5	1.091	10.81
1.8	0.619	151.8	2.471	61.4	0.149	56.7	0.300	-175.8	1.095	10.33
1.9	0.623	150.0	2.347	59.9	0.156	56.2	0.301	-176.5	1.093	9.92
2.0	0.621	148.2	2.243	58.2	0.163	55.7	0.301	-178.3	1.100	9.47
2.1	0.631	146.7	2.149	56.5	0.169	55.2	0.300	-179.1	1.087	9.23
2.2	0.627	145.4	2.054	55.3	0.176	54.7	0.300	178.3	1.101	8.73
2.3	0.640	144.7	1.974	53.7	0.183	54.0	0.301	177.4	1.084	8.57
2.4	0.636	143.3	1.903	52.2	0.190	53.2	0.305	175.2	1.091	8.17
2.5	0.639	141.9	1.826	50.9	0.197	52.6	0.304	174.3	1.090	7.85
2.6	0.641	140.2	1.777	49.6	0.203	52.0	0.312	173.0	1.087	7.62
2.7	0.645	139.1	1.708	48.3	0.210	51.2	0.310	171.2	1.088	7.30
2.8	0.646	137.7	1.648	47.2	0.216	50.2	0.319	170.6	1.090	7.00
2.9	0.629	136.4	1.575	45.3	0.223	49.1	0.323	168.6	1.122	6.37
3.0	0.629	133.6	1.536	43.6	0.230	48.6	0.329	168.8	1.119	6.15
4.0	0.649	114.7	1.184	26.3	0.286	39.2	0.380	161.9	1.111	4.14
5.0	0.692	98.2	0.921	15.1	0.331	26.9	0.445	150.4	1.112	2.41

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	0.955	-17.0	3.558	168.4	0.035	81.7	0.986	-6.4	0.015	20.05
0.2	0.952	-31.6	3.464	157.7	0.070	71.8	0.967	-12.4	0.078	16.96
0.3	0.921	-46.2	3.314	147.7	0.099	63.3	0.924	-17.7	0.126	15.24
0.4	0.883	-59.9	3.111	138.0	0.125	55.4	0.881	-22.8	0.173	13.97
0.5	0.848	-73.8	2.913	128.7	0.145	48.3	0.832	-27.3	0.215	13.03
0.6	0.813	-86.2	2.721	120.4	0.160	41.8	0.785	-31.4	0.259	12.31
0.7	0.783	-97.4	2.518	113.3	0.171	36.2	0.741	-34.8	0.301	11.67
0.8	0.753	-107.9	2.332	106.3	0.179	31.2	0.701	-38.0	0.349	11.16
0.9	0.731	-117.5	2.159	100.0	0.184	26.7	0.668	-41.1	0.395	10.70
1.0	0.714	-126.5	2.010	94.1	0.186	23.0	0.640	-43.9	0.437	10.33
1.1	0.703	-134.4	1.875	88.9	0.187	19.7	0.616	-46.3	0.480	10.01
1.2	0.695	-141.4	1.741	84.4	0.187	17.0	0.598	-48.7	0.522	9.70
1.3	0.690	-148.0	1.635	79.8	0.185	14.5	0.585	-50.9	0.562	9.46
1.4	0.689	-153.7	1.530	75.5	0.183	12.2	0.574	-53.3	0.604	9.23
1.5	0.687	-159.0	1.443	71.4	0.180	10.5	0.565	-55.6	0.650	9.05
1.6	0.687	-163.8	1.369	67.7	0.176	9.0	0.558	-57.7	0.694	8.92
1.7	0.688	-168.1	1.293	64.2	0.172	7.9	0.551	-59.8	0.748	8.77
1.8	0.689	-172.1	1.228	60.6	0.167	7.0	0.547	-61.6	0.807	8.67
1.9	0.695	-176.0	1.168	57.9	0.162	6.4	0.542	-63.7	0.847	8.57
2.0	0.690	-179.1	1.120	55.0	0.158	6.1	0.537	-65.6	0.926	8.51
2.1	0.702	177.6	1.081	52.4	0.153	6.3	0.537	-68.1	0.937	8.50
2.2	0.693	174.8	1.035	50.2	0.148	6.6	0.533	-70.0	1.043	7.18
2.3	0.704	171.7	1.000	48.0	0.144	7.2	0.540	-72.1	1.039	7.21
2.4	0.701	169.2	0.963	46.0	0.140	8.3	0.535	-74.4	1.128	6.19
2.5	0.707	166.5	0.924	43.7	0.136	9.4	0.536	-76.5	1.176	5.77
2.6	0.707	163.9	0.900	42.3	0.132	10.9	0.539	-79.3	1.227	5.45
2.7	0.711	161.9	0.865	40.2	0.129	12.7	0.539	-81.1	1.283	5.05
2.8	0.711	159.4	0.833	38.8	0.126	14.9	0.543	-83.7	1.350	4.66
2.9	0.700	157.1	0.788	36.1	0.124	16.7	0.530	-85.9	1.568	3.59
3.0	0.702	153.5	0.766	33.8	0.123	19.5	0.531	-89.2	1.616	3.34
4.0	0.730	126.5	0.596	16.6	0.161	44.3	0.559	-118.6	1.481	1.59
5.0	0.757	104.1	0.460	9.5	0.253	41.3	0.594	-148.6	1.287	-0.61

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

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	0.890	-25.0		9.801	162.8		0.033	75.2		0.959	-13.3		0.092	24.78
0.2	0.853	-49.3		9.059	147.7		0.063	64.2		0.886	-25.1		0.127	21.55
0.3	0.793	-69.6		8.072	135.2		0.084	54.7		0.786	-34.2		0.193	19.84
0.4	0.738	-86.9		7.093	124.7		0.099	47.0		0.693	-41.7		0.262	18.56
0.5	0.692	-102.7		6.214	115.7		0.108	41.2		0.610	-47.4		0.326	17.58
0.6	0.656	-115.9		5.503	108.3		0.115	37.0		0.540	-52.1		0.392	16.81
0.7	0.636	-126.8		4.900	102.5		0.119	33.9		0.484	-55.9		0.450	16.14
0.8	0.616	-136.9		4.390	96.9		0.122	31.7		0.438	-59.3		0.515	15.56
0.9	0.606	-145.2		3.948	92.2		0.124	29.9		0.402	-62.4		0.576	15.03
1.0	0.600	-152.8		3.598	87.8		0.125	28.8		0.374	-65.5		0.633	14.58
1.1	0.599	-159.0		3.299	84.0		0.126	28.0		0.353	-68.1		0.685	14.17
1.2	0.599	-164.6		3.021	80.7		0.127	27.8		0.335	-70.7		0.738	13.75
1.3	0.600	-170.0		2.808	77.3		0.128	27.6		0.324	-73.0		0.786	13.40
1.4	0.603	-173.9		2.609	74.2		0.129	27.7		0.315	-75.3		0.831	13.05
1.5	0.603	-178.1		2.443	71.1		0.130	27.9		0.308	-77.3		0.881	12.74
1.6	0.607	178.2		2.305	68.3		0.131	28.2		0.303	-79.2		0.920	12.47
1.7	0.609	175.1		2.167	65.7		0.132	28.9		0.297	-81.0		0.966	12.16
1.8	0.610	172.1		2.053	63.0		0.133	29.5		0.293	-82.5		1.013	11.19
1.9	0.617	168.9		1.949	60.9		0.134	30.3		0.292	-84.3		1.037	10.45
2.0	0.613	166.8		1.861	58.5		0.136	31.2		0.286	-85.7		1.088	9.57
2.1	0.623	164.4		1.790	56.3		0.137	32.1		0.287	-87.7		1.090	9.33
2.2	0.620	162.1		1.709	54.5		0.139	33.0		0.281	-89.4		1.146	8.58
2.3	0.632	160.2		1.649	52.8		0.141	34.0		0.284	-90.9		1.129	8.49
2.4	0.631	158.0		1.585	51.0		0.144	34.8		0.279	-93.5		1.167	7.94
2.5	0.634	156.1		1.521	49.1		0.147	35.8		0.280	-95.0		1.185	7.56
2.6	0.637	154.0		1.478	47.6		0.150	36.6		0.283	-98.1		1.187	7.33
2.7	0.642	152.6		1.422	45.9		0.153	37.4		0.281	-99.4		1.200	6.99
2.8	0.643	150.5		1.374	44.7		0.156	38.0		0.286	-102.4		1.216	6.66
2.9	0.629	148.9		1.301	42.3		0.159	38.3		0.279	-104.8		1.306	5.81
3.0	0.631	145.6		1.266	40.1		0.164	39.2		0.286	-107.9		1.301	5.59
4.0	0.664	122.8		0.982	21.0		0.213	41.7		0.337	-134.9		1.229	3.75
5.0	0.704	102.9		0.749	8.2		0.276	34.4		0.402	-161.0		1.179	1.78

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

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	0.836	-33.6		14.979	158.2		0.033	71.3		0.927	-19.3		0.121	26.63
0.2	0.772	-63.0		13.076	140.0		0.057	59.4		0.807	-35.0		0.179	23.63
0.3	0.702	-86.7		11.024	126.7		0.071	50.4		0.675	-46.0		0.266	21.89
0.4	0.648	-104.8		9.249	116.5		0.081	44.6		0.566	-54.5		0.356	20.55
0.5	0.612	-120.5		7.852	108.3		0.088	40.8		0.480	-60.8		0.438	19.51
0.6	0.589	-132.8		6.780	102.0		0.092	38.5		0.413	-66.1		0.518	18.67
0.7	0.578	-142.7		5.956	97.0		0.096	37.2		0.362	-70.4		0.587	17.92
0.8	0.567	-151.5		5.262	92.3		0.099	36.6		0.323	-74.8		0.660	17.25
0.9	0.565	-158.7		4.699	88.3		0.102	36.2		0.293	-78.9		0.725	16.64
1.0	0.562	-165.1		4.255	84.6		0.105	36.6		0.271	-83.1		0.784	16.09
1.1	0.566	-170.4		3.883	81.4		0.107	36.8		0.255	-86.6		0.831	15.58
1.2	0.570	-175.1		3.553	78.6		0.110	37.4		0.243	-90.2		0.877	15.08
1.3	0.573	-179.5		3.288	75.7		0.113	37.9		0.234	-93.0		0.918	14.63
1.4	0.576	177.1		3.051	73.1		0.116	38.4		0.229	-95.7		0.954	14.18
1.5	0.577	173.6		2.853	70.3		0.120	39.0		0.224	-98.1		0.991	13.78
1.6	0.583	170.7		2.684	68.0		0.123	39.7		0.221	-100.1		1.016	12.64
1.7	0.587	167.7		2.520	65.6		0.126	40.3		0.217	-102.3		1.047	11.69
1.8	0.587	165.3		2.388	63.2		0.130	40.9		0.214	-103.9		1.073	11.00
1.9	0.596	162.7		2.267	61.3		0.133	41.5		0.214	-105.7		1.080	10.58
2.0	0.590	160.6		2.164	59.2		0.137	42.0		0.209	-107.4		1.116	9.91
2.1	0.601	158.6		2.077	57.2		0.141	42.6		0.210	-108.9		1.107	9.69
2.2	0.597	156.6		1.984	55.7		0.145	43.1		0.204	-111.1		1.144	9.07
2.3	0.610	155.1		1.911	53.9		0.149	43.5		0.206	-112.5		1.124	8.94
2.4	0.609	153.4		1.839	52.3		0.154	43.8		0.204	-115.6		1.142	8.48
2.5	0.614	151.5		1.767	50.6		0.159	44.1		0.204	-117.0		1.144	8.17
2.6	0.615	149.6		1.714	49.3		0.163	44.4		0.209	-120.0		1.148	7.88
2.7	0.619	148.5		1.652	47.7		0.168	44.6		0.205	-121.3		1.152	7.57
2.8	0.619	146.7		1.590	46.4		0.172	44.5		0.213	-124.2		1.164	7.20
2.9	0.606	145.0		1.513	44.2		0.177	44.1		0.209	-127.5		1.221	6.47
3.0	0.608	142.0		1.471	42.2		0.183	44.3		0.218	-129.7		1.213	6.27
4.0	0.639	120.7		1.137	23.6		0.235	41.6		0.282	-152.0		1.172	4.33
5.0	0.685	102.1		0.872	10.5		0.290	32.2		0.353	-174.3		1.147	2.45

$V_{CE} = 2\text{ V}$, $I_C = 7\text{ mA}$, $Z_o = 50\ \Omega$

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	0.759	-41.5	19.307	154.2	0.031	69.9	0.895	-24.4	0.137	27.95
0.2	0.707	-74.3	15.948	134.4	0.051	56.6	0.739	-42.8	0.226	24.92
0.3	0.638	-99.3	12.851	120.9	0.063	48.7	0.592	-54.9	0.338	23.09
0.4	0.598	-117.3	10.516	111.3	0.071	44.4	0.482	-63.9	0.437	21.72
0.5	0.572	-132.0	8.756	104.0	0.076	42.4	0.402	-70.8	0.531	20.62
0.6	0.557	-143.7	7.494	98.1	0.080	41.4	0.342	-76.8	0.618	19.71
0.7	0.553	-152.4	6.525	93.9	0.084	41.2	0.298	-82.2	0.688	18.89
0.8	0.548	-160.3	5.736	89.6	0.088	41.6	0.265	-87.5	0.759	18.14
0.9	0.547	-166.5	5.111	86.1	0.092	42.0	0.242	-92.8	0.821	17.46
1.0	0.549	-172.2	4.608	82.9	0.096	42.6	0.225	-98.0	0.872	16.82
1.1	0.554	-176.9	4.198	79.9	0.099	43.3	0.214	-102.4	0.914	16.25
1.2	0.559	179.2	3.833	77.4	0.104	44.0	0.207	-106.7	0.949	15.66
1.3	0.562	175.0	3.546	74.7	0.108	44.6	0.202	-110.0	0.982	15.16
1.4	0.566	172.1	3.290	72.3	0.113	45.1	0.200	-113.0	1.007	14.15
1.5	0.569	169.0	3.073	69.8	0.117	45.7	0.197	-115.7	1.032	13.11
1.6	0.573	166.4	2.890	67.5	0.121	46.2	0.195	-117.7	1.051	12.39
1.7	0.576	164.0	2.714	65.4	0.126	46.6	0.193	-120.1	1.071	11.71
1.8	0.578	161.6	2.568	63.3	0.130	47.0	0.191	-122.0	1.089	11.12
1.9	0.583	159.2	2.439	61.5	0.135	47.3	0.192	-123.5	1.095	10.68
2.0	0.580	157.2	2.327	59.6	0.140	47.5	0.187	-125.6	1.117	10.12
2.1	0.593	155.4	2.231	57.7	0.145	47.9	0.189	-127.0	1.102	9.92
2.2	0.590	153.5	2.135	56.3	0.150	48.0	0.184	-129.6	1.126	9.38
2.3	0.602	152.3	2.051	54.7	0.155	48.0	0.185	-130.9	1.109	9.20
2.4	0.599	150.5	1.975	52.9	0.161	48.0	0.185	-134.3	1.124	8.75
2.5	0.604	149.1	1.895	51.4	0.166	48.0	0.185	-135.4	1.125	8.43
2.6	0.605	147.3	1.841	50.2	0.171	48.1	0.190	-138.2	1.125	8.16
2.7	0.609	146.2	1.771	48.8	0.176	47.9	0.187	-139.6	1.128	7.84
2.8	0.611	144.5	1.709	47.6	0.182	47.6	0.195	-142.1	1.131	7.53
2.9	0.597	143.2	1.623	45.5	0.188	46.9	0.194	-145.6	1.180	6.81
3.0	0.597	139.9	1.582	43.6	0.194	46.9	0.204	-146.7	1.176	6.59
4.0	0.628	119.6	1.219	25.2	0.247	41.7	0.272	-164.1	1.143	4.63
5.0	0.676	101.5	0.939	12.2	0.299	31.3	0.344	176.6	1.128	2.79

$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $Z_o = 50\ \Omega$

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	0.707	-49.7	24.190	149.4	0.028	67.7	0.853	-30.6	0.164	29.31
0.2	0.639	-88.0	18.849	128.3	0.045	54.4	0.660	-51.5	0.289	26.20
0.3	0.583	-112.8	14.532	115.4	0.054	48.3	0.509	-64.5	0.424	24.31
0.4	0.554	-130.1	11.613	106.6	0.061	46.0	0.405	-74.3	0.538	22.81
0.5	0.539	-143.4	9.529	100.1	0.066	45.6	0.335	-82.3	0.639	21.61
0.6	0.533	-153.7	8.091	94.8	0.071	45.8	0.284	-89.4	0.723	20.59
0.7	0.533	-161.2	6.998	91.0	0.075	46.5	0.250	-95.9	0.790	19.67
0.8	0.532	-168.2	6.142	87.3	0.080	47.5	0.225	-102.7	0.854	18.84
0.9	0.535	-173.5	5.449	84.3	0.085	48.1	0.209	-109.1	0.905	18.08
1.0	0.538	-178.5	4.909	81.4	0.090	49.0	0.200	-115.2	0.946	17.37
1.1	0.545	177.6	4.472	78.7	0.095	49.7	0.194	-120.0	0.974	16.73
1.2	0.549	173.9	4.070	76.4	0.100	50.5	0.192	-124.5	1.006	15.60
1.3	0.552	170.5	3.763	74.0	0.106	50.9	0.190	-127.8	1.026	14.52
1.4	0.560	168.0	3.490	71.8	0.111	51.2	0.191	-130.6	1.040	13.75
1.5	0.563	165.0	3.258	69.5	0.116	51.5	0.190	-133.4	1.056	13.02
1.6	0.567	162.6	3.063	67.4	0.122	51.8	0.190	-135.1	1.066	12.43
1.7	0.570	160.4	2.876	65.4	0.127	52.0	0.190	-137.6	1.080	11.81
1.8	0.574	158.3	2.725	63.4	0.133	52.0	0.189	-139.5	1.089	11.31
1.9	0.577	156.3	2.582	61.7	0.138	52.0	0.190	-140.7	1.095	10.84
2.0	0.574	154.2	2.465	59.8	0.144	51.9	0.187	-143.1	1.107	10.34
2.1	0.587	152.6	2.363	58.0	0.149	52.0	0.188	-144.0	1.094	10.12
2.2	0.583	151.0	2.260	56.7	0.155	51.9	0.184	-147.2	1.112	9.60
2.3	0.593	150.0	2.170	55.1	0.161	51.6	0.185	-148.2	1.098	9.39
2.4	0.591	148.4	2.089	53.6	0.167	51.4	0.187	-151.7	1.109	8.96
2.5	0.597	146.9	2.005	52.1	0.173	51.0	0.187	-152.6	1.105	8.67
2.6	0.600	145.1	1.947	50.9	0.179	50.9	0.193	-154.9	1.103	8.42
2.7	0.603	144.3	1.874	49.5	0.184	50.4	0.190	-156.8	1.104	8.11
2.8	0.602	142.5	1.807	48.4	0.190	49.9	0.199	-158.4	1.112	7.74
2.9	0.589	141.2	1.717	46.3	0.196	49.1	0.200	-161.8	1.150	7.07
3.0	0.590	138.1	1.675	44.5	0.203	48.7	0.210	-162.0	1.144	6.87
4.0	0.619	118.5	1.284	26.6	0.257	41.8	0.277	-174.7	1.125	4.83
5.0	0.670	100.7	0.988	13.9	0.307	30.7	0.350	168.5	1.117	3.00

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

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	0.574	-75.7	34.015	139.4	0.025	63.6	0.738	-44.2	0.265	31.37
0.2	0.539	-115.5	23.133	117.6	0.034	53.0	0.509	-69.0	0.454	28.34
0.3	0.512	-137.6	16.740	106.6	0.041	51.8	0.374	-83.8	0.624	26.08
0.4	0.507	-151.0	12.969	99.4	0.048	53.4	0.297	-95.6	0.740	24.34
0.5	0.509	-161.1	10.460	94.4	0.053	54.7	0.250	-105.7	0.831	22.94
0.6	0.511	-168.9	8.792	90.2	0.059	56.0	0.222	-115.0	0.895	21.70
0.7	0.518	-174.3	7.573	87.2	0.066	57.2	0.205	-123.3	0.937	20.60
0.8	0.520	-179.7	6.625	84.1	0.072	58.1	0.197	-131.0	0.975	19.61
0.9	0.527	176.5	5.857	81.6	0.079	58.7	0.194	-137.6	1.006	18.25
1.0	0.532	172.5	5.275	79.1	0.085	59.2	0.195	-143.1	1.025	16.95
1.1	0.539	169.5	4.793	76.8	0.092	59.5	0.197	-147.2	1.039	15.98
1.2	0.546	166.8	4.359	75.0	0.098	59.7	0.201	-150.5	1.052	15.08
1.3	0.552	164.0	4.032	72.7	0.105	59.7	0.204	-153.0	1.057	14.38
1.4	0.555	161.9	3.737	70.9	0.112	59.6	0.207	-154.8	1.066	13.68
1.5	0.558	159.5	3.489	68.8	0.118	59.4	0.209	-156.9	1.074	13.05
1.6	0.565	157.5	3.276	66.9	0.125	59.2	0.211	-158.2	1.071	12.56
1.7	0.567	155.7	3.074	65.2	0.131	58.8	0.213	-160.1	1.080	11.97
1.8	0.566	153.8	2.906	63.2	0.138	58.4	0.214	-161.7	1.087	11.44
1.9	0.573	152.0	2.764	61.7	0.144	58.1	0.215	-162.4	1.082	11.08
2.0	0.570	150.2	2.636	60.0	0.151	57.6	0.214	-164.6	1.091	10.59
2.1	0.581	148.8	2.524	58.3	0.157	57.2	0.214	-165.4	1.079	10.34
2.2	0.578	147.3	2.412	57.1	0.163	56.7	0.213	-168.5	1.092	9.85
2.3	0.590	146.2	2.316	55.7	0.170	56.1	0.214	-169.6	1.076	9.66
2.4	0.587	145.1	2.230	54.1	0.177	55.4	0.217	-172.4	1.083	9.26
2.5	0.592	143.6	2.140	52.7	0.183	54.8	0.217	-173.2	1.080	8.95
2.6	0.593	142.0	2.075	51.7	0.189	54.3	0.224	-174.7	1.081	8.67
2.7	0.597	141.4	1.993	50.5	0.196	53.6	0.222	-176.7	1.080	8.36
2.8	0.597	139.6	1.926	49.4	0.201	52.7	0.231	-177.6	1.086	8.02
2.9	0.583	138.5	1.836	47.4	0.208	51.6	0.235	-179.7	1.113	7.41
3.0	0.584	135.4	1.787	45.7	0.215	51.1	0.243	179.8	1.109	7.19
4.0	0.612	116.7	1.366	28.4	0.271	42.3	0.303	172.2	1.098	5.12
5.0	0.662	99.8	1.053	16.2	0.318	30.2	0.376	158.6	1.099	3.29

$V_{CE} = 3\text{ V}$, $I_C = 1\text{ mA}$, $Z_O = 50\ \Omega$

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	0.974	-16.4	3.585	168.8	0.034	80.3	0.986	-6.0	0.042	20.28
0.2	0.949	-30.4	3.517	158.3	0.066	72.3	0.969	-11.6	0.087	17.30
0.3	0.925	-45.1	3.359	148.5	0.093	64.2	0.927	-16.5	0.124	15.58
0.4	0.887	-58.6	3.159	139.0	0.117	56.3	0.889	-21.6	0.170	14.31
0.5	0.852	-72.2	2.970	129.9	0.136	49.3	0.844	-25.9	0.209	13.39
0.6	0.815	-84.5	2.776	121.7	0.151	43.0	0.798	-29.7	0.255	12.64
0.7	0.785	-95.6	2.577	114.7	0.162	37.4	0.754	-33.0	0.298	12.02
0.8	0.754	-106.2	2.393	107.7	0.170	32.4	0.716	-36.1	0.346	11.50
0.9	0.732	-115.9	2.216	101.4	0.174	28.0	0.684	-39.0	0.390	11.04
1.0	0.713	-124.7	2.067	95.5	0.177	24.3	0.656	-41.6	0.436	10.67
1.1	0.704	-132.8	1.927	90.4	0.178	20.9	0.632	-44.0	0.476	10.35
1.2	0.696	-140.2	1.794	85.7	0.178	18.2	0.614	-46.4	0.515	10.04
1.3	0.690	-146.8	1.686	81.1	0.176	15.7	0.600	-48.6	0.557	9.80
1.4	0.687	-152.4	1.577	77.0	0.174	13.6	0.588	-50.9	0.603	9.57
1.5	0.685	-157.7	1.486	72.8	0.171	11.8	0.579	-53.0	0.650	9.39
1.6	0.687	-162.8	1.411	69.1	0.168	10.4	0.572	-55.1	0.689	9.25
1.7	0.686	-167.2	1.332	65.7	0.164	9.3	0.565	-57.1	0.747	9.11
1.8	0.686	-171.1	1.266	62.2	0.160	8.5	0.560	-58.9	0.804	8.99
1.9	0.693	-175.3	1.206	59.4	0.155	7.9	0.556	-60.9	0.841	8.90
2.0	0.688	-178.3	1.157	56.3	0.151	7.8	0.551	-62.6	0.920	8.84
2.1	0.698	178.3	1.113	53.9	0.146	7.9	0.550	-65.0	0.939	8.81
2.2	0.692	175.5	1.065	51.7	0.142	8.4	0.546	-66.9	1.037	7.58
2.3	0.701	172.8	1.029	49.5	0.138	8.9	0.552	-68.9	1.043	7.45
2.4	0.699	169.9	0.994	47.4	0.135	10.1	0.547	-71.1	1.121	6.57
2.5	0.704	167.2	0.952	45.2	0.131	11.4	0.548	-73.1	1.174	6.09
2.6	0.703	164.6	0.925	43.9	0.127	13.1	0.550	-75.7	1.227	5.74
2.7	0.708	162.6	0.892	41.9	0.125	15.0	0.550	-77.4	1.278	5.38
2.8	0.708	160.0	0.858	40.5	0.122	17.3	0.552	-79.9	1.347	4.96
2.9	0.695	157.7	0.810	37.8	0.120	19.3	0.539	-81.9	1.579	3.82
3.0	0.699	154.1	0.788	35.3	0.119	22.1	0.538	-85.3	1.613	3.60
4.0	0.725	127.0	0.614	17.8	0.159	46.4	0.561	-114.4	1.462	1.84
5.0	0.751	104.2	0.473	9.8	0.251	43.0	0.591	-144.5	1.278	-0.42

V_{CE} = 3 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	0.901	-23.8	9.819	163.3	0.032	77.1	0.961	-12.5	0.079	24.87
0.2	0.861	-47.1	9.129	148.7	0.059	65.2	0.894	-23.4	0.127	21.88
0.3	0.797	-67.1	8.193	136.3	0.079	55.9	0.799	-31.9	0.194	20.15
0.4	0.743	-84.0	7.230	125.9	0.094	48.4	0.710	-39.0	0.260	18.88
0.5	0.694	-99.9	6.372	116.9	0.103	42.7	0.628	-44.4	0.324	17.91
0.6	0.658	-113.1	5.651	109.5	0.110	38.3	0.559	-48.8	0.390	17.12
0.7	0.634	-124.3	5.042	103.7	0.114	35.3	0.503	-52.2	0.448	16.45
0.8	0.615	-134.1	4.528	98.1	0.117	32.9	0.457	-55.3	0.512	15.86
0.9	0.601	-142.8	4.082	93.3	0.119	31.0	0.421	-58.2	0.575	15.34
1.0	0.594	-150.5	3.722	88.9	0.121	30.0	0.392	-61.0	0.632	14.88
1.1	0.592	-157.1	3.414	85.0	0.122	29.1	0.370	-63.3	0.684	14.47
1.2	0.593	-162.9	3.131	81.7	0.123	28.9	0.352	-65.7	0.734	14.05
1.3	0.593	-168.2	2.910	78.2	0.124	28.7	0.340	-67.8	0.782	13.70
1.4	0.595	-172.5	2.703	75.2	0.125	28.7	0.331	-69.9	0.829	13.35
1.5	0.594	-176.6	2.532	72.0	0.126	29.0	0.323	-71.8	0.881	13.04
1.6	0.599	179.6	2.389	69.2	0.126	29.4	0.317	-73.6	0.918	12.77
1.7	0.600	176.4	2.245	66.7	0.127	29.9	0.311	-75.2	0.967	12.46
1.8	0.602	173.2	2.126	64.0	0.129	30.5	0.306	-76.6	1.009	11.60
1.9	0.609	170.4	2.018	61.9	0.130	31.4	0.305	-78.3	1.035	10.77
2.0	0.606	167.7	1.934	59.4	0.131	32.2	0.299	-79.6	1.081	9.94
2.1	0.619	165.2	1.854	57.3	0.133	33.2	0.300	-81.6	1.078	9.74
2.2	0.613	163.4	1.771	55.6	0.135	34.2	0.293	-83.1	1.139	8.92
2.3	0.625	161.0	1.708	53.8	0.137	35.1	0.295	-84.6	1.125	8.81
2.4	0.620	159.2	1.644	52.0	0.140	36.0	0.290	-87.0	1.166	8.23
2.5	0.627	156.9	1.577	50.2	0.143	36.9	0.291	-88.5	1.174	7.91
2.6	0.629	154.8	1.534	48.8	0.145	37.8	0.293	-91.5	1.186	7.64
2.7	0.633	153.6	1.472	47.1	0.148	38.5	0.291	-92.7	1.197	7.28
2.8	0.633	151.4	1.420	45.8	0.151	39.4	0.294	-95.6	1.218	6.90
2.9	0.619	149.8	1.346	43.3	0.155	39.5	0.286	-98.0	1.305	6.06
3.0	0.622	146.5	1.310	41.1	0.160	40.3	0.292	-101.1	1.301	5.85
4.0	0.653	123.5	1.016	21.8	0.209	43.1	0.335	-128.7	1.230	3.97
5.0	0.699	103.5	0.773	8.6	0.272	35.8	0.394	-155.9	1.166	2.06

V_{CE} = 3 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	0.829	-31.2	15.030	158.7	0.030	75.0	0.933	-17.9	0.100	26.94
0.2	0.777	-60.3	13.223	141.4	0.053	60.7	0.819	-32.6	0.177	23.93
0.3	0.706	-83.0	11.213	128.2	0.068	51.8	0.692	-42.9	0.267	22.14
0.4	0.654	-101.0	9.491	117.9	0.078	46.0	0.585	-50.8	0.351	20.85
0.5	0.613	-117.1	8.087	109.6	0.085	41.9	0.499	-56.6	0.433	19.79
0.6	0.586	-129.5	7.010	103.1	0.089	39.7	0.432	-61.3	0.513	18.96
0.7	0.573	-139.8	6.149	98.1	0.093	38.3	0.380	-65.2	0.583	18.21
0.8	0.559	-148.8	5.455	93.3	0.096	37.6	0.339	-68.9	0.657	17.55
0.9	0.556	-156.3	4.883	89.3	0.099	37.2	0.308	-72.5	0.719	16.94
1.0	0.554	-162.9	4.423	85.7	0.102	37.4	0.283	-76.1	0.777	16.39
1.1	0.556	-168.4	4.041	82.3	0.104	37.7	0.266	-79.1	0.825	15.88
1.2	0.559	-173.3	3.695	79.5	0.107	38.1	0.253	-82.4	0.871	15.36
1.3	0.562	-177.8	3.419	76.6	0.110	38.6	0.243	-84.8	0.914	14.92
1.4	0.566	178.7	3.174	74.0	0.113	39.1	0.237	-87.4	0.948	14.48
1.5	0.568	175.0	2.967	71.2	0.116	39.7	0.231	-89.6	0.983	14.07
1.6	0.572	172.0	2.791	68.8	0.119	40.4	0.227	-91.5	1.011	13.05
1.7	0.574	169.2	2.623	66.5	0.123	41.0	0.223	-93.5	1.041	12.05
1.8	0.576	166.6	2.486	64.0	0.126	41.6	0.219	-95.1	1.068	11.36
1.9	0.581	163.9	2.357	62.1	0.130	42.3	0.218	-96.7	1.084	10.83
2.0	0.580	161.7	2.250	60.0	0.133	42.8	0.213	-98.2	1.111	10.24
2.1	0.591	159.7	2.162	58.1	0.137	43.5	0.214	-99.9	1.102	10.03
2.2	0.586	157.7	2.065	56.5	0.141	43.9	0.207	-101.8	1.138	9.40
2.3	0.598	156.0	1.984	54.8	0.145	44.3	0.209	-103.1	1.124	9.21
2.4	0.596	154.3	1.911	53.1	0.150	44.7	0.205	-106.1	1.142	8.77
2.5	0.602	152.5	1.833	51.5	0.154	45.0	0.206	-107.4	1.144	8.45
2.6	0.604	150.6	1.781	50.2	0.159	45.4	0.209	-110.6	1.146	8.18
2.7	0.608	149.2	1.713	48.7	0.163	45.5	0.205	-111.6	1.151	7.86
2.8	0.608	147.5	1.650	47.4	0.168	45.6	0.211	-114.8	1.163	7.48
2.9	0.596	145.9	1.570	45.2	0.173	45.2	0.205	-117.9	1.218	6.77
3.0	0.597	142.7	1.528	43.1	0.178	45.4	0.214	-120.5	1.213	6.54
4.0	0.628	121.5	1.177	24.6	0.231	42.8	0.272	-145.2	1.173	4.57
5.0	0.679	102.5	0.903	11.0	0.286	33.5	0.339	-169.1	1.135	2.76

V_{CE} = 3 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	0.796	-38.7	19.338	155.2	0.028	73.1	0.903	-22.7	0.090	28.41
0.2	0.709	-70.6	16.228	135.7	0.049	58.1	0.754	-39.8	0.233	25.17
0.3	0.638	-95.2	13.188	122.4	0.060	50.2	0.611	-51.1	0.338	23.39
0.4	0.594	-113.3	10.846	112.7	0.068	45.6	0.501	-59.4	0.437	22.04
0.5	0.564	-128.5	9.074	105.2	0.073	43.3	0.418	-65.7	0.530	20.93
0.6	0.547	-140.3	7.772	99.3	0.078	42.2	0.357	-70.9	0.615	20.00
0.7	0.541	-149.5	6.787	95.0	0.082	42.2	0.311	-75.5	0.685	19.18
0.8	0.535	-157.6	5.972	90.7	0.086	42.4	0.276	-80.1	0.756	18.43
0.9	0.535	-164.3	5.320	87.1	0.089	42.7	0.250	-84.6	0.814	17.75
1.0	0.536	-170.2	4.808	83.7	0.093	43.3	0.231	-89.2	0.867	17.13
1.1	0.538	-175.0	4.383	80.8	0.097	44.0	0.218	-93.1	0.909	16.55
1.2	0.544	-179.1	3.998	78.3	0.101	44.8	0.209	-97.1	0.947	15.97
1.3	0.548	176.7	3.702	75.5	0.105	45.3	0.202	-100.1	0.976	15.46
1.4	0.553	173.4	3.434	73.2	0.109	45.8	0.198	-103.1	1.003	14.61
1.5	0.555	170.4	3.209	70.7	0.114	46.4	0.195	-105.7	1.027	13.49
1.6	0.558	167.7	3.015	68.4	0.118	46.9	0.193	-107.7	1.047	12.74
1.7	0.562	165.1	2.832	66.2	0.123	47.3	0.189	-109.9	1.067	12.06
1.8	0.565	162.6	2.679	64.1	0.127	47.7	0.187	-111.8	1.084	11.47
1.9	0.571	160.5	2.546	62.4	0.132	48.0	0.187	-113.4	1.088	11.05
2.0	0.568	158.4	2.428	60.4	0.137	48.2	0.182	-115.3	1.110	10.47
2.1	0.580	156.4	2.328	58.6	0.141	48.6	0.183	-116.6	1.098	10.26
2.2	0.576	154.6	2.227	57.1	0.146	48.8	0.177	-119.2	1.124	9.69
2.3	0.588	153.2	2.137	55.4	0.151	48.8	0.178	-120.4	1.108	9.50
2.4	0.584	151.7	2.059	53.8	0.157	48.8	0.176	-123.8	1.123	9.05
2.5	0.591	149.9	1.976	52.4	0.162	48.8	0.177	-125.0	1.121	8.76
2.6	0.592	148.1	1.917	50.9	0.167	48.9	0.181	-128.3	1.124	8.46
2.7	0.595	147.1	1.846	49.5	0.172	48.6	0.177	-129.6	1.126	8.15
2.8	0.597	145.2	1.779	48.2	0.178	48.4	0.184	-132.4	1.130	7.81
2.9	0.584	143.9	1.689	46.2	0.183	47.6	0.182	-136.1	1.179	7.09
3.0	0.586	140.6	1.646	44.2	0.189	47.7	0.191	-137.7	1.172	6.90
4.0	0.616	120.2	1.264	25.9	0.242	42.8	0.256	-157.8	1.143	4.88
5.0	0.667	101.9	0.972	12.8	0.294	32.5	0.326	-178.9	1.125	3.03

V_{CE} = 3 V, I_C = 10 mA, Z_O = 50 Ω

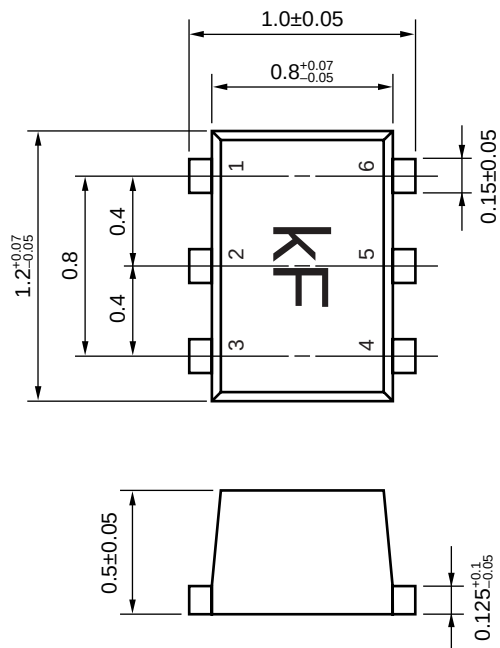
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.711	-47.0	24.365	150.6	0.027	70.1	0.863	-28.3	0.153	29.63
0.2	0.640	-83.2	19.224	129.8	0.044	54.9	0.678	-47.8	0.299	26.44
0.3	0.579	-108.2	14.969	116.8	0.053	49.6	0.527	-60.0	0.424	24.52
0.4	0.546	-125.5	12.010	107.8	0.059	47.2	0.422	-68.7	0.535	23.08
0.5	0.529	-139.5	9.896	101.3	0.064	46.4	0.347	-75.6	0.633	21.89
0.6	0.520	-150.3	8.397	96.0	0.069	46.6	0.294	-81.8	0.718	20.86
0.7	0.518	-158.4	7.295	92.1	0.074	47.3	0.256	-87.4	0.784	19.96
0.8	0.516	-165.6	6.402	88.3	0.078	48.0	0.228	-93.3	0.848	19.13
0.9	0.520	-171.4	5.684	85.2	0.083	48.6	0.209	-99.0	0.897	18.36
1.0	0.521	-176.6	5.126	82.1	0.088	49.5	0.197	-104.9	0.941	17.66
1.1	0.528	179.2	4.669	79.5	0.093	50.2	0.189	-109.5	0.970	17.02
1.2	0.535	175.6	4.255	77.2	0.098	50.8	0.184	-114.1	0.998	16.38
1.3	0.539	171.9	3.934	74.7	0.103	51.3	0.181	-117.4	1.018	14.99
1.4	0.544	169.2	3.649	72.5	0.108	51.6	0.180	-120.4	1.034	14.14
1.5	0.546	166.3	3.407	70.2	0.114	52.0	0.179	-123.3	1.054	13.35
1.6	0.551	163.8	3.202	68.1	0.119	52.2	0.178	-125.3	1.062	12.78
1.7	0.553	161.6	3.006	66.2	0.124	52.3	0.177	-127.7	1.079	12.13
1.8	0.557	159.5	2.842	64.1	0.129	52.5	0.175	-129.7	1.087	11.62
1.9	0.562	157.2	2.698	62.5	0.135	52.5	0.176	-131.1	1.090	11.18
2.0	0.557	155.1	2.575	60.6	0.140	52.5	0.172	-133.3	1.108	10.63
2.1	0.571	153.6	2.470	58.8	0.146	52.5	0.173	-134.4	1.089	10.46
2.2	0.568	152.1	2.359	57.5	0.151	52.5	0.168	-137.5	1.109	9.92
2.3	0.581	150.8	2.268	55.9	0.157	52.2	0.170	-138.7	1.092	9.75
2.4	0.577	149.3	2.179	54.4	0.163	51.9	0.170	-142.3	1.106	9.28
2.5	0.583	147.8	2.093	52.9	0.169	51.7	0.170	-143.3	1.102	9.00
2.6	0.585	146.1	2.030	51.7	0.174	51.5	0.176	-146.1	1.101	8.72
2.7	0.587	145.0	1.953	50.3	0.180	51.0	0.172	-147.9	1.106	8.38
2.8	0.590	143.3	1.885	49.2	0.185	50.5	0.180	-150.0	1.108	8.08
2.9	0.575	142.1	1.791	47.0	0.191	49.6	0.181	-153.6	1.147	7.38
3.0	0.576	138.9	1.745	45.2	0.198	49.3	0.190	-154.3	1.143	7.16
4.0	0.608	119.1	1.336	27.4	0.252	42.8	0.257	-169.2	1.121	5.13
5.0	0.661	101.2	1.029	14.3	0.302	31.7	0.329	172.4	1.110	3.30

V_{CE} = 3 V, I_C = 20 mA, Z₀ = 50 Ω

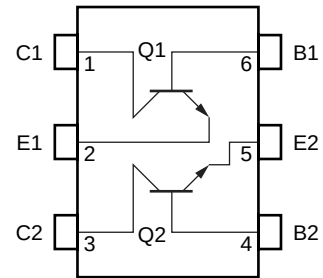
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.563	-68.2	34.590	140.5	0.023	67.6	0.753	-41.1	0.267	31.85
0.2	0.528	-109.6	23.926	118.9	0.034	53.9	0.525	-64.0	0.458	28.50
0.3	0.501	-132.5	17.450	107.8	0.040	52.8	0.386	-77.5	0.615	26.35
0.4	0.492	-146.9	13.548	100.5	0.047	53.4	0.303	-88.0	0.730	24.63
0.5	0.489	-157.8	10.957	95.4	0.052	55.0	0.251	-97.0	0.821	23.20
0.6	0.491	-166.1	9.217	91.1	0.059	56.3	0.217	-105.5	0.885	21.97
0.7	0.495	-172.2	7.959	88.0	0.065	57.4	0.196	-113.3	0.930	20.89
0.8	0.499	-177.8	6.952	84.9	0.071	58.3	0.184	-121.1	0.969	19.91
0.9	0.507	178.1	6.156	82.3	0.077	58.9	0.178	-128.1	0.997	19.02
1.0	0.511	174.0	5.541	79.8	0.083	59.5	0.177	-134.3	1.020	17.36
1.1	0.518	170.8	5.043	77.5	0.090	59.6	0.177	-138.8	1.034	16.37
1.2	0.525	168.2	4.583	75.7	0.096	59.9	0.180	-142.7	1.048	15.45
1.3	0.530	165.1	4.236	73.4	0.103	59.8	0.182	-145.6	1.056	14.71
1.4	0.536	163.0	3.930	71.5	0.109	59.8	0.185	-147.7	1.060	14.07
1.5	0.539	160.6	3.667	69.5	0.115	59.6	0.186	-150.0	1.070	13.41
1.6	0.544	158.3	3.445	67.6	0.122	59.3	0.188	-151.4	1.070	12.90
1.7	0.547	156.4	3.231	65.8	0.128	59.1	0.190	-153.5	1.077	12.32
1.8	0.548	154.4	3.058	63.9	0.134	58.7	0.190	-155.3	1.084	11.81
1.9	0.555	152.7	2.902	62.4	0.141	58.3	0.192	-156.2	1.080	11.41
2.0	0.552	151.0	2.770	60.7	0.147	58.0	0.190	-158.5	1.087	10.94
2.1	0.564	149.5	2.648	59.2	0.154	57.5	0.190	-159.3	1.076	10.69
2.2	0.557	148.0	2.529	57.9	0.160	57.1	0.188	-162.7	1.093	10.15
2.3	0.571	147.2	2.429	56.3	0.166	56.5	0.189	-163.7	1.076	9.97
2.4	0.568	145.9	2.338	54.8	0.173	55.9	0.192	-166.8	1.083	9.57
2.5	0.574	144.3	2.245	53.5	0.179	55.2	0.192	-167.7	1.078	9.28
2.6	0.577	142.7	2.177	52.5	0.185	54.8	0.199	-169.5	1.076	9.02
2.7	0.580	142.1	2.094	51.2	0.191	54.1	0.196	-171.5	1.078	8.70
2.8	0.581	140.4	2.023	50.1	0.197	53.3	0.205	-172.6	1.081	8.38
2.9	0.566	139.3	1.923	48.1	0.203	52.1	0.208	-175.7	1.113	7.71
3.0	0.567	136.1	1.872	46.5	0.210	51.7	0.217	-175.1	1.107	7.50
4.0	0.596	117.4	1.427	29.1	0.266	43.1	0.280	176.1	1.098	5.39
5.0	0.649	100.1	1.098	16.7	0.313	30.9	0.353	161.4	1.099	3.53

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]

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