

NPN SILICON RF TWIN TRANSISTOR

μ PA872TD

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

FEATURES

- Built-in low voltage operation, low phase distortion transistor suited for OSC operation
 $f_T = 5.5 \text{ GHz TYP.}$, $|S_{21e}|^2 = 4.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_c = 10 \text{ mA, } f = 2 \text{ GHz}$
- Built-in 2 transistors ($2 \times 2\text{SC}5676$)
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

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

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA872TD	50 pcs (Non reel)	• 8 mm wide embossed taping
μ PA872TD-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.

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	9	V
Collector to Emitter Voltage	V_{CEO}	5.5	V
Emitter to Base Voltage	V_{EBO}	1.5	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	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

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

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.

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	–	–	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 = 10 mA	100	–	160	–
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%

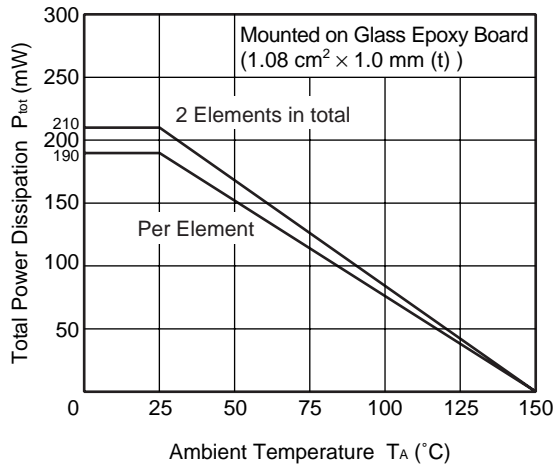
2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

h_{FE} CLASSIFICATION

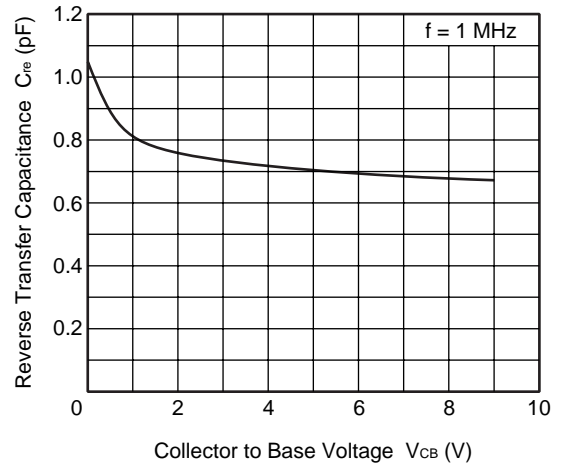
Rank	FB
Marking	cD
h _{FE} Value	100 to 160

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

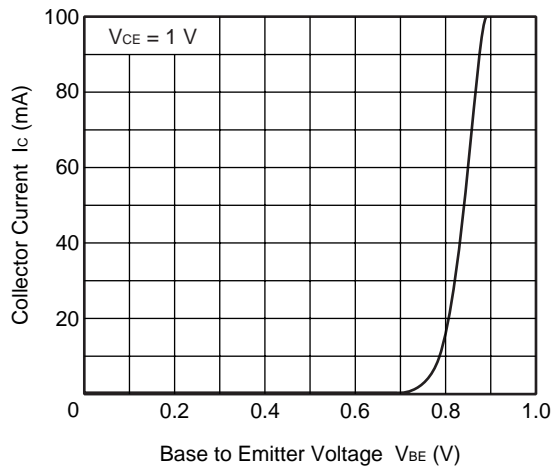
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



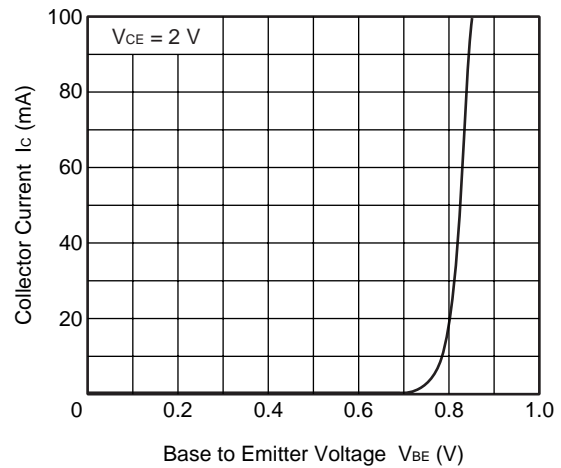
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



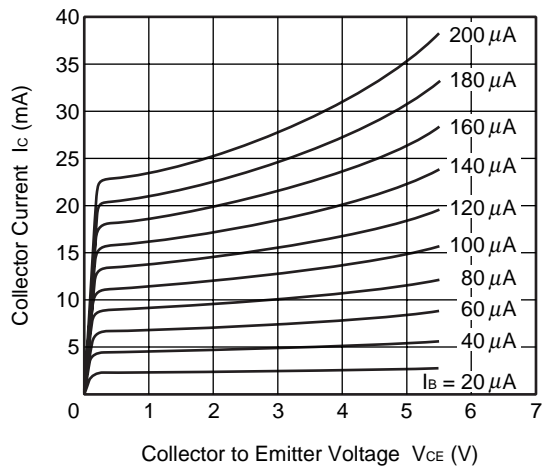
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



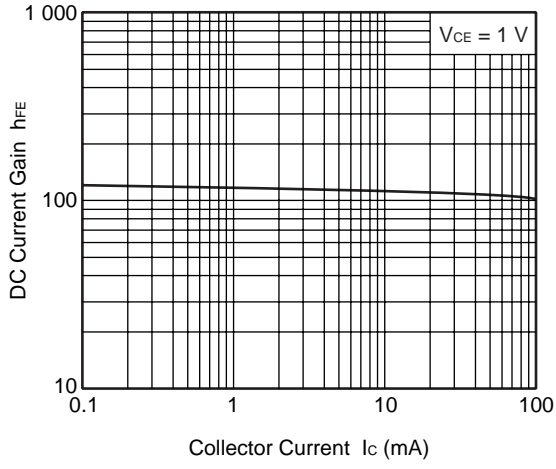
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



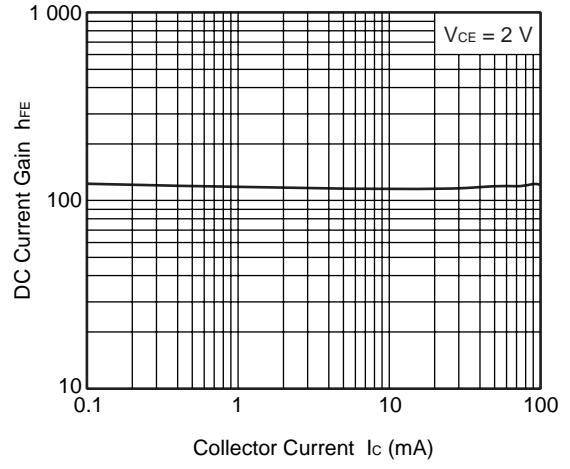
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



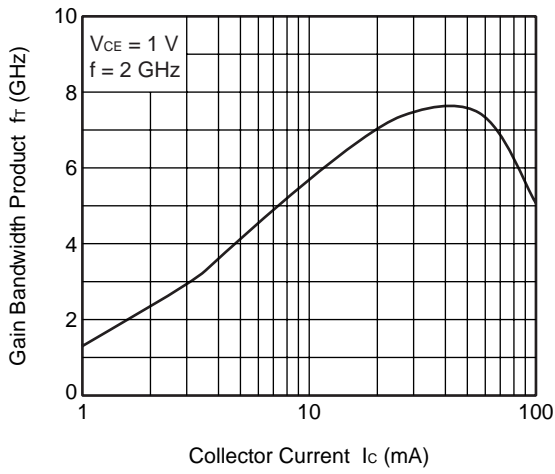
DC CURRENT GAIN vs.
COLLECTOR CURRENT



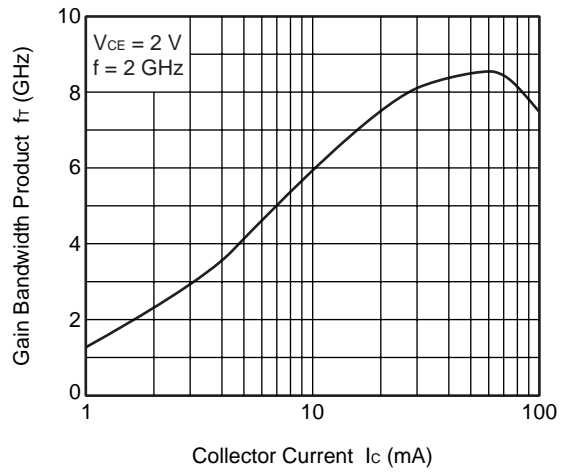
DC CURRENT GAIN vs.
COLLECTOR CURRENT



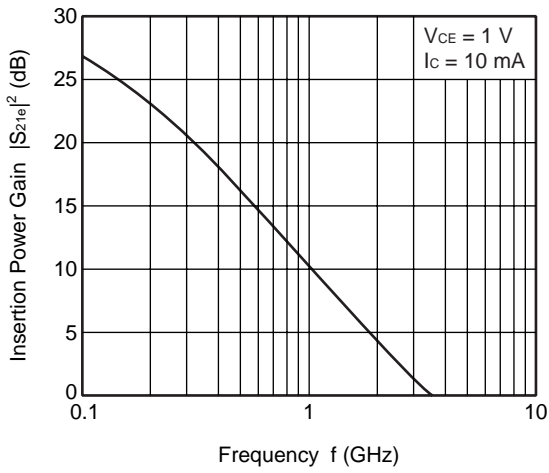
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



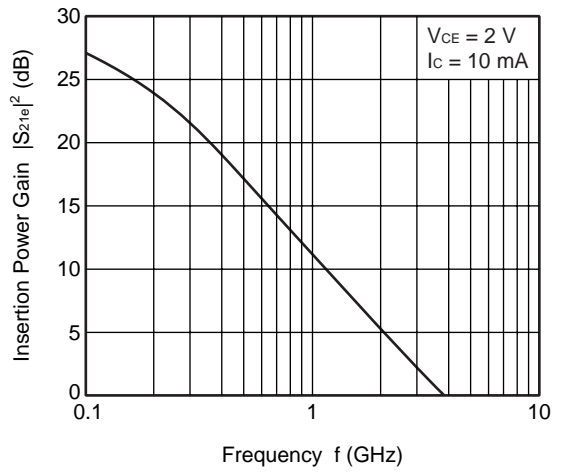
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



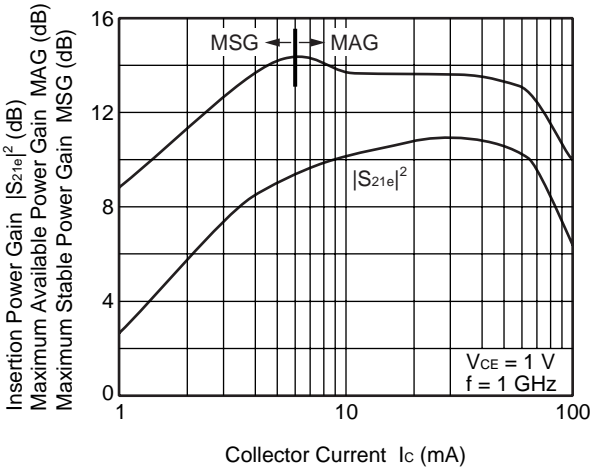
INSERTION POWER GAIN vs. FREQUENCY



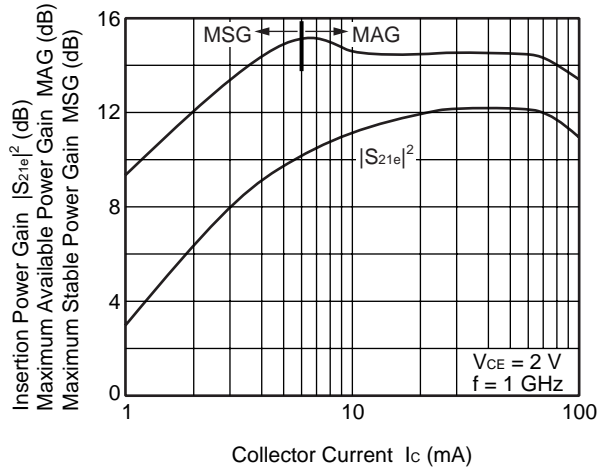
INSERTION POWER GAIN vs. FREQUENCY



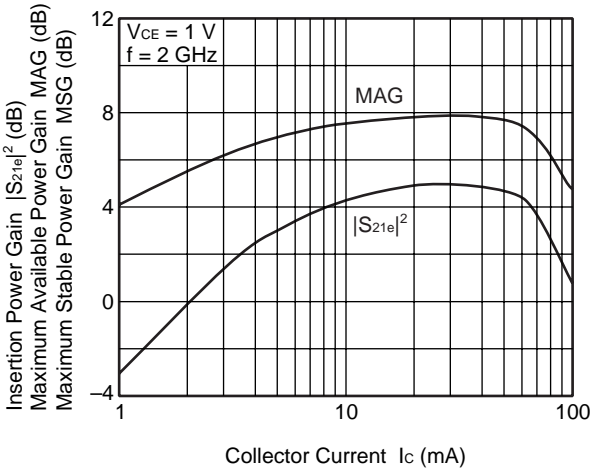
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



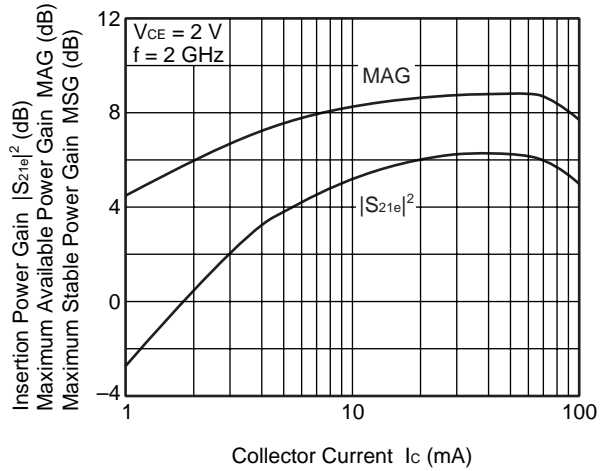
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



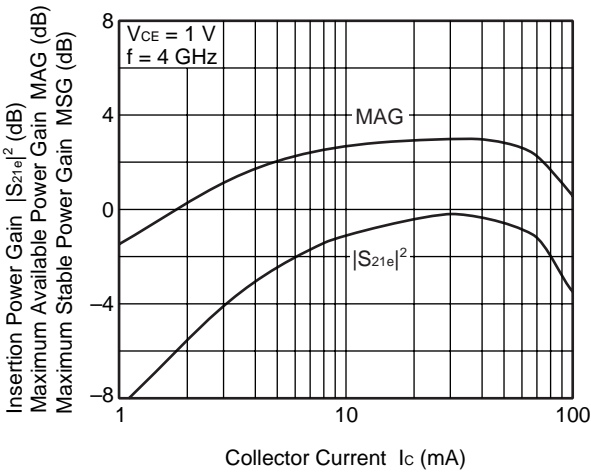
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



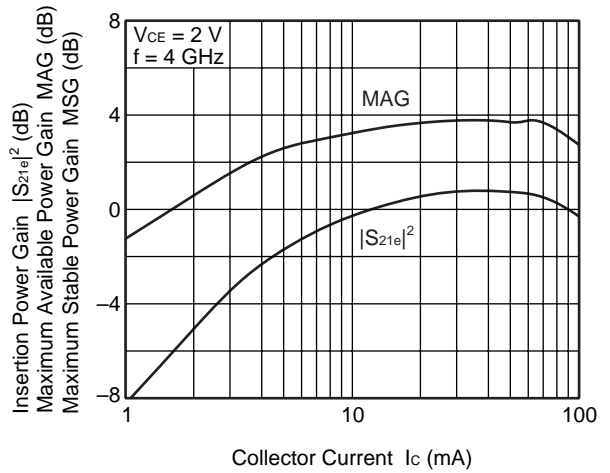
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



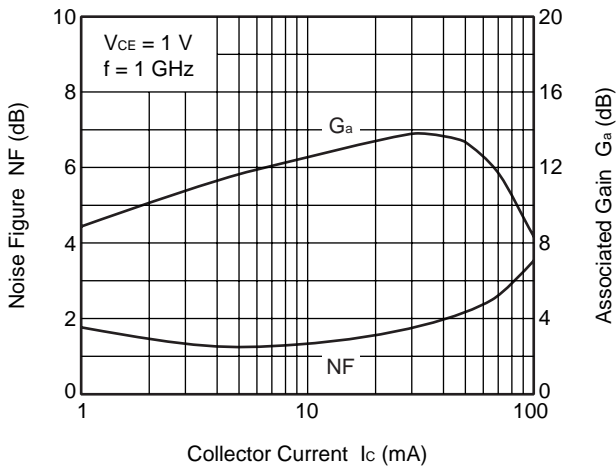
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



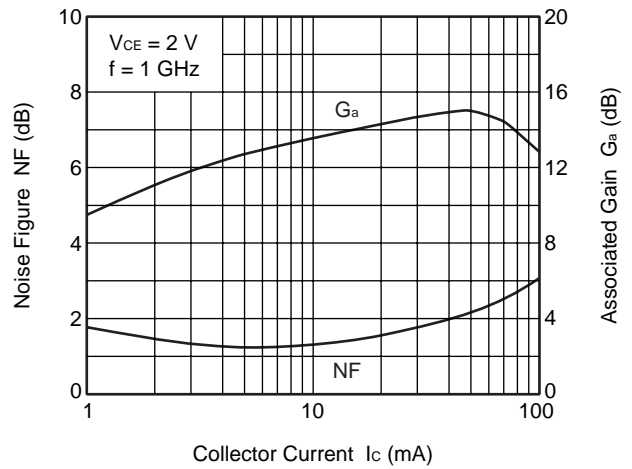
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



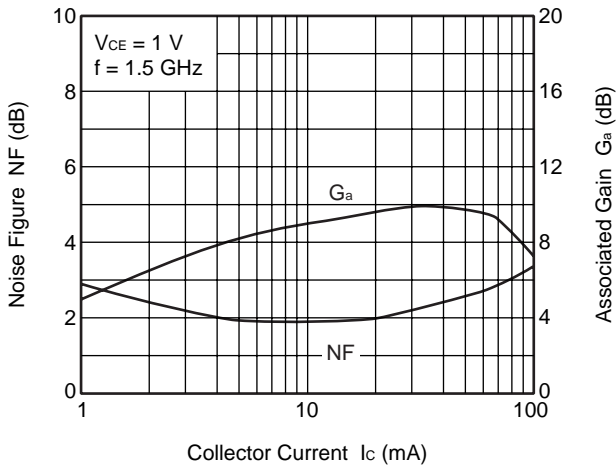
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



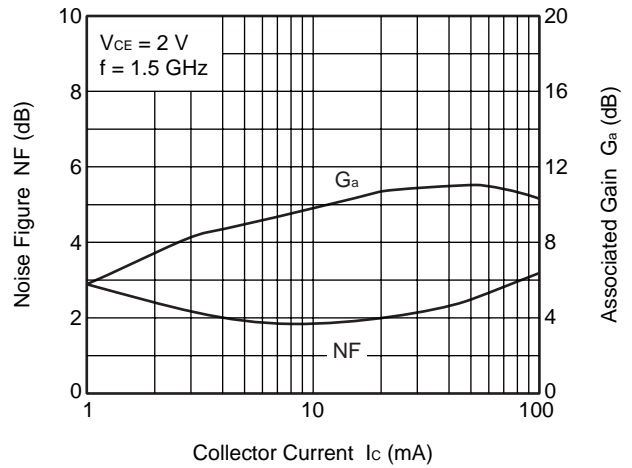
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



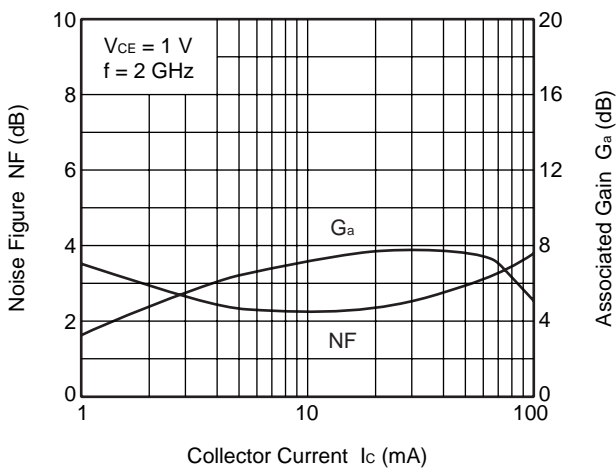
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



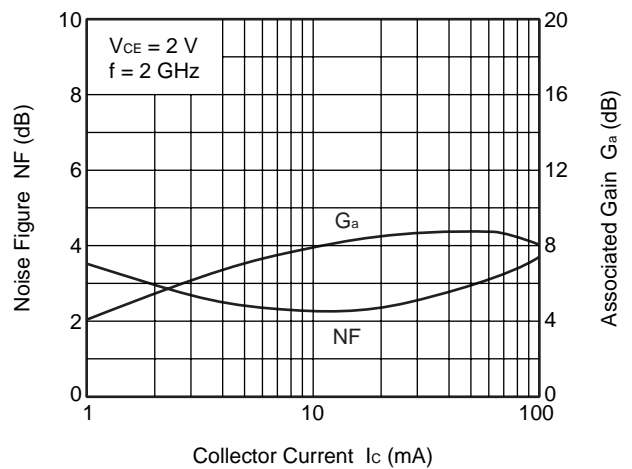
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

When $K < 1$, the MSG (Maximum Stable Power 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	MAG/MSG (dB)	Note
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)			
0.1	0.973	-26.9	3.619	162.3	0.055	73.9	0.980	-9.6	0.059	18.14	
0.2	0.936	-51.7	3.311	146.1	0.104	60.7	0.917	-18.4	0.099	15.03	
0.3	0.883	-74.2	2.950	131.4	0.139	48.2	0.847	-25.1	0.164	13.28	
0.4	0.835	-92.8	2.602	118.8	0.161	38.4	0.777	-30.6	0.234	12.08	
0.5	0.809	-108.3	2.317	108.8	0.175	30.5	0.719	-34.7	0.285	11.22	
0.6	0.781	-121.3	2.046	99.7	0.182	24.1	0.669	-38.2	0.354	10.50	
0.7	0.766	-132.5	1.829	92.3	0.186	18.7	0.635	-41.3	0.409	9.93	
0.8	0.754	-141.9	1.644	85.7	0.185	14.4	0.605	-44.5	0.472	9.48	
0.9	0.746	-149.9	1.482	79.5	0.184	10.7	0.584	-47.6	0.539	9.06	
1.0	0.743	-156.8	1.357	73.9	0.180	7.8	0.568	-50.8	0.604	8.77	
1.1	0.741	-163.2	1.249	68.9	0.175	5.0	0.559	-54.3	0.667	8.53	
1.2	0.745	-168.8	1.145	64.1	0.169	3.1	0.551	-57.5	0.733	8.30	
1.3	0.747	-173.2	1.066	60.0	0.163	1.3	0.549	-61.1	0.799	8.16	
1.4	0.753	-177.7	0.995	55.9	0.156	0.1	0.547	-64.6	0.859	8.03	
1.5	0.753	178.8	0.933	52.0	0.149	-0.6	0.551	-68.0	0.944	7.98	
1.6	0.759	175.2	0.874	48.7	0.141	-0.9	0.549	-71.3	1.027	6.90	
1.7	0.764	172.2	0.821	45.4	0.134	-0.6	0.556	-74.6	1.104	5.91	
1.8	0.765	169.2	0.774	42.4	0.126	0.6	0.558	-77.8	1.228	5.00	
1.9	0.767	166.2	0.733	39.7	0.119	2.1	0.564	-80.9	1.332	4.45	
2.0	0.772	163.6	0.700	36.6	0.113	4.7	0.566	-84.0	1.436	4.00	
2.1	0.773	161.1	0.675	35.0	0.107	8.1	0.573	-87.2	1.523	3.73	
2.2	0.776	158.7	0.641	33.0	0.102	12.2	0.576	-90.3	1.653	3.24	
2.3	0.776	156.0	0.614	31.4	0.100	17.0	0.584	-93.2	1.737	2.91	
2.4	0.777	153.5	0.592	29.5	0.098	22.0	0.582	-96.4	1.837	2.52	
2.5	0.781	151.0	0.568	27.9	0.099	27.7	0.588	-99.8	1.844	2.29	
2.6	0.779	148.5	0.545	26.7	0.101	33.2	0.591	-103.1	1.905	1.85	
2.7	0.776	145.9	0.526	25.4	0.106	37.9	0.596	-106.7	1.905	1.47	
2.8	0.765	143.6	0.502	24.6	0.113	41.4	0.599	-109.8	1.982	0.80	
2.9	0.737	141.5	0.478	23.3	0.123	42.9	0.599	-113.2	2.176	-0.22	
3.0	0.722	140.5	0.463	22.0	0.130	44.1	0.596	-117.1	2.283	-0.84	
4.0	0.793	118.9	0.379	17.8	0.230	53.2	0.655	-150.7	1.372	-1.47	
5.0	0.752	96.1	0.380	17.2	0.338	34.4	0.687	-177.9	1.313	-2.85	

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	0.900	-42.3	9.612	154.4	0.052	67.8	0.921	-20.6	0.066	22.63
0.2	0.828	-75.6	7.960	134.2	0.087	51.1	0.767	-36.3	0.150	19.61
0.3	0.758	-101.6	6.434	119.4	0.106	40.0	0.631	-46.1	0.240	17.84
0.4	0.722	-120.4	5.271	108.5	0.116	32.8	0.527	-53.0	0.321	16.59
0.5	0.702	-134.5	4.452	100.0	0.121	28.3	0.453	-57.5	0.399	15.66
0.6	0.685	-145.7	3.801	93.4	0.123	25.2	0.397	-61.5	0.488	14.90
0.7	0.678	-154.7	3.310	87.7	0.124	23.0	0.359	-64.6	0.566	14.25
0.8	0.674	-162.1	2.919	83.0	0.125	21.9	0.330	-68.1	0.648	13.70
0.9	0.675	-168.1	2.605	78.5	0.125	21.0	0.311	-71.5	0.725	13.20
1.0	0.677	-173.6	2.359	74.4	0.124	21.1	0.297	-75.0	0.797	12.79
1.1	0.677	-178.3	2.149	70.8	0.124	21.2	0.290	-78.4	0.874	12.41
1.2	0.684	177.5	1.968	67.2	0.123	21.8	0.284	-81.9	0.937	12.04
1.3	0.688	174.0	1.820	64.1	0.123	22.6	0.285	-85.0	1.000	11.72
1.4	0.692	170.8	1.694	60.9	0.122	23.6	0.285	-88.3	1.062	9.89
1.5	0.695	168.0	1.583	57.7	0.122	25.0	0.289	-91.0	1.122	9.00
1.6	0.701	165.4	1.488	55.0	0.123	26.3	0.291	-94.0	1.166	8.37
1.7	0.704	163.0	1.397	52.4	0.123	27.9	0.298	-96.4	1.218	7.73
1.8	0.705	160.9	1.322	49.8	0.124	29.7	0.301	-99.1	1.273	7.14
1.9	0.706	158.6	1.255	47.4	0.126	31.5	0.309	-101.3	1.315	6.64
2.0	0.709	156.5	1.194	44.7	0.128	33.6	0.311	-103.7	1.351	6.18
2.1	0.713	154.3	1.150	42.9	0.130	35.5	0.319	-106.0	1.355	5.90
2.2	0.712	152.6	1.100	41.0	0.133	37.2	0.322	-108.6	1.389	5.44
2.3	0.716	150.3	1.059	39.1	0.137	38.9	0.330	-110.8	1.379	5.20
2.4	0.717	148.3	1.019	36.7	0.142	40.3	0.332	-113.3	1.387	4.85
2.5	0.721	146.1	0.983	35.1	0.148	41.8	0.339	-116.0	1.371	4.60
2.6	0.719	144.2	0.946	33.4	0.152	42.9	0.344	-118.7	1.392	4.20
2.7	0.716	142.0	0.911	31.5	0.159	43.7	0.351	-121.8	1.408	3.79
2.8	0.707	139.8	0.876	30.1	0.165	43.8	0.356	-124.5	1.453	3.26
2.9	0.682	138.2	0.831	28.1	0.172	43.0	0.362	-127.6	1.571	2.38
3.0	0.670	137.7	0.804	26.7	0.177	43.0	0.366	-131.2	1.637	1.90
4.0	0.750	118.5	0.630	11.9	0.250	45.5	0.466	-159.4	1.217	1.21
5.0	0.729	96.8	0.507	4.9	0.334	30.8	0.551	178.1	1.252	-1.21

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	0.833	-54.3	14.362	147.8	0.049	62.3	0.861	-30.0	0.112	24.67
0.2	0.757	-92.6	10.885	126.0	0.074	46.4	0.652	-49.9	0.208	21.66
0.3	0.693	-118.9	8.290	112.2	0.086	37.7	0.502	-61.9	0.325	19.85
0.4	0.670	-135.7	6.567	102.6	0.092	33.1	0.401	-70.3	0.430	18.54
0.5	0.661	-148.0	5.432	95.5	0.096	30.9	0.334	-76.4	0.523	17.55
0.6	0.651	-157.5	4.591	89.9	0.098	30.0	0.287	-82.4	0.625	16.69
0.7	0.649	-165.1	3.964	85.2	0.101	29.7	0.256	-87.3	0.713	15.95
0.8	0.650	-171.3	3.486	81.2	0.103	30.3	0.233	-92.9	0.796	15.31
0.9	0.652	-176.4	3.095	77.4	0.105	30.9	0.220	-97.5	0.868	14.68
1.0	0.656	179.1	2.793	73.8	0.107	32.0	0.212	-102.5	0.937	14.16
1.1	0.659	174.9	2.544	70.7	0.110	32.9	0.209	-106.5	0.997	13.65
1.2	0.665	171.5	2.321	67.7	0.113	34.0	0.208	-110.3	1.047	11.82
1.3	0.671	168.3	2.148	64.7	0.115	35.2	0.211	-113.3	1.088	10.91
1.4	0.673	165.6	1.999	62.0	0.118	36.4	0.213	-116.5	1.129	10.10
1.5	0.678	163.2	1.864	59.3	0.121	37.7	0.218	-118.6	1.159	9.45
1.6	0.683	161.0	1.756	56.8	0.125	38.7	0.221	-121.1	1.181	8.90
1.7	0.687	158.9	1.648	54.5	0.129	39.8	0.228	-122.5	1.206	8.34
1.8	0.686	157.0	1.561	52.2	0.132	41.0	0.231	-124.7	1.240	7.76
1.9	0.688	154.7	1.481	49.9	0.137	41.9	0.238	-125.7	1.255	7.31
2.0	0.690	153.1	1.412	47.5	0.141	43.0	0.240	-127.8	1.268	6.88
2.1	0.694	151.2	1.358	45.7	0.146	43.9	0.246	-129.1	1.260	6.61
2.2	0.692	149.5	1.300	43.9	0.151	44.5	0.249	-131.1	1.281	6.16
2.3	0.695	147.4	1.251	41.9	0.157	45.0	0.255	-132.6	1.272	5.87
2.4	0.697	145.7	1.210	39.9	0.163	45.4	0.258	-134.7	1.268	5.59
2.5	0.698	143.6	1.165	38.1	0.170	45.8	0.264	-136.6	1.263	5.27
2.6	0.698	141.7	1.121	36.4	0.175	45.9	0.268	-138.7	1.275	4.91
2.7	0.694	139.8	1.080	34.6	0.182	45.8	0.275	-141.1	1.290	4.50
2.8	0.684	137.8	1.039	33.1	0.188	45.2	0.282	-143.4	1.331	3.98
2.9	0.661	136.3	0.988	31.2	0.195	43.8	0.290	-146.0	1.418	3.20
3.0	0.649	135.8	0.956	29.7	0.199	43.5	0.295	-149.1	1.475	2.74
4.0	0.730	117.8	0.753	13.6	0.264	42.5	0.399	-170.4	1.181	1.98
5.0	0.716	96.9	0.598	3.4	0.336	28.5	0.491	171.9	1.213	-0.28

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	0.782	-65.3	18.038	142.5	0.045	59.1	0.806	-37.9	0.130	26.03
0.2	0.705	-105.6	12.752	120.4	0.065	44.4	0.571	-60.8	0.266	22.95
0.3	0.661	-130.4	9.386	107.8	0.073	37.4	0.425	-74.6	0.402	21.08
0.4	0.645	-145.6	7.303	99.2	0.079	35.1	0.336	-85.0	0.522	19.69
0.5	0.640	-156.4	5.973	92.7	0.083	34.8	0.280	-93.1	0.627	18.60
0.6	0.637	-164.5	5.020	87.9	0.086	35.2	0.243	-101.4	0.728	17.67
0.7	0.639	-171.2	4.330	83.6	0.089	35.9	0.220	-108.0	0.811	16.85
0.8	0.639	-176.7	3.799	80.0	0.093	37.1	0.206	-115.1	0.893	16.12
0.9	0.643	178.7	3.367	76.6	0.097	38.3	0.199	-120.7	0.953	15.39
1.0	0.648	174.8	3.036	73.4	0.101	39.7	0.197	-126.0	1.007	14.28
1.1	0.651	171.0	2.761	70.6	0.105	40.7	0.197	-129.9	1.053	12.78
1.2	0.657	167.9	2.519	67.8	0.110	41.7	0.200	-133.6	1.089	11.78
1.3	0.663	165.3	2.329	65.2	0.114	42.8	0.204	-135.9	1.116	11.03
1.4	0.667	162.7	2.168	62.7	0.119	43.7	0.208	-138.5	1.141	10.33
1.5	0.671	160.5	2.023	60.2	0.124	44.6	0.213	-139.9	1.161	9.70
1.6	0.673	158.3	1.903	57.8	0.129	45.2	0.217	-142.1	1.177	9.14
1.7	0.675	156.6	1.787	55.6	0.134	46.1	0.221	-142.8	1.197	8.58
1.8	0.680	154.6	1.692	53.4	0.139	46.6	0.225	-144.7	1.206	8.12
1.9	0.680	152.7	1.607	51.2	0.145	47.0	0.229	-145.1	1.213	7.67
2.0	0.683	150.9	1.533	48.9	0.150	47.7	0.231	-146.7	1.219	7.27
2.1	0.683	149.4	1.474	47.3	0.156	47.8	0.236	-147.6	1.220	6.92
2.2	0.684	147.7	1.413	45.6	0.162	47.9	0.238	-149.4	1.223	6.55
2.3	0.687	145.6	1.356	43.7	0.169	48.0	0.243	-150.3	1.219	6.22
2.4	0.687	144.0	1.314	41.6	0.175	47.9	0.244	-152.0	1.214	5.96
2.5	0.689	142.1	1.266	39.9	0.183	47.8	0.250	-153.4	1.208	5.65
2.6	0.686	140.2	1.217	38.3	0.189	47.6	0.253	-155.2	1.227	5.23
2.7	0.682	138.4	1.174	36.3	0.196	47.0	0.260	-157.1	1.238	4.84
2.8	0.675	136.6	1.132	34.9	0.201	46.0	0.266	-159.0	1.265	4.41
2.9	0.652	135.2	1.076	33.1	0.208	44.4	0.275	-160.9	1.342	3.64
3.0	0.639	134.7	1.041	31.6	0.211	43.9	0.280	-163.5	1.395	3.19
4.0	0.718	117.2	0.829	15.2	0.273	41.1	0.378	-179.5	1.159	2.40
5.0	0.708	96.9	0.651	3.9	0.338	27.2	0.465	166.3	1.201	0.13

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	0.711	-79.1	21.972	136.6	0.040	54.1	0.740	-47.1	0.186	27.35
0.2	0.658	-118.6	14.391	115.0	0.055	42.8	0.494	-73.3	0.346	24.19
0.3	0.634	-140.8	10.281	103.6	0.062	39.4	0.364	-89.2	0.500	22.20
0.4	0.626	-154.5	7.903	96.2	0.067	39.0	0.294	-101.9	0.632	20.71
0.5	0.625	-163.6	6.414	90.5	0.072	40.1	0.252	-111.9	0.740	19.51
0.6	0.626	-170.7	5.384	86.1	0.077	41.4	0.228	-121.7	0.834	18.47
0.7	0.629	-176.4	4.630	82.3	0.082	42.8	0.215	-129.3	0.907	17.54
0.8	0.633	178.5	4.058	79.1	0.087	44.3	0.210	-136.6	0.971	16.70
0.9	0.636	174.6	3.595	76.0	0.092	45.4	0.209	-141.8	1.019	15.05
1.0	0.643	171.0	3.234	73.1	0.098	46.8	0.211	-146.4	1.056	13.75
1.1	0.646	167.9	2.942	70.5	0.104	47.6	0.215	-149.6	1.089	12.72
1.2	0.653	165.0	2.683	67.9	0.110	48.4	0.219	-152.4	1.110	11.87
1.3	0.657	162.6	2.481	65.4	0.115	49.0	0.224	-154.3	1.128	11.16
1.4	0.662	160.1	2.308	63.2	0.121	49.7	0.229	-156.2	1.140	10.53
1.5	0.666	158.3	2.153	60.7	0.127	50.2	0.233	-157.2	1.152	9.93
1.6	0.670	156.1	2.024	58.5	0.133	50.4	0.237	-158.9	1.159	9.41
1.7	0.674	154.4	1.904	56.4	0.139	50.7	0.241	-159.3	1.163	8.91
1.8	0.671	152.7	1.802	54.4	0.145	51.0	0.243	-161.0	1.185	8.34
1.9	0.673	150.8	1.712	52.4	0.152	51.0	0.246	-161.2	1.184	7.92
2.0	0.676	149.2	1.634	50.2	0.158	51.0	0.247	-162.7	1.185	7.54
2.1	0.679	147.6	1.571	48.5	0.165	50.9	0.250	-163.3	1.177	7.25
2.2	0.676	145.9	1.507	46.8	0.171	50.6	0.252	-164.9	1.191	6.80
2.3	0.680	144.2	1.445	45.0	0.179	50.3	0.255	-165.6	1.179	6.51
2.4	0.682	142.5	1.399	43.1	0.186	49.8	0.256	-167.2	1.170	6.26
2.5	0.679	140.9	1.347	41.4	0.193	49.4	0.260	-168.3	1.177	5.88
2.6	0.680	138.9	1.299	39.6	0.200	48.9	0.263	-170.0	1.183	5.54
2.7	0.676	137.3	1.254	37.8	0.207	48.0	0.269	-171.4	1.191	5.19
2.8	0.668	135.6	1.205	36.6	0.213	46.8	0.276	-172.9	1.220	4.70
2.9	0.644	134.1	1.147	34.6	0.219	45.0	0.283	-174.1	1.289	3.97
3.0	0.632	133.8	1.112	33.4	0.222	44.4	0.289	-176.5	1.333	3.55
4.0	0.710	116.6	0.887	16.8	0.283	40.0	0.376	171.6	1.142	2.68
5.0	0.700	96.7	0.699	4.8	0.341	25.9	0.454	160.3	1.187	0.50

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	0.628	-107.7	28.511	125.0	0.030	50.6	0.596	-68.5	0.287	29.76
0.2	0.613	-142.3	16.654	106.2	0.040	45.0	0.387	-100.4	0.535	26.24
0.3	0.613	-158.5	11.440	97.5	0.047	47.4	0.308	-119.5	0.711	23.90
0.4	0.614	-168.2	8.692	91.6	0.053	49.6	0.276	-133.8	0.832	22.12
0.5	0.614	-174.5	6.982	86.9	0.060	52.0	0.260	-143.8	0.920	20.64
0.6	0.621	-179.9	5.841	83.5	0.067	54.1	0.258	-152.2	0.981	19.38
0.7	0.624	-175.6	4.989	80.3	0.075	55.1	0.257	-157.9	1.026	17.26
0.8	0.632	-171.9	4.368	77.5	0.082	56.3	0.262	-162.9	1.057	15.82
0.9	0.636	-168.8	3.870	74.9	0.090	56.8	0.266	-166.2	1.078	14.65
1.0	0.641	-165.8	3.483	72.4	0.097	57.5	0.273	-169.1	1.095	13.67
1.1	0.645	-163.0	3.164	70.1	0.105	57.6	0.279	-171.0	1.107	12.81
1.2	0.652	-160.4	2.887	67.9	0.113	57.6	0.285	-172.8	1.114	12.04
1.3	0.657	-158.6	2.666	65.7	0.119	57.8	0.289	-173.9	1.120	11.38
1.4	0.662	-156.4	2.480	63.6	0.127	57.6	0.295	-175.2	1.121	10.79
1.5	0.664	-154.6	2.314	61.4	0.134	57.4	0.298	-175.9	1.127	10.19
1.6	0.667	-152.9	2.175	59.5	0.142	57.0	0.301	-177.3	1.129	9.68
1.7	0.672	-151.4	2.046	57.5	0.149	56.8	0.303	-177.7	1.128	9.21
1.8	0.673	-149.7	1.938	55.6	0.156	56.4	0.306	-179.1	1.132	8.73
1.9	0.671	-148.0	1.843	53.8	0.163	55.9	0.307	-179.4	1.138	8.27
2.0	0.672	-146.6	1.758	51.8	0.171	55.4	0.307	-179.3	1.138	7.87
2.1	0.675	-145.4	1.689	50.3	0.178	54.8	0.308	-178.5	1.131	7.57
2.2	0.673	-143.6	1.623	48.7	0.186	53.9	0.308	-176.9	1.136	7.17
2.3	0.676	-142.0	1.556	47.0	0.194	53.2	0.310	-176.2	1.130	6.86
2.4	0.674	-140.3	1.508	45.1	0.202	52.3	0.310	-174.8	1.129	6.55
2.5	0.675	-138.7	1.451	43.4	0.210	51.6	0.313	-173.8	1.127	6.23
2.6	0.673	-137.0	1.401	41.9	0.216	50.6	0.315	-172.2	1.135	5.88
2.7	0.667	-135.3	1.351	40.1	0.224	49.4	0.320	-171.0	1.147	5.49
2.8	0.659	-133.6	1.298	38.9	0.229	48.0	0.326	-170.0	1.171	5.03
2.9	0.636	-132.5	1.235	36.9	0.235	45.9	0.331	-169.2	1.223	4.36
3.0	0.626	-132.0	1.197	35.7	0.237	45.1	0.337	-167.1	1.257	3.98
4.0	0.701	-115.4	0.959	19.4	0.297	38.9	0.405	-158.9	1.118	3.00
5.0	0.690	-96.4	0.760	7.3	0.349	24.2	0.465	-150.5	1.168	0.90

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	0.974	-25.0	3.575	163.7	0.047	76.0	0.983	-7.9	0.046	18.78
0.2	0.941	-48.8	3.301	148.2	0.089	62.4	0.933	-15.5	0.097	15.69
0.3	0.887	-70.6	2.978	134.1	0.120	50.6	0.874	-21.4	0.159	13.94
0.4	0.847	-88.6	2.648	121.9	0.141	41.0	0.812	-26.3	0.223	12.75
0.5	0.820	-104.0	2.380	112.0	0.155	33.1	0.759	-29.8	0.275	11.87
0.6	0.789	-117.4	2.117	103.0	0.162	26.7	0.712	-33.0	0.345	11.17
0.7	0.770	-128.7	1.893	95.6	0.166	21.3	0.680	-35.8	0.402	10.58
0.8	0.755	-138.6	1.710	89.0	0.166	16.9	0.650	-38.7	0.468	10.14
0.9	0.749	-146.7	1.546	82.9	0.165	13.3	0.630	-41.4	0.529	9.72
1.0	0.744	-154.1	1.416	77.4	0.162	10.3	0.613	-44.3	0.597	9.42
1.1	0.741	-160.6	1.306	72.3	0.158	7.6	0.603	-47.5	0.662	9.19
1.2	0.745	-166.5	1.198	67.7	0.153	5.7	0.593	-50.4	0.727	8.95
1.3	0.746	-171.4	1.115	63.7	0.146	3.9	0.590	-53.7	0.799	8.81
1.4	0.751	-175.9	1.039	59.4	0.140	2.8	0.586	-56.8	0.865	8.69
1.5	0.752	-179.8	0.973	55.5	0.134	2.3	0.588	-60.0	0.952	8.61
1.6	0.755	-176.8	0.916	52.1	0.127	2.2	0.585	-63.2	1.047	8.24
1.7	0.760	-173.4	0.860	48.9	0.121	2.6	0.591	-66.3	1.123	6.40
1.8	0.762	-170.5	0.813	45.9	0.114	4.0	0.590	-69.3	1.247	5.55
1.9	0.764	-167.4	0.768	43.3	0.107	5.8	0.596	-72.4	1.352	5.00
2.0	0.767	-164.6	0.731	40.4	0.102	8.8	0.596	-75.2	1.477	4.48
2.1	0.771	-162.1	0.702	38.4	0.096	12.6	0.601	-78.1	1.554	4.24
2.2	0.771	-159.6	0.669	36.6	0.093	16.7	0.601	-81.1	1.706	3.70
2.3	0.772	-156.9	0.643	34.6	0.090	21.9	0.607	-84.0	1.783	3.41
2.4	0.775	-154.3	0.618	32.7	0.089	27.4	0.605	-86.9	1.857	3.05
2.5	0.774	-151.7	0.593	31.1	0.091	33.3	0.608	-90.0	1.896	2.70
2.6	0.774	-149.1	0.570	29.8	0.094	38.8	0.610	-93.4	1.928	2.31
2.7	0.767	-146.5	0.549	28.4	0.099	43.7	0.614	-96.6	1.942	1.86
2.8	0.758	-144.1	0.525	27.6	0.107	47.0	0.615	-99.7	1.986	1.23
2.9	0.730	-142.0	0.500	26.1	0.116	48.3	0.612	-103.0	2.178	0.20
3.0	0.715	-140.9	0.483	25.0	0.123	49.5	0.608	-107.0	2.285	-0.44
4.0	0.787	-119.2	0.390	19.3	0.226	57.5	0.650	-141.2	1.370	-1.25
5.0	0.742	-96.3	0.383	18.4	0.336	37.8	0.679	-170.1	1.329	-2.85

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	0.907	-37.9	9.712	156.4	0.044	68.0	0.936	-17.2	0.102	23.41
0.2	0.834	-70.3	8.220	137.1	0.075	54.0	0.800	-30.7	0.146	20.37
0.3	0.764	-95.9	6.772	122.4	0.094	42.9	0.675	-39.2	0.235	18.60
0.4	0.720	-114.8	5.611	111.3	0.104	35.7	0.574	-44.9	0.321	17.33
0.5	0.698	-129.3	4.779	102.9	0.109	30.7	0.502	-48.4	0.398	16.42
0.6	0.679	-141.0	4.095	96.0	0.112	27.6	0.445	-51.3	0.485	15.65
0.7	0.670	-150.3	3.576	90.3	0.113	25.4	0.406	-53.6	0.564	15.00
0.8	0.663	-158.5	3.164	85.4	0.113	24.2	0.374	-56.1	0.650	14.46
0.9	0.663	-164.9	2.824	81.0	0.114	23.5	0.354	-58.6	0.725	13.95
1.0	0.665	-170.5	2.557	76.9	0.113	23.4	0.337	-61.4	0.801	13.53
1.1	0.665	-175.6	2.336	73.1	0.113	23.4	0.327	-64.2	0.874	13.14
1.2	0.669	179.8	2.136	69.6	0.113	24.1	0.319	-67.1	0.947	12.77
1.3	0.674	176.3	1.977	66.4	0.112	24.9	0.317	-70.1	1.011	11.83
1.4	0.679	172.8	1.838	63.3	0.112	26.0	0.314	-73.0	1.069	10.53
1.5	0.682	169.8	1.718	60.2	0.112	27.4	0.317	-75.7	1.127	9.68
1.6	0.687	167.1	1.614	57.4	0.113	28.9	0.316	-78.6	1.182	8.98
1.7	0.691	164.8	1.515	54.8	0.113	30.5	0.322	-81.1	1.228	8.38
1.8	0.692	162.3	1.429	52.1	0.114	32.5	0.322	-83.7	1.292	7.73
1.9	0.692	159.8	1.358	49.8	0.116	34.3	0.329	-86.0	1.331	7.24
2.0	0.696	157.8	1.293	47.1	0.118	36.5	0.329	-88.4	1.359	6.82
2.1	0.700	155.7	1.241	45.2	0.120	38.6	0.336	-90.8	1.370	6.51
2.2	0.700	153.6	1.192	43.2	0.124	40.3	0.337	-93.3	1.393	6.11
2.3	0.702	151.4	1.142	41.4	0.128	42.1	0.343	-95.7	1.398	5.76
2.4	0.705	149.4	1.102	39.1	0.132	43.6	0.344	-98.2	1.385	5.50
2.5	0.707	147.2	1.059	37.3	0.137	45.2	0.349	-100.9	1.381	5.19
2.6	0.707	145.0	1.020	35.5	0.142	46.5	0.351	-103.7	1.397	4.81
2.7	0.702	142.9	0.983	33.7	0.149	47.1	0.356	-106.7	1.411	4.39
2.8	0.693	141.0	0.940	32.2	0.155	47.4	0.359	-109.5	1.463	3.80
2.9	0.670	139.1	0.892	30.3	0.162	46.6	0.363	-112.9	1.572	2.95
3.0	0.659	138.6	0.863	28.7	0.167	46.7	0.364	-116.6	1.631	2.48
4.0	0.738	119.1	0.672	13.4	0.241	49.2	0.446	-147.8	1.213	1.67
5.0	0.721	97.4	0.532	5.2	0.327	34.1	0.530	-173.0	1.241	-0.85

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	0.839	-49.3	14.693	150.4	0.042	64.2	0.885	-25.2	0.120	25.42
0.2	0.757	-85.8	11.472	129.2	0.065	49.6	0.693	-42.2	0.209	22.44
0.3	0.693	-112.1	8.902	115.3	0.077	40.4	0.546	-52.1	0.320	20.62
0.4	0.660	-129.8	7.140	105.2	0.083	35.6	0.442	-58.5	0.428	19.32
0.5	0.647	-142.7	5.913	98.0	0.088	33.3	0.373	-62.7	0.521	18.29
0.6	0.635	-153.2	5.021	92.3	0.090	32.3	0.320	-66.5	0.622	17.45
0.7	0.628	-161.1	4.354	87.4	0.093	32.0	0.285	-69.6	0.714	16.71
0.8	0.631	-167.8	3.829	83.3	0.095	32.4	0.257	-73.1	0.794	16.07
0.9	0.633	-173.4	3.406	79.4	0.097	32.9	0.240	-76.5	0.866	15.45
1.0	0.636	-178.1	3.072	75.9	0.099	34.0	0.227	-80.3	0.938	14.91
1.1	0.638	177.5	2.802	72.7	0.102	34.9	0.220	-83.8	0.997	14.41
1.2	0.644	173.5	2.557	69.7	0.104	36.0	0.214	-87.3	1.051	12.52
1.3	0.649	170.5	2.368	66.7	0.107	37.3	0.214	-90.4	1.094	11.61
1.4	0.653	167.6	2.200	64.0	0.110	38.4	0.214	-93.5	1.130	10.82
1.5	0.657	165.1	2.054	61.3	0.113	39.8	0.217	-96.0	1.166	10.14
1.6	0.661	162.7	1.932	58.8	0.116	40.8	0.217	-98.9	1.192	9.57
1.7	0.666	160.5	1.813	56.5	0.120	42.0	0.223	-100.9	1.212	9.03
1.8	0.665	158.5	1.712	54.1	0.123	43.3	0.224	-103.3	1.254	8.41
1.9	0.669	156.5	1.627	51.9	0.127	44.2	0.230	-104.9	1.257	8.01
2.0	0.671	154.5	1.551	49.4	0.132	45.4	0.231	-107.0	1.271	7.58
2.1	0.676	152.7	1.490	47.7	0.136	46.4	0.237	-108.9	1.259	7.32
2.2	0.673	150.8	1.424	45.7	0.141	46.9	0.238	-111.0	1.286	6.82
2.3	0.677	148.7	1.368	43.9	0.147	47.6	0.244	-112.8	1.274	6.55
2.4	0.679	146.7	1.319	41.9	0.153	48.0	0.245	-115.1	1.274	6.22
2.5	0.680	144.9	1.270	40.0	0.159	48.5	0.250	-117.3	1.267	5.91
2.6	0.680	142.9	1.223	38.4	0.164	48.7	0.252	-119.7	1.279	5.54
2.7	0.676	141.0	1.177	36.4	0.171	48.6	0.258	-122.6	1.291	5.14
2.8	0.667	138.9	1.130	35.0	0.177	48.1	0.262	-125.2	1.333	4.61
2.9	0.645	137.5	1.077	32.9	0.184	46.7	0.268	-128.4	1.411	3.87
3.0	0.632	137.1	1.039	31.5	0.187	46.4	0.272	-131.9	1.474	3.36
4.0	0.719	118.7	0.819	14.8	0.253	45.8	0.364	-158.3	1.162	2.66
5.0	0.706	97.8	0.630	3.7	0.326	31.6	0.459	-179.0	1.210	0.09

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	0.792	-58.7	18.513	145.7	0.039	62.2	0.837	-31.5	0.125	26.78
0.2	0.705	-97.3	13.582	123.9	0.058	47.3	0.614	-51.0	0.264	23.69
0.3	0.651	-122.9	10.160	110.6	0.067	40.3	0.465	-61.9	0.396	21.81
0.4	0.628	-139.5	7.999	101.8	0.072	37.5	0.367	-69.5	0.517	20.44
0.5	0.617	-150.9	6.578	95.1	0.076	36.8	0.303	-74.7	0.625	19.36
0.6	0.613	-160.0	5.548	90.1	0.080	37.0	0.257	-80.2	0.723	18.41
0.7	0.612	-167.1	4.775	85.7	0.083	37.7	0.227	-84.6	0.811	17.59
0.8	0.615	-173.4	4.203	82.0	0.086	38.9	0.205	-90.0	0.887	16.87
0.9	0.619	-178.3	3.730	78.5	0.090	39.8	0.192	-94.5	0.950	16.16
1.0	0.624	177.6	3.361	75.4	0.094	41.2	0.183	-99.6	1.003	15.19
1.1	0.626	173.7	3.058	72.4	0.098	42.1	0.179	-103.7	1.052	13.55
1.2	0.630	169.9	2.793	69.6	0.102	43.2	0.177	-107.7	1.094	12.49
1.3	0.637	167.3	2.582	66.9	0.106	44.3	0.178	-110.9	1.121	11.74
1.4	0.640	164.6	2.400	64.4	0.111	45.2	0.180	-114.2	1.147	11.03
1.5	0.646	162.2	2.239	61.9	0.115	46.3	0.183	-116.2	1.164	10.42
1.6	0.650	159.9	2.105	59.5	0.120	46.9	0.185	-119.0	1.182	9.87
1.7	0.655	158.2	1.977	57.4	0.125	47.6	0.190	-120.3	1.192	9.35
1.8	0.656	156.3	1.870	55.1	0.130	48.5	0.192	-122.5	1.211	8.82
1.9	0.658	154.1	1.774	52.9	0.135	48.9	0.197	-123.5	1.215	8.39
2.0	0.658	152.4	1.692	50.6	0.140	49.6	0.198	-125.4	1.229	7.93
2.1	0.664	150.8	1.622	49.0	0.146	49.9	0.203	-126.6	1.217	7.65
2.2	0.660	148.9	1.556	47.2	0.152	50.1	0.204	-128.6	1.235	7.20
2.3	0.665	147.1	1.494	45.4	0.158	50.2	0.209	-129.8	1.221	6.92
2.4	0.666	145.2	1.441	43.2	0.164	50.1	0.210	-131.8	1.218	6.61
2.5	0.666	143.1	1.389	41.5	0.171	50.1	0.215	-133.5	1.216	6.29
2.6	0.664	141.4	1.335	39.8	0.177	50.0	0.217	-135.7	1.231	5.87
2.7	0.660	139.7	1.288	38.0	0.183	49.4	0.223	-138.2	1.241	5.51
2.8	0.653	137.9	1.236	36.6	0.189	48.4	0.228	-140.5	1.275	5.01
2.9	0.630	136.6	1.177	34.8	0.196	46.8	0.235	-143.4	1.348	4.26
3.0	0.621	136.0	1.137	33.3	0.199	46.5	0.239	-146.6	1.393	3.83
4.0	0.702	118.3	0.897	16.5	0.262	44.1	0.333	-167.8	1.158	2.94
5.0	0.696	97.9	0.695	4.1	0.328	30.1	0.427	175.2	1.192	0.61

V_{CE} = 2 V, I_c = 10 mA, Z_o = 50 Ω

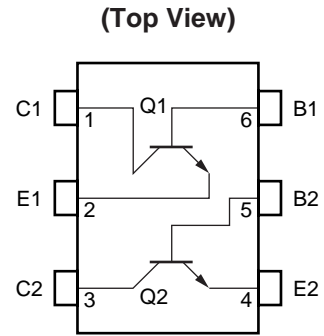
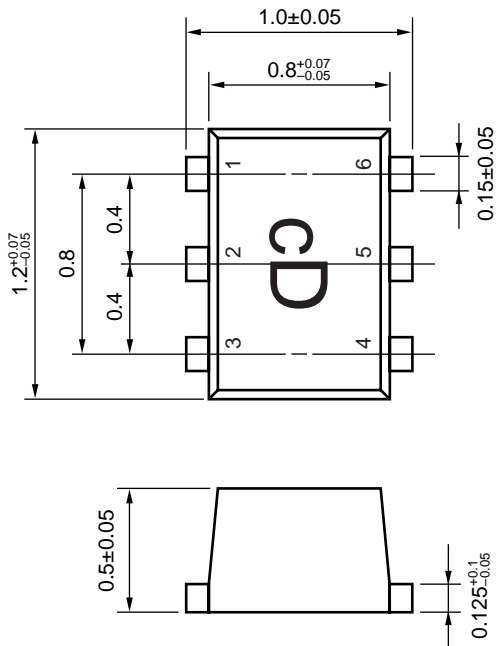
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.717	-69.5	22.966	139.9	0.035	56.5	0.774	-39.5	0.205	28.12
0.2	0.656	-110.4	15.675	118.4	0.050	46.1	0.530	-61.4	0.335	24.96
0.3	0.612	-134.4	11.341	106.3	0.057	41.8	0.388	-74.0	0.496	22.96
0.4	0.600	-148.9	8.789	98.4	0.062	40.9	0.303	-83.4	0.627	21.51
0.5	0.598	-158.6	7.159	92.6	0.067	41.6	0.250	-90.8	0.732	20.31
0.6	0.598	-166.9	6.019	88.1	0.071	43.1	0.214	-98.6	0.826	19.25
0.7	0.599	-173.0	5.167	84.1	0.076	44.4	0.191	-105.2	0.904	18.32
0.8	0.603	-178.3	4.533	80.9	0.081	45.9	0.177	-112.4	0.967	17.48
0.9	0.607	177.3	4.021	77.7	0.086	46.9	0.170	-118.3	1.014	15.96
1.0	0.612	173.6	3.623	74.8	0.091	48.2	0.167	-124.0	1.055	14.56
1.1	0.616	169.9	3.295	72.1	0.097	49.1	0.168	-128.3	1.087	13.53
1.2	0.623	166.7	3.007	69.6	0.102	49.9	0.169	-132.2	1.111	12.65
1.3	0.629	164.4	2.780	67.0	0.108	50.6	0.173	-134.8	1.126	11.97
1.4	0.632	161.7	2.583	64.7	0.113	51.2	0.176	-137.7	1.143	11.28
1.5	0.637	159.8	2.407	62.4	0.119	51.7	0.180	-139.1	1.153	10.68
1.6	0.640	157.7	2.265	60.1	0.125	52.0	0.183	-141.5	1.163	10.14
1.7	0.644	155.9	2.128	58.1	0.131	52.4	0.187	-142.1	1.168	9.63
1.8	0.645	154.2	2.012	56.0	0.136	52.6	0.189	-144.1	1.181	9.11
1.9	0.647	152.2	1.911	54.0	0.142	52.7	0.193	-144.4	1.185	8.68
2.0	0.648	150.7	1.822	51.8	0.149	52.8	0.194	-146.2	1.190	8.26
2.1	0.652	148.9	1.749	50.1	0.155	52.8	0.197	-146.9	1.182	7.95
2.2	0.651	147.3	1.675	48.5	0.161	52.5	0.198	-148.6	1.189	7.54
2.3	0.654	145.6	1.607	46.8	0.168	52.2	0.202	-149.5	1.183	7.22
2.4	0.653	143.6	1.554	44.6	0.175	51.8	0.202	-151.2	1.180	6.92
2.5	0.656	141.9	1.494	43.0	0.182	51.5	0.206	-152.6	1.174	6.61
2.6	0.651	140.1	1.439	41.2	0.188	50.9	0.208	-154.5	1.191	6.19
2.7	0.650	138.4	1.386	39.6	0.195	50.2	0.214	-156.4	1.197	5.84
2.8	0.641	136.7	1.332	38.3	0.200	49.0	0.220	-158.3	1.228	5.35
2.9	0.620	135.4	1.271	36.3	0.207	47.2	0.227	-160.4	1.289	4.66
3.0	0.610	135.1	1.227	34.9	0.210	46.7	0.233	-163.2	1.329	4.23
4.0	0.692	117.7	0.971	18.0	0.270	42.8	0.322	-178.6	1.138	3.30
5.0	0.686	97.8	0.755	5.3	0.331	28.6	0.408	168.2	1.180	1.01

V_{CE} = 2 V, I_c = 20 mA, Z_o = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.608	-95.8	30.772	128.9	0.029	50.8	0.637	-56.7	0.314	30.26
0.2	0.579	-133.1	18.610	109.3	0.037	48.6	0.398	-83.5	0.526	26.97
0.3	0.572	-152.2	12.924	99.9	0.043	48.6	0.293	-99.9	0.702	24.73
0.4	0.572	-163.4	9.847	93.5	0.050	50.9	0.240	-113.4	0.823	22.94
0.5	0.573	-170.4	7.946	88.8	0.056	53.0	0.211	-124.0	0.910	21.48
0.6	0.581	-176.7	6.645	85.2	0.063	55.1	0.199	-134.2	0.969	20.21
0.7	0.581	178.6	5.690	81.9	0.070	56.2	0.192	-141.6	1.021	18.21
0.8	0.590	174.4	4.978	79.0	0.077	57.2	0.192	-148.6	1.051	16.72
0.9	0.595	170.9	4.415	76.4	0.084	57.7	0.195	-153.1	1.075	15.54
1.0	0.601	167.8	3.962	74.0	0.091	58.3	0.201	-157.4	1.094	14.52
1.1	0.606	164.8	3.596	71.7	0.098	58.5	0.205	-160.0	1.108	13.64
1.2	0.612	162.3	3.289	69.3	0.106	58.6	0.211	-162.5	1.114	12.88
1.3	0.620	160.2	3.042	67.1	0.112	58.8	0.215	-163.9	1.117	12.26
1.4	0.622	157.9	2.825	65.0	0.119	58.6	0.220	-165.7	1.125	11.60
1.5	0.627	156.2	2.638	62.9	0.126	58.5	0.224	-166.6	1.125	11.05
1.6	0.631	154.5	2.479	60.9	0.133	58.2	0.228	-168.0	1.126	10.54
1.7	0.635	152.8	2.325	59.1	0.140	58.0	0.230	-168.5	1.130	10.01
1.8	0.634	150.8	2.201	57.1	0.147	57.7	0.233	-170.1	1.139	9.49
1.9	0.637	149.5	2.088	55.2	0.154	57.1	0.234	-170.2	1.138	9.07
2.0	0.635	147.9	1.990	53.3	0.161	56.8	0.235	-171.9	1.145	8.61
2.1	0.640	146.2	1.912	51.7	0.168	56.3	0.236	-172.4	1.135	8.34
2.2	0.638	144.8	1.833	50.1	0.175	55.5	0.236	-174.2	1.140	7.93
2.3	0.641	143.3	1.759	48.5	0.183	54.7	0.238	-174.8	1.133	7.62
2.4	0.641	141.6	1.698	46.5	0.190	53.9	0.239	-176.4	1.130	7.32
2.5	0.642	140.0	1.634	44.9	0.197	53.2	0.241	-177.4	1.129	6.99
2.6	0.641	138.3	1.574	43.4	0.204	52.3	0.243	-179.0	1.136	6.63
2.7	0.638	136.7	1.515	41.6	0.211	51.2	0.248	-179.7	1.145	6.25
2.8	0.630	135.0	1.458	40.3	0.216	49.7	0.253	178.3	1.169	5.80
2.9	0.606	133.8	1.390	38.5	0.222	47.8	0.261	177.4	1.221	5.13
3.0	0.599	133.6	1.345	37.3	0.225	47.1	0.266	175.0	1.249	4.76
4.0	0.677	116.9	1.067	20.8	0.285	41.2	0.340	165.7	1.116	3.66
5.0	0.673	97.5	0.832	7.7	0.338	26.5	0.411	156.7	1.162	1.47

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

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

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